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Digital Cultural Heritage Protection in the AI Era: An Integrative Review and an Integrated Governance Framework

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ABSTRACT: The rapid advancement of artificial intelligence (AI) is fundamentally transforming the preservation, production, dissemination, and commercialization of cultural heritage. While AI technologies provide unprecedented opportunities for documenting, revitalizing, and transmitting intangible cultural heritage (ICH), they also create significant legal, ethical, and governance challenges, particularly concerning traditional knowledge (TK), traditional cultural expressions (TCEs), community rights, and cultural data governance. Existing intellectual property frameworks remain primarily oriented toward individual authorship and are therefore insufficient to address the collective, intergenerational, and community-based nature of cultural heritage in AI-driven digital environments. This article aims to synthesize interdisciplinary scholarship on digital cultural heritage protection and to develop a Digital Cultural Heritage Protection Framework (DCHPF) that integrates legal, technological, and governance perspectives. An integrative literature review was employed to analyze international legal instruments, academic literature, policy documents, and governance frameworks relating to intellectual property, AI governance, cultural heritage, Indigenous data sovereignty, and community rights. The synthesis identifies six interrelated governance challenges: digital cultural extraction, unauthorized AI training using cultural data, ownership ambiguity, cultural distortion, insufficient transparency, and the absence of equitable benefit-sharing mechanisms. In response, the article proposes the DCHPF, comprising six interconnected governance dimensions: community-centered rights, cultural data governance, AI transparency, digital cultural heritage registry, licensing and prior informed consent mechanisms, and equitable benefit-sharing. Unlike existing approaches that primarily emphasize copyright protection, the proposed framework adopts a community-centered governance model that integrates cultural rights, digital governance, and AI ethics. The article further argues that effective protection of digital cultural heritage requires a paradigm shift from conventional intellectual property toward cultural data sovereignty, ensuring that indigenous peoples and local communities remain active rights holders, decision-makers, and beneficiaries throughout the AI lifecycle. The proposed framework offers theoretical, legal, and policy contributions that can support future legislative reforms and sustainable AI governance in Thailand and other jurisdictions facing similar challenges.

KEYWORDS: artificial intelligence, digital cultural heritage, intangible cultural heritage, traditional knowledge, traditional cultural expressions, community rights, cultural data sovereignty, AI governance, benefit-sharing, intellectual property law

1. INTRODUCTION

Artificial intelligence (AI) has emerged as one of the most transformative technologies of the twenty-first century, profoundly reshaping the ways in which knowledge is created, preserved, disseminated, and commercialized. Beyond its applications in industrial automation and digital services, AI increasingly influences the cultural sector through generative technologies capable of producing music, visual arts, literary works, traditional designs, and multimedia content that closely resemble human creativity. These developments have created unprecedented opportunities for documenting, revitalizing, and disseminating cultural heritage while simultaneously introducing complex legal, ethical, and governance challenges concerning ownership, authenticity, cultural integrity, and community rights (UNESCO, 2021; European Union, 2024).

The rapid digital transformation of cultural heritage has significantly expanded public access to traditional knowledge and cultural resources. Museums, archives, libraries, universities, and cultural institutions have digitized large collections of intangible cultural heritage (ICH), including oral traditions, traditional music, rituals, handicrafts, indigenous languages, and folk performances. Digital archives, virtual museums, three-dimensional documentation, and AI-assisted preservation technologies have enhanced cultural education, interdisciplinary research, and intergenerational knowledge transmission, thereby contributing to the long-term sustainability of cultural heritage (UNESCO, 2003; European

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Commission, 2023). These technological innovations also support the broader objectives of the digital economy and sustainable cultural development by increasing the visibility and accessibility of local cultural assets on a global scale. Recent studies also demonstrate that music education serves as an effective mechanism for preserving intangible cultural heritage by strengthening cultural literacy, promoting intergenerational transmission, and sustaining community identity. Evidence from Chinese higher education indicates that integrating traditional music into educational practices enhances learners' understanding of cultural heritage while supporting long-term cultural sustainability (Huang et al., 2025).

Despite these benefits, the increasing use of AI in cultural production has exposed fundamental limitations within existing legal and governance frameworks. Contemporary generative AI systems are trained on enormous volumes of digital data collected from publicly accessible sources, many of which contain traditional knowledge (TK) and traditional cultural expressions (TCEs). These cultural resources are frequently incorporated into AI training datasets without the knowledge or consent of indigenous peoples and local communities and without mechanisms for attribution, licensing, or equitable benefit-sharing (Lucchi, 2023; WIPO, 2025). Although AI-generated outputs may not directly reproduce copyrighted works, they often replicate cultural styles, artistic characteristics, symbolic meanings, and traditional aesthetics that remain deeply embedded within community identity and collective memory.

This challenge arises because traditional knowledge and cultural heritage differ fundamentally from conventional intellectual property. Whereas copyright law primarily protects individual authorship, originality, and fixed expressions for limited periods, traditional cultural heritage is collectively created, continuously transmitted across generations, and closely associated with customary law, spiritual beliefs, and community identity (Gervais, 2021; Preechasilpakul, 2022). Consequently, many forms of cultural heritage receive only limited protection under existing intellectual property regimes despite their profound cultural significance. The emergence of AI further complicates this situation because cultural heritage may be computationally learned, transformed, and commercially exploited without direct reproduction of protected works, thereby creating legal uncertainty and new forms of cultural exploitation.

Recent international developments demonstrate a growing recognition that protecting digital cultural heritage requires governance approaches extending beyond traditional copyright law. International organizations, including UNESCO, the World Intellectual Property Organization (WIPO), the Organisation for Economic Co-operation and Development (OECD), and the European Union, have increasingly emphasized responsible AI governance, ethical data management, transparency, accountability, and the protection of human rights in digital environments (OECD, 2019; UNESCO, 2021; European Union, 2024). Nevertheless, these initiatives remain primarily focused on individual rights, personal data protection, and commercial intellectual property, while comparatively limited attention has been devoted to collective cultural rights, Indigenous data sovereignty, and community-based governance of traditional cultural heritage.

