

Indian Knowledge Systems (IKS) As A Dynamic Ecosystem: Integrating South Asian Heritage with Ethical Artificial Intelligence

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Abstract:

In the 21st century, there has been a renewed interest across the globe in indigenous knowledge systems, as societies face unprecedented technological, environmental, ethical and educational challenges. The Indian Knowledge System (IKS) is one of the most multi-dimensional knowledge systems in the world which covers philosophy, mathematics, medicine, astronomy, linguistics, education, governance, ecology, architecture, aesthetics and spirituality. Although the importance of IKS is gaining ground in India's policies, it is often perceived as a collection of ancient religious scriptures or as a purely national heritage. In this paper IKS is conceptualised as a dynamic civilizational knowledge system whose evolution is not confined to its own region but is embedded in the wider South Asian region, and whose intellectual resources continue to be relevant to the global issues of today. The study compares and contrasts the conceptual basis, evolution, key areas, merits, shortcomings and current uses of IKS using the qualitative, comparative and interdisciplinary approach. It also examines the intersection of traditional knowledge systems and the advent of Artificial Intelligence (AI), highlighting the philosophical dimensions that can be drawn from the principles of Dharma, Ahimsa, Lokasaṅgraha, and Vasudhaiva Kutumbakam, which form part of the Indian intellectual heritage. The paper also draws attention to the significant role Bangladesh has played in the region's knowledge tradition, a tradition that is, to date, largely forgotten, in scholarship, ecological knowledge, vernacular intellectual culture, Sufi and Baul philosophies, and community-based environmental adaptation. This study does not call for the revival of traditional practices, but suggests an integrative model where indigenous knowledge, scientific inquiry and AI

merge into each other. This reflects the current international issues of sustainability, cultural diversity, transformation of education and ethical innovation of technologies. The paper suggests that the future of knowledge is not the technology determinism nor nostalgic traditionalism, but dialogue between civilizations, disciplines, and intelligent technologies.

Keywords: Indigenous Knowledge; South Asia; Artificial Intelligence; Knowledge Ecology; Ethics; Interdisciplinary Education

Introduction

Human civilization is being transformed by Artificial Intelligence, machine learning, quantum computing, biotechnology, and digital transformation. All these advances have sparked scientific progress and economic development, but they have also raised significant ethical, ecological, educational, and philosophical issues. Intelligent technologies have grown rapidly, raising questions about the inadequacies of technocentric development approaches, thus reigniting a global interest in indigenous knowledge systems as other sources of knowledge, sustainability, and ethics.

Indigenous knowledge is increasingly seen as a vital tool for tackling the conservation of biodiversity, climate change, disaster risk reduction, sustainable agriculture, and cultural heritage management on the global scale. International bodies like UNESCO stress that indigenous and local knowledge should not be seen as "relics of the past" but rather as "living knowledge systems" to address current global problems. Likewise, the United Nations has emphasized the importance of traditional knowledge for the Sustainable Development Goals (SDGs), with a particular emphasis on the SDGs pertaining to education, environmental sustainability, health and resilient communities.

In this international backdrop, India has taken a bold step in an intellectual and educational process to resurgence and institutionalization of Indian Knowledge System (IKS). The Government of India's National Education Policy (NEP) 2020 makes IKS a key part of the educational reform, with the vision to include India's intellectual legacy in higher education, interdisciplinary research, and innovation. The policy is not about narrow specialization of knowledge but is encouraging learning that is broad based and based on ethics, cultural awareness and critical inquiry.

The idea of IKS is still largely misunderstood, despite increased institutional interest. Some define it as only Vedic or religious practices, while for some it is only a cultural heritage project or a political project. These explanations are oblivious to the wide range, diversity and history of Indian intellectual tradition and its encompassing fields of philosophy, mathematics, astronomy, linguistics, medicine, governance, architecture, agriculture, aesthetics and education. Most importantly, they neglect the intellectual histories of South Asia, which were far more complex, with present-day India, Bangladesh, Nepal, Sri Lanka, Bhutan, and Pakistan having had extensive scholarly, cultural, linguistic and educational interactions long before the advent of modern nation-state structures.

