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SUSTAINING INTANGIBLE CULTURAL HERITAGE AND SOCIAL IDENTITY IN EGYPT: EMPLOYING DIGITAL MEDIA BETWEEN REALITY AND EXPECTATION

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ABSTRACT

Digital media platforms have emerged as powerful tools for cultural preservation, offering interactive, instantaneous, and multimedia-rich capabilities for documenting and disseminating heritage. In Egypt, where intangible cultural heritage (ICH) faces challenges from globalization and socio-cultural transformations, official institutions such as the Center for Documentation of Cultural and Natural Heritage (CULTNAT) and the Supreme Council of Antiquities (SCA) have increasingly employed digital technologies for heritage documentation. However, a gap persists between the technological potential of these platforms and their actual utilization, as well as between institutional efforts and public engagement. This study investigates the role of digital media in sustaining Egypt's intangible cultural heritage and reinforcing social identity, examining the gap between current reality and future aspirations. Employing a mixed-methods approach combining content analysis of official heritage websites, a survey of 574 Egyptian citizens, and focus group discussions with digital heritage activists, the research addresses three main questions: (1) How are digital media currently employed by CULTNAT and the SCA for ICH documentation? (2) What are the public's attitudes toward and engagement with these digital heritage initiatives? (3) What is the gap between the current reality of digital heritage employment and the desired future state? Findings reveal that while CULTNAT demonstrates technological leadership in employing 3D digitization, augmented reality, and virtual reality applications, significant disparities exist between the two institutions' digital strategies. The survey results indicate that educational level significantly affects both awareness of heritage issues and participation in digital heritage initiatives, while social media platforms, particularly Facebook, serve as primary sources of heritage information for a substantial portion of respondents. Focus group discussions highlight a persistent reality-expectation gap: despite institutional technological capacity, public access, engagement, and identity outcomes remain limited. The study concludes with recommendations for bridging this gap, including establishing a unified national digital platform, developing interactive engagement mechanisms, and fostering collaboration between official institutions and civil initiatives to ensure the sustainability of Egypt's intangible cultural heritage and the reinforcement of its associated social identity.

KEYWORDS: Intangible Cultural Heritage, Digital Media, Social Identity, Heritage Documentation, Cultural Sustainability, Egypt, CULTNAT, Supreme Council of Antiquities, Reality-Expectation Gap.

1. INTRODUCTION

Digital media and social networking platforms have fundamentally transformed how cultural heritage is documented, preserved, and disseminated (UNESCO, 2025). In an era characterized by information explosion and rapid technological advancement, intangible cultural heritage (ICH)—embodying oral traditions, performing arts, social practices, rituals, and traditional craftsmanship—faces both unprecedented challenges and opportunities (Elrawy, 2025). While globalization and socio-economic changes threaten the continuity of heritage elements, digital technologies offer innovative solutions for safeguarding this heritage and transmitting it to future generations (Giglietto et al., 2019).

The relationship between digital media and cultural heritage preservation has garnered increasing scholarly attention over the past decade. Research has explored various dimensions of this relationship, including the use of artificial intelligence for heritage documentation (Shazly, 2025), the impact of user experience on heritage craft design (Saeed & Al Atrees, 2025), the role of digital technologies in heritage innovation (Ebraheem et al., 2025), and the potential of social media platforms for cultural communication (Giliberto & Labadi, 2022). Studies have also examined heritage documentation efforts in specific national contexts, such as China (Taha & Ragab, 2021), Morocco (Hassan, 2020), and Egypt (Hesham et al., 2023; Mohamed et al., 2025).

Despite this growing body of literature, a significant research gap remains. Most existing studies have either focused on technical aspects of digital heritage preservation (McKenna et al., 2025; Ebraheem et al., 2025) or examined specific heritage elements in isolation (Liang et al., 2021; Eladway et al., 2020). Few studies have comprehensively investigated how official cultural institutions employ digital media to sustain intangible cultural heritage while simultaneously reinforcing social identity, particularly in the Arab world. In the Egyptian context specifically, research examining the digital documentation efforts of key institutions such as the Center for Documentation of Cultural and Natural Heritage (CULTNAT) and the Supreme Council of Antiquities remains scarce (Hesham et al., 2023). Furthermore, studies exploring Egyptian public attitudes toward these digital heritage initiatives and their impact on social identity formation are virtually nonexistent.

This research gap is particularly problematic given Egypt's rich and diverse intangible cultural

heritage, which faces mounting pressures from globalization, urbanization, and socio-cultural transformations (UNESCO, 2003). The 2003 UNESCO Convention for the Safeguarding of Intangible Cultural Heritage emphasizes the crucial role of documentation and transmission in heritage preservation, yet the extent to which Egyptian institutions leverage digital media to fulfill this mandate remains underexplored. Moreover, the relationship between digital heritage documentation and the reinforcement of social identity—a core function of cultural heritage—has received insufficient scholarly attention (Hassan, 2020).

The present study addresses these gaps by investigating the following primary research question: "How can digital media be employed to achieve sustainability of intangible cultural heritage and enhance social identity in Egypt?" This main question branches into several sub-questions: (1) What is the current state of digital media employment in official Egyptian cultural institutions (CULTNAT and the Supreme Council of Antiquities)? (2) What are the mechanisms through which these institutions document and disseminate intangible cultural heritage via digital platforms? (3) How do Egyptian audiences perceive and interact with these digital heritage initiatives? (4) What obstacles hinder the optimal utilization of digital media for heritage preservation? (5) How can digital media employment be developed to ensure heritage sustainability and identity reinforcement?

To address these questions, the study adopts a mixed-methods approach, combining quantitative content analysis of official heritage websites, a survey questionnaire administered to a sample of the Egyptian public (N=574), and focus group discussions with digital heritage activists and professionals. This methodological triangulation enables comprehensive understanding of both institutional efforts and audience reception, while capturing the contextual nuances that shape digital heritage practices in Egypt.

The study is guided by Media Richness Theory (Trevino, Lengel, & Daft, 1987), which provides a robust analytical framework for examining how digital media characteristics—interactivity, immediacy, and multimedia integration—influence communication effectiveness regarding complex heritage issues and audience engagement. This theory is particularly relevant for understanding how Egyptian institutions can optimize their digital platforms to convey rich cultural content and foster meaningful audience interaction, ultimately contributing to heritage sustainability and identity

reinforcement.

The significance of this study is multifaceted. Theoretically, it addresses a notable gap in Arab academic literature concerning the in-depth examination of digital media's role in sustaining intangible cultural heritage and enhancing social identity. It contributes to enriching scholarship across intersecting fields: new media studies, heritage studies, and cultural studies. Practically, the study offers applied insights beneficial to decision-makers and heritage preservation institutions in developing their digital communication strategies. It also sheds light on the experiences of digital heritage activists—a relatively understudied group in Arab media research—and provides an analytical model that can guide similar studies on heritage in other Arab countries.

The study tests five main hypotheses derived from the theoretical framework and previous research:

- H1: There is a statistically significant relationship between the public's use of digital media and their awareness of Egyptian intangible cultural heritage.
- H2: There is a statistically significant relationship between digital media use and public participation in heritage protection efforts.
- H3: Attitudes of digital media workers toward employing these tools in heritage service differ according to demographic variables.
- H4: Technical and human obstacles hinder optimal digital media utilization for heritage preservation.
- H5: Social media platforms contribute more effectively than traditional media to creating heritage awareness and enhancing cultural identity among younger generations.

This study is structured into seven main sections. Following this introduction, Section Two presents a comprehensive literature review examining previous studies on digital media and intangible cultural heritage. Section Three elaborates the theoretical framework grounded in Media Richness Theory. Section Four details the research methodology, including study population, sampling procedures, data collection instruments, and validity and reliability measures. Section Five presents the analytical results of website content analysis and field study findings. Section Six discusses these results in light of the theoretical framework and previous studies. Finally, Section Seven offers conclusions, recommendations, and suggestions for future research.

By undertaking this comprehensive investigation,

the study aspires to bridge the knowledge gap regarding mechanisms for employing digital media in service of heritage and identity preservation, while contributing to the sustainability of Egypt's rich intangible cultural heritage and the reinforcement of its associated social identity.

2. LITERATURE REVIEW

2.1. *Intangible Cultural Heritage: Conceptual Foundations and Global Perspectives*

Intangible cultural heritage (ICH) encompasses the practices, representations, expressions, knowledge, and skills that communities recognize as part of their cultural heritage. As defined by UNESCO (2003), ICH includes oral traditions, performing arts, social practices, rituals, festive events, knowledge concerning nature and the universe, and traditional craftsmanship. This definition has shaped global discourse on heritage preservation, emphasizing the living and evolving nature of cultural expressions transmitted from generation to generation (Meissner, 2021, p. 23; Muñoz-Viñas, 2023).

The safeguarding of ICH has gained increasing scholarly attention over the past two decades, particularly as globalization threatens traditional practices while digital technologies offer new preservation possibilities. In this context, digital heritage represents not merely documentation but a fundamental transformation in how communities interact with their cultural inheritance (Chakrabarti & Chakrabarti, 2025). This perspective positions digital media as active agents in heritage transmission rather than passive storage mechanisms.

2.2. *Digital Technologies for Heritage Documentation and Preservation*

The application of digital technologies to cultural heritage preservation has evolved rapidly, encompassing diverse approaches ranging from three-dimensional digitization to artificial intelligence-driven documentation systems.

Baratin et al. (2023), in a systematic literature review published in *Heritage Science*, examined the potential of metaverse applications in digitalizing cultural heritage, including virtual reconstructions, educational outreach, global accessibility, and sustainability. Following PRISMA guidelines, their study investigated current practices and technologies in heritage preservation digitization, evaluating the impact of metaverse applications on public engagement and cultural education. The findings

provide valuable insights into developing innovative strategies for preserving cultural heritage in the digital age while highlighting best practices for optimizing immersive technologies in heritage contexts (Baratin et al., 2023, p.3).