This imbalance has generated an important research gap. Existing studies commonly examine artificial intelligence, intellectual property, cultural heritage, Indigenous knowledge, community rights, and digital governance as separate areas of inquiry. Relatively few studies integrate these perspectives into a comprehensive governance framework capable of addressing the unique legal and ethical challenges arising from AI-driven use of cultural heritage. In particular, insufficient attention has been given to governance mechanisms that combine community-centered rights, cultural data governance, transparency, prior informed consent, digital heritage registration, and equitable benefit-sharing within a unified conceptual architecture.

To address this gap, this article employs an integrative literature review to synthesize interdisciplinary scholarship from intellectual property law, cultural heritage studies, AI governance, Indigenous data sovereignty, digital ethics, and community rights. The study pursues two principal objectives. First, it identifies the major legal, ethical, and governance challenges associated with the use of digital cultural heritage in artificial intelligence systems. Second, it develops the Digital Cultural Heritage Protection Framework (DCHPF) as a community-centered governance model that integrates legal principles, technological governance, and cultural justice into a coherent framework for protecting digital cultural heritage in the AI era.

Unlike previous studies that primarily focus on copyright protection or AI ethics independently, this article argues that future governance should move toward the broader concept of cultural data sovereignty, under which indigenous peoples and local communities retain meaningful authority over the collection, digitization, governance, licensing, utilization, and commercialization of their cultural heritage throughout the AI lifecycle. By proposing an integrated governance framework, this study contributes to contemporary scholarship on AI governance, cultural heritage law, and community rights while offering practical policy recommendations for Thailand and other jurisdictions seeking to balance technological innovation with cultural sustainability and social justice.

2. SCOPE OF ANALYSIS

The protection of digital cultural heritage in the era of artificial intelligence requires an interdisciplinary perspective because the challenges extend beyond conventional intellectual property law. They involve the interaction of cultural heritage, artificial intelligence, digital governance, community rights, ethics, and public policy. Accordingly, this article adopts a broad analytical perspective that integrates these complementary fields to examine how digital technologies are transforming the preservation, use, and governance of traditional cultural heritage.

The analysis focuses on five interrelated dimensions. First, it examines the concepts and characteristics of digital cultural heritage, intangible cultural heritage, traditional knowledge, and traditional cultural expressions. Second, it explores the opportunities and challenges arising from the application of artificial intelligence in cultural preservation and creative production. Third, it analyses the legal and ethical issues associated with AI-generated cultural content, including ownership, cultural integrity, transparency, and community rights. Fourth, it reviews emerging international approaches to cultural data governance and AI regulation. Finally, based on these analyses, the article develops the Digital Cultural Heritage Protection Framework (DCHPF) as a conceptual model for strengthening community-centered governance of digital cultural heritage.

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Rather than examining the legal framework of a single country, this article adopts a comparative and interdisciplinary approach by synthesizing international conventions, policy documents, academic literature, and contemporary governance initiatives. This perspective enables the identification of common governance principles that may be adapted to different legal systems while responding to the rapid development of artificial intelligence technologies.

The scope of this article is therefore not limited to legal interpretation. Instead, it seeks to connect law, technology, cultural heritage, and governance in order to propose a practical framework that supports both technological innovation and the long-term protection of community cultural rights in the digital era.



Figure 1. Analytical Scope of the Study

Figure 1 illustrates the analytical scope adopted in this article. The analysis begins with the interaction between artificial intelligence and digital cultural heritage and integrates three complementary perspectives: legal, technological, and cultural. These perspectives are synthesized through an interdisciplinary approach combining law, artificial intelligence, digital governance, cultural heritage studies, and ethics. The synthesis provides the conceptual foundation for developing the Digital Cultural Heritage Protection Framework (DCHPF) proposed in this study.

3. CONCEPTUAL AND LEGAL FOUNDATIONS

The protection of digital cultural heritage in the era of artificial intelligence requires a broader conceptual foundation than conventional intellectual property law alone. As AI increasingly participates in the creation, reproduction, and dissemination of cultural content, the governance of cultural heritage becomes closely connected with community rights, digital governance, cultural ethics, and human rights. Accordingly, this article adopts an interdisciplinary perspective that integrates concepts from cultural heritage studies, intellectual property law, AI governance, and community-centered governance.

A fundamental concept underpinning this study is Intangible Cultural Heritage (ICH), as defined by the 2003 UNESCO Convention for the Safeguarding of the Intangible Cultural Heritage. Unlike tangible cultural property, intangible cultural heritage consists of living cultural practices, including oral traditions, performing arts, social customs, rituals, traditional craftsmanship, and indigenous knowledge that are continuously transmitted from one generation to another through community participation (UNESCO, 2003). Because these cultural resources remain dynamic rather than static, their protection extends beyond preserving cultural objects to safeguarding the social and cultural systems through which they continue to exist.

Closely related to ICH are the concepts of Traditional Knowledge (TK) and Traditional Cultural Expressions (TCEs). These cultural resources are generally developed collectively over long periods and form an integral part of community identity, local wisdom, and cultural continuity. Unlike conventional copyrighted works, they often lack an identifiable individual creator and cannot easily be accommodated within intellectual property systems that emphasize originality, individual authorship, and limited terms of protection (Gervais, 2021; WIPO, 2024). Consequently, the governance of TK and TCEs increasingly requires legal approaches that recognize collective rights alongside individual intellectual property rights.

The emergence of artificial intelligence has further complicated this legal landscape. Contemporary generative AI systems rely on extensive datasets containing texts, images, music, audio recordings, and other digital resources that may incorporate traditional cultural materials. Although AI-generated outputs frequently avoid direct reproduction of copyrighted works, they may reproduce distinctive cultural styles, artistic characteristics, or symbolic meanings derived from community knowledge. This situation creates new legal and ethical questions that cannot be resolved solely through traditional copyright doctrines but instead require broader governance mechanisms addressing transparency, accountability, cultural integrity, and community participation (UNESCO, 2021; European Union, 2024).