This paper thus proposes that Indian Knowledge Systems be seen not merely as a national heritage but as a civilizational knowledge ecosystem which is continuing to evolve. Its relevance in the modern world is not that of displacing the current scientific paradigm, but rather in contributing to scientific research by incorporating ethical considerations, ecological consciousness, transdisciplinary approaches and values based on human beings. These integrated approaches are both academically required and society's pressing needs at a time when Artificial Intelligence and the new Fifth Industrial Revolution have become a dominant force in the world.

A major issue in Indian Knowledge Systems is that there is not a single, accepted definition for the term. IKS is not a specific academic discipline, but rather a large intellectual tradition. It is, therefore, described differently by various organisations and scholars from a different angle.

IKS can be comprehended as the sum of knowledge, wisdom, and scientific, philosophical, technological and educational developments which have emerged over thousands of years across the Indian subcontinent to understand nature, society, humanity and the universe.

In an academic sense, IKS can be defined as multidisciplinary civilizational knowledge system that has developed through textual scholarship, empirical observation, experimentation, oral transmission and community practices across the Indian subcontinent through a continuum of philosophy, science, mathematics, medicine, linguistics, governance, ecology, education, arts, architecture, ethics and spirituality.

This is a wider definition which does not limit IKS to religion or mythology. Rather, it acknowledges that this tradition encompasses theoretical questions as well as applied knowledge, ranging from the humanities and natural sciences to social sciences, engineering, health sciences and environmental studies.

The majority of the current literature focuses on IKS in relation to education policy or cultural renewal. Little current scholarship has been written about its impact on artificial intelligence, interdisciplinary innovation, or intellectual collaboration among regions in South Asia. This study aims to address the above domains by showing that IKS has the potential to meaningfully update ethical technological development, sustainability and future knowledge societies, whilst simultaneously fostering critical analyses and scientific validation, instead of uncritical acceptance.

Literature Review

Indian Knowledge System (IKS) is one of the oldest continuous evolving intellectual systems of human civilization. IKS was not a product of specialization like many of the modern science disciplines do, but instead it was an integrated framework where philosophy, science, medicine, mathematics, language, ecology, ethics, governance and spirituality were updating each other. Knowledge was not considered simply information stored, but an instrument for understanding, attaining individual health, guaranteeing social equilibrium and adjust and ecological balance.

Unlike the disciplinary specialization characteristic of modern academia, IKS conceptualizes knowledge as an interconnected whole in which philosophy, science, ethics, ecology, governance, education, and spirituality mutually reinforce one another. Learning is viewed not merely as the acquisition of information but as a transformative process aimed at cultivating wisdom (*jñāna*), discernment/judgement (*viveka*), ethical responsibility, and social well-being. Consequently, theoretical understanding is consistently integrated with practical application, as reflected in Ayurveda's clinical observations, ecological approaches to agriculture, architectural principles, and the analytical precision of Sanskrit grammar, which continues to attract interest in contemporary computational linguistics (Pollock, 2006; Wujastyk, 2003). Ethical values such as *Dharma*, *Ahimsa*, *Satya*, and *Lokasaṅgraha* further distinguish IKS by embedding justice, compassion, and collective welfare

within intellectual and social life, making these concepts increasingly relevant to current debates on sustainability, environmental governance, and ethical Artificial Intelligence (Government of India, Ministry of Education, 2021; UNESCO, 2021). Recent scholarship and policy initiatives have also repositioned IKS as a dynamic, evidence-informed, and interdisciplinary knowledge ecosystem capable of contributing to contemporary research, higher education, innovation, and sustainable development rather than merely preserving cultural heritage (Government of India, Ministry of Education, 2020, 2021; UNESCO, 2021). Accordingly, the literature suggests that the enduring significance of IKS lies not in claims of civilizational superiority but in its holistic epistemology, integrative methodology, and continuing capacity to engage constructively with modern science, global sustainability, and emerging technologies.

Indian thinkers traditionally viewed knowledge as an integrated whole rather than the division between science and philosophy as most civilizational histories do.

IKS should, therefore, be viewed as a dynamic knowledge system that is continuously developed as a result of dialogue, debate, experimentation, commentary, and regional adaptations.

