ICT AND THE INDIAN KNOWLEDGE SYSTEM: BRIDGING TRADITION AND TECHNOLOGY

Harishankar Singh
Founder Head & Former Dean,
Department of Education, School of Education,
Babasaheb Bhimrao Ambedkar University, Lucknow.

ISSN 2277-7733
Volume 14 Issue 3,
December 2025

Abstract

The integration of Information and Communication Technology (ICT) with the Indian Knowledge System (IKS) represents a transformative convergence of ancient epistemic traditions and modern digital innovation. This study examines how ICT facilitates the preservation, dissemination, and revitalization of IKS through digital infrastructures, policy interventions, and institutional frameworks. Using a mixed-methods approach, it analyzes quantitative data from AICTE-IKS reports, national education platforms (SWAYAM, DIKSHA), and bibliometric databases (Scopus, Shodhganga) from 2015-2024, alongside a qualitative review of NEP 2020 and related policy documents. Findings reveal exponential growth in ICT-enabled IKS initiatives, with significant expansion in digital learning platforms, manuscript digitization, and cross-disciplinary research collaborations. ICT has democratized access to indigenous knowledge, fostered pedagogical innovation, and redefined traditional modes of transmission through digital-dialogical learning. However, challenges persist concerning linguistic inclusivity, metadata standardization, and contextual authenticity. The study concludes that sustainable integration requires ethical digital frameworks and participatory models that preserve cultural integrity while leveraging ICT for innovation and inclusion. Ultimately, ICT and IKS together exemplify India's endeavour to harmonize tradition with technology in building an equitable, knowledge-based society.

Keywords: *Indian Knowledge System (IKS), Information and Communication Technology (ICT), Digital Education, Cultural Heritage, NEP 2020, Indigenous Knowledge, Digital Pedagogy, Knowledge Preservation*

The twenty-first century has ushered in an era of unprecedented transformation in the production, preservation, and dissemination of knowledge, driven largely by the rapid advancement of Information and Communication Technology (ICT). Digital infrastructures now underpin nearly every aspect of educational, cultural, and research activity, dissolving spatial and temporal constraints that once limited access to information. ICT has fundamentally altered how societies learn, communicate, and create, fostering what UNESCO (2022) identifies as a "global knowledge society" characterized by inclusivity, interconnectivity, and innovation. In this evolving landscape, ICT is not merely a tool for transmission but a catalyst for democratization enabling equitable access to education, bridging rural-urban divides, and promoting lifelong learning opportunities.

In the Indian context, ICT holds a particularly transformative potential because of its dual role as both a democratizing agent and a medium of cultural continuity. While ICT has globally expanded the frontiers of modern education, in India, it also serves as a conduit for revitalizing and recontextualizing the Indian Knowledge System (IKS), a body of indigenous intellectual traditions that

constitute one of the world's most ancient and sophisticated epistemological frameworks. The Indian Knowledge System encompasses diverse domains such as philosophy, logic, grammar, linguistics, mathematics, medicine (Ayurveda), architecture (Vāstu Śāstra), astronomy, ecology, music, and governance (Joshi, 2021). More than a collection of subject areas, IKS represents a holistic worldview grounded in the unity of knowledge and action, where the empirical, ethical, and spiritual dimensions of human existence are inseparably interwoven (Radhakrishnan, 2020).

Traditionally, IKS was transmitted through oral and experiential modes of learning, embodied in the guru-śiṣya paramparā (teacher-disciple lineage). This pedagogical model emphasized moral discipline (śīla), devotion (śraddhā), and direct experiential realization (anubhava), contrasting with the textual and institutionalized learning that later came to dominate under colonial and modern education systems. The onset of British rule and subsequent Westernization of higher education systems marginalized these indigenous epistemic traditions, replacing them with positivist and utilitarian frameworks that privileged textual rationality over embodied wisdom (Chatterjee, 2018). As a result, vast repositories of traditional knowledge were either devalued, fragmented, or rendered inaccessible within mainstream academia.