Danesh & Rajabi (2022) offered a comprehensive literature review of 3D technologies for intangible cultural heritage preservation across major databases including Scopus, Web of Knowledge, and IEEE Xplore. Their analysis focused on three primary technological domains: motion capture, 3D modeling, and virtual/augmented reality. The review demonstrated how these technologies enable unprecedented documentation of embodied heritage practices, from traditional dances to craftsmanship techniques, while noting persistent challenges related to technological obsolescence and standardization (Danesh & Rajabi, 2022, p.8).

Džikić & Radin (2019) provided an overview of augmented reality applications in cultural heritage over the past decade, identifying key trends in user experience design, contextual information delivery, and visitor engagement. Their synthesis revealed that AR technologies have evolved from simple marker-based applications to sophisticated location-aware systems that layer historical information onto physical environments, transforming heritage sites into interactive learning spaces (Džikić & Radin, 2019, p.12).

Paschalidou (2021) critically examined terminologies and methodologies in virtual restoration and reconstruction, distinguishing between scientific visualization approaches and interpretive digital models. Their work highlighted the epistemological challenges inherent in representing fragmentary heritage materials, emphasizing the importance of transparency in documenting the interpretive decisions underlying digital reconstructions (Paschalidou, 2021, p.5).

In the Chinese context, Ji, Sangkatip, and Tirakoat (2026) conducted a narrative review examining digital popular science design applications for ICH protection and dissemination from 2021 to 2025. Employing Heeks's design-reality gap model, their research systematically investigated implementation gaps between design intentions and practical outcomes. The study identified challenges including information integrity issues, technological update costs, maintenance of cultural authenticity, and multi-stakeholder collaboration. Their proposed optimization strategies encompass technological standardization, deepened cultural integration, expanded dissemination channels, and improved training mechanisms (Ji et al., 2026, p.285).

Mendoza (2023) developed a web-based digital protection system for cultural heritage using ASP.NET programming with SQL database and B/S architecture. Applied to the cultural heritage of China's Tujia ethnic group, the system employed HSV algorithms for image feature extraction and quality enhancement, demonstrating the effectiveness of interactive, accessible digital platforms for heritage awareness and dissemination (Mendoza, 2023, p.15).

2.3. Social Media, Cultural Communication, and Identity Formation

A parallel stream of scholarship has examined how social media platforms reshape cultural communication practices and identity construction processes.

Nugraha et al. (2024) conducted a critical investigation of museums' Instagram practices, analyzing content from 11 global museums to assess social media utilization for cultural communication. Their findings revealed that museums remain underutilized platforms' interactive potentials, with most content limited to exhibition announcements rather than creating meaningful dialogic engagement with followers. The study highlighted the gap between the interactive affordances of social platforms and institutional communication strategies (Nugraha et al. (2024, p.78).

Elsayed (2021) explored the role of social media in maintaining cultural identity through a qualitative literature review approach. Their synthesis identified the importance of local community collaboration and participation in online communities for cultural heritage preservation efforts. The results demonstrated that social media provides platforms for individuals and communities to confirm, express, and celebrate their cultural identity, while also noting challenges including identity commodification and misinformation spread. The study emphasized the need for careful, critical approaches to social media utilization for cultural identity strengthening (Elsayed, 2021), p.45).

Cianfanelli (2024) provided a comprehensive review of research on information and communication technologies (ICT) and social media in cultural heritage sustainability. Analyzing the dual role of these media as digital archives and interactive platforms, their study discussed how these tools can enhance community participation, reproduce cultural meaning, and create new forms of heritage expression. The review emphasized the necessity of novel theoretical and methodological frameworks for understanding these complex

relationships (Cianfanelli, 2024, p.92).

Kianpour (2025) examined the role of social media in shaping identity and cultural narratives within Canadian and global contexts through a scoping review and meta-analysis of studies from 2014 to 2024 across diaspora studies, sociology, and literary studies. The findings highlighted three key areas: the dual nature of social media in facilitating community-building while spreading misinformation; identity formation through personal storytelling that commodifies narratives; and the role of advanced digital technologies in preserving and transforming cultural heritage while risking homogenization through profit-driven algorithms. The study proposed a new analytical framework for examining diasporic identity and collective memory in relation to social media narratives (Kianpour, 2025, p.112).

Park (2020) argues that in the network society, identity becomes a primary source of meaning for individuals navigating globalized digital spaces. His distinction between legitimizing, resistance, and project identities provides a useful framework for understanding how engagement with digital heritage can reinforce or transform social identities (Park, 2020, p.45).

Giddens, A. (2023) concept of self-identity in late modernity suggests that individuals actively construct their identities through narrative engagement with cultural resources. Digital heritage platforms provide rich resources for such identity work, enabling individuals to weave traditional narratives into contemporary self-understandings (Giddens, 2023, p.78).

In the Egyptian context, Ezzat (2020) examined the relationship between digital media and national identity formation among youth, finding that engagement with cultural content online significantly influences belonging and citizenship perceptions. This underscores the importance of investigating how digital heritage initiatives specifically contribute to social identity reinforcement in Egypt.

Laba et al. (2025) and Kasianenko (2025) examined how social media transforms collective memory, tracing theoretical reconceptualizations from collective memory to concepts such as "connective memory" and the "memory of the multitude." Their analysis demonstrated how platformization reshapes processes of remembering and forgetting through algorithmic curation, identifying emerging mnemonic practices including hashtag commemoration, memetic memory, and digital memory activism. The review also highlighted key

challenges, such as methodological limitations, Western-centric bias, and the emergence of artificial intelligence as memory agents (Laba et al., 2025; Kasianenko, 2025).

2.4. Digital Heritage in the Egyptian Context

Some studies have specifically examined digital heritage documentation efforts in Egypt, providing important context for the present research.

The Grand Egyptian Museum (GEM) Project: Studies by El Azazy (2025) and Ezzat (2015) examining efforts to create and sustain digital transformation of museum collections found that Egyptian cultural materials are spread across hundreds of museums throughout Egypt, making digitization a common challenge. Digital sustainability and digitization in Egyptian museums are constrained by limited knowledge capacity, fundraising resources, and ICT infrastructure. The GEM has addressed these challenges through interdisciplinary collaborative planning, management, digitization, and digital presentation of collections (El Azazy, 2025, p.140; Ezzat, 2015, p.212). The museum's anticipated opening represents the realization of these digital ambitions, establishing an institution where, according to director general Tarek Tawfik, "All means of modern technology have been taken into consideration in order to make this an unforgettable experience for the visitor, but at the same time provide the best possible environment for the artifacts" (as cited in Montanez, 2023). Upon completion, the GEM will utilize this technological infrastructure to house over 100,000 artifacts, including the complete King Tutankhamun collection displayed together for the first time within a technologically advanced environment spanning more than 5.2 million square feet (Montanez, 2023).

The "Eternal Egypt" Project: Developed through partnership between CULTNAT, the Supreme Council of Antiquities, and IBM, this landmark initiative in Egyptian digital heritage includes high-resolution images, three-dimensional reconstructions of Egyptian monuments and antiquities, virtually-reconstructed environments, and panoramic views captured by robotic cameras from locations spanning Karnak Temple to Old Cairo streets. The website, available in Arabic, English, and French, won several international awards including the Cultural E-Content Award at the World Summit for Information Society and the Best Internet Site Design Award for 2005 (Giglietto, Lazem, & Preston, 2019, p.33; Tamborrino & Wendrich, 2017, p.170).

The "Egypt Memory" Platform: This e-commerce platform was launched to provide researchers,

students, and heritage enthusiasts worldwide access to academic materials related to Egyptian history and society across Pharaonic, Roman, Coptic, and Islamic eras. The platform offers publications including the "Atlas of Archeological Sites," "Guide to the Plants of Ancient Egypt," "Encyclopedia of Great Arab Music Figures," and "Thesaurus of Egyptian Folklore," demonstrating CULTNAT's comprehensive approach to heritage documentation and dissemination (Giglietto, Lazem, & Preston, 2019, p.35; Tamborrino & Wendrich, 2017, p.175).

Younis et al. (2025) examined the role of digital media in documenting cultural heritage in Egyptian governorates, employing media survey methodology to monitor official and civil society efforts utilizing social media platforms and websites for tangible and intangible heritage documentation. The study revealed disparities in these efforts and recommended establishing a unified digital platform comprising an integrated archive of Egyptian heritage with emphasis on content quality and appeal (Younis et al., 2025, p.105).

Abouelmagd & Elrawy (2022) investigated Egyptian culture's role in sustaining folk heritage through social media platforms, seeking to understand how these platforms shape public awareness of heritage importance and issues. Employing critical discourse analysis methodology on specialized page content, the findings revealed active virtual communities contributing to heritage reproduction and circulation, while facing challenges related to scientific accuracy and methodological documentation. The study recommended concerted efforts from academic and media institutions to present reliable, engaging heritage content (Abouelmagd & Elrawy, 2022, p.89).

Lucarelli, Roberson, and Vinson (2023) edited a significant volume on "Ancient Egypt, New Technology" emerging from an international conference held at Indiana University in 2019, bringing together Egyptologists and digital humanists. The collection presents current projects in 3D modeling, virtual and augmented reality, game technology, digital pedagogy, database projects, computational linguistics, and electronic publications. Topics include photogrammetry applications in Alexandria, digital Rosetta Stone projects, VR investigations of sacred space in Memphis, and 3D documentation of Saqqara shafts, demonstrating the breadth of digital approaches to Egyptian heritage (Lucarelli et al., 2023, p.5). The international scope of these digital approaches is further reflected in work by Tamborrino and Wendrich (2017), who examined the application of

digital technologies for conservation in the context of the Nubian temples, linking Egyptian heritage practices to broader global conversations about the future of conservation.

Looking toward emerging trends, Mohamed, Said, and Adel El Sayed (2025) explore how heritage sites in the digital age can create new pathways to sustain cultural identity, a theme that connects directly to the concerns of public engagement and identity outcomes raised in the present study.

These Egyptian initiatives demonstrate significant institutional commitment to digital heritage documentation. However, they also reveal a consistent pattern: while technological capacity exists, systematic investigation of public engagement and identity outcomes remains limited—a gap the present study directly addresses.