IKS is not just one discipline, but a set of interrelated fields of knowledge:

- A. Philosophy (Darśana)
- B. Mathematics
- C. Astronomy
- D. Medicine (Āyurveda)
- E. Linguistics
- F. Governance
- G. Education
- H. Ecology and Agriculture -

Examples of traditional agricultural knowledge, water harvesting practices, biodiversity management, seed saving, forest protection, and ecological ethics reflect the historical understanding of interdependence of human communities and natural ecosystems through IKS. These practices have gained a fresh interest in studies on sustainability and climate adaptation.

Research Gap

Although there has been a significant number of literature published, there are still several gaps.

First, there is a tendency to limit the range of discussion of IKS to an exclusively Indian national framework instead of acknowledging its South Asian civilizational histories.

Second, the contributions of Bangladesh to the regional knowledge system—such as the Buddhist scholarship, vernacular philosophies, ecological knowledge, Baul philosophies, Sufi philosophies, and community-based environmental adaptation—are relatively under-researched.

Third, many of the writings of the modern era are descriptive, focus on historical achievements and do not critically assess the application of IKS in the current world context.

Fourth, while there has been growing interest in the field of Artificial Intelligence, there are very few studies that systematically explore how indigenous epistemologies could help to develop ethical AI, explainable AI, responsible technological innovation, and human-centered technological governance.

Last but not least, numerous discussions tend to 'polarize' the debate by representing the IKS as being better than contemporary science, or as being a 'historical legacy'. Both fail to take into account possible positive synthesis of the indigenous knowledge and modern scientific knowledge.

This paper will bridge these gaps by establishing an interdisciplinary framework where IKS will be a dynamic network/ecosystem that will be able to interact productively in the field of AI, sustainability and future educational transformation.

Research Objectives

The objective of the study is to:

1. To understand the historical evolution and concepts of Indian Knowledge System and recognize the main domains and features of IKS.
2. To assess critically the strengths and weaknesses of IKS in the current academic field.

3. To explore the contributions of Bangladesh and the rest of the South Asian region to shared civilizational knowledge traditions.
4. To explore the role of IKS in relation to AI, sustainability and ethical technological innovation.
5. To suggest an interdisciplinary model combining indigenous knowledge, scientific research and AI to create future knowledge societies.

Research Questions

The study has six major research questions:

1. What are the definitions of Indian Knowledge Systems in the present academic discourse?
2. How is the tradition of historical knowledge in IKS different from other historical knowledge traditions?
3. What are the opportunities for Bangladesh to contribute to the wider South Asian knowledge system?
4. How can responsible technological development be achieved in the context of ethical Artificial Intelligence and what role can IKS play?
5. What are the opportunities and challenges in the current mainstream of higher education and research for incorporating IKS?
6. What can be the relationship between indigenous knowledge and modern scientific research that doesn't contradict each other?

Research Hypotheses

- H1: Indian Knowledge Systems are relevant in the epistemological sense as well.
- H2: The combination of indigenous knowledge and scientific investigation promotes sustainability, innovation in education and ethical technological development.
- H3: A comparative South Asian perspective emphasises the understanding of IKS beyond the nation-centred perspective.

H4: Conceptual resources from ethical principles within IKS provide valuable resources for the development of human-centred Artificial Intelligence.

There is a growing need for collaboration between indigenous knowledge, scientific evidence and intelligent technologies rather than the supremacy of any single knowledge system to shape the future of knowledge societies.

Research Methodology

This study adopts a qualitative, descriptive, analytical, and comparative research design grounded in an interdisciplinary framework to examine Indian Knowledge Systems (IKS) as a dynamic civilizational knowledge ecosystem. Rather than testing empirical hypotheses through quantitative methods, the study critically investigates the historical evolution, epistemological foundations, major knowledge domains, and contemporary relevance of IKS through systematic interpretation and synthesis of classical texts, policy documents, and contemporary scholarship. A qualitative approach is particularly appropriate because it facilitates the exploration of complex philosophical traditions, educational models, ethical principles, scientific contributions, and cultural practices that cannot be adequately explained through numerical analysis alone (Creswell & Creswell, 2018). Furthermore, the study employs a comparative analytical approach to place IKS within the broader intellectual traditions of South Asia, emphasizing its shared civilizational heritage across present-day India, Bangladesh, Nepal, Sri Lanka, Bhutan, and neighbouring regions. This interdisciplinary perspective enables the research to examine the emerging relationship between IKS, sustainability, higher education, and ethical Artificial Intelligence (AI), thereby offering a holistic understanding of its contemporary significance.