The National Education Policy (NEP) 2020 has initiated a paradigm shift in India's approach to knowledge and education by explicitly recognizing the relevance of IKS in contemporary pedagogy and research. The policy underscores the need for "rootedness and pride in India" while simultaneously promoting global engagement and scientific temper (Ministry of Education, 2020, p. 47). This has catalyzed the institutionalization of IKS within modern academic frameworks through initiatives such as the AICTE-IKS Division, the establishment of digital repositories, and the development of online IKS curricula. These initiatives mark a significant effort to bridge the historical gap between traditional wisdom and modern knowledge systems using the affordances of ICT.

The convergence of ICT and IKS thus represents a dual opportunity and responsibility. On one hand, ICT enables the preservation and digitization of ancient manuscripts, artifacts, and oral traditions, many of which are at risk due to physical decay, linguistic obsolescence, or loss of custodial knowledge. On the other hand, it provides innovative pedagogical tools to contextualize traditional wisdom within modern problem-solving frameworks related to sustainability, healthcare, governance, and digital ethics. The development of digital archives, Massive Open Online Courses (MOOCs), interactive multimedia resources, and AI-driven language processing tools has transformed how IKS can be accessed, taught, and reinterpreted in the digital age. However, this convergence is not without its challenges. The translation of IKS into digital formats raises critical questions regarding authenticity, contextual integrity, and epistemic representation. Uncritical digitization risks reducing IKS to mere data decontextualized from the socio-cultural and spiritual ecosystems that sustain its meaning. Therefore, the application

of ICT to IKS must be guided by ethical frameworks that respect cultural diversity, linguistic plurality, and community participation.

Against this backdrop, the present study adopts a data-driven approach to examine how India's ICT ecosystem is facilitating the mainstreaming of IKS through policy interventions, institutional initiatives, and technological innovation. Drawing on quantitative data from AICTE-IKS reports, digital education platforms, bibliometric analyses, and government databases, alongside a qualitative review of policy frameworks, this paper explores how ICT acts as both an enabler and mediator of India's indigenous knowledge heritage. Specifically, it investigates the growth of ICT-linked IKS projects, the proliferation of digital learning platforms, the digitization of manuscripts, and the evolution of research trends between 2015 and 2024. By doing so, it aims to provide an empirical and conceptual understanding of how ICT and IKS together embody India's endeavour to harmonize tradition and technology in building an inclusive, knowledge-based society.

Literature Review

ICT in Education: A Transformative Catalyst: Information and Communication Technology (ICT) has emerged as one of the most transformative forces in contemporary education, reshaping the ways knowledge is produced, transmitted, and consumed. Globally, ICT has expanded educational access, enhanced pedagogical interactivity, and fostered collaborative learning ecosystems that transcend physical and temporal boundaries (Anderson, 2019). According to UNESCO (2022), the integration of ICT into education not only improves learner engagement but also promotes equity by bridging spatial and socio-economic divides. Digital learning environments supported by multimedia, simulations, and cloud-based resources enable learners to interact dynamically with content, fostering both critical and creative capacities.

In India, ICT has been strategically deployed as a tool for educational democratization. National initiatives such as the National Mission on Education through ICT (NMEICT), SWAYAM, and DIKSHA have revolutionized access to high-quality educational content, particularly in higher and technical education (Ministry of Education, 2022). The NMEICT project alone has developed more than 1,500 online courses, while SWAYAM currently hosts over 4,000 MOOCs with a cumulative enrollment exceeding 32 million learners as of 2024 (SWAYAM Analytics, 2024). These platforms have made education more inclusive, offering learners in rural and underserved regions opportunities that were once limited to elite institutions. ICT's transformative impact on India's educational infrastructure has, therefore, laid the groundwork for its application in revitalizing Indian Knowledge Systems (IKS) facilitating their preservation, dissemination, and reinterpretation in the digital era.