In response to these developments, increasing international attention has been given to **AI** governance, which emphasizes principles such as transparency, fairness, accountability, explainability, and human oversight. These principles provide an important foundation for the responsible development of AI systems. However, existing AI governance frameworks remain primarily concerned with personal data, consumer protection, and individual rights. Comparatively less attention has been devoted to the governance of collectively owned cultural resources and the protection of community interests within AI ecosystems.

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Another concept that has gained increasing importance is Indigenous Data Sovereignty, which recognizes the authority of indigenous peoples and local communities to determine how information relating to their cultural heritage is collected, managed, shared, and used. This perspective extends governance beyond individual consent by emphasizing community decision-making and collective stewardship over cultural data (Kukutai & Taylor, 2016; Carroll et al., 2020). In the context of artificial intelligence, this concept highlights the importance of ensuring that communities remain active participants in decisions concerning the use of their cultural heritage rather than becoming passive sources of training data.

Building upon these complementary perspectives, this article adopts a community-centered governance approach. Rather than viewing cultural heritage merely as intellectual property or digital information, the proposed perspective regards cultural heritage as a living community asset whose governance should balance technological innovation with cultural sustainability, community participation, transparency, and equitable benefit-sharing. This conceptual foundation provides the basis for developing the Digital Cultural Heritage Protection Framework (DCHPF) presented in the following sections.

4. INTEGRATIVE REVIEW APPROACH

This article adopts an integrative review as its primary analytical approach because the protection of digital cultural heritage in the era of artificial intelligence is an interdisciplinary issue that cannot be adequately understood through a single disciplinary perspective. Unlike traditional literature reviews that summarize findings within a specific field, an integrative review enables the synthesis of concepts, theories, legal principles, policy documents, and scholarly evidence from diverse disciplines to develop broader conceptual understanding and generate new theoretical insights.

The review draws upon international academic literature, legal scholarship, policy reports, and international instruments relating to intellectual property law, artificial intelligence governance, cultural heritage protection, Indigenous data sovereignty, community rights, and digital governance. Particular attention is given to publications issued by international organizations, including UNESCO, the World Intellectual Property Organization (WIPO), the Organisation for Economic Co-operation and Development (OECD), and the European Union, together with recent peer-reviewed studies examining the implications of generative artificial intelligence for cultural heritage and traditional knowledge.

Rather than evaluating individual jurisdictions in isolation, this article adopts a comparative analytical perspective to identify common principles, emerging governance trends, and shared challenges across different legal and policy contexts. This comparative perspective facilitates the development of a conceptual framework that is sufficiently flexible to accommodate diverse legal systems while remaining responsive to the rapidly evolving nature of artificial intelligence technologies.

The analytical process consisted of three interconnected stages. First, relevant literature and international policy documents were examined to identify contemporary developments concerning digital cultural heritage, artificial intelligence, traditional knowledge, and community rights. Second, the collected literature was comparatively analysed to identify recurring themes, governance challenges, conceptual relationships, and areas requiring further development. Finally, these findings were synthesized to develop the Digital Cultural Heritage Protection Framework (DCHPF), which integrates legal principles, community-centered governance, digital ethics, and artificial intelligence governance into a coherent conceptual model.

The objective of this approach is not to produce a systematic inventory of previous studies but to generate an integrated understanding of how legal, technological, cultural, and governance perspectives can collectively contribute to the sustainable protection of digital cultural heritage in the age of artificial intelligence. Consequently, the proposed framework should be regarded as a conceptual model intended to support future legal development, public policy formulation, and interdisciplinary research rather than as a prescriptive legal standard.

Table 1. Key Governance Challenges in Digital Cultural Heritage

Governance Issue	Major Challenge	Governance Need
Digitalization	Loss of community control	Cultural governance
AI Training	Unauthorized use	Transparency
Ownership	Legal uncertainty	Community rights
Cultural Integrity	Misrepresentation	Ethical AI

5. KEY ISSUES IN DIGITAL CULTURAL HERITAGE PROTECTION IN THE AI ERA

The rapid advancement of artificial intelligence has fundamentally transformed the way cultural heritage is preserved, accessed, interpreted, and utilized. While AI provides significant opportunities for documenting and revitalizing cultural heritage, it also creates complex governance challenges that extend beyond conventional intellectual property law. The literature consistently indicates that these challenges are closely interconnected and require an integrated governance approach rather than isolated legal solutions. Based on the synthesis of contemporary scholarship, this article identifies six key issues that collectively shape the future protection of digital cultural heritage in the AI era.

5.1 Digital Transformation of Cultural Heritage

Digital technologies have significantly expanded opportunities for preserving and disseminating cultural heritage. Museums, archives, libraries, and cultural institutions increasingly employ digital platforms to document traditional music, oral traditions, rituals, indigenous languages, performing arts, and traditional craftsmanship. These initiatives enhance accessibility, facilitate intercultural learning, and reduce the risk of cultural loss by enabling long-term digital preservation (UNESCO, 2003; European Commission, 2023).

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However, digitization also changes the nature of cultural heritage. Once cultural resources are converted into digital data, they become easier to reproduce, distribute, modify, and integrate into large-scale digital systems. Consequently, digital preservation should not be viewed solely as a technological process but also as a governance process requiring appropriate legal protection, ethical standards, and community participation. The challenge therefore lies not in digitization itself but in ensuring that digital transformation strengthens rather than weakens community control over cultural heritage.

5.2 Artificial Intelligence and Cultural Data

Generative AI has introduced a new dimension to cultural heritage governance by enabling machines to learn from vast collections of digital cultural data. Unlike traditional digital archives, AI systems actively analyse patterns, styles, structures, and relationships embedded within training datasets before generating new cultural content. As a result, AI-generated music, visual arts, literary works, and multimedia products may closely resemble traditional cultural expressions without directly reproducing existing works.

This capability challenges traditional legal concepts because cultural influence is no longer limited to direct copying. Instead, AI systems computationally transform cultural knowledge into new outputs, making it increasingly difficult to determine where inspiration ends and appropriation begins. Consequently, governance should focus not only on copyright infringement but also on the responsible use of cultural data throughout the AI lifecycle.