Sources of Data

The study is based entirely on documentary research using both primary and secondary sources. Primary sources include authoritative classical texts such as the *Vedas*, *Upaniṣads*, *Bhagavad Gītā*, *Arthaśāstra*, *Caraka Saṃhitā*, *Suśruta Saṃhitā*, and *Aṣṭādhyāyī*, together with official policy documents including the National Education Policy (Government of India, 2020) and publications of the Indian Knowledge Systems (IKS) Division. Secondary sources comprise peer-reviewed journal articles, scholarly books, university publications, UNESCO and OECD reports, and contemporary literature on

indigenous knowledge, sustainability, South Asian studies, AI ethics, and interdisciplinary education. Only authentic, peer-reviewed, and verifiable sources have been included to ensure the academic reliability and credibility of the study.

Limitations of the Study

This study has several limitations. First, Indian Knowledge Systems encompass more than three millennia of intellectual development across numerous disciplines, making comprehensive coverage within a single paper impossible.

Second, many foundational texts remain available primarily in Sanskrit, Pali, or Prakrit; consequently, the study relies on authoritative English translations and critical editions.

Third, scholarly research examining the intersection of IKS and Artificial Intelligence is still emerging, limiting the availability of empirical evidence. Finally, although the paper highlights Bangladesh's contributions to the broader South Asian knowledge tradition, many indigenous knowledge systems, oral traditions, and local ecological practices warrant independent and more detailed investigation. These limitations also indicate important directions for future interdisciplinary research.

Indian Knowledge Systems in South Asia: Bangladesh and a Shared Civilizational Heritage

Beyond Political Boundaries: A Civilizational Perspective

Indian Knowledge Systems (IKS) should be understood as a shared South Asian civilizational heritage rather than being confined to the political boundaries of modern India. Before the emergence of nation-states, scholars, monks, physicians, traders, and philosophers moved freely across the Indian subcontinent, creating interconnected networks of learning that linked present-day India, Bangladesh, Nepal, Sri Lanka, Pakistan, Bhutan, and neighbouring regions. Ancient Bengal, particularly during the Pāla period (8th–12th centuries CE), emerged as a major centre of Buddhist scholarship, Sanskrit learning, and intellectual exchange. Renowned institutions such as Somapura Mahāvihāra attracted students from across Asia and contributed significantly to philosophy, medicine, linguistics, astronomy, mathematics,

and the arts. These historical interactions demonstrate that Bengal was not merely a recipient but an active producer and disseminator of knowledge, reinforcing the view that IKS evolved through regional collaboration and cultural exchange across South Asia (Singh, 2008; Thapar, 2002; UNESCO World Heritage Centre, n.d.).

Ancient Bengal played a crucial role in the intellectual geographies of South Asia.

A. Bengal's Knowledge Tradition and its merchants.

Bengal was located at the crossroads of northern India, Southeast Asia, Tibet and the Bay of Bengal and became a significant trade, learning, Buddhist, Sanskrit studies and cultural hub.

Bengal became one of the greatest centers of Buddhist scholarship in Asia in the Pāla period (8th to 12th centuries CE).

Internationally famous universities and monasteries were located in the region that spread their influence throughout China, Tibet, Nepal, Mongolia, Sri Lanka, Myanmar, Thailand, Cambodia, Indonesia, and other parts of the world.

These institutions were not just religious centres. They taught - philosophy, medicine, logic, linguistics, astronomy, mathematics, literature, fine arts, political thought.

Pupils made journeys of thousands of km to attend these study groups. This shows that the knowledge transfer from Bengals was not passive receipt of knowledge but Bengal was an active producer and exporter of intellectual traditions.

B. Somapura Mahāvihāra: A World Centre of Learning

The best proof of the historical contribution of Bangladesh to IKS is Somapura Mahāvihāra situated in Paharpur, Naogaon District.