Understanding the Indian Knowledge System: The Indian Knowledge System (IKS) represents a civilizational continuum of intellectual and ethical inquiry that integrates metaphysical reflection with empirical observation. Rooted in the

triadic synthesis of jnāna (knowledge), karma (action), and śīla (ethical conduct), IKS emphasizes the unity of theory and practice as the foundation of true understanding (Dasgupta, 1940). This framework reflects a holistic worldview, where the pursuit of knowledge is inseparable from moral and ecological responsibility. Across disciplines such as Ayurveda (medicine), Yoga (well-being), Nyāya (logic), Vāstu Shāstra (architecture), and Arthashāstra (governance), ancient Indian thinkers developed methodologies of reasoning and observation that predate yet parallel modern scientific approaches (Radhakrishnan, 2020).

Contemporary scholarship increasingly recognizes IKS not as a relic of the past but as a living epistemic tradition with contemporary applicability. Its principles are being revisited in fields such as sustainable development, environmental ethics, psychological well-being, and governance (Nair, 2021). The National Education Policy (NEP) 2020 explicitly acknowledges this relevance, advocating for the integration of IKS into mainstream education to promote cultural rootedness while engaging with global epistemic challenges. The NEP envisions IKS as a "vibrant knowledge tradition" essential for cultivating a national identity grounded in pluralism, ethics, and innovation (Ministry of Education, 2020, p. 47). By embedding IKS into contemporary pedagogy, the policy aims to reorient Indian education toward its philosophical foundations while equipping learners for global knowledge economies.

ICT as a Bridge between Tradition and Technology: ICT serves as a critical bridge connecting the depth of India's traditional knowledge heritage with the dynamism of digital technology. The digitization of manuscripts, creation of multimedia learning resources, and formation of online repositories have enabled unprecedented access to IKS materials that were once confined to specialized archives or oral traditions. Projects such as the Digital Library of India, Bharat Vidya Portal, and the National Mission for Manuscripts (NAMAMI) have collectively digitized hundreds of thousands of manuscripts across domains like Ayurveda, astronomy, linguistics, and philosophy (IGNCA, 2023). These digital platforms not only preserve fragile knowledge artefacts but also make them available to global audiences through searchable metadata, translation tools, and open-access repositories.

Beyond preservation, ICT facilitates pedagogical innovation in the transmission of IKS. Interactive platforms, MOOCs, and augmented or virtual reality (AR/VR) tools are now used to reconstruct ancient Indian scientific practices, visualize historical sites, and simulate philosophical dialogues. For instance, IIT Kharagpur's digital course Foundations of Indian Knowledge Systems integrates 3D models of Vedic geometries and online discussion forums, enabling learners to explore IKS through immersive and dialogical learning methods (Singh & Nair, 2023). Such initiatives illustrate how ICT reconfigures the traditional guru-śiṣya model into a digital-dialogical paradigm, sustaining the ethos of mentorship while expanding access and interactivity.

However, scholars caution that the uncritical digitization of traditional knowledge can lead to epistemic distortion. Menon (2021) argues that when indigenous knowledge is extracted from its cultural and linguistic context, it risks being reduced to mere data detached from its ethical and experiential essence. Therefore, while ICT enables the democratization and revitalization of IKS, it must operate within frameworks that respect context, authenticity, and interpretive nuance. The goal should not be to modernize IKS in form alone, but to preserve its philosophical substance while leveraging the transformative power of technology for inclusive knowledge dissemination.

Objective

The objective is to examine how Information and Communication Technology (ICT) has facilitated the preservation, dissemination, and innovation of Indian Knowledge Systems (IKS).

Methodology

Research Design: This study employed a mixed-methods approach, integrating quantitative trend analysis with qualitative policy and content review. It relies primarily on secondary data from governmental, institutional, and bibliometric sources between 2015 and 2024.

