

Digital Transformation and the Transformation of Management Methods for Historical–Cultural Relics in Hanoi Today

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ABSTRACT: Digital transformation is reshaping the management of historical-cultural relics in Hanoi, from inventory, documentation and condition monitoring to communication, public education and visitor services. Based on policy analysis, publicly available data and selected implementation practices in Hanoi, this article clarifies the shift from a management model primarily dependent on paper-based records, administrative experience and direct inspection to a model increasingly organized around digital data, digital platforms and interactive engagement with communities. The findings show that digital transformation can improve the capacity to identify, protect and promote the value of relics; however, it also raises challenges related to data standardization, system interoperability, human-resource capacity, information security and long-term technological sustainability. The article proposes four major groups of solutions: improving heritage data governance, developing integrated digital infrastructure, strengthening digital competencies among cultural managers, and expanding community participation in the digital preservation and promotion of heritage values.

KEYWORDS – Digital transformation; Relics; Management; Hanoi; Heritage

I. INTRODUCTION

Digital transformation is no longer a matter confined to the economy, public administration or urban services. It has become an essential requirement in the field of culture, particularly in the preservation and promotion of historical-cultural relics. In Vietnam, Decision No. 749/QĐ-TTg approving the National Digital Transformation Program to 2025, with orientation to 2030, provides an important policy foundation for renewing management, governance and public service delivery through digital technologies [1]. In the cultural sector, Decision No. 2026/QĐ-TTg approving the Program on Digitalization of Vietnam’s Cultural Heritage for the period 2021-2030 creates a direct framework for building digital databases, improving public access and strengthening the preservation of cultural heritage in the digital environment [2]. These policy orientations indicate that relic management today should not be limited to protecting material structures, but must also include the management of information, data, interpretation, user experience and public participation in digital spaces.

Hanoi is a particularly significant case for examining this transformation. As the political, historical and cultural center of Vietnam, Hanoi possesses a dense and diverse system of historical-cultural relics. According to information released by the Hanoi People’s Committee in March 2025, the city approved the addition of 567 relics to the inventory list, increasing the total number of inventoried relics in the city to 6,489 [3]. The scale, diversity and spatial distribution of these relics create both an enormous cultural advantage and a substantial management burden. Relics are located not only in the historical inner city but also in suburban districts, ancient villages, craft villages, religious spaces and rapidly urbanizing areas. A conventional model based on fragmented paper records,

periodic reports and direct inspection is therefore increasingly insufficient for timely monitoring, risk prevention, public communication and evidence-based decision-making.

This article examines how digital transformation is changing the methods used to manage historical-cultural relics in Hanoi today. The central issue is not merely the technical act of digitizing records or attaching QR codes at heritage sites. More importantly, digital transformation implies a deeper change in management logic: from managing isolated physical objects to managing integrated heritage data; from managing relics through administrative boundaries to managing them as a cultural network; from static conservation to dynamic interpretation and public interaction; and from one-way information provision to co-creation of heritage knowledge among state agencies, experts, communities, schools and visitors. By analyzing theoretical foundations, policy directions and selected implementation practices, the article identifies key achievements, existing limitations and practical solutions for enhancing the effectiveness of digital transformation in the management of Hanoi's historical-cultural relics.

II. THEORETICAL BACKGROUND

2.1. Digital transformation in historical-cultural relic management

Digital transformation in the cultural sector may be understood as the process of using digital technologies to reorganize the ways in which cultural information is created, stored, managed, accessed, interpreted and circulated. It differs from simple computerization or information-technology application because it does not merely convert paper files into electronic files. Rather, it changes management processes, decision-making mechanisms, service delivery models and the relationship between managing institutions and the public. In the management of historical-cultural relics, digital transformation may include digital documentation, geospatial mapping, digitization of artifacts and architectural details, integrated databases, QR-based interpretation, e-ticketing, automated audio guides, virtual tours, 3D scanning, condition-monitoring systems and digital platforms for citizen feedback.

Historical-cultural relics are tangible heritage sites that embody historical, cultural, scientific, aesthetic and educational values. Their management always involves two interconnected tasks: preserving authenticity and integrity, while promoting their value in contemporary social life. In the past, relic management in Vietnam was primarily based on classification dossiers, inventory documents, restoration plans, administrative decentralization and field inspections. These tools remain necessary, but they are no longer sufficient in a context where the number of relics is large, public demand for access is increasing, and urban development exerts pressure on heritage landscapes. Digital transformation allows information about relics to be updated, retrieved, shared and analyzed more rapidly, thereby supporting a shift from passive response to proactive monitoring and evidence-based management.