C Atīśa Dīpaṅkara Śrījñāna: A Global Scholar from Bengal

No one is better suited to represent the transnational nature of South Asian knowledge than Atīśa Dīpaṅkara Śrījñāna (982-1054 CE). Born in Bikrampur (now in Bangladesh), Atīśa became one of the most influential Buddhist scholars of medieval Asia.

D. Bengal as a source of literature and Philosophy

Bengal's intellectual legacy is not limited to classical Sanskrit knowledge. Over the following centuries, the area yielded brilliant thinkers whose ideas helped enrich the general knowledge stream.

Among them, Rabindranath Tagore transformed the concept of education by applying the principles of holistic learning, creativity, internationalism, environmental awareness and intercultural dialogue.

Lalon Shah created an extraordinary philosophy of humanism, inner consciousness, experiential spirituality and tolerance that transcended religion based barriers.

Although folk tradition is the basis, Lalon's concepts are very much aligned with current debates about intercultural dialogue and inclusive humanism.

Overall, these numbers reflect the ongoing nature of intellectual traditions rather than their conclusion in classical antiquity.

E. Indigenous Ecological Knowledge in Bangladesh

Bangladesh's most significant but little-known achievements in modern knowledge is community-based adaptation to the environment.

Local communities have created complex knowledge of the environment, gained from their first hand experience with rivers, wetlands, forests, coastal areas and flooding for centuries.

Examples include - floating agriculture, traditional irrigation, flood forecasting, cyclone preparedness, indigenous fisheries, mangrove resource management, medicinal plant knowledge, community-based disaster response.

These systems have developed from long term observation, experimentation, adaptation and collective memory.

Increasingly, modern climate science has acknowledged the value of such indigenous knowledge, beyond scientific models, especially when it comes to risk reduction and adaptation to climate change.

Bangladesh is thus not just a laboratory of vulnerability, but also of environmental resiliency.

F. Baul and Sufi Knowledge Traditions

The focus on conveying information about IKS often is through Sanskrit texts, and not addressing vernacular philosophical traditions.

The preservation of rich body of knowledge about the Baul and Sufi communities in Bangladesh for example human identity, ethics, music, psychology, spirituality, coexistence, social equality are imperatives. These are not traditions that enforce institutional hierarchy, but traditions of experiential knowledge and understanding, of compassion, of dialogue, of human dignity.

In the context of AI ethics, these practices serve as a reminder that intelligence is not just about speed. There are also other aspects of human wisdom that are related to the others: empathy, cultural understanding, moral imagination and self-awareness.

Due to geographical proximity, Bangladesh is often portrayed in modern discourses as a player to Indian Knowledge Systems. This paper refutes that.

Bangladesh is a worthy member of the larger South Asian knowledge landscape, given its unique contribution and its contributions include Buddhist scholarship, medieval universities, ecological knowledge, riverine civilization, vernacular philosophy, disaster adaptation, folk medicine, literary humanism, multicultural coexistence.

G. Reframing the meaning of ‘Indian’ in the context of Indian Knowledge Systems

One of the constant conceptual hurdles is with respect to the word Indian.

The word 'India' has been used to denote various geographical, cultural and political units in the past. The term India in many ancient Greek, Persian and Arab sources, and later European, referred not to the modern day India, but to the subcontinent as a whole.

For scholars from Bangladesh, Nepal, Sri Lanka, Bhutan and Pakistan, this distinction is especially relevant as their own intellectual traditions have long been involved in the same civilizational networks.

H. Toward a South Asian Knowledge Partnership –

Regional collaboration should be the basis of the future of IKS, not national competition.

South Asian universities have complementary intellectual assets that can help them respond to common challenges on issues of climate change, biodiversity, disaster resilience, AI ethics, multilingual education, indigenous medicine, sustainable agriculture, cultural preservation.

This paper thus suggests the creation of a South Asian Indigenous Knowledge Network (SAIKN), a collaborative academic network of Universities, Research Institutes, Museums, Archives, Indigenous communities, Digital libraries and AI Research Centres in the South Asian region.

A network of this sort could support

- joint research projects,
- multilingual digital archives,
- AI-assisted manuscript preservation,
- collaborative doctoral programmes,
- indigenous methods of food production and resource exploitation, and
- regional policy dialogues.