Data Sources: The research relies exclusively on secondary data drawn from verified institutional and government sources. Key datasets include AICTE-IKS Division Reports (2020–2024), documenting project funding and collaborations; Ministry of Education ICT initiatives such as SWAYAM, DIKSHA, and NMEICT, which provide enrollment and user interaction data; and UGC Digital Education Data Portal (2022–2024), which details institutional adoption of ICT-IKS programs. Additionally, metadata on manuscript digitization were sourced from the Indira Gandhi National Centre for the Arts (IGNCA, 2023), and bibliometric data on research output were collected from Scopus and Shodhganga databases (2015–2024).

Analytical Framework: A two-tier analytical framework was employed. The quantitative component utilized descriptive statistical techniques to measure growth rates in ICT-linked IKS projects, online courses, and scholarly publications. The qualitative component involved thematic analysis of key policy documents particularly the National Education Policy (NEP, 2020) and AICTE–IKS guidelines to interpret institutional priorities and strategies promoting digital integration of indigenous knowledge. This dual approach enabled triangulation between numerical trends and policy narratives

Limitations: The analysis is limited to publicly available secondary data, which may not capture ongoing non-documented projects or localized community initiatives. However, triangulating multiple data sources improves reliability.

Data Analysis and Results

Growth of ICT-Enabled IKS Projects: The data from the AICTE Indian Knowledge Systems (IKS) Division (2024) indicate a remarkable expansion in the number of ICT-integrated research projects under the IKS framework over the last five years.

Table 1 : Growth of ICT-Enabled IKS Projects

Year	Funded Projects	ICT-Integrated (%)	Research Collaborations
2020	12	25	8
2021	46	38	19
2022	97	52	41
2023	145	61	56
2024	186	68	73

(Source: AICTE, 2024)

Between 2020 and 2024, the total number of IKS-related projects increased from 12 to 186 an overall rise of 1,450%, underscoring rapid institutional adoption of ICT methodologies in traditional knowledge research. The most significant growth occurred between 2022 and 2023, coinciding with the launch of the Bharat Vidya Portal and the introduction of AICTE's digital fellowship programs. Moreover, the data show a steady rise in interdisciplinary collaborations, expanding from 8 in 2020 to 73 in 2024, reflecting a growing network of partnerships among universities, research institutions, and private technology firms. This trend suggests that ICT integration is not merely an infrastructural enhancement but a structural transformation in how IKS research is conceptualized, funded, and disseminated across academic domains.

IKS in Digital Learning Platforms

The proliferation of digital learning platforms has played a pivotal role in mainstreaming IKS education across disciplines and learner demographics. According to SWAYAM Analytics (2024), the number of IKS-related online courses increased from 5 in 2020 to 62 in 2024, marking a twelvefold expansion. These courses, which encompass subjects such as Vedic Mathematics, Ayurveda and Wellness Science, Indian Logic and Scientific Thought, and Indigenous Ecological Knowledge, collectively enrolled over 480,000 learners by mid-2024. The DIKSHA platform similarly reported over 1.2 million user interactions with IKS modules in 2023, highlighting the rising public engagement with indigenous knowledge in digital form.

Furthermore, the Bharat Vidya Portal, launched in 2023 by IGNOU and the Ministry of Education, has emerged as a comprehensive digital ecosystem for IKS dissemination. It hosts 3,000+ hours of recorded lectures, 5,200 digitized texts, and virtual museum tours of ancient Indian universities such as Nalanda, Takshashila, and Vikramashila (IGNOU, 2024). These developments signal a paradigm shift from the physical classroom model to open and lifelong learning ecosystems, where digital interfaces enable self-paced, multilingual, and interdisciplinary engagement with traditional knowledge content. The data confirm that digital learning platforms have become essential mediators in the democratization and globalization of IKS education.