2.5. Theoretical Frameworks in Digital Heritage Research

The theoretical underpinnings of digital heritage research draw from diverse disciplinary traditions. This section provides a comprehensive examination of the key theoretical frameworks that inform the present study, namely Media Richness Theory, Heeks's Design–Reality Gap Model, and concepts from digital memory studies. The section concludes with a proposed analytical model that synthesizes these frameworks for application in the Egyptian context.

2.5.1. Media Richness Theory

Media Richness Theory, developed by Daft and Lengel (1986), is one of the most influential theories in the field of organizational communication. The theory focuses on the capacity of different communication media to convey information, reduce ambiguity, and resolve multiple-interpretation problems (Daft & Lengel, 1986, p. 554).

2.5.2. Core Principles of the Theory

The theory posits that communication media vary in their degree of "richness" based on four primary criteria:

- **First: Immediate Feedback:** The capacity of the medium to provide quick and direct response between sender and receiver. The faster the feedback, the richer the medium. Face-to-face communication provides immediate feedback, while written text messages lack this characteristic (Daft & Lengel, 1986, p. 560).
- **Second: Multiple Cues:** The medium's ability to convey multiple signals simultaneously, such as voice tone, body language, facial

expressions, images, and graphics. The more cues a medium can transmit, the richer it is (Trevino, Lengel, & Daft, 1987, p. 78).

- Third: Language Variety: The extent to which the medium can employ natural and flexible language to convey complex and nuanced meanings. Rich media allow the use of everyday language and metaphorical expressions, while lean media are limited to formal, standardized language (Daft, Lengel, & Trevino, 1987, p. 358).
- Fourth: Personal Focus: The medium's capacity to tailor messages to fit the individual needs and circumstances of the receiver. Rich media enable a high degree of personalization, while mass media lack this characteristic (Lengel & Daft, 1988, p. 226).

2.5.3. Media Richness Hierarchy

Based on these four criteria, media can be classified according to a hierarchical ladder of richness, with the richest media at the top and the leanest at the bottom:

Richness Level	Medium Type	Examples
Highest Richness	Face-to-face communication	Meetings, lectures, direct dialogue
High Richness	Audio-visual media	Video conferences, live streaming
Medium Richness	Audio-only media	Phone calls, voice messages
Low Richness	Text-based media	Email, written reports
Lowest Richness	Standardized digital media	Newsletters, public announcements

Source: Adapted from Daft & Lengel (1986, p. 562).

2.5.4 The Matching Principle

The matching principle is the cornerstone of Media Richness Theory. It states that communication effectiveness is achieved when there is a "match" or "fit" between the richness of the medium used and the equivocality and complexity of the communication task (Daft & Lengel, 1986, p. 565). The more ambiguous and complex the task, the richer the communication medium required. Conversely, simple and clear tasks can suffice with leaner media such as written memos or emails (Trevino, Daft, & Lengel, 1990, p. 156).

2.5.5. Evolution of the Theory in the Digital Age

With the emergence of digital media and social networking platforms, Media Richness Theory has undergone important developments to keep pace with technological advancements. Ishii, Lyons, and Carr (2019) evaluated the theory in the context of

contemporary digital communication and found that modern digital platforms challenge the traditional classification of media, as they combine multiple characteristics that were previously separate. Platforms such as YouTube and Facebook combine text, audio, image, video, and instant interaction, making them extremely rich media (Ishii et al., 2019, p. 125).

2.5.6. Applications of the Theory in Cultural Heritage Context

Recent years have witnessed multiple applications of Media Richness Theory in the field of cultural heritage. Liang, Lu, and Martin (2021) applied the theory in studying the role of social media in cultural heritage sustainability. Their results showed that rich digital platforms (combining text, image, and video) achieve deeper interaction with audiences compared to traditional websites, and contribute to creating new cultural meaning and engaging communities in heritage production processes (Liang et al., 2021, p. 95).

Mylona et al. (2024) used the theory to analyze museum practices on social media, examining the pre- and post-COVID-19 landscape of archaeological museums in Greece. Their findings highlighted how museums employing rich media capabilities achieved greater audience engagement (Mylona et al., 2024, p. 201).

Boboc et al. (2022) studied augmented reality applications in cultural heritage from a Media Richness Theory perspective. Their results showed that AR technologies represent extremely rich media, integrating digital information with the physical environment, providing immediate feedback, and offering immersive interactive experiences that enhance visitor understanding of heritage (Boboc et al., 2022, p. 15).

In heritage contexts, Media Richness Theory provides analytical frameworks for understanding how digital platforms can effectively convey complex cultural information. Rich media combining text, image, video, and interactive elements enable a more nuanced communication of heritage meanings than text-only documentation. This theoretical lens is particularly relevant for examining how institutional websites and social media platforms balance information provision with audience engagement (Vala, Moosavi, & Baghiabadi, 2022, p. 95).

2.5.7. Critique of the Theory and Its Limitations

Despite its importance, Media Richness Theory has faced some criticism. Ngwenyama and Lee (1997) criticized the theory's focus on objective

characteristics of media at the expense of social and cultural factors that influence media choice and use. They proposed integrating the theory with a socio-cultural perspective that considers context and shared meaning between communicators (Ngwenyama & Lee, 1997, p. 150).

Dennis and Kinney (1998) pointed out that the matching principle may not always apply in certain contexts, especially with the evolution of digital media that combine multiple characteristics. They suggested developing the theory to accommodate the complexities of contemporary digital communication (Dennis & Kinney, 1998, p. 270).

Carlson and Zmud (1999) introduced the concept of "Channel Expansion Theory" as an extension of Media Richness Theory, suggesting that individuals' prior experiences with a particular medium affect their perception of its richness. The more experience an individual has with a medium, the greater their perception of its richness and their ability to effectively employ its capabilities (Carlson & Zmud, 1999, p. 160).

2.5.8. Appropriateness of the Theory for the Current Study

Media Richness Theory is considered an appropriate theoretical framework for this study for the following reasons:

First: Analyzing Digital Media Characteristics

The theory provides analytical tools for understanding the characteristics of digital media used by official institutions in Egypt (CULTNAT and the Supreme Council of Antiquities) to document and disseminate intangible cultural heritage. It helps assess the extent to which these institutions benefit from the rich capabilities of digital media (video, interaction, personalization) in conveying heritage messages to the public.

Second: Understanding Audience Interaction

The theory helps analyze how the Egyptian public interacts with heritage content presented through different digital media. It enables examination of whether this interaction is affected by the degree of "richness" of the medium used, and whether richer media achieve higher levels of awareness and participation.

Third: Explaining the Reality-Expectation Gap

The theory provides an interpretive framework for the gap between the current reality of digital media employment (what institutions actually do) and the desired future state (what could theoretically be achieved). It helps determine whether institutions optimally employ the rich capabilities of digital media, or whether they settle for limited uses that do

not achieve the desired effectiveness.

Fourth: Linking Heritage to Social Identity

The theory helps understand how rich digital media contribute to enhancing social identity associated with heritage. Rich media (such as video and virtual reality) enable deeper emotional and interactive experiences, enhancing feelings of belonging and connection to heritage.

2.5.9. Heeks's Design-Reality Gap Model

While Media Richness Theory focuses on communication effectiveness, understanding the successful implementation of digital heritage projects requires additional analytical tools. Heeks's Design-Reality Gap Model, as examined by Ayoung and Abbott (2021) and Kanya and Good (2013), offers complementary analytical tools for understanding implementation challenges in digital heritage projects. The model conceptualizes gaps between system design assumptions and on-the-ground realities across seven dimensions: information, technology, processes, objectives and values, staffing and skills, management systems and structures, and other resources (Ayoung & Abbott, 2021, p. 72; Kanya & Good, 2013, p. 4).

This framework is particularly valuable for diagnosing why some digital heritage initiatives succeed while others fall short of their objectives. In the Egyptian context, where institutions like CULTNAT and the Supreme Council of Antiquities undertake large-scale digitization projects, the model provides a systematic approach to identifying potential barriers to successful implementation.

2.5.10. Digital Memory Studies

Beyond communication effectiveness and implementation challenges, understanding how heritage is represented and negotiated in digital spaces requires engagement with digital memory studies. Concepts from this field, including "connective memory" and "platform affordances," provide additional theoretical resources for understanding how social media platforms actively shape heritage narratives rather than neutrally transmitting them.

As Makhortykh (2023) argues, contemporary digital memory studies have moved beyond user-centric approaches to recognize how platform architectures and algorithms influence the remembrance and representation of the past (Makhortykh, 2023, p. 1505). Annabell (2023) further demonstrates through empirical research how performances of digital memory work on social media platforms are shaped by both user agency and

platform constraints, revealing the complex interplay between individual and technological factors in heritage narration (Annabell, 2023, p. 45).

These insights are particularly relevant for examining how Egyptian cultural heritage is represented, circulated, and negotiated across platforms such as Facebook, YouTube, and Instagram, where institutional content intersects with user-generated narratives and algorithmic curation.

2.5.11. Proposed Analytical Model for the Study

Based on Media Richness Theory, and informed by the complementary frameworks of Heeks's Design-Reality Gap Model and digital memory studies, the study proposes an analytical model combining the theory's variables with field study variables:

Richness Level	Media Characteristics	Application in Egyptian Heritage	Measured Indicators
High Richness	Video + Interaction + Personalization	Virtual tours, AR, VR, live streaming	High interaction, participation, deep awareness
Medium Richness	Images + Text + Links	Photo galleries, articles, posts	Medium interaction, likes, limited sharing
Low Richness	Text only	Written reports, official data	Passive viewing, limited interaction

Source: Prepared by the researcher

This model will guide the empirical investigation by providing a framework for categorizing and analyzing the digital heritage communication practices of Egyptian institutions and their reception by audiences. The three levels of richness correspond to different communication strategies and anticipated outcomes, enabling systematic assessment of how media characteristics influence heritage engagement.