UNESCO defines digital heritage as resources of human knowledge or expression that are created digitally or converted from existing analog resources into digital form. The preservation of digital heritage is intended to ensure that these resources remain accessible and usable in the future [4]. This perspective is important for Hanoi because, once scientific dossiers, archival photographs, inscriptions, architectural drawings, artifacts, stories and community memories are digitized, they are no longer merely internal archival materials. They become part of a knowledge infrastructure that can serve conservation, education, tourism, research and public communication.

2.2. Heritage governance and the historical urban landscape approach

In historical cities, relics do not exist as isolated objects. They are embedded in residential spaces, religious practices, transportation systems, tourism activities, local economies and community identities. Therefore, the management of relics in Hanoi should be understood as part of broader urban heritage governance. UNESCO's Recommendation on the Historic Urban Landscape emphasizes an integrated approach in which heritage conservation is linked to urban development, quality of life, social memory and sustainability [5]. This approach is particularly relevant to Hanoi, where many relics are situated in the Old Quarter, ancient villages, traditional craft areas, peri-urban settlements and landscapes undergoing rapid socio-economic change.

Traditional management tends to organize relics by administrative units and individual files. This model has the advantage of defining management responsibility, but it often fails to capture the relationships among relics, heritage routes, cultural landscapes and visitor flows. Digital technologies can address this limitation through geospatial databases, digital maps and network-based information systems. When data on location, typology, classification, historical value, legal status, conservation condition and visitor information are integrated, managers can view heritage not as disconnected sites but as a dynamic network.

The historical urban landscape approach also emphasizes the role of communities. A relic has sustainable social vitality only when local communities recognize, preserve and participate in the transmission of its values. In the digital environment, community participation can be expanded through online feedback on site conditions, contribution of historical photographs and oral histories, community-based interpretation, digital storytelling and participatory mapping. The relationship between authorities and the public is thereby transformed: citizens are not only recipients of official information but can become co-managers and co-creators of heritage knowledge.

2.3. Digital data and the changing logic of relic management

One of the most important changes brought about by digital transformation is the shift from static record management to dynamic data management. A paper dossier usually reflects the state of a relic at a particular time, whereas digital data can be updated continuously and linked to photographs, coordinates, drawings, videos, 3D models, restoration histories, inspection records and public feedback. This enables relic management to become a continuous process rather than a set of periodic administrative activities.

ICOMOS has emphasized the importance of recording monuments, groups of buildings and sites as a fundamental component of conservation. Recording does not simply describe physical form; it also supports research, management, monitoring and the communication of heritage values [6]. In the current context, this principle should be expanded through digital technologies, including geospatial data, high-resolution imagery, 3D documentation, unique identifiers and metadata standards. For a city such as Hanoi, where thousands of relics require different levels of monitoring and conservation, systematic data architecture is indispensable.

However, digital data have management value only when they are standardized, verified and governed properly. If each locality, relic management board or project uses a different data structure and lacks common identifiers, the result may be fragmented digital repositories rather than an integrated heritage management system. Digital transformation must therefore be accompanied by data standards, access protocols, update procedures, professional verification and long-term preservation policies. Technology alone cannot guarantee better management unless it is embedded in a coherent governance framework.

2.4. Digital transformation and the promotion of heritage values

In addition to supporting conservation, digital transformation opens new possibilities for promoting the values of historical-cultural relics. QR codes, interactive maps, mobile applications, e-ticketing systems, multilingual audio guides, virtual exhibitions and immersive experiences can help relics reach broader audiences, especially young people and international visitors. This is particularly important for Hanoi, where historical-cultural relics are not only objects of conservation but also resources for cultural tourism, historical education, city branding and the development of cultural industries.

UNESCO's Culture|2030 Indicators suggest that cultural data can support evidence-based policy-making and help measure the contribution of culture to sustainable development [7]. In the context of Hanoi, this implies that data on relics should not be used only for storage or administrative reporting. It can also support the analysis of visitor demand, evaluation of restoration investment, measurement of public access, design of heritage routes and allocation of conservation resources. In this sense, digital transformation connects heritage management with broader urban development strategies.