5.3 Community Rights and Cultural Data Governance

One of the most significant issues identified in recent scholarship concerns the position of indigenous peoples and local communities within AI ecosystems. Traditional cultural heritage is rarely the product of individual creativity alone; rather, it represents collective knowledge accumulated through generations and sustained by community participation. Nevertheless, existing legal systems often provide only limited recognition of collective cultural ownership.

As AI developers increasingly rely on publicly available cultural resources, communities risk losing meaningful control over how their cultural heritage is collected, digitized, analysed, and commercialized. This challenge highlights the importance of community-centered governance in which local communities participate in decisions concerning access, licensing, cultural interpretation, and the future use of their traditional knowledge. Such an approach reflects the growing recognition of cultural data as a shared community resource rather than merely another category of digital information.

5.4 Transparency, Accountability, and Cultural Integrity

Transparency has become a fundamental principle of responsible AI governance.

When AI systems utilize cultural resources during model development, stakeholders increasingly expect clear information regarding the origin of cultural data, the purposes for which they are used, and the safeguards implemented to protect culturally sensitive information.

Equally important is the preservation of cultural integrity. AI-generated content may unintentionally distort cultural meanings, remove important historical or spiritual contexts, or represent sacred traditions in inappropriate commercial settings. Although such activities may not violate copyright law, they may nevertheless undermine cultural authenticity and weaken community identity. Consequently, effective governance should incorporate both legal protection and ethical responsibility to ensure that technological innovation respects the cultural significance of traditional heritage.

5.5 Equitable Benefit-Sharing

Another recurring issue concerns the distribution of benefits generated through the commercial use of cultural heritage. AI systems increasingly create economic value from digital cultural resources, yet the communities responsible for preserving those resources frequently receive little or no recognition or compensation.

Contemporary international discussions therefore emphasize that benefit-sharing should extend beyond financial remuneration. Sustainable governance should also include educational support, cultural revitalization, digital capacity building, technology transfer, and opportunities for communities to participate in governance processes. Such measures promote cultural sustainability while encouraging innovation based on principles of fairness and mutual responsibility.

5.6 Toward an Integrated Governance Approach

These six issues demonstrate that no single legal instrument can adequately address the challenges arising from the interaction between artificial intelligence and digital cultural heritage. Copyright law remains important, but it represents only one component of a much broader governance landscape involving community rights, cultural ethics, digital governance, transparency, participation, and social justice.

Accordingly, the protection of digital cultural heritage requires an integrated governance framework capable of balancing technological innovation with the long-term preservation of cultural identity and community rights. This synthesis provides the conceptual foundation for the Digital Cultural Heritage Protection Framework (DCHPF) proposed in the following section, which seeks to integrate these complementary dimensions into a coherent governance model suitable for the AI era.

6. DIGITAL CULTURAL HERITAGE PROTECTION FRAMEWORK (DCHPF)

The synthesis presented in the preceding section demonstrates that protecting digital cultural heritage in the age of artificial intelligence requires a governance approach that extends beyond conventional intellectual property law. The challenges identified including the digitization of cultural heritage, AI-driven use of cultural data, limited recognition of community rights, inadequate transparency, and the absence of equitable benefit-sharing are closely interconnected and cannot be effectively addressed through isolated legal measures. They require a governance model that integrates legal, technological, ethical, and cultural dimensions within a single conceptual framework.

In response to these challenges, this article proposes the Digital Cultural Heritage Protection Framework (DCHPF) as an integrated governance model for the responsible use of digital cultural heritage throughout the AI lifecycle. Rather than focusing solely on ownership or copyright protection, the framework emphasizes community participation, cultural integrity, transparency, and sustainable governance. It positions

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indigenous peoples and local communities not merely as providers of cultural information but as legitimate rights holders, decision-makers, and beneficiaries in the governance of cultural resources.

The DCHPF consists of six interrelated components (Figure 2). These components should not be viewed as independent legal mechanisms but as complementary elements of a comprehensive governance system. Together, they seek to balance technological innovation with the long-term protection of cultural heritage and community rights.

Community-Centered Rights constitute the foundation of the framework. The DCHPF recognizes that traditional cultural heritage is collectively created and maintained through community participation. Accordingly, communities should possess meaningful authority over decisions concerning the preservation, access, interpretation, and utilization of their cultural heritage within digital environments. This perspective moves beyond conventional intellectual property by emphasizing collective stewardship rather than individual ownership.

The second component, Cultural Data Governance, recognizes that cultural data require governance arrangements that reflect their cultural significance rather than treating them as ordinary digital information. Different categories of cultural heritage may require different levels of protection depending on their cultural sensitivity, customary restrictions, and potential social impacts. Such governance promotes responsible access while respecting community values and cultural diversity.

The third component is AI Transparency. Responsible AI governance requires greater openness regarding the sources of cultural data used in AI development, the purposes for which those data are processed, and the safeguards implemented to prevent inappropriate or culturally harmful uses. Transparency strengthens accountability and enables communities to understand how their cultural heritage contributes to AI systems.

The fourth component is the establishment of a Digital Cultural Heritage Registry. Beyond documenting cultural resources, the registry functions as a governance mechanism that records community custodianship, cultural protocols, access conditions, licensing arrangements, and other information relevant to the responsible management of cultural heritage. Such a registry provides an institutional foundation for long-term cultural governance while supporting cultural preservation and legal certainty.

The fifth component concerns Licensing and Prior Informed Consent. The framework proposes that culturally significant heritage should be used in AI systems only under transparent licensing arrangements and with appropriate community participation. Prior informed consent promotes trust, strengthens legal certainty, and ensures that communities remain active participants in decisions affecting their cultural resources.

Finally, the framework incorporates Equitable Benefit-Sharing as a core principle of cultural justice. Benefits arising from the use of cultural heritage should not be limited to financial compensation but should also include educational opportunities, capacity building, technology transfer, cultural revitalization, digital infrastructure, and other forms of community development. Such an approach encourages innovation while ensuring that communities share fairly in the social, cultural, and economic value generated through AI technologies.