2.6. Identification of Research Gaps

Synthesis of the existing literature reveals several significant gaps that the present study addresses, including:

First, while there is a growing body of international research on digital heritage technologies (Mendoza et al., 2023; Danesh & Rajabi, 2022; Džikić & Radin, 2019), and some studies have focused on specific Egyptian heritage elements or technical applications (Giglietto, Lazem, & Preston, 2019; El Azazy, 2025), few studies have comprehensively investigated how official cultural institutions employ digital media to sustain intangible cultural heritage while simultaneously reinforcing social identity.

Second, although scholarship on social media, cultural identity, and collective memory has developed internationally (Kianpour et al., 2025; Laba et al., 2025; Makhortykh, 2023; Annabell, 2023), studies examining the intersection of institutional digital heritage efforts and public reception within the Egyptian context remain scarce. Understanding both the production and reception of digital heritage content is essential for developing effective preservation strategies.

Third, the reality-expectation gap in Egyptian digital heritage manifests in several dimensions: while institutions like CULTNAT employ advanced technologies for documentation (El Azazy, 2025; Giglietto, Lazem, & Preston, 2019), public access, engagement, and identity outcomes remain limited. This gap between institutional technological capacity and realized public benefit represents a central tension in Egyptian digital heritage.

Fourth, studies exploring Egyptian public attitudes toward digital heritage initiatives and their impact on social identity formation are virtually nonexistent. While researchers have examined institutional documentation efforts (El Azazy, 2025; Younis et al., 2025), heritage communities (Abouelmagd & Elrawy, 2022), and online identity among Egyptian youth (Ezzat, H., 2020), systematic investigation of broader public engagement with official digital heritage platforms remains an open research frontier.

Fifth, theoretical integration in digital heritage research remains underdeveloped. While Media Richness Theory offers promising analytical tools for understanding platform effectiveness (Trevino et al., 1987; Daft & Lengel, 1986; Ishii et al., 2019; Vala et al., 2022), its application in heritage contexts has been relatively limited. Similarly, concepts from digital memory studies (Makhortykh, 2023; Annabell, 2023; Laba et al., 2025) have not been systematically applied to institutional heritage documentation in the Egyptian or Arab context.

Sixth, methodological approaches in the field have tended toward either technical demonstration projects or qualitative case studies. Mixed-methods research combining systematic content analysis, survey methods with broad samples, and qualitative inquiry remains relatively rare, limiting comprehensive understanding of digital heritage phenomena.

Seventh, Egypt's selection as the focus of this study is neither arbitrary nor merely convenient; it is deliberate and strategic. As a nation possessing one of the world's oldest, richest, and most diverse cultural repertoires—encompassing Pharaonic,

Coptic, and Islamic heritage—Egypt occupies a central position in global heritage discourse. Its intangible cultural heritage, from the epic of the Bani Hilal to traditional craftsmanship in Old Cairo, is recognized by UNESCO as part of humanity's collective legacy. Consequently, investigating how digital media are employed to sustain this heritage and reinforce social identity within Egypt offers insights that extend far beyond its borders. The challenges and opportunities encountered in the Egyptian context—balancing technological innovation with cultural authenticity, bridging institutional efforts with public engagement, and navigating the digital divide—are emblematic of broader debates facing heritage-rich nations across the Global South. Thus, Egypt serves not only as a case study but as a valuable lens through which to examine the global challenges of digital heritage preservation in the twenty-first century.

2.7. The Present Study's Contribution

The present study addresses these gaps through comprehensive investigation of how digital media can be employed to sustain intangible cultural heritage and enhance social identity in Egypt. By examining both CULTNAT and the Supreme Council of Antiquities as complementary official institutions, the research provides systematic analysis of institutional digital heritage efforts, building upon foundational work by Giglito, Lazem, and Preston (2019), El Azazy (2025), and Younis et al. (2025). The mixed-methods design, combining content analysis, a survey of 574 Egyptian citizens, and focus group discussions with digital heritage activists, enables triangulation of findings across methodological approaches. Application of Media Richness Theory (Trevino, Lengel, & Daft, 1987; Ishii et al., 2019) provides theoretical grounding for analyzing platform effectiveness, while engagement with digital memory studies literature (Makhortykh, 2023; Annabell, 2023) situates the research within broader scholarly conversations about media, memory, and identity. The study also responds to calls for understanding the reality-expectation gap in digital heritage implementation, a concept informed by the Design-Reality Gap Model (Ayoung & Abbott, 2021; Kanya & Good, 2013). In doing so, it contributes both theoretically and empirically to the fields of digital heritage, cultural studies, and new media research in the Arab world.

3. STUDY MATERIALS AND METHODS

3.1. Research Design

This study adopts a mixed-methods approach

(Creswell & Clark, 2023), combining quantitative and qualitative methods to achieve a comprehensive and in-depth understanding of the phenomenon of employing digital media in sustaining intangible cultural heritage in Egypt. This approach enables the researcher to leverage the advantages of both paradigms: the quantitative component provides generalizability of findings and hypothesis testing, while the qualitative component offers rich understanding of the phenomenon's contexts, details, and interpretations from the perspective of the actors themselves (practitioners and experts). The mixed-methods design is particularly appropriate for this study as it allows for triangulation of findings across multiple data sources, enhancing the validity and reliability of the results.

3.2. Scope and Limitations of the Study

The study is delimited to analyzing the role of digital media in sustaining intangible cultural heritage in Egypt, with a focus on a sample of Egyptian governorates. The research was conducted during the specific time period allocated for the field study, with quantitative data collection completed between July 2025 and December 2025, and qualitative data collection (in-depth interviews and focus group discussions) conducted between January 2025 and January 2026. Geographically, the study focuses on Egypt, while thematically, it concentrates on intangible cultural heritage and its documentation through digital media platforms.

Several limitations should be acknowledged. First, the geographical scope is limited to Egypt, which may restrict the generalizability of findings to other Arab or international contexts. Second, the study focuses specifically on intangible cultural heritage, excluding tangible heritage such as monuments and archaeological sites. Third, the time constraints of the field study may not capture long-term changes in public engagement or institutional practices. Fourth, reliance on self-reported data in the survey may introduce response bias. Despite these limitations, the study provides valuable insights into the underexplored intersection of digital media, intangible cultural heritage, and social identity in the Egyptian context.

3.3. Study Population

The study population consists of three main categories:

1. Experts and Academics: Specialists in the fields of media, heritage, and cultural studies, possessing theoretical and practical knowledge of digital heritage documentation.

2. **Officials and Planners:** Individuals responsible for managing heritage files in institutions such as the Center for Documentation of Cultural and Natural Heritage (CULTNAT), the Ministry of Tourism and Antiquities, and the Supreme Council of Culture.

3. **Digital Activists and Content Creators:** Individuals interested in disseminating Egyptian intangible heritage through social media platforms, including independent activists and administrators of heritage-focused pages and groups.

3.4. Data Collection Tools

Data were collected using the following methods:

3.4.1. In-depth Interviews

Semi-structured in-depth interviews were conducted with a number of experts and officials in the fields of heritage and digital media to explore their visions and experiences regarding the reality, challenges, and mechanisms of employing digital media in this field. Each interview lasted between 45-60 minutes and was audio-recorded with participants' consent for subsequent transcription and analysis. The interview guide covered topics such as institutional strategies for digital documentation, challenges faced, and future aspirations for digital heritage preservation.

3.4.2 Questionnaire Survey

A questionnaire was administered to a sample of the general public to measure their exposure to and use of digital media in following heritage issues, as well as their attitudes toward digital heritage documentation efforts. The questionnaire included sections on demographic characteristics, patterns of digital media use for heritage content, awareness of heritage issues, participation in heritage preservation efforts, and attitudes toward official heritage documentation platforms.

Sample Size and Response Rate:

Distributed Questionnaires	Retrieved Questionnaires	Invalid for Analysis	Valid for Analysis
650	597	23	574

The sample size of 650 individuals was determined based on statistical considerations for representativeness. Of these, 597 questionnaires were retrieved (91.8% response rate). After data cleaning, 23 questionnaires were excluded due to incomplete data or lack of seriousness in responses, resulting in 574 valid questionnaires for statistical analysis (88.3% of the distributed sample).

To ensure the sample's representativeness of the original population, established guidelines for

sample size determination in mixed methods research were followed (Creswell & Plano Clark, 2023). Results indicated that the achieved sample size (574) meets the requirements for statistical analysis and adequately represents the population, with a margin of error not exceeding 4%, which is excellent in social research.

3.4.3 Focus Group Discussions

Two focus group sessions were conducted with a purposive sample of digital activists and individuals interested in Egyptian intangible heritage. Each session lasted approximately 90 minutes and included 10 participants. The discussions aimed to explore in depth their experiences, challenges, and visions regarding the role of digital media in heritage documentation and sustainability. Sessions were recorded with participants' consent and transcribed verbatim for thematic analysis.

3.5. Study Samples

3.5.1. Analytical Study Sample

The analytical study sample consisted of two components:

1. **Digital Content:** A sample of content published on social media platforms affiliated with CULTNAT, the Ministry of Tourism and Antiquities, and the Supreme Council of Culture was analyzed. The analysis focused on the nature of content, interactive features, technological capabilities, and communicative strategies employed, following established approaches for digital content analysis in heritage contexts (Mylona et al., 2024; Liang, Lu, & Martin, 2021).

2. **Institutional Case Study:** Selected active institutions in the field of digital documentation of Egyptian heritage were examined as case studies, including CULTNAT and the Supreme Council of Antiquities.

3.5.2. Field Study Sample

A simple random sample of followers of Egyptian heritage pages on social media platforms was selected, consisting of 650 individuals from various Egyptian governorates, yielding 574 valid responses for analysis. This sampling method ensures diversity in geographic representation and reduces selection bias.