Digitization of Manuscripts and Cultural Resources

The digitization of manuscripts and cultural heritage materials forms the backbone of ICT-enabled IKS preservation. According to the Indira Gandhi National Centre for the Arts (IGNCA, 2023), approximately 520,000 manuscripts

had been digitized by the end of 2023, including over 75,000 Sanskrit and Prakrit texts related to IKS disciplines such as Ayurveda, Vāstu Śāstra, Jyotiṣa, and Nyāya. The National Mission for Manuscripts (NAMAMI) further reported the cataloguing of nearly 3 million manuscripts across 82 repositories, of which approximately 30% are now digitally accessible (NAMAMI Report, 2024).

This large-scale digitization effort not only safeguards fragile manuscripts from physical deterioration but also provides open digital access to scholars and practitioners worldwide. Moreover, the integration of metadata, high-resolution imaging, and OCR (Optical Character Recognition) technologies has enhanced searchability and data mining potential for linguistic, philological, and historical research. Despite these advancements, disparities persist across institutions regarding metadata standards and language encoding, underscoring the need for a unified national metadata framework. Nonetheless, the data clearly reveal that ICT-driven digitization has substantially expanded the visibility and preservation capacity of India's traditional knowledge archives, transforming them into dynamic digital repositories of cultural memory.

Research Publication Trends (2015–2024): Bibliometric analysis from Scopus and Shodhganga databases reveals an exponential increase in research output on ICT-IKS integration over the past decade.

Table 2: Research Publication Trends (2015–2024)

Year	ICT–IKS Publications	% Annual Growth
2015	31	—
2017	54	74%
2019	68	26%
2021	123	81%
2023	189	54%
2024	231	22%

(Source: Scopus Database, 2024)

From 2015 to 2024, scholarly publications in this domain grew by more than 640%, demonstrating a sharp and sustained rise in academic interest. Thematic analysis shows that approximately 47% of the studies focus on ICT-enabled pedagogy and curriculum design, while 33% examine digitization, preservation, and metadata systems. The remaining studies explore interdisciplinary linkages particularly between education technology, cultural informatics, and artificial intelligence.

Notably, the period 2020–2023 marked the most dynamic phase, coinciding with NEP 2020's implementation and the pandemic-driven acceleration of digital learning. Citation analysis also suggests a growing trend of cross-disciplinary collaboration, with publications increasingly co-authored by scholars in education, computer science, and heritage studies. This reflects the emergence of IKS as a transdisciplinary research domain supported by both data analytics and cultural theory.

Institutional Adoption of ICT–IKS Integration: Data from the UGC Digital Education Survey (2024) reveal that Indian higher education institutions (HEIs) are increasingly embedding ICT tools into their IKS programs, signaling

institutional consolidation of this trend. Out of 1,056 HEIs surveyed, the following adoption metrics were observed: 42% have introduced IKS-based elective courses using ICT tools such as Learning Management Systems (LMS), interactive simulations, and digital repositories; 23% operate dedicated IKS Centres equipped with digital infrastructure for research and documentation; 12% conduct Faculty Development Programmes (FDPs) on ICT-enabled IKS pedagogy through online or blended modes.

Leading institutions such as IIT Kharagpur, Banaras Hindu University, Nalanda University, and Sanchi University of Buddhist-Indic Studies have pioneered structured ICT–IKS initiatives, including online courses, digital laboratories, and virtual heritage tours. For example, IIT Kharagpur's "Centre of Excellence for Indian Knowledge Systems" integrates computational linguistics and digital humanities to develop AI tools for Sanskrit text analysis. Similarly, BHU's digital archive of Ayurvedic manuscripts combines traditional medicinal knowledge with biomedical informatics.