Taken together, these six components form an integrated governance framework that addresses the complete lifecycle of digital cultural heritage—from documentation and data governance to AI development, cultural use, and community benefit. Rather than replacing existing intellectual property law, the DCHPF complements current legal frameworks by incorporating principles of cultural rights, digital governance, and ethical artificial intelligence. In doing so, it provides a flexible conceptual model capable of supporting future legal reform and policy development in Thailand and other jurisdictions confronting similar challenges.

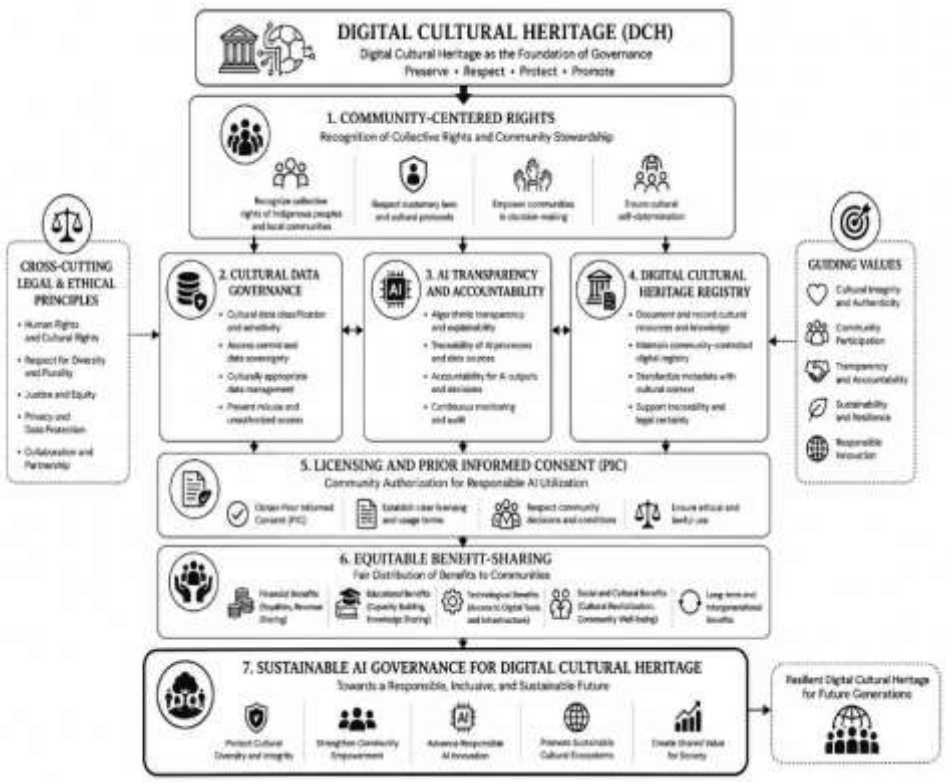


Figure 2. Digital Cultural Heritage Protection Framework (DCHPF)

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7. DISCUSSION AND IMPLICATIONS

The Digital Cultural Heritage Protection Framework (DCHPF) proposed in this article extends current scholarship by presenting a community-centered governance model for protecting digital cultural heritage in the era of artificial intelligence. Rather than approaching the issue solely through the perspective of copyright protection, the framework integrates principles of cultural rights, digital governance, AI ethics, and community participation into a unified conceptual model. This broader perspective reflects the increasingly interdisciplinary nature of digital cultural heritage governance and acknowledges that technological innovation should be accompanied by mechanisms that safeguard cultural identity and social justice.

One important implication of the proposed framework is the recognition that traditional intellectual property law alone is insufficient to govern the use of cultural heritage in AI systems. Copyright law remains an important mechanism for protecting creative works; however, it was primarily designed to protect identifiable authors, original works, and limited periods of exclusive rights. Traditional knowledge and traditional cultural expressions differ fundamentally because they are collectively developed, continuously transmitted across generations, and closely associated with community identity and customary practices. Consequently, effective governance requires legal approaches that complement intellectual property law by recognizing collective rights and community participation.

The DCHPF also highlights the importance of treating cultural heritage as a form of culturally significant data rather than merely as digital information. As AI increasingly relies on large-scale datasets to generate creative content, the governance of cultural data becomes as important as the protection of cultural expressions themselves. This perspective shifts attention from questions of ownership alone toward broader issues of transparency, accountability, consent, and responsible data governance throughout the AI lifecycle.

Another important contribution of the framework lies in its emphasis on community participation. The proposed model recognizes indigenous peoples and local communities as active partners in the governance of their cultural heritage rather than passive providers of information. Such participation strengthens the legitimacy of governance decisions, supports cultural sustainability, and promotes greater trust between communities, governments, cultural institutions, and technology developers. This approach is consistent with emerging international discussions concerning Indigenous data sovereignty and community-centered governance, which increasingly emphasize the role of communities in managing culturally significant information.

From a policy perspective, the DCHPF provides a practical foundation for developing future legal and institutional mechanisms governing the use of digital cultural heritage in AI environments. Governments may apply the framework when developing legislation concerning AI governance, digital cultural heritage, and community rights. Cultural institutions may use it to establish guidelines for digital archives, heritage registries, and access management. Likewise, AI developers may adopt its principles to strengthen transparency, improve community engagement, and promote the responsible use of cultural resources in AI development.

The framework also contributes to broader discussions concerning sustainable development. Protecting digital cultural heritage is not solely a matter of preserving the past but also of ensuring that cultural resources continue to support education, creativity, innovation, and community well-being in the future. In this respect, the DCHPF is consistent with the objectives of the United Nations Sustainable Development Goals (SDGs), particularly SDG 4 (Quality Education) through the preservation and transmission of cultural knowledge, SDG 11 (Sustainable Cities and Communities) through safeguarding cultural heritage, SDG 16 (Peace, Justice and Strong Institutions) through strengthening transparent and participatory governance, and SDG 17 (Partnerships for the Goals) by encouraging collaboration among governments, communities, cultural institutions, and technology developers. By integrating these dimensions, the framework demonstrates that cultural heritage protection and technological innovation should be regarded as complementary rather than competing objectives. The proposed framework is also consistent with recent interdisciplinary scholarship highlighting the contribution of artificial intelligence to music education, cultural preservation, and sustainable development. AI-assisted educational innovation can enhance psychological well-being, support quality music education, and strengthen the long-term preservation of cultural heritage when implemented within ethical governance frameworks (Santaveesuk et al., 2025).