3.6 Time Frame

Phase	Duration
Field study implementation and quantitative data collection (questionnaire)	July 2025 - December 2025
Focus group discussions and in-depth interviews	January 2025 - January 2026

3.7. Validity and Reliability

3.7.1 Validity of the Questionnaire

Content validity of the questionnaire was ensured by presenting it to a panel of expert reviewers specializing in media, heritage, and cultural studies. The reviewers assessed the appropriateness, clarity, and comprehensiveness of the questions in relation to the study variables. Modifications were made to the wording based on their valuable feedback and observations. The final version of the questionnaire incorporated all recommended changes to enhance its validity.

3.7.2 Reliability of the Questionnaire

Reliability was assessed using two methods:

Cronbach's Alpha Coefficient: The overall Cronbach's alpha value reached (0.91), which is a high value indicating a strong degree of reliability and internal consistency among the questionnaire items.

Test-Retest Method: The test-retest method was applied to a small pilot sample with a two-week interval between administrations. Results showed a high correlation coefficient, confirming the stability and reliability of the instrument over time.

3.8. Statistical Analysis Methods

Quantitative data were processed using the Statistical Package for Social Sciences (SPSS). A set of appropriate statistical methods were employed based on the nature of the data and the study's objectives, including:

1. Frequencies and percentages for describing sample characteristics and responses.
2. One Sample T-Test for comparing means.
3. Independent Samples T-Test for comparing means between two independent groups.
4. One-Way ANOVA (Analysis of Variance) for comparing means among more than two groups.
5. Pearson correlation coefficient for examining relationships between variables.
6. Multiple regression analysis for predicting dependent variables from independent variables.

3.9. Qualitative Data Analysis

Qualitative data derived from in-depth interviews and focus group discussions were analyzed using thematic analysis (Braun & Clarke, 2006). The analysis process involved:

1. Familiarization with the data: Transcribing recordings and reading transcripts multiple times to gain an overall sense of the content.
2. Generating initial codes: Systematically

coding interesting features across the entire dataset.

3. Searching for themes: Collating codes into potential themes and gathering all data relevant to each potential theme.

4. Reviewing themes: Checking if themes work in relation to the coded extracts and the entire dataset.

5. Defining and naming themes: Refining the specifics of each theme and generating clear definitions and names.

6. Producing the report: Selecting vivid, compelling extract examples and relating the analysis back to the research questions and literature.

This systematic approach ensured rigor and transparency in the qualitative analysis process, enhancing the trustworthiness of the findings.

3.10 Ethical Considerations

This study adhered to established ethical guidelines for research involving human participants. All participants were informed about the purpose of the study, the voluntary nature of their participation, and their right to withdraw at any time without consequences. Informed consent was obtained from all interview and focus group participants prior to data collection. Questionnaire respondents were assured of their anonymity and the confidentiality of their responses. Data were stored securely and accessed only by the research team for analytical purposes.

4. RESULTS AND DISCUSSION

4.1 Content Analysis of Official Heritage Websites

This section presents the findings from the content analysis of two official Egyptian heritage websites: the Center for Documentation of Cultural and Natural Heritage (CULTNAT) and the Supreme Council of Antiquities (SCA). The analysis focused on evaluating the effectiveness of these platforms in documenting and disseminating intangible cultural heritage, examining their interactive features, technological capabilities, and communicative strategies through the lens of Media Richness Theory (Daft & Lengel, 1986).

Table 1: Characterization of Heritage Websites' Interface Content.

Item	Status	Available Separately via Dedicated Icon	Available Clearly but Not Separately
Website communication icon	Yes	Available	Available

Employing information technologies for digital documentation	Yes	Available	Available
Media center (news, press releases)	No	Not available	Not available

Source: Prepared by the researcher based on website content analysis.

Table (1) reveals the reality and effectiveness of intangible cultural heritage documentation mechanisms across the two official websites. The analysis demonstrates variation in the employment of digital tools. While communication icons and documentation mechanisms using information technologies are available, the absence of an integrated "Media Center" dedicated to publishing news and press releases indicates a deficiency in utilizing both websites as interactive media platforms. From the perspective of Media Richness Theory, this absence limits the websites' capacity for immediate feedback and personalized communication, reducing their overall media richness and potentially hindering their ability to create meaningful dialogue with the public about heritage issues. This finding aligns with Mylona et al.

Table (3): Social Media Followership of the Websites.

Website	Platform	Subscription and Followership
Center for Documentation of Cultural and Natural Heritage (CULTNAT)	Facebook	65,000 followers - 62,000 likes
	X (formerly Twitter)	2,500 followers
	YouTube	8,500 subscribers - 415,000 views
	Instagram	2,200 followers
Supreme Council of Antiquities	Facebook	4,800 followers

Source: Prepared by the researcher based on social media platform data (accessed December 2025)

Table (3) reveals significant variation in social media engagement between the two institutions. CULTNAT's Facebook page enjoys a substantial audience (65,000 followers), indicating remarkable success in reaching the public and building a virtual community interested in heritage. Its YouTube channel also attracts high viewership (415,000 views) despite the moderate number of subscribers (8,500), reflecting the strong appeal of the visual content presented. CULTNAT has also demonstrated growth on other platforms, with 2,500 followers on X and 2,200 on Instagram, indicating an expanding multi-platform presence.

In contrast, the Supreme Council of Antiquities' Facebook page shows notably lower engagement (4,800 followers), though this represents a significant increase from previous years, suggesting growing awareness of digital outreach importance.

This disparity is particularly interesting when considered alongside Table (2). Despite producing

(2024), who found that cultural institutions often underutilize the interactive potentials of digital platforms in their study of archaeological museums in Greece.

Table (2): Number of News Articles Published on the Websites.

Website	Count	Percentage
Center for Documentation of Cultural and Natural Heritage (CULTNAT)	155	44.7%
Supreme Council of Antiquities	191	55.3%
Total	346	100%

Source: Prepared by the researcher based on website content analysis.

Table (2) reveals disparity in the volume of news content published on the two websites. The Supreme Council of Antiquities leads with 55.3% of total heritage-related news (191 articles), while CULTNAT follows with 44.7% (155 articles). This disparity may reflect differences in priorities or resources allocated to digital news production. However, as subsequent analysis will show, quantity does not necessarily equate to engagement or effectiveness.

more news content, the Supreme Council of Antiquities achieves significantly less social media engagement than CULTNAT. This finding suggests that content quality, presentation style, and interactive features may be more important than quantity—a principle consistent with Media Richness Theory, which emphasizes the importance of multiple cues and language variety in effective communication (Daft & Lengel, 1986).

Table (4): Availability of Website Sharing with the Public.

Website	Sharing Availability	Through
Center for Documentation of Cultural and Natural Heritage (CULTNAT)	Not available for sharing	Facebook
Supreme Council of Antiquities	Available	WhatsApp, X (formerly Twitter), Copy link

Source: Prepared by the researcher based on

website content analysis

Table (4) demonstrates variation in the availability of sharing features. While the Supreme Council of Antiquities allows content sharing through multiple platforms, CULTNAT does not enable this feature on Facebook. This represents a clear deficiency, especially given that Facebook is the center's most popular platform. This feature restriction prevents the public from contributing to content dissemination, limiting the viral spread of heritage content. From a theoretical perspective, this limitation reduces the potential for audience participation and co-creation of meaning, which Liang, Lu, and Martin (2021) identify as crucial for cultural heritage sustainability in the digital age.

Table (5): Communication and Access Possibilities.

Website	Through
Center for Documentation of Cultural and Natural Heritage (CULTNAT)	- Download Google Maps for center location - Detailed address provided - Submit data or inquiry via electronic message
Supreme Council of Antiquities	- Official email available - Hotline - Detailed address

Source: Prepared by the researcher based on website content analysis.

Table (5) shows the provision of diverse and direct communication channels with the public on both websites. CULTNAT offers modern means such as Google Maps and an electronic contact form, while the Supreme Council of Antiquities relies on traditional means such as email and hotline. These channels provide direct communication lines that facilitate public inquiries and information reception, enhancing transparency and contributing to building trust with heritage institutions. The availability of multiple communication channels increases the media richness of both platforms, potentially enhancing their effectiveness in conveying complex heritage information (Liang, Lu, & Martin, 2021).

Table (6): Heritage Publication Technologies on CULTNAT Website.

Center for Documentation of Cultural and Natural Heritage (CULTNAT)
➤ Ubiquitous Displays (Kulturrama)
➤ 3D Digitization
➤ Panoramic Photography
➤ Augmented Reality (AR)
➤ Geographic Information Systems - GIS
➤ Documentary Films Using 3D Animation (3D Documentation)
➤ 3D Display - Hologram
➤ Virtual Tours through Virtual Reality Applications (VR)

Source: Prepared by the researcher based on CULTNAT website content analysis.

Table (6) reveals the leadership and uniqueness of CULTNAT in employing the latest digitization and visual documentation technologies for publishing Egyptian heritage. The center adopts an integrated methodology that significantly enhances media richness through multiple cues, immediate feedback possibilities, and language variety. This technological sophistication aligns with Boboc et al. (2022), who found that immersive technologies like VR and AR significantly enhance public engagement with cultural heritage.

The documentation of ancient Egyptian tombs using 3D technology stands as a prominent example, with tombs documented including "Ptahmes," "Qar," "Edfu," "Nakht," and "the Ascending Path of the Pyramid of Unas." These efforts demonstrate how high-richness media can transform heritage preservation from passive archiving to active experience creation.

Panoramic Photography Technology: 360-Degree Image Display

Panoramic photography (360-degree) technology is among the most prominent tools employed by the center to provide immersive user experiences, enabling exploration of archaeological sites and museums interactively. The center has produced over 500 panoramic images covering more than 50 archaeological sites across Egypt, including the Pyramids of Giza, the Egyptian Museum in Tahrir, and historic locations in Islamic Cairo. These virtual tours have attracted over 2 million views since their launch, demonstrating strong public appetite for immersive heritage experiences. This technology exemplifies high media richness through its capacity for multiple cues and immersive engagement, allowing users to explore heritage sites as if they were physically present.

Augmented Reality (AR) Technology

Augmented Reality (AR) technology enriches visitor experiences by integrating digital elements with the real world. For example, CULTNAT and the Supreme Council of Antiquities launched an AR application allowing visitors in the Pyramids area to point their phones at the pyramid to see its construction process. Over 25 similar applications have been launched at the National Museum of Egyptian Civilization, Historic Cairo, and Luxor.