From a theoretical perspective, digital transformation changes relic management in at least four dimensions. First, it changes the object of management from a physical monument alone to a digital-physical heritage ecosystem. Second, it changes management tools from paper files and direct inspection to integrated platforms and data systems. Third, it changes decision-making from experience-based and reactive administration to data-

informed and proactive governance. Fourth, it changes the relationship among stakeholders by creating new channels for interaction among public authorities, experts, communities and visitors.

III. CURRENT TRANSFORMATION OF MANAGEMENT METHODS FOR HISTORICAL-CULTURAL RELICS IN HANOI

3.1. A large-scale relic system and the pressure to renew management methods

Hanoi has one of the largest and most diverse systems of historical-cultural relics in Vietnam. The city's relics vary in typology, historical period, legal classification and spatial distribution. According to the Hanoi People's Committee, after the approval of 567 additional relics in 2025, the total number of inventoried relics in the city reached 6,489 [3]. This large number represents a distinctive cultural advantage, but it also creates pressure for state management. Relics must be identified, documented, protected, restored, interpreted and connected to public life under conditions of limited human and financial resources.

Table 1. Scale of the inventoried historical-cultural relic system in Hanoi

Item	Number	Note
Relics previously included in the inventory list	5,922	According to the inventory list approved in 2016
Relics added during the period from 31 December 2015 to 31 January 2025	567	Additional approval announced in 2025
Total number of inventoried relics after the addition	6,489	Publicly reported figure in 2025

Source: Compiled by the author based on information released by the Hanoi People's Committee in 2025 [3].

With such a large number of relics, conventional management methods face several limitations. First, information is distributed across multiple levels and actors, including city departments, district authorities, commune-level cultural officers, relic management boards and local communities. Second, the quality and completeness of documentation are not always uniform. Well-known relics in the central urban area tend to have richer records, while many village-level relics, temples, communal houses, pagodas and shrines in suburban districts may have incomplete or outdated documentation. Third, the monitoring of degradation, encroachment, inappropriate renovation and changes in surrounding landscapes requires frequent observation, but direct inspection is costly and labor-intensive. Fourth, the public increasingly expects accurate, attractive and easily accessible information about heritage sites.

These pressures make digital transformation not simply a modernization option but a practical necessity. A digital system can support the updating of inventory lists, standardization of dossiers, connection of data among administrative levels, communication of heritage values, and participation of the public in heritage protection. Without a sufficiently integrated digital infrastructure, the management of thousands of relics may remain reactive, fragmented and dependent on administrative paperwork.

3.2. From paper-based dossiers to digital heritage data

The most visible transformation in relic management in Hanoi is the gradual shift from paper-based dossiers to digital heritage data. Traditionally, relic documentation consisted of written descriptions, legal documents, printed photographs, architectural drawings, inventory forms and restoration records. These documents remain important because they provide legal and scientific evidence. However, paper records are difficult to retrieve quickly, update systematically, analyze collectively or share with different user groups.

Hanoi's Plan No. 294/KH-UBND on the conservation and promotion of cultural heritage values for the 2024-2025 period and subsequent years reflects the city's orientation toward stronger application of information technology and digital tools in heritage management [8]. The logic of this policy is consistent with the national program on cultural heritage digitalization. Each relic increasingly needs to be managed through a structured digital profile that contains identifiers, location data, legal status, historical information, architectural features, related artifacts, associated festivals, conservation condition and records of restoration or maintenance.

Table 2. Changes from paper-based record management to digital-data management

Aspect	Traditional model	Digital-transformation model
Record format	Paper dossiers, printed photographs and separate drawings	Electronic dossiers, digital images, geospatial data and digital models
Access method	Direct search at archives or management offices	Retrieval through databases, platforms and authorized digital systems
Updating process	Periodic inventory and administrative reporting	More frequent updating linked to inspections and field feedback
Data connection	Limited linkage among agencies and localities	Potential interoperability among departments, districts and relic sites
Public communication	Direct interpretation, static signage and printed brochures	QR codes, digital maps, mobile applications and multimedia content

Source: Author's synthesis based on policy analysis and current digital transformation practices in heritage management.

This shift, however, is not merely technical. Digitization requires professional verification, consistent metadata and a clear update mechanism. Many historical documents, inscriptions, archival photographs and architectural drawings require expert assessment before they can be incorporated into a public database. Therefore, digital transformation must involve collaboration among historians, conservation specialists, architects, Han-Nom researchers, museum professionals and information-technology experts. Without professional verification, digitized information may become inaccurate, superficial or inconsistent.