Although the DCHPF is developed primarily as a conceptual framework, its principles are sufficiently flexible to be adapted across different legal systems and cultural contexts. Future studies may further refine the framework through comparative legal analysis, policy evaluation, or empirical research examining its practical implementation in specific countries or cultural communities. Such research would strengthen understanding of how community-centered governance can be translated into effective legal and institutional practices within rapidly evolving AI ecosystems.

Overall, the DCHPF demonstrates that the future governance of digital cultural heritage should move beyond a narrow focus on intellectual property protection toward a more comprehensive governance paradigm integrating community rights, cultural integrity, digital governance, and responsible artificial intelligence. Such an approach provides a balanced pathway for supporting technological innovation while preserving the cultural diversity, knowledge systems, and collective identities that constitute the foundation of humanity's shared cultural heritage.

Table 2. Comparison Between Conventional Intellectual Property and the DCHPF

Conventional IP	DCHPF
Individual ownership	Community-centered rights
Copyright	Cultural governance
Exclusive rights	Shared stewardship
Ownership	Participation
Economic protection	Cultural sustainability
Legal remedy	Integrated governance

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8. POLICY RECOMMENDATIONS

The findings of this study suggest that protecting digital cultural heritage in the era of artificial intelligence requires governance mechanisms that integrate legal regulation, institutional capacity, technological responsibility, and community participation. As AI technologies continue to evolve, governments, cultural institutions, and technology developers should adopt policies that balance innovation with the protection of cultural diversity and community rights.

A first priority is the development of legal frameworks that explicitly recognize the rights of indigenous peoples and local communities over their traditional knowledge and cultural expressions in digital environments. Existing intellectual property laws remain important for protecting individual creative works, but they should be complemented by legal mechanisms capable of recognizing collective cultural rights, cultural stewardship, and community participation in decision-making. Such legal reforms would strengthen the protection of traditional cultural heritage while reducing legal uncertainty concerning the use of cultural resources in AI systems.

Second, governments should promote governance mechanisms that ensure greater transparency in the development of artificial intelligence. AI developers and digital platform providers should clearly disclose whether culturally significant materials have been incorporated into training datasets and should implement appropriate safeguards when handling culturally sensitive information. Increased transparency would strengthen public trust, improve accountability, and enable communities to participate more effectively in decisions concerning the use of their cultural heritage.

Third, cultural institutions should expand their role beyond documentation and preservation by establishing governance systems for digital cultural resources. Digital heritage registries, culturally appropriate access policies, and community consultation mechanisms can help ensure that digital preservation is accompanied by responsible management of cultural data. Such initiatives also create opportunities for collaboration among museums, archives, universities, local communities, and technology developers.

Another important policy priority concerns the implementation of prior informed consent and equitable benefit-sharing mechanisms. Where digital cultural heritage contributes to commercial AI applications or other value-generating activities, communities should be appropriately involved in decision-making and should share fairly in the resulting benefits. Benefit-sharing may include financial returns, educational opportunities, digital infrastructure development, capacity building, cultural revitalization program, or technology transfer. These mechanisms support not only fairness but also the long-term sustainability of cultural heritage.

Finally, effective governance cannot be achieved by governments acting alone. The protection of digital cultural heritage requires sustained collaboration among public agencies, cultural institutions, local communities, researchers, international organizations, and the private technology sector. Multi-stakeholder partnerships provide opportunities to exchange knowledge, develop common governance standards, and encourage responsible innovation while respecting cultural diversity. Such collaborative governance is increasingly important as AI technologies continue to transcend national boundaries and operate across multiple legal and cultural contexts.

Taken together, these policy recommendations demonstrate that the future governance of digital cultural heritage should combine legal protection, institutional cooperation, technological accountability, and meaningful community participation. The Digital Cultural Heritage Protection Framework (DCHPF) offers a conceptual foundation upon which these policy initiatives may be developed and adapted to different national contexts while supporting both technological innovation and cultural sustainability.

Table 3. Policy Priorities for Digital Cultural Heritage Governance

Stakeholder	Priority
Government	Legal reform
Communities	Cultural participation
AI Developers	Transparency
Museums	Digital registry
Universities	Capacity building
International Organizations	Cooperation

9. CONCLUSION

Artificial intelligence is rapidly reshaping the ways in which cultural heritage is preserved, interpreted, and utilized. While digital technologies and AI provide unprecedented opportunities for documenting, revitalizing, and disseminating intangible cultural heritage, they also introduce complex legal, ethical, and governance challenges that extend beyond the scope of conventional intellectual property law. Issues relating to community rights, cultural integrity, transparency, ownership, and equitable benefit-sharing have become increasingly significant as traditional cultural knowledge is transformed into digital resources and incorporated into AI systems.

This article argues that these emerging challenges cannot be effectively addressed through copyright law alone. Instead, the protection of digital cultural heritage requires an integrated governance approach that recognizes the collective nature of cultural heritage and the continuing role of indigenous peoples and local communities as custodians of cultural knowledge. By synthesizing scholarship from cultural heritage studies, intellectual property law, artificial intelligence governance, Indigenous data sovereignty, and community rights, this study demonstrates that future governance should move beyond fragmented legal solutions toward a more comprehensive and community-centered governance model.

The principal contribution of this article is the development of the Digital Cultural Heritage Protection Framework (DCHPF). The framework integrates six complementary governance dimensions community-centered rights, cultural data governance, AI transparency, digital cultural heritage registry, licensing and prior informed consent, and equitable benefit-sharing into a coherent conceptual model. Unlike

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conventional approaches that focus primarily on ownership or copyright protection, the DCHPF emphasizes responsible governance throughout the entire AI lifecycle while balancing technological innovation with cultural sustainability and social justice.