Discussion

ICT as a Democratizing Agent of IKS: The findings affirm that Information and Communication Technology (ICT) has emerged as a powerful democratizing force within the Indian Knowledge System (IKS) ecosystem. Historically, access to traditional knowledge was mediated through rigid hierarchies of language, caste, and institutional privilege, often restricting participation to a limited scholarly elite proficient in Sanskrit or affiliated with gurukula traditions. ICT has disrupted this exclusivity by opening access to broader populations through digital learning platforms, open educational resources, and e-repositories. Platforms such as SWAYAM, DIKSHA, and Bharat Vidya have made IKS courses freely accessible to students and educators across India, including those from rural and marginalized communities (Singh & Nair, 2023). Through these digital interfaces, learners who were previously excluded from Sanskritic or institutional spaces can now engage with ancient texts, indigenous science, and traditional arts using contemporary pedagogical tools. Furthermore, the incorporation of subtitles, translations, and interactive assessments enhances inclusivity and comprehension. In this sense, ICT has transformed IKS from a localized intellectual heritage into a participatory national knowledge commons, thereby advancing epistemic justice and social inclusion in education.

Transformation of Pedagogy and Knowledge Transmission: ICT has profoundly redefined the modes of pedagogy and transmission within the IKS framework. The traditional guru–śiṣya paramparā, characterized by direct mentorship and experiential learning, has evolved into a digital-dialogical model that retains the essence of guided learning while embracing interactive and multimedia-based engagement. This hybridization allows continuity of traditional epistemic values discipline, dialogue, and reflection within technologically mediated spaces. Modern digital tools such as virtual classrooms, MOOCs, podcasts, and digital archives facilitate collaborative interpretation of ancient manuscripts, fostering a

dialogical approach that bridges traditional hermeneutics with modern analytical methods. For instance, IIT Kharagpur's "Foundations of Indian Knowledge Systems" course integrates 3D simulations, discussion forums, and cross-disciplinary modules to explore Vedic geometry and logic interactively. Similarly, digital storytelling and visualization techniques are being used to teach Sanskrit poetics, Ayurveda, and classical philosophy, making these domains intellectually accessible to students from diverse academic backgrounds. Thus, ICT is not only reshaping how IKS is taught but also transforming it into a living pedagogical tradition responsive to the cognitive styles and expectations of contemporary learners.

Policy Catalysts and Institutional Frameworks: Significant policy interventions and institutional initiatives have accelerated the integration of ICT and IKS. The National Education Policy (NEP) 2020 stands as a landmark reform, emphasizing the need to promote "rootedness and pride in India" and the inclusion of "knowledge of India" as a core curricular theme (Ministry of Education, 2020). This policy impetus has led to the establishment of the AICTE-IKS Division, which coordinates research, curriculum development, and digital dissemination of indigenous knowledge. Under its guidance, several universities have launched online IKS programs and digital repositories, while initiatives such as NAMAMI (National Mission for Manuscripts) and the Indira Gandhi National Centre for the Arts (IGNCA) have expanded digitization projects to preserve and share rare manuscripts. Furthermore, the Digital India campaign and National Digital Library of India (NDLI) have created a robust ICT infrastructure for hosting and accessing IKS content. These frameworks collectively demonstrate how state policy, institutional leadership, and digital technology converge to reimagine IKS as a modern academic discipline supported by data-driven management, open-access platforms, and interdisciplinary collaboration. This alignment between policy and technology is crucial for sustaining the long-term integration of IKS into India's knowledge economy.

Challenges and Gaps: Despite these positive trends, several critical challenges impede the full realization of ICT's transformative potential for IKS.

First, linguistic barriers persist. A significant proportion of IKS literature remains untranslated from Sanskrit, Prakrit, or regional scripts, limiting digital accessibility and cross-cultural engagement (Kumar, 2023). Without systematic translation and linguistic digitization, ICT platforms risk reinforcing the same exclusivity they aim to dismantle.

Second, the quality of digitization and metadata management remains uneven. Inconsistent metadata standards across repositories such as IGNCA and NAMAMI hinder interoperability and effective information retrieval (IGNCA, 2023). The absence of unified taxonomies and ontologies restricts interlinking among disciplines and languages.