A further challenge lies in data standardization. If each unit digitizes relic information according to its own format, it will be difficult to integrate data into a city-wide heritage management system. A common data standard should specify required fields, terminology, metadata, location formats, image-quality requirements, update procedures and levels of public access. This is essential for moving from digitized documents to genuinely usable heritage data.

3.3. From administrative management to platform-based and service-oriented management

Digital transformation also changes the mode of interaction between heritage management agencies and the public. The iHanoi application, which includes a map of historical-cultural relics, allows citizens to search for sites recognized as world heritage, special national relics, national relics and city-level relics, while accessing brief information on their history and architecture [9]. This practice illustrates a shift from closed administrative management to more open digital service provision, in which heritage data are transformed into a public utility.

Other forms of digital application are also emerging at selected sites, including QR codes, interactive maps, digital interpretation, e-ticketing and automated visitor services. The Temple of Literature - Imperial Academy is a notable example. It has applied smart tourism cards, QR codes and e-ticketing to facilitate visitor access and improve site management [10]. Such applications support not only convenience for visitors but also management functions such as visitor statistics, ticket control, communication efficiency and service quality assessment.

Table 3. Selected forms of digital transformation in the management and promotion of relic values in Hanoi

Form of implementation	Main content	Management impact
Relic maps on iHanoi	Location and basic information on classified relics	Expands public access to official heritage information
QR codes at heritage sites	Connection to dossiers, images and stories about relics	Reduces dependence on static signage and supports self-guided interpretation
E-ticketing	Digital ticket booking, checking and transaction records	Improves visitor management, revenue control and statistical reporting

Form of implementation	Main content	Management impact
Interactive heritage routes	Connection of multiple relics by themes and routes	Supports management of heritage networks rather than isolated sites
Multimedia heritage data	Images, videos, research data and archival materials	Enhances education, communication and research capacity

Source: Author's synthesis based on public information about iHanoi, the Temple of Literature - Imperial Academy and digital heritage-route initiatives in Hanoi [9], [10], [11].

The movement of relic information onto digital maps and platforms has implications beyond publicity. When citizens can easily locate nearby relics and understand their value, their awareness and willingness to participate in heritage protection may increase. When visitors can access multilingual and multimedia information, the visiting experience becomes more convenient and meaningful. When management agencies can analyze user searches, visitor flows and feedback, policy decisions can be supported by practical data rather than solely by administrative reports.

In 2025, Hanoi also introduced digital heritage tourism routes using interactive maps, the H-Heritage application and QR codes at selected central heritage sites [11]. These initiatives aim to bring heritage knowledge closer to the public by allowing users to access scientific dossiers, research data, past-and-present images, archival documents and videos through mobile devices. This development is important because it organizes heritage knowledge not only by individual sites but also by route, theme and experience.

3.4. From static conservation to digital interaction and public engagement

In conventional conservation practice, relics are often treated as objects that must be protected from inappropriate physical intervention. This approach remains necessary to ensure authenticity and integrity. However, if conservation is limited to physical protection, relics may become static spaces with limited public engagement, especially among younger generations. Digital transformation supports a more dynamic model in which relics are preserved according to professional principles while being interpreted, narrated and connected to contemporary audiences through digital means.

Digital interaction can enrich heritage experiences in several ways. For school students, digital materials can make the history and culture of Thang Long-Hanoi more visual and accessible. For visitors, mobile applications and QR codes enable self-guided exploration, personalized routes and reduced language barriers. For researchers, digital databases facilitate access to materials, comparison of changes over time and identification of research gaps. For local communities, digital platforms create opportunities to contribute memories, photographs, stories and local knowledge related to relics.

Table 4. Changing roles of stakeholders in relic management under digital transformation

Stakeholder	Role in the traditional model	Role in the digital-transformation model
State management agencies	Issue regulations, conduct inventories, classify relics and inspect sites	Govern data, coordinate platforms, analyze information and provide digital services
Relic management boards	Guard, maintain, interpret and manage tickets	Update data, operate e-ticketing, manage feedback and support digital experiences
Experts	Assess dossiers and advise on conservation or restoration	Verify data, develop digital content and establish interpretation standards
Local communities	Maintain customs, organize festivals and protect sites	Contribute materials, report site conditions and participate in digital storytelling
Visitors	Visit sites and listen to direct interpretation	Search, interact, share experiences and provide feedback through digital channels

Source: Author's synthesis.