Beyond its theoretical contribution, the framework also provides practical guidance for policymakers, cultural institutions, technology developers, and local communities. It demonstrates how legal principles, institutional arrangements, ethical standards, and community participation may be combined to strengthen the protection of digital cultural heritage without restricting technological innovation. In this respect, the DCHPF offers a flexible governance model that may be adapted to different legal systems and cultural contexts while supporting international efforts to promote responsible artificial intelligence.

The findings of this study also contribute to the broader global agenda for sustainable development. Effective protection of digital cultural heritage supports lifelong learning and cultural transmission, strengthens community resilience, promotes inclusive institutions, and encourages partnerships among governments, cultural organizations, researchers, technology developers, and local communities. Consequently, safeguarding cultural heritage should be regarded not only as a cultural objective but also as an essential component of sustainable digital transformation.

Although this article proposes a comprehensive conceptual framework, further research remains necessary to evaluate its practical implementation in different legal and cultural settings. Comparative legal studies, policy analyses, and empirical investigations involving governments, cultural institutions, AI developers, and local communities would provide valuable evidence for refining the framework and assessing its effectiveness. Future studies may also explore the application of the DCHPF to specific cultural sectors, including traditional music, performing arts, indigenous languages, crafts, museums, digital archives, and emerging AI technologies.

Ultimately, the future of artificial intelligence and the future of cultural heritage should not be viewed as competing interests. Rather, sustainable technological innovation depends upon governance systems that respect cultural diversity, recognize community rights, promote ethical AI, and ensure that the benefits of digital transformation are shared fairly among all stakeholders. The Digital Cultural Heritage Protection Framework (DCHPF) proposed in this article represents one possible pathway toward achieving this balance and contributes to the continuing international dialogue on the responsible governance of cultural heritage in the age of artificial intelligence.

10. LIMITATIONS

Although this article proposes a comprehensive conceptual framework for protecting digital cultural heritage in the era of artificial intelligence, several limitations should be acknowledged.

First, the study is based on an integrative review of interdisciplinary literature rather than empirical investigation. Consequently, the proposed Digital Cultural Heritage Protection Framework (DCHPF) has not been validated through field implementation or stakeholder evaluation. Its effectiveness in different legal, institutional, and cultural contexts therefore remains to be examined.

Second, this article adopts a broad international perspective by synthesizing legal scholarship, policy documents, and governance frameworks from multiple jurisdictions. While this approach enables the identification of common governance principles, it does not provide a detailed analysis of the legal systems of individual countries. Future legal reforms will therefore need to consider national constitutional structures, cultural diversity, and existing legislative frameworks.

Finally, artificial intelligence technologies continue to evolve rapidly, creating new governance challenges that may extend beyond those discussed in this article. Emerging developments in foundation models, multimodal generative AI, autonomous agents, and synthetic media are likely to reshape the governance of digital cultural heritage in the coming years. Consequently, the DCHPF should be regarded as a flexible conceptual framework that can evolve alongside technological, legal, and societal developments.

Despite these limitations, the framework provides an integrated foundation for future legal development, public policy, and interdisciplinary scholarship by bringing together cultural rights, digital governance, artificial intelligence, and community participation within a coherent governance model for the protection of digital cultural heritage.

11. POLICY AND LEGAL RECOMMENDATIONS

11.1 Enact a Dedicated Legal Framework for the Protection of Digital Cultural Heritage

Thailand should consider enacting dedicated legislation or a specialized chapter within existing cultural heritage or intellectual property laws to govern the protection of digital cultural heritage in the era of artificial intelligence. Such legislation should formally recognize indigenous peoples and local communities as rights holders, establish legal principles governing the use of cultural data in AI systems, and provide effective remedies for unauthorized use, cultural misappropriation, and AI-related exploitation.

A comprehensive legal framework should also define community rights over digital cultural resources, establish obligations for AI developers and digital platform providers, and introduce enforcement mechanisms capable of addressing emerging forms of cultural harm that are not adequately covered by conventional copyright law.

11.2 Establish a Legally Recognized Digital Cultural Heritage Registry

A Digital Cultural Heritage Registry should be established with explicit legal effect. Rather than functioning merely as an inventory of cultural assets, the registry should document the originating community, ownership and custodianship information, cultural protocols, permitted uses, access classifications, community representatives, licensing conditions, and benefit-sharing arrangements associated with each registered cultural resource.

Such a registry would serve both as documentary evidence of community rights and as a practical governance mechanism for regulating access to cultural heritage within digital and AI environments. Importantly, the registry should operate under meaningful community participation to prevent governmental agencies or external organizations from exercising unilateral control over community-owned cultural heritage.

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11.3 Require Transparency in the Use of Cultural Data for Artificial Intelligence Training

Developers of artificial intelligence systems should be legally required to disclose whether cultural heritage, traditional knowledge, or traditional cultural expressions have been incorporated into AI training datasets.

Transparency obligations should include disclosure of the categories of cultural data used, their sources, licensing arrangements, consent status, applicable community restrictions, and measures adopted to safeguard culturally sensitive information. Such requirements would strengthen public accountability while enabling communities to monitor and challenge unauthorized uses of their cultural heritage.

11.4 Develop Standard Licensing Agreements for the Use of Cultural Heritage in Artificial Intelligence

Governments and relevant cultural institutions should develop standardized licensing agreements specifically designed for the use of traditional cultural heritage in artificial intelligence systems.

These agreements should clearly define the scope of authorized use, duration of authorization, permitted purposes, attribution requirements, cultural restrictions, obligations to preserve cultural integrity, benefit-sharing provisions, and mechanisms allowing communities to withdraw consent or object to culturally inappropriate uses.

Standardized licensing frameworks would enhance legal certainty while facilitating responsible innovation and ethical AI development.

11.5 Recognize the Right to Cultural Integrity

Communities should be granted an explicit legal Right to Cultural Integrity, enabling them to oppose, prevent, or seek legal remedies against uses of their cultural heritage that distort, desecrate, trivialize, or otherwise undermine its cultural significance.