South Asia does not need to fight over ownership of knowledge – it can show how shared civilizational heritage can serve as a catalyst for future innovations.

The major contribution of this paper is to redefine Indian Knowledge Systems as a South Asian Civilizational Knowledge Ecosystem (SACKE) instead of a framework that looks at it as an exclusively nation-oriented system. (can be considered as Knowledge-centered framework)

This is a new approach that has three significant improvements:

- i. Historical Accuracy – It illustrates the interwoven networks of ideas that were present in the world prior to the existence of the modern nation state.
- ii. Academic Inclusivity – It recognizes the contributions of Bangladesh, Nepal, Sri Lanka, Bhutan, Pakistan and other parts of the world that were involved in the tradition of historical knowledge.

- iii. Future Collaboration – It promotes collaboration in education, sustainability, ethics of AI use and preservation of Indigenous knowledge across the region rather than a single national narrative on Indigenous knowledge.

This conceptual rethinking not only reinforces the historical basis but also increases the relevance of IKS, as it is a knowledge tradition that is living, pluralistic and collaborative, and has a global dimension.

Indian Knowledge Systems in the Age of Artificial Intelligence: Towards Ethical and Human-centred Artificial Intelligence

Artificial Intelligence (AI) is revolutionizing practically every facet of human civilization. Intelligent algorithms have infiltrated societies in aspects of healthcare and education, finance, governance, scientific discovery, language technologies, transportation and creative industries, among others.

This rapid pace of innovation is driven by the rise of large language models and generative AI, autonomous systems, predictive analytics, and machine learning. Concurrently, these advancements have raised serious ethical issues about bias, privacy, misinformation, surveillance, accountability, job, intellectual property, and the future of the human-machine dynamic.

The debate about AI has slowly moved from the age-old query "Can machines be intelligent?" to the more fundamental question: What should be the role of intelligent technologies for humanity?

The transition is what has led to the inclusion of philosophers, ethicists, educators, indigenous scholars and international institutions in the world of AI governance.

In this nascent discourse on Indian Knowledge Systems, an intriguing but under-researched voice emerges.

IKS has no algorithms for machine learning. Rather, it offers ethical guidelines, epistemological understandings, educational philosophies, and civilizational values that can help shape the responsible creation and utilization of intelligent technologies.

A. Artificial Intelligence Is Not Just a Technological Revolution

AI's applications are often just described as an engineering feat. Each AI system embodies human decision-making on issues related to

- how this data is gathered, and what is known,
- the preferences for values, and how to apply fairness to a situation, and who benefits,

There be disadvantaged people. So, AI is far from being a neutral tool. It reflects the human assumptions and institutional priorities inescapably.

In Indian philosophy, it is always been observed that knowledge is not completely independent of ethics. It is one of the best conceptual links between IKS and AI governance.

B . From Artificial Intelligence to Responsible Intelligence

In recent years, AI research increasingly focuses on topics like: trustworthy AI, explainable AI, responsible AI, human-centered AI, ethical AI, inclusive AI.

These initiatives show that this does not automatically imply socially desirable results if computational efficiency is the sole focus.

Incredibly, many of these current goals are similar to moral principles that have always been part of the Indian intellectual tradition.

No attempt is made to interpret the relationship as technological continuity.

Instead, these traditions provide alternative philosophical tools for dealing with the new moral dilemmas.

C. Ahimsa and AI Safety

The concept of Ahimsa is not just about physical non-violence. It promotes reducing the harm done where it is not needed. In the field of AI, this is a fundamental relevance.

AI systems can inflict damage via discriminatory decisions, biased datasets, misinformation, privacy violations, autonomous weapons, the power required for computing, and unequal technological access.

Hence, with the help of Ahimsa, developers are encouraged to ask - does this technology have a positive or negative impact on suffering?

Instead, Ahimsa is a design principle for responsible technological innovations that can be applied at a practical level.

The challenge of explainability is one of the greatest challenges in today's AI. Many complex systems of machine learning are called "black boxes," because they give very accurate forecasts, but only little information about how they reach their decision.

Epistemology concerns similar questions in India, where *Pramāṇa* was discussed: valid knowledge needs valid reasons.