These applications represent high-richness media that combine immediate feedback, multiple cues, and personalized experiences – characteristics that Media Richness Theory identifies as essential for effective communication of complex information (Daft & Lengel, 1986). Boboc et al. (2022) similarly found that AR applications significantly enhance visitor

engagement and learning in heritage contexts.

Geographic Information Systems (GIS)

GIS technology is used to create accurate interactive maps of Egyptian heritage, linking archaeological sites with geographical, historical, and social information. These systems assist in preservation, planning, and site management, while providing researchers and the public with powerful tools for understanding heritage in its spatial context. This application demonstrates how digital technologies can layer multiple types of information, increasing media richness and enabling more nuanced understanding of heritage.

Three-Dimensional (3D) Documentation Technology

3D documentation represents one of the center's most significant achievements, with numerous artifacts, ancient Egyptian tombs, and heritage buildings documented with extreme precision. This technology enables unprecedented opportunities for virtual study and interaction with heritage, particularly in virtual restoration and reconstruction of damaged archaeological sites. Danesh and Rajabi (2022) similarly documented the transformative potential of 3D technologies for intangible heritage preservation.

Hologram Display Technology

Three-dimensional hologram display technology is used to provide innovative and attractive display experiences for the public. The center successfully employed this technology in displaying the Tutankhamun statue at the Egyptian Museum in Cairo, using interactive technologies such as Leap Motion and Xbox Kinect. This represents a high-richness medium that combines multiple cues and creates immersive experiences, enhancing emotional connection to heritage.

Virtual Reality Applications

Employing Virtual Reality (VR) technologies represents one of the center's most significant achievements. The center participated in major international projects such as the Virtual Museums Network (V-MusT), which includes over 60 partners from 15 European countries and Egypt. VR applications have been developed for virtually visiting sites such as "Al-Suhaimi House" and historic Cairo.

These applications represent the highest level of media richness, combining immediate feedback, multiple cues, language variety, and personal focus to create deeply immersive experiences that can transform users' understanding of and connection to heritage.

Table (7): Cultural Heritage Publications Available on the Websites.

Item	CULTNAT	Supreme Council of Antiquities	Total
Publications - Magazines	0	5	5
Applications (Bibliotheca Alexandrina)	5	0	5
Published Reports and Research	25	0	25
Published Periodicals	95	0	95

Source: Prepared by the researcher based on website content analysis

Table (7) reveals the richness of heritage publications available on the two institutions' websites, particularly CULTNAT, which hosts a large collection of periodicals (95) and published reports and research (25), in addition to 5 applications developed in collaboration with the Bibliotheca Alexandrina. The Supreme Council of Antiquities offers 5 heritage magazines, contributing to the total publications. This reflects attention to documenting and publishing heritage through academic and research means, contributing to building a robust knowledge base. However, the accessibility and visibility of these resources to the general public remain limited, pointing to the reality-expectation gap identified by Ji, Sangkatip, and Tirakoat (2026) in their study of digital heritage implementation in China.

Table (8): Website Objectives in Publishing Heritage Topics.

Objectives	CULTNAT		Supreme Council of Antiquities		Total		Rank
	Count	%	Count	%	Count	%	
Supportive	220	13.9	140	10.5	360	12.4	4
Awareness	230	14.6	170	12.8	400	13.8	3
Documentary	590	37.3	550	41.3	1140	39.2	1
Informational	450	28.5	370	27.5	820	28.2	2
Future ideas	65	4.1	55	4.1	120	4.1	5
Behavioral	25	1.6	45	3.4	70	2.4	6
Total	1580	100	1330	100	2910	100	

Source: Prepared by the researcher based on website content analysis

Table (8) reveals that the documentary objective emerges as the top priority for both websites at 39.2% of total content (1,140 articles), followed by informational objectives at 28.2% (820 articles) . This

focus on documentation and information provision reflects the core mission of these institutions. However, the lower percentages for awareness (13.8%) and behavior-supporting objectives (12.4%) suggest a need to develop more interactive and impactful communication strategies. The total

volume of heritage-related content reached 2,910 articles across both platforms, reflecting the growing digital output of Egyptian heritage institutions. This finding aligns with Abouelmagd and Elrawy (2022), who found that Egyptian digital heritage initiatives often prioritize documentation over engagement.

Table 9: Appeals and Persuasion Methods in Heritage Websites.

Appeals and Persuasion Methods	CULTNAT		Supreme Council of Antiquities		Total	
	Count	%	Count	%	Count	%
Enhancing citizenship and belonging	110	13.0	105	13.5	215	13.2
Pride and esteem	100	11.8	110	14.2	210	12.9
Heritage dissemination and preservation	108	12.8	104	13.4	212	13.0
Enhancing national identity	105	12.4	80	10.3	185	11.4
Connecting heritage with past and future	80	9.5	85	11.0	165	10.1
Communication with regional/international communities	65	7.7	90	11.6	155	9.5
Promoting tourism and serving economy	90	10.6	45	5.8	135	8.3
Community responsibility	45	5.3	52	6.7	97	6.0
Understanding the past and drawing lessons	32	3.8	52	6.7	84	5.2
Creativity and critical thinking	35	4.1	35	4.5	70	4.3
Community participation	22	2.6	18	2.3	40	2.5
Total	847	100	776	100	1623	100

Source: Prepared by the researcher based on website content analysis

Table (9) reveals that emotional/affective appeals—"Enhancing citizenship and belonging" (13.2%), "Heritage dissemination and preservation" (13.0%) , and "Pride and esteem" (12.9%) –topped the list of most frequently used appeals, with a total of 637 articles focusing on these emotional dimensions. This reflects attempts to emotionally connect the public with their heritage, consistent with Giddens' (2023) argument that individuals actively construct their identities through narrative engagement with cultural resources in late modernity.

In contrast, appeals to "Community participation" (2.5%) , "Creativity and critical thinking" (4.3%) , and "Community responsibility" (6.0%) ranked lowest, with only 207 articles addressing these participatory dimensions. This suggests that current digital

4.2.1 Descriptive Results of the Study Sample

Table 10: Demographic Characteristics of the Study Sample.

Characteristic	Category	Frequency	Percentage
Gender	Male	396	68.9%
	Female	178	31.1%
Age	Less than 30 years	238	41.5%
	30 to less than 40 years	231	40.2%
	40 to less than 50 years	54	9.4%
	50 years and above	51	8.9%
Educational Level	Secondary	100	17.4%
	University (Bachelor's)	279	48.6%
	Postgraduate (Master's/PhD)	195	34.0%
Total		574	100%

Source: Prepared by the researcher based on SPSS output.

Table (10) presents the demographic characteristics of the study sample, which consisted of 574 respondents. Regarding gender distribution,

heritage communication strategies focus more on passive reception of emotional content than on active engagement and participation—a finding that resonates with Nugraha et al. (2024)'s observation that social media's potential for community participation in heritage preservation remains underutilized. The total volume of heritage content reached 1,623 articles across both platforms, reflecting the continued growth of digital heritage communication in Egypt

4.2 Results of the Field Study

The field study aimed to reveal the nature of the public's relationship with digital heritage documentation sites and platforms, measure their attitudes toward them, and identify patterns of their use and interaction with heritage content.

the sample included 396 males (68.9%) compared to 178 females (31.1%). This distribution reflects the nature of respondents' interests in heritage, though it

should be noted as a limitation when generalizing findings.

Concerning age distribution, the majority of study sample members belong to young and middle age groups. The age group less than 30 years comprised 238 individuals (41.5%), followed by the age group 30 to less than 40 years with 231 individuals (40.2%). This reflects the increasing interest of youth in heritage and its issues through digital media, consistent with global trends identified by Kianpour et al. (2025).

Regarding educational level, the data reveal the high educational level of study sample members, with university qualification holders reaching 279 individuals (48.6%), followed by postgraduate qualification holders at 195 individuals (34.0%). This indicates that interest in heritage documentation issues requires a certain degree of awareness and knowledge, a finding that will be further explored in hypothesis testing.

4.2.2 Results of Hypotheses Testing

A set of appropriate statistical tests were used based on data nature, including the Mann-Whitney test for two independent samples and the Kruskal-Wallis test for comparing more than two groups, to test the hypotheses. All tests were conducted using SPSS with a significance level of $p < 0.05$.

Hypothesis One states: "There is a statistically significant relationship between the public's use of digital media and social media platforms and their level of awareness of the importance of Egyptian intangible cultural heritage and methods of its preservation."

Hypothesis Two states: "There is a statistically significant relationship between the public's use of digital media and social media platforms and their level of participation in efforts to protect and disseminate intangible cultural heritage, particularly through platforms such as UNESCO and the Ministry of Tourism and Antiquities website."

Table 11: Hypothesis Testing Results by Demographic Variables.

Hypothesis	Dependent Variable	Independent Variable	Test Used	Test Value	Sig. Level	Significance
H1	Awareness	Gender	Mann-Whitney	Z = 0.892	0.372	Not Significant
	Awareness	Age	Kruskal-Wallis	$\chi^2 = 1.245$	0.742	Not Significant
	Awareness	Educational Level	Kruskal-Wallis	$\chi^2 = 18.234$	0.000	Significant

H2	Participation	Gender	Mann-Whitney	Z = 1.234	0.217	Not Significant
	Participation	Age	Kruskal-Wallis	$\chi^2 = 3.567$	0.312	Not Significant
	Participation	Educational Level	Kruskal-Wallis	$\chi^2 = 38.901$	0.000	Significant

Source: Prepared by the researcher based on SPSS output.

Table (11) presents the results of hypothesis testing for both H1 and H2 across demographic variables. Regarding Hypothesis One (Awareness), the analysis reveals no statistically significant differences attributable to gender ($p = 0.372 > 0.05$) or age ($p = 0.742 > 0.05$). This suggests that both males and females, as well as different age groups, demonstrate similar levels of heritage awareness. The finding that age does not determine awareness is particularly interesting given the sample's youth predominance—it aligns with Kianpour et al. (2025)'s finding that digital engagement with heritage transcends age boundaries in the network society.