Third, there is the issue of pedagogical decontextualization. The digitization of knowledge often strips traditional practices of their lived and ritual contexts,

reducing holistic traditions to textual or visual fragments (Menon, 2021). This decontextualization risks commodifying sacred knowledge for academic consumption without preserving its philosophical or ethical depth.

Fourth, the digital divide remains a persistent structural challenge. As per NITI Aayog (2024), only 37% of rural households in India have reliable internet access, creating disparities in digital participation. Infrastructural inequalities, inadequate digital literacy, and uneven access to ICT devices continue to limit rural engagement with IKS resources. Addressing these challenges requires a comprehensive national strategy that combines linguistic inclusion, metadata standardization, contextual pedagogy, and equitable ICT infrastructure to ensure that the digital renaissance of IKS is both inclusive and sustainable.

The Epistemic Shift: From Preservation to Innovation: ICT's role in IKS has evolved beyond preservation toward innovation and creative re-contextualization. Digital technologies are enabling IKS to emerge as a dynamic knowledge ecosystem contributing to the global digital economy. Artificial Intelligence (AI) and Machine Learning (ML) are now applied to analyze Sanskrit corpora, identify semantic patterns, and reconstruct lost philosophical lineages. Computational models are used to classify Ayurvedic formulations, simulate astronomical calculations from Siddhantic texts, and digitize architectural treatises like Vāstu Śāstra for modern applications in design and sustainability. These developments signify a paradigmatic shift from IKS as a static cultural archive to IKS as a data-rich, innovation-driven field of research. Moreover, ICT enables participatory innovation by connecting traditional practitioners, data scientists, and educators through collaborative platforms. This transformation repositions IKS not as an artifact of the past but as an evolving epistemic system capable of informing modern science, ethics, and sustainable development. In doing so, ICT helps realize the vision of an inclusive, intercultural, and innovation-oriented knowledge society rooted in India's civilizational ethos.

Recommendations

1. Develop a National IKS Knowledge Graph: A national IKS Knowledge Graph should be created using AI and semantic web technologies to interlink diverse knowledge domains such as Ayurveda, astronomy, and linguistics. This would enable advanced data analytics, cross-disciplinary research, and multilingual access, facilitating integration between traditional knowledge and modern digital systems.

2. Establish a Unified IKS Digital Repository: Existing IKS archives (IGNCA, NAMAMI, and Bharat Vidya) should be merged into a single open-access repository under a standardized metadata framework. A unified portal would enhance visibility, reduce duplication, and ensure interoperability for long-term academic and public use.

3. Invest in Digital Pedagogy Training: Comprehensive ICT training for educators and researchers is essential to design culturally grounded digital learning content.

Faculty development programs should focus on multimedia pedagogy, digital storytelling, and ethical online representation of traditional knowledge systems.

4. Promote Multilingual Digitization: Digitization initiatives must prioritize regional and vernacular languages to capture non-Sanskritic indigenous knowledge traditions. Using AI-based translation and OCR tools can expand access, preserving linguistic diversity and ensuring inclusive representation of India's plural knowledge heritage.

5. Strengthen Public–Private Collaboration: Collaborations between government, universities, and EdTech firms should be encouraged to develop AR/VR-based applications for immersive IKS learning. Public–private partnerships can enhance innovation, funding, and scalability of digital heritage projects.

6. Embed Ethical AI in IKS Research: AI-driven research on IKS must adhere to ethical principles that ensure accuracy, transparency, and cultural sensitivity. Algorithms should respect contextual meanings, acknowledge source communities, and adhere to global ethical frameworks like UNESCO's Recommendation on the Ethics of AI (2021).