Nevertheless, digital promotion also creates risks. If heritage content is prepared superficially or without professional verification, digital platforms can spread inaccurate knowledge. If technological spectacle is

prioritized over historical meaning, relics may be reduced to entertainment products. If digital platforms are not accessible to older people, people with disabilities or communities with limited digital skills, digital transformation may create new forms of exclusion. Therefore, digital transformation must be guided by the principles of authenticity, educational value, social accessibility and respect for the cultural meaning of relics.

3.5. Limitations and challenges in the digital transformation of relic management

Despite important initial progress, the digital transformation of historical-cultural relic management in Hanoi still faces several limitations. The first limitation is uneven implementation among locations and types of relics. Famous sites with professional management boards and stable revenue sources generally have better conditions for applying technology. In contrast, many commune-level relics, village temples, communal houses, pagodas and lesser-known sites have limited funding, equipment and personnel. This may create a digital divide within the city's own heritage system.

The second limitation is the risk of data fragmentation. Heritage data may be stored separately in different departments, districts, projects, applications or websites. Without an integrated data architecture, digital products may remain isolated demonstrations rather than components of a sustainable management system. The third limitation concerns human resources. Cultural officers and relic-site staff must not only understand heritage law and conservation practice but also acquire skills in data management, digital communication, software operation and information security.

The fourth limitation is the long-term preservation of digital data. Digital heritage can be lost due to changing hardware and software, obsolete formats or insufficient preservation strategies [4]. For Hanoi, this means that digital files, 3D models, photographs, GIS layers and electronic dossiers require backup, migration and preservation policies. Digital transformation should therefore be understood as a long-term governance process rather than a short-term technological project.

Table 5. Major limitations in the digital transformation of relic management in Hanoi

Limitation group	Main manifestations	Management implications
Data	Lack of unified standards, fragmented data and uneven updating	Difficult interoperability and limited capacity for comprehensive analysis
Human resources	Uneven digital skills among local cultural staff	Difficulty in operating and maintaining digital systems
Infrastructure	Uneven equipment, software, network and security conditions	Service interruption and risks to data security
Finance	Limited resources for implementation and long-term maintenance	Digital projects may remain experimental or unsustainable
Content quality	Heritage information requires professional verification	Risk of misinformation and reduced public trust

Source: Author's synthesis based on policy analysis and practical requirements of heritage-data governance.

IV. SOLUTIONS FOR IMPROVING DIGITAL TRANSFORMATION IN THE MANAGEMENT OF HISTORICAL-CULTURAL RELICS IN HANOI

First, Hanoi should build a unified, standardized and interoperable database for historical-cultural relics. This is the foundational solution because all digital transformation activities depend on reliable data. The city needs to establish a minimum data standard for each relic, including a unique identifier, official name, alternative names, location, classification level, typology, historical period, legal documents, historical-cultural values, conservation condition, photographs, drawings, maps, restoration records, related festivals and responsible management units. Data should be organized in open and interoperable formats that can connect with geographic information systems, smart tourism platforms, national cultural databases and citizen-service platforms. For significant relics, priority should be given to high-resolution photography, 3D scanning, archival documentation, Han-Nom materials and

complete scientific dossiers. Data standardization must be accompanied by update procedures, access permissions and professional verification mechanisms before information is publicly released.

Second, the city should move from isolated digital products to an integrated digital ecosystem for relic management. A QR code, mobile application, e-ticketing system or interactive map has limited value if it is not connected to a common architecture. Hanoi should develop an integrated platform that serves three functions at the same time: state management, professional conservation and public access. For state management, the platform should support statistics, reporting, condition monitoring, restoration planning, risk warnings and resource allocation. For professional conservation, it should store scientific dossiers, technical drawings, inspection records, restoration histories and research materials. For the public, it should provide concise, accurate and attractive information in multiple languages, with maps, images, audio, videos and suggested heritage routes. Such an ecosystem would reduce data fragmentation and improve the efficiency of technological investment.

Third, digital competencies should be strengthened among cultural managers, local cultural officers and relic management boards. Digital transformation cannot succeed if the people responsible for heritage management lack the capacity to operate and update systems. Training should focus on several groups of competencies: digital record management, geospatial data use, information security, digital communication, multimedia content management, online feedback handling and data-informed decision-making. At commune and ward levels, practical manuals and standardized procedures are needed so that staff can update information consistently. At major relic sites, specialized positions related to data management and digital communication should be considered. Expert collaboration is also necessary because digital content must be historically accurate, culturally appropriate and accessible to users.