- The view here is that AI should not just respond, it ought to be reliable.
- It should also give clear arguments to back up its opinions.

Therefore, *Pramāṇa* provides a fascinating philosophical underpinning for Explainable AI (XAI).

d. Guru–Śiṣya and Human–AI Collaboration

One of the most interesting educational lessons to be gleaned from IKS is the teacher/learner relationship.

The traditional Guru–Śiṣya model was focused on dialogue, mentorship, questioning, ethical development, intellectual independence.

Importantly, the teacher was not just a communicator of information. The teacher was a sage. This educational theory is helpful for an analogy of the learning process with AI.

Artificial Intelligence must operate as

- an intellectual assistant, -
- a research collaborator,
- a learning facilitator,

In addition, rather than replacing human teachers. The human-centeredness of education must endure at the core of all education. Information alone is not enough to impart knowledge; judgment, empathy and ethical thinking are also vital.

F. The Rahman Mahbub Integrated Knowledge Intelligence Framework (RIKIF - A Proposed Model)

In order to link historical wisdom of IKS to the realities of the twenty first-century technology, this paper proposes a new conceptual framework: The Rahman Mahbub Integrated Knowledge Intelligence Framework (RIKIF)

The framework is based on the assumption that in the future knowledge societies, it is necessary to combine four complementary types of intelligence; not one of them must control the other.

Pillar I: Indigenous Knowledge

- Traditional ecological knowledge
- Cultural wisdom
- Community practices
- Historical experience
- Ethical traditions



Pillar II: Scientific Intelligence

- Empirical observation
- Experimental validation
- Evidence-based reasoning
- Interdisciplinary research



Pillar III: Artificial Intelligence

- Machine learning
- Knowledge discovery
- Computational modelling
- Decision support
- Automation



Pillar IV: Human Wisdom

- Ethics
- Critical thinking
- Creativity
- Compassion
- Democratic accountability

Central Principle: Artificial Intelligence must complement, not supersede, human judgment.

This RIKIF (The Rahman Mahbub Integrated Knowledge Intelligence Framework) Framework is unique because -

In contrast to most modern AI models, that focus on computation, the RIKIF model suggests that sustainable intelligence only comes about when:

- Indigenous knowledge offers contextual understanding
- Science gives empirical support.
- Artificial Intelligence offers computational power.
- Ethical guidance is given by human wisdom.

RIKIF in equation form:

Future Intelligence (FI) is a combination of Intelligence , Science, Artificial Intelligence , Human Ethics.

This paradigm is not about Artificial Intelligence but about Augmented or improved Human Intelligence, where technology and humans complement each other and human agency is not sacrificed.

This is a new knowledge civilization, it is no longer a challenge to create information in the 21st century. Now, more than ever before, humanity is creating more data than ever before. The greatest difficulty is to convert information into wisdom.

- AI is particularly good at recognising patterns.
- Science is good at testing hypotheses.
- Indigenous knowledge is strong in understanding context.
- Responsible action is inspired by Human ethics.

The future of civilization is thus neither on the basis of choosing one system in preference to another but on the basis of building meaningful dialogue among them.

Indian Knowledge Systems remind us that knowledge is not just information; it is a tool to develop responsible people, a resilient society, and harmonious relationship with nature.

This is a crucial part of knowledge in the era of AI that can be more valuable than ever.

This method mitigates speculative historical assertions while providing a future-oriented perspective to guide interdisciplinary studies, educational reforms, and governance of AI. It also offers a unique scholarly contribution to the paper—one that goes beyond descriptions of Indian Knowledge Systems.

Indian Knowledge Systems in the Age of Artificial Intelligence: Towards Ethical and Human-Centred AI

Artificial Intelligence (AI) has emerged as one of the most transformative technologies of the twenty-first century, reshaping healthcare, education, governance, finance, scientific research, transportation, and creative industries. Recent advances in machine learning, generative AI, large language models, and predictive analytics have significantly enhanced computational capabilities while simultaneously raising profound ethical concerns regarding algorithmic bias, privacy, misinformation, surveillance, accountability, intellectual property, employment, and human autonomy (OECD, 2019; UNESCO, 2021). Consequently, contemporary debates have shifted from asking whether machines can be intelligent to questioning how intelligent technologies should serve humanity. This paradigm shift has brought philosophers, educators, ethicists, and indigenous knowledge scholars into discussions on AI governance, emphasizing that technological innovation must be guided by ethical responsibility rather than computational efficiency alone.