However, statistically significant differences in awareness were found attributable to educational level ($p < 0.001$). Post-hoc analysis indicates that respondents with secondary education demonstrate significantly higher awareness scores than those with university or postgraduate education. This counterintuitive finding suggests that formal education level does not necessarily correlate with heritage awareness—rather, personal interest and engagement may be more important factors. This finding partially supports Hypothesis One, confirming that demographic variables (specifically education) affect heritage awareness, though not in the expected direction.

Regarding Hypothesis Two (Participation), the analysis reveals no statistically significant differences attributable to gender ($p = 0.217 > 0.05$) or age ($p = 0.312 > 0.05$). While younger age groups show slightly higher mean ranks, the differences are not statistically significant. Both males and females, as well as different age groups, demonstrate similar levels of engagement with digital heritage initiatives.

As with awareness, statistically significant differences in participation were found attributable to educational level ($p < 0.001$). Respondents with secondary education demonstrate significantly higher participation scores than those with higher education levels. This pattern suggests that formal education level does not predict engagement with digital heritage—rather, passion and personal connection to heritage may be more important

drivers. This finding partially supports Hypothesis Two, confirming that educational level affects

participation in digital heritage initiatives.

4.2.3. Sources of Information about Heritage Documentation

Table (12): Sources of Information about Heritage Documentation.

Sources of Heritage Documentation Information	Frequency	Percentage
Center for Documentation of Cultural and Natural Heritage (CULTNAT)	31	5.4%
Supreme Council of Antiquities	38	6.6%
Documentary films on television	348	60.6%
Facebook pages	157	27.4%
Total	574	100%

Source: Prepared by the researcher based on survey data

Table (12) reveals variation in the public's sources of information about heritage. Documentary films on television ranked first at 60.6%, followed by Facebook pages at 27.4%, then the Supreme Council of Antiquities at 6.6%, and finally CULTNAT at 5.4%. This indicates the continued dominance of traditional media (television) as the primary source of heritage information, followed by digital media (Facebook), while the official websites of heritage institutions remain a secondary information source.

This finding highlights a significant reality-expectation gap: despite CULTNAT's technological sophistication and high-richness media applications, only 5.4% of respondents use it as a primary information source. This aligns with the design-reality gap model examined by Ayoung and Abbott (2021) and Kanya and Good (2013), which emphasizes the disconnect between technological capacity and actual user engagement. It also supports Abouelmagd and Elrawy's (2022) finding that official Egyptian heritage sites face challenges in reaching broad audiences.

4.3 Results of Focus Group Discussions

Two focus group sessions were conducted with digital activists and individuals interested in Egyptian intangible heritage, in collaboration with CULTNAT and the Supreme Council of Antiquities. Each group consisted of 10 participants, and sessions were conducted via Microsoft Teams during October–December 2025, as part of the qualitative data collection phase of the study.

4.3.1. Thematic analysis revealed six main themes:

Theme 1: The Concept of Heritage Documentation

Participants agreed that heritage documentation efforts by official institutions aim to preserve and safeguard tangible and intangible heritage. One participant from CULTNAT stated: "We don't just stop at documentation as archiving; we create

interactive and engaging content... we try to create an 'experience' for the user, so they feel they are living inside the past."

This statement reflects an implicit understanding of Media Richness Theory principles—recognizing that high-richness media creating immersive experiences can enhance emotional connection to heritage. Another from the Supreme Council of Antiquities noted: "Tangible heritage faces major challenges... Digital documentation helps us preserve, at the very least, the 'image' and accurate 'data' of the artifact."

Key points extracted:

- Ultimate Goal: Preserving identity and ensuring heritage continuity
- Specialization: Differentiation between SCA (tangible) and CULTNAT (intangible)
- Methodology: Transition from archiving to experience creation
- Challenges: Weak funding, shortage of specialized cadres, rapid technological change

Theme 2: Official vs. Popular Documentation Efforts

Participants identified a gap between institutional efforts and popular initiatives. One independent activist explained: "Official institutions have wonderful archiving and a huge archive, but access to it is difficult for the ordinary citizen. We, as groups on Facebook, present content simply, quickly, and close to people."

This gap between institutional capacity and public access exemplifies the reality-expectation gap central to this study. It also resonates with Nugraha et al. (2024)'s finding that community participation is essential for cultural heritage preservation.

Theme 3: Publication Policies and Mechanisms

Participants noted that official websites are subject to bureaucratic procedures causing delays, while unofficial platforms offer speed and interactivity. One participant observed: "The official website should be the reliable source and main

archive, but it can't compete with Facebook in speed and reaching the ordinary public."

This reflects a tension between institutional requirements for accuracy and the public's desire for accessible, engaging content—a challenge also identified by Mylona et al. (2024) in their study of museum social media practices.

Theme 4: Responding to Heritage Misinformation

Participants raised concerns about attempts to appropriate Egyptian heritage. They emphasized that accurate digital documentation is the first line of defense. One stated: "Documentation is the strongest weapon to protect our identity."

This finding underscores the political and identity dimensions of digital heritage documentation, supporting Giddens' (2023) argument that individuals actively construct their identities through narrative engagement with cultural resources.

Theme 5: Documentation Projects and Accessibility

Participants noted the absence of comprehensive catalogs or guides to documented materials. They suggested creating an "interactive atlas of Egyptian intangible heritage" similar to those in China and Morocco. This reflects a desire for what Liang, Lu, and Martin (2021) call platforms that enable communities to access and contribute to heritage narratives.

Theme 6: Informing the Public

Participants unanimously agreed on shortcomings in communicating documentation achievements. One participant from CULTNAT noted that 8 short documentary films about major projects achieved high viewership on YouTube, demonstrating public appetite for this content.

They called for:

- Electronic newsletters and mobile applications
- Open days and interactive workshops
- Interactive screens in museums and archaeological sites

One participant captured the essence of the desired transition: "The public wants to see, touch, and experience... not just read or watch a film. Hologram and virtual reality technologies create amazing and enjoyable experiences, making people feel part of history."

4.3.2. Summary of Focus Group Results

Focus group participants unanimously agreed on the importance of documenting Egyptian intangible heritage, but emphasized the gap between official efforts and popular initiatives. They called for:

- Developing official websites to be more

interactive and user-friendly

- Leveraging social media platforms for broader reach
- Creating a unified national platform for Egyptian intangible heritage
- Producing engaging, diverse media content in multiple languages
- Organizing interactive events to showcase documentation technologies
- Enhancing cooperation between official institutions and civil initiatives

4.4. Integration of Findings: The Reality-Expectation Gap

Triangulation of findings from content analysis, survey research, and focus group discussions reveals a consistent pattern: a significant reality-expectation gap in Egyptian digital heritage.

Dimension	Reality	Expectation
Technological Capacity	CULTNAT employs cutting-edge technologies (3D, AR, VR, holograms)	Public access to and awareness of these technologies remains limited
Content Production	Both institutions produce substantial heritage content	Only 5.4% of respondents use CULTNAT as primary information source
Audience Engagement	CULTNAT achieves high social media following (40,000 on Facebook)	Participation in heritage preservation efforts remains low
Institutional Coordination	Separate institutions with distinct mandates	Public desires unified, accessible platform
Communication Strategy	Focus on documentary and informational objectives	Public desires interactive, participatory experiences

This gap aligns with the design-reality gap model examined by Ayoung and Abbott (2021) and Kanya and Good (2013) for understanding implementation challenges in digital projects. It also resonates with Media Richness Theory's emphasis on matching media characteristics to communication tasks—suggesting that Egyptian institutions have developed high-richness technological capabilities but have not fully optimized their use for public engagement.

4.5 General Findings of the Study

1. CULTNAT demonstrates technological leadership in employing high-richness media (3D digitization, AR, VR, holograms) for heritage documentation, positioning Egypt as a regional leader in digital heritage (El Azazy, 2025; Boboc et al., 2022).

2. Significant disparity exists between the two institutions' digital strategies, with CULTNAT achieving substantially higher social media engagement despite producing less news content—suggesting that content quality and interactive features matter more than quantity.
3. Educational level significantly affects both awareness ($\chi^2 = 18.234$, $p < 0.001$) and participation ($\chi^2 = 38.901$, $p < 0.001$) in digital heritage initiatives, though counterintuitively, respondents with secondary education show higher engagement than those with higher education.
4. Traditional media (television) remains the primary source of heritage information for 60.6% of respondents, followed by Facebook (27.4%), while official heritage websites reach only 12% combined—highlighting a significant reach gap (Abouelmagd & Elrawy, 2022).
5. Emotional appeals dominate current digital heritage communication, with "citizenship and belonging" (13.4%), "pride" (12.8%), and "heritage preservation" (13.2%) most frequently used, while appeals to "community participation" (1.9%) and "critical thinking" (3.8%) are underutilized (Giddens, 2023; Nugraha et al., 2024).
6. A significant reality-expectation gap exists between institutional technological capacity and public access, engagement, and identity outcomes—consistent across all three data sources (Ayoun & Abbott, 2021; Kanya & Good, 2013).
7. Focus group participants articulated a clear vision for bridging this gap, emphasizing the need for unified platforms, interactive experiences, and enhanced cooperation between official and civil initiatives.

5. CONCLUSION

This study investigated the role of digital media in sustaining intangible cultural heritage and reinforcing social identity in Egypt, with a particular focus on the gap between current reality and future expectations. Employing a mixed-methods approach combining content analysis of official heritage websites, a survey of 574 Egyptian citizens, and focus group discussions with digital heritage activists, the research examined the digital documentation efforts of two primary institutions: the Center for Documentation of Cultural and Natural Heritage (CULTNAT) and the Supreme Council of Antiquities (SCA).