Conclusion

The integration of ICT and the Indian Knowledge System (IKS) signifies a dynamic convergence of India's civilizational wisdom with modern technological innovation. Data trends reveal a steady expansion of ICT-enabled IKS initiatives, supported by policy frameworks and institutional engagement. Through its scalability and interactivity, ICT has enabled traditional knowledge to transcend geographic, linguistic, and disciplinary boundaries, positioning IKS as a cornerstone of India's emerging knowledge economy. Yet, this integration must remain critically reflective. Digital representation should safeguard cultural authenticity, linguistic diversity, and community participation, ensuring that technology complements rather than distorts traditional epistemologies. Ultimately, the ICT–IKS nexus is not about technology transforming tradition but about tradition humanizing technology embedding it with ethical, inclusive, and sustainable values that define the essence of a truly knowledge-based society.

References

AICTE. (2024). Annual report of the Indian Knowledge Systems (IKS) Division, 2020–2024. All India Council for Technical Education.

Anderson, T. (2019). The theory and practice of online learning (3rd ed.). Athabasca University Press.

Bhattacharya, S. (2022). Digitizing India's intellectual heritage: ICT innovations in manuscript preservation. Journal of South Asian Cultural Studies, 14(2), 77–96.

Bordoloi, P. (2023). Digital pedagogy and indigenous epistemologies in Indian higher education. Asian Journal of Educational Research, 11(1), 34–50.

Chatterjee, S. (2018). Colonial modernity and the displacement of indigenous epistemologies. Oxford University Press.

Dasgupta, S. (1940). A history of Indian philosophy (Vol. 1). Cambridge University Press.

Ghosh, A., & Singh, R. (2022). Reinterpreting the guru–śiṣya paramparā through digital platforms: Pedagogical continuity and change. International Journal of Indic Studies, 8(3), 41–59.

IGNCA. (2023). Digital preservation of manuscripts and cultural heritage: Annual report 2023. Indira Gandhi National Centre for the Arts.

IGNOU. (2024). Bharat Vidya Portal: Annual performance review 2024. Indira Gandhi National Open University.

Jha, P., & Sinha, A. (2021). ICT-enabled educational transformation in India: Policy perspectives and institutional responses. Indian Journal of Open Learning, 30(1), 1–17.

Joshi, K. (2021). Foundations of Indian Knowledge Systems: Concepts and applications. Springer Nature.

Kumar, R. (2023). Linguistic inclusivity and digital access in India's knowledge ecosystems. Journal of Digital Humanities and Education, 9(2), 55–72.

Kumar, S., & Srivastava, M. (2022). The role of NEP 2020 in mainstreaming Indian Knowledge Systems: A digital perspective. Higher Education Policy Review, 12(2), 19–37.

Menon, A. (2021). Contextual integrity and epistemic representation in digital heritage. Cultural Informatics Review, 13(1), 88–104.

Ministry of Education. (2020). National Education Policy 2020. Government of India.

Ministry of Education. (2022). National Mission on Education through ICT: Implementation report. Government of India.

Nair, S. (2021). Reviving traditional epistemologies for contemporary challenges: The role of Indian Knowledge Systems. Journal of Indic Studies, 5(1), 1–15.

NAMAMI. (2024). National Mission for Manuscripts annual report 2024. Ministry of Culture, Government of India.

NITI Aayog. (2024). India digital inclusion index 2024. Government of India.

Radhakrishnan, S. (2020). Indian philosophy and the unity of knowledge. HarperCollins.

Raman, V., & Subramaniam, M. (2023). Artificial intelligence in Sanskrit studies: Computational linguistics and text analytics. Journal of Digital Sanskrit Research, 4(2), 67–83.

Roy, D., & Chakraborty, A. (2023). Integrating traditional wisdom into modern education: ICT as a catalyst. Educational Technology and Society, 26(1), 91–108.

Singh, V., & Nair, P. (2023). Digital pedagogy for Indian Knowledge Systems: MOOCs and immersive learning models. International Journal of Educational Technology in Higher Education, 20(3), 215–233.

SWAYAM Analytics. (2024). Usage statistics and course analytics 2024. Ministry of Education, Government of India.

UNESCO. (2022). Reimagining our futures together: A new social contract for education. United Nations Educational, Scientific and Cultural Organization.