Such protection should extend beyond traditional copyright law by recognizing that cultural harm may occur even when no formal copyright infringement exists. The legal system should therefore acknowledge cultural integrity as an independent legal interest deserving protection alongside economic rights and intellectual property interests.

11.6 Establish a Benefit-Sharing Fund for Digital Cultural Heritage

Whenever digital cultural heritage contributes to the creation of economic value through artificial intelligence, digital platforms, or other emerging technologies, a proportion of the resulting economic benefits should be allocated to a Digital Cultural Heritage Benefit-Sharing Fund.

The fund should support community-based cultural preservation initiatives, intergenerational transmission of traditional knowledge, educational scholarships, digital capacity-building programs, community archives, cultural documentation projects, and other activities that strengthen the long-term sustainability of traditional cultural heritage.

Such a mechanism would operationalize the principle of cultural justice by ensuring that indigenous peoples and local communities receive equitable benefits from the commercialization and technological utilization of their cultural resources, thereby transforming them from passive providers of cultural data into active beneficiaries and partners in the digital economy.

12. PROPOSED LEGAL AND INSTITUTIONAL FRAMEWORK FOR THAILAND

The findings of this study provide a practical foundation for developing a legal framework that addresses the protection of digital cultural heritage within Thailand's emerging artificial intelligence ecosystem. Rather than relying solely on conventional intellectual property legislation, the proposed framework integrates community rights, cultural data governance, AI transparency, and equitable benefit-sharing into a comprehensive governance model.

Although Thailand possesses several legal instruments relevant to intellectual property, cultural heritage, and community rights, these laws were enacted independently and do not provide an integrated governance framework for addressing the challenges posed by artificial intelligence. In particular, current legislation lacks explicit provisions concerning community-centered governance, digital cultural heritage registries, AI transparency, licensing of culturally sensitive data, and equitable benefit-sharing. Consequently, future legal reform should move beyond fragmented regulation toward an integrated governance model capable of balancing technological innovation with cultural sustainability.

The potential application of the Digital Cultural Heritage Protection Framework (DCHPF) within the Thai legal context is summarized



Figure 3. Proposed Legal and Policy Framework for Implementing the Digital Cultural Heritage Protection Framework (DCHPF) in Thailand

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The proposed legal mechanisms collectively seek to establish a governance system that balances technological innovation with cultural sustainability while ensuring meaningful community participation throughout the digital lifecycle of cultural heritage.

13. NOVEL CONTRIBUTIONS OF THE ARTICLE

This article makes four principal contributions to the emerging scholarship on artificial intelligence and digital cultural heritage.

First, it reconceptualizes the relationship between artificial intelligence and cultural heritage by arguing that the central challenge extends beyond conventional copyright protection. Instead, AI governance should be understood primarily as an issue of cultural data governance, community rights, and digital cultural justice, thereby broadening the legal and policy discourse surrounding AI and traditional knowledge.

Second, this article introduces the concept of Digital Cultural Extraction to explain how traditional cultural knowledge is increasingly incorporated into AI training datasets and transformed into economic value without the knowledge, participation, or effective control of the originating communities. This concept provides a new analytical lens for understanding the intersection between artificial intelligence, data colonialism, and cultural exploitation.

Third, this study develops the Digital Cultural Heritage Protection Framework (DCHPF), an original conceptual model that integrates six complementary governance components: community-centered rights, cultural data governance, AI transparency, digital cultural heritage registries, licensing and prior informed consent mechanisms, and equitable benefit-sharing. By connecting these elements within a single governance architecture, the DCHPF offers a comprehensive framework for protecting digital cultural heritage in AI ecosystems.

Fourth, the article proposes a practical policy roadmap for Thailand by identifying concrete legal and institutional reforms necessary to safeguard digital cultural heritage in the era of artificial intelligence. These recommendations provide guidance for future legislative development and institutional innovation while supporting the growth of Thailand's creative economy in a manner consistent with cultural sustainability and community rights.

Collectively, these four contributions advance existing scholarship by shifting the focus from conventional intellectual property protection toward an integrated governance paradigm emphasizing cultural data sovereignty, community participation, and ethical AI governance.

14. CONCLUSION

Artificial intelligence has created unprecedented opportunities for the preservation, revitalization, and dissemination of intangible cultural heritage. Digital technologies and AI systems can substantially enhance cultural documentation, educational accessibility, multilingual preservation, and intergenerational transmission of traditional knowledge. At the same time, however, these technologies have introduced novel risks that conventional intellectual property law is not adequately equipped to address. Among the most pressing challenges are the use of cultural data for AI training without community consent, the generation of culturally distorted or misleading content, and the commercialization of traditional knowledge without equitable benefit-sharing for the originating communities.

This article argues that protecting cultural heritage in the era of artificial intelligence requires a fundamental transition from a framework centered exclusively on protecting creative works toward one that safeguards cultural data, community rights, and cultural integrity. Such a transformation recognizes that traditional knowledge and cultural expressions represent collectively owned living heritage rather than merely intellectual property subject to conventional copyright doctrines.

To address these emerging challenges, this article proposes the Digital Cultural Heritage Protection Framework (DCHPF) as an integrated governance model capable of balancing technological innovation with cultural sustainability. By combining community-centered rights, cultural data governance, AI transparency, digital cultural heritage registries, licensing and prior informed consent mechanisms, and equitable benefit-sharing, the DCHPF enables indigenous peoples and local communities to retain meaningful authority over the governance, authorization, and utilization of their cultural heritage within digital and AI environments.

Looking forward, Thailand should accelerate the development of legislation and public policies specifically addressing digital cultural heritage. Priority should be given to establishing legally recognized digital cultural heritage registries, implementing community consent mechanisms based on Free, Prior, and Informed Consent (FPIC) principles, developing standardized AI licensing agreements for cultural data, and creating equitable benefit-sharing systems that return economic value to traditional knowledge holders.

Ultimately, the sustainable development of artificial intelligence and the creative economy should proceed alongside the protection of cultural diversity, community autonomy, and cultural justice. Achieving this balance will ensure that technological innovation strengthens rather than diminishes the cultural heritage that communities have preserved and transmitted across generations.

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