Fourth, Hanoi should expand the participation of communities, educational institutions, technology enterprises and social organizations in the digital transformation of relics. Heritage is a shared social resource, and heritage data should not be produced only by state agencies. A community-based digital heritage program could encourage citizens to contribute historical photographs, memories, stories, festival information and local knowledge. Universities and research institutes can support content verification, interpretation design, survey research and user-experience evaluation. Technology enterprises can contribute solutions in mapping, artificial intelligence, virtual reality, cloud storage, cybersecurity and data analytics. However, participation must be governed by clear standards to ensure the authenticity of information, protection of sensitive data and prevention of excessive commercialization of heritage spaces.

Fifth, digital transformation should be linked to Hanoi's strategies for sustainable cultural tourism and cultural industries. Historical-cultural relics are not only preservation objects but also development resources. When heritage data are well organized, the city can develop thematic routes such as Thang Long heritage, Confucian education and examination heritage, revolutionary relics, religious heritage, craft-village heritage and Red River cultural landscapes. These routes can be supported by interactive maps, QR codes, digital interpretation, educational games, virtual experiences and digital learning materials for schools. Nevertheless, promotion must be balanced with conservation capacity. Digital tools should help distribute visitor flows, reduce pressure on vulnerable sites and encourage responsible tourism rather than simply increase visitor numbers.

Sixth, the city should ensure data security, long-term digital preservation and technological continuity. Digital heritage is vulnerable if storage, backup, format migration and cybersecurity are not planned carefully. Important data such as original dossiers, architectural drawings, condition photographs, 3D files and archival materials should be stored in multiple layers and backed up regularly. Data-access rights must be clearly defined, especially for sensitive information related to site security, sacred objects or community practices. At the same time, Hanoi should avoid excessive dependence on closed platforms or single vendors, because this may create long-term difficulties in maintenance, expansion and interoperability.

V. CONCLUSION

Digital transformation is producing a substantial change in the management of historical-cultural relics in Hanoi. This change is not limited to the use of QR codes, digital maps or electronic tickets. At a deeper level, it

represents a transformation from paper-based and reactive administration to data-based and platform-oriented governance; from the management of individual monuments to the management of a heritage network; from static conservation to digital interpretation and public interaction; and from one-way official communication to broader participation by communities, experts, educational institutions and visitors.

The current context of Hanoi clearly demonstrates the necessity of this transformation. With 6,489 inventoried relics, the city possesses an exceptionally rich heritage system but also faces a complex management challenge. Recent practices, including the orientation toward heritage digitalization in Plan No. 294/KH-UBND, the integration of relic maps into iHanoi, the use of QR codes and e-ticketing at selected sites, and the development of digital heritage routes, show that Hanoi has begun to transform the way heritage information is organized and delivered to the public. These developments contribute to improved access, more flexible interpretation and new possibilities for data-informed management.

However, the effectiveness of digital transformation remains limited by several factors, including fragmented data, uneven implementation among sites, insufficient digital competencies, limited resources for long-term maintenance, risks to information security and the need for professional verification of heritage content. These limitations indicate that digital transformation cannot be approached as a short-term technical project. It should be treated as a long-term process of cultural governance that requires policy coherence, institutional coordination, data standards, professional expertise and sustained investment.

For digital transformation to become a genuine driver of improved relic management, Hanoi should consider heritage data as a strategic cultural infrastructure. The city needs an integrated and standardized database, a platform-based ecosystem for management and public access, trained personnel capable of operating digital systems, and mechanisms that allow communities and experts to contribute to digital heritage knowledge. At the same time, all digital initiatives must remain guided by the principles of authenticity, integrity, public education, social inclusion and sustainable development.

The case of Hanoi suggests a broader lesson for urban heritage management in Vietnam. Technology does not replace the original value of relics, nor does it replace professional conservation principles. Its proper role is to help identify, protect, interpret and transmit those values more effectively in contemporary society. Therefore, the success of digital transformation should not be measured merely by the number of digitized files, QR codes or software systems. It should be evaluated by the extent to which digital tools improve management quality, strengthen community participation, enhance public understanding and contribute to the sustainable development of the capital city.

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