The study was guided by three theoretical frameworks: Media Richness Theory (Daft & Lengel, 1986; Trevino et al., 1987; Ishii et al., 2019), which provided analytical tools for understanding platform effectiveness; Heeks's Design-Reality Gap Model (Ayoun & Abbott, 2021; Kanya & Good, 2013), which offered insights into implementation challenges; and concepts from digital memory studies (Makhortykh, 2023; Annabell, 2023; Laba et al., 2025), which illuminated how social media platforms shape heritage narratives.

The research yielded several significant findings that address the study's research questions and hypotheses:

First, the content analysis revealed that CULTNAT demonstrates technological leadership in employing high-richness media for heritage documentation, including 3D digitization, augmented reality (AR), virtual reality (VR), holograms, and panoramic photography. This technological sophistication positions Egypt as a regional leader in digital heritage. However, significant disparity exists between the two institutions' digital strategies, with CULTNAT achieving substantially higher social media engagement despite producing less news content—suggesting that content quality and interactive features matter more than quantity.

Second, the survey results indicated that educational level significantly affects both awareness ($\chi^2 = 18.234$, $p < 0.001$) and participation ($\chi^2 = 38.901$, $p < 0.001$) in digital heritage initiatives. Counterintuitively, respondents with secondary education demonstrated higher engagement than those with university or postgraduate education, suggesting that personal interest and passion for heritage may be more important drivers than formal education.

Third, the study revealed that traditional media (television) remains the primary source of heritage information for 60.6% of respondents, followed by Facebook (27.4%), while official heritage websites reach only 12% combined. This finding highlights a significant reach gap despite CULTNAT's technological sophistication.

Fourth, the focus group discussions uncovered six key themes: the concept of heritage documentation transitioning from archiving to experience creation; the gap between official and popular documentation efforts; publication policies and mechanisms; responding to heritage misinformation; documentation projects and accessibility; and informing the public about documentation achievements.

Fifth, the integration of findings across all three data sources revealed a consistent pattern: a significant reality-expectation gap between institutional technological capacity and public access, engagement, and identity outcomes. This gap manifests across multiple dimensions, including technological capacity versus public awareness, content production versus audience reach, and institutional coordination versus public desire for unified platforms.

This study makes several theoretical contributions to the fields of digital heritage, media studies, and cultural research:

First, it extends the application of Media Richness Theory to the context of intangible cultural heritage, demonstrating how the theory's core principles—immediate feedback, multiple cues, language variety, and personal focus—can be operationalized to assess the effectiveness of digital heritage platforms. The findings confirm that high-richness media (VR, AR, holograms) create more immersive and emotionally engaging heritage experiences, supporting the theory's central premise.

Second, the study empirically validates the Design-Reality Gap Model in the context of digital heritage, demonstrating its utility for diagnosing implementation challenges. The gap between CULTNAT's technological capacity and limited public reach exemplifies the model's core concept, suggesting its value for future heritage research.

Third, the research contributes to digital memory studies by examining how official heritage institutions in the Arab world navigate the tension between institutional authority and platform affordances. The findings reveal that while institutions produce rich heritage content, their communication strategies often prioritize documentation over the interactive, participatory engagement that social media platforms enable.

Fourth, the study introduces the concept of the reality-expectation gap as an analytical framework for understanding digital heritage implementation, synthesizing insights from Media Richness Theory, the Design-Reality Gap Model, and digital memory studies into an integrated analytical model.

The findings carry several practical implications for heritage institutions, policymakers, and digital heritage practitioners:

For heritage institutions, the study underscores the importance of balancing technological investment with public engagement strategies. CULTNAT's technological leadership demonstrates what is possible, but the limited public reach of both institutions highlights the need for complementary

communication and outreach efforts.

For policymakers, the findings suggest the need for a comprehensive national strategy that explicitly addresses the reality-expectation gap, setting measurable targets for public engagement alongside documentation goals. The proposed unified national platform and interactive atlas offer concrete directions for policy development.

For digital heritage practitioners, the study provides evidence that content quality and interactive features matter more than quantity. CULTNAT's success on Facebook despite producing less news content than SCA demonstrates that audience engagement depends on how content is presented, not just how much is produced.

5.1. Recommendations

Based on the integrated findings, the following recommendations are proposed:

5.1.1. Policy and Strategy Recommendations

1. Establish a unified national digital platform for Egyptian intangible cultural heritage, serving as an interactive "living archive" accessible to all segments of society. This platform should integrate content from CULTNAT, the Supreme Council of Antiquities, and civil initiatives, responding to the call from focus group participants for comprehensive access.
2. Develop a comprehensive national strategy for digital heritage that explicitly addresses the reality-expectation gap, setting measurable targets for public engagement and identity outcomes alongside documentation goals, as informed by the design-reality gap model (Ayoung & Abbott, 2021; Kanya & Good, 2013).
3. Create an "interactive atlas of Egyptian intangible heritage" similar to successful models in China and Morocco, classifying heritage into clear categories (crafts, performing arts, social practices, traditional knowledge) with interactive maps and multimedia content.

5.1.2. Institutional Practice Recommendations

4. Enhance the interactivity and user-friendliness of official websites, implementing sharing features, personalized content recommendations, and user-contributed content where appropriate. This addresses the finding that only 12% of respondents use official websites as primary information sources.

5. Leverage social media platforms more effectively by developing platform-specific content strategies, engaging with user comments and contributions, and using analytics to understand audience preferences. CULTNAT's relative success on Facebook (40,000 followers) provides a model for expansion.
6. Develop innovative interactive mechanisms to attract youth, such as digital game technologies, augmented reality applications, and virtual reality experiences that make heritage engaging and relevant, building on CULTNAT's technological leadership (Boboc et al., 2022).
7. Produce engaging, diverse media content (short films, infographics, podcasts) in multiple languages, distributed through both traditional and social media channels to reach broader audiences. The high viewership of CULTNAT's YouTube content (231,442 views) demonstrates public appetite for visual heritage content.
8. Organize interactive events for the general public at archaeological sites and museums to showcase modern documentation technologies (holograms, VR/AR) and their results, transforming passive spectators into active participants.

5.1.3. Capacity Building Recommendations

9. Enhance cooperation with educational and academic institutions to integrate digital heritage concepts into curricula and prepare specialized human cadres in heritage documentation and digital media fields, addressing the shortage of specialized cadres identified in focus groups.
10. Provide institutions with necessary financial and technical support to develop their performance and keep pace with accelerating technological developments, ensuring sustainability of digital heritage initiatives.
11. Establish a permanent media observatory to monitor and analyze heritage content presented through digital media, evaluate its performance and impact, and continuously work on its development.

5.1.4. Research and Collaboration Recommendations

12. Encourage scientific research in digital heritage by supporting academic studies and research projects addressing heritage

documentation issues through digital media, and publishing results in peer-reviewed journals, contributing to the theoretical integration called for in this study.

13. Benefit from leading international experiences and expertise by building partnerships with specialized global institutions and adapting successful models to the Egyptian context, as exemplified by CULTNAT's participation in the Virtual Museums Network (V-MusT).
14. Enhance cooperation and coordination between official institutions (CULTNAT, Supreme Council of Antiquities, Ministry of Culture) and civil initiatives, independent activists, and local communities to unify efforts and avoid dispersion.
15. Launch continuous awareness campaigns through social media platforms and official websites, targeting different age groups and regions, to introduce the importance of heritage and its issues.

5.2. Limitations And Future Research

5.2.1. Limitations of the Study

This study has several limitations that should be acknowledged:

1. Geographic scope: The sample included respondents from various Egyptian governorates, offering geographic diversity within the digital heritage audience. However, as the sample was drawn primarily from social media followers of heritage pages, it reflects the perspectives of digitally active populations. Future research could expand geographic representation by incorporating non-digital and community-based populations.
2. Cross-sectional design: The study captured attitudes at a single point in time (2025-2026). As such, it provides a description of public engagement and identity outcomes, with its primary strength being description, and offering insights into associations, not the establishment of causal relationships.
3. Focus on official institutions: Focus on official institutions: The study focused on CULTNAT and the Supreme Council of Antiquities as the primary official institutions for heritage documentation in Egypt. This provides an in-depth understanding of their role, while other actors—such as governorate-level initiatives, university projects, or private sector efforts—remain areas for future research.
4. Quantitative focus on awareness and

participation: The survey captured self-reported awareness and participation, offering valuable insights into these dimensions. However, social identity is complex and multidimensional, and future research could employ more sophisticated measures to explore its deeper layers.

5. Technological focus: The study emphasized digital media platforms and technologies, offering rich insights into their role in heritage documentation, while traditional media and on-the-ground documentation efforts—which may reach different audiences—present valuable avenues for future exploration.

5.2.2. Directions for Future Research

These limitations suggest several directions for future research:

1. Geographic and demographic expansion: Future research could employ stratified sampling to ensure proportional representation across all Egyptian governorates, including rural and border regions, while also examining how different audience segments (youth, rural populations, diaspora communities, tourists) engage with digital heritage content.
2. Longitudinal and impact assessment research: Longitudinal designs could track changes in public engagement and identity outcomes over time, examining how digital heritage initiatives evolve and whether they achieve sustained impact. Such research could employ pre-post designs to assess the measurable impact of specific interventions on heritage

awareness, preservation behaviors, and identity reinforcement.

3. Expanded institutional scope: Future research could examine other actors in Egyptian digital heritage, including governorate-level initiatives, university documentation projects, and private sector heritage documentation efforts.
4. Deeper identity measures: Future research could develop more sophisticated measures of identity outcomes, perhaps employing qualitative methods to explore how individuals incorporate digital heritage into their identity narratives.
5. Comparative research: Comparative studies with other Arab and non-Arab countries could identify best practices and contextual factors that influence digital heritage effectiveness across different cultural contexts.
6. Evolving technological platforms: Given the rapid evolution of digital technologies, ongoing research could examine emerging platforms (TikTok, Instagram Reels, AR/VR) alongside the role of artificial intelligence—including AI-generated content, algorithmic curation, and recommendation systems—in shaping heritage narratives and public engagement.
7. Participatory research: Future research could employ participatory methodologies that involve communities in both heritage documentation and research design, building on previous participatory approaches with Egyptian Bedouin communities.

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