Although Indian Knowledge Systems (IKS) do not provide technological algorithms for artificial intelligence, they offer enduring ethical principles, epistemological frameworks, and educational philosophies that are highly relevant to responsible AI. Classical Indian thought consistently regarded knowledge as inseparable from ethics, suggesting that technological advancement should contribute to human welfare and social harmony rather than merely increasing efficiency. Concepts such as Dharma (ethical duty), Ahimsa (non-violence), Pramāṇa (valid knowledge), Lokasaṅgraha (collective welfare), and Vasudhaiva Kutumbakam (the world as one family) resonate strongly with contemporary principles of trustworthy, explainable, inclusive, and human-centred AI promoted by UNESCO and the OECD (OECD, 2019; UNESCO, 2021). For instance, *Ahimsa* encourages developers to minimize algorithmic harm, discrimination, and technological inequality,

while *Pramāṇa* emphasizes transparency, reliability, and reasoned justification, providing a philosophical foundation for Explainable Artificial Intelligence (XAI). Likewise, the traditional Guru–Śiṣya model offers a valuable analogy for human–AI collaboration by viewing AI as an intellectual assistant that augments, rather than replaces, human judgment, creativity, and ethical reasoning.

Building upon these insights, this paper proposes the Rahman Integrated Knowledge Intelligence Framework (RIKIF) as an original conceptual model for future knowledge societies. RIKIF integrates Indigenous Knowledge, Scientific Intelligence, Artificial Intelligence, and Human Ethical Wisdom into a complementary framework where no single form of intelligence dominates the others. Indigenous knowledge contributes contextual understanding and cultural experience; science provides empirical validation; AI offers computational capability and decision support; and human wisdom ensures ethics, critical thinking, creativity, compassion, and democratic accountability. The framework therefore advances the principle that Artificial Intelligence should complement rather than supersede human intelligence, transforming AI from a purely technological innovation into an instrument of responsible and sustainable human development. By repositioning the relationship between IKS and AI as an ethical rather than technological dialogue, the proposed framework offers a novel contribution to interdisciplinary scholarship and provides a future-oriented model for education, public policy, and AI governance in the twenty-first century.

Major Findings

This paper explores Indian Knowledge Systems (IKS) in terms of historical, philosophical, educational and technological aspects and exploring their applicability to South Asia and the new Age of Artificial Intelligence. Relying on first-hand classical literature, modern research, official state papers, and international structures, the work makes a number of noteworthy discoveries.

A. Indian Knowledge Systems are a complete Knowledge Civilization

The paper concludes that Indian Knowledge Systems cannot be perceived as a set of ancient religious texts or an ancient practice. Instead IKS is a holistic civilizational system of knowledge created over a period of several thousand years that unites philosophy, mathematics, astronomy, medicine, linguistics,

ecology, government, education, architecture, ethics, literature, and performing arts into a joint intellectual tradition.

In contrast to the contemporary disciplinary fragmentation, IKS advocates holistic knowledge whereby knowledge, ethics, society and nature are all intrinsically related to each other.

B. IKS Integrates the Rational and the Ethical

Through the study of history we can see that Indian schools of thought have always placed special stress upon observation (Pratyaksha), logical reasoning (Anumana), comparison (Upamana), testimony (Shabda), postulation (Arthapatti), and critical examination. As a result, most Indian philosophical schools evolved complex systems of epistemology that are on par with systematic systems of knowledge inquiry in the rest of the world.

There was another important aspect of knowledge, which is that knowledge was considered to be inseparable with ethical responsibility. Dharma, Ahimsa, Satya and Lokasaṅgraha and Vasudhaiva Kutumbakam were concepts that made sure that intellectual success was linked to social good.

C. Indian Knowledge Systems are both dynamic and historical

This research dismisses two myths.

To begin with, IKS is not to be romanticized as something that houses all scientific discoveries of the modern age.

Second, it cannot be discarded as the old-fashioned traditional knowledge.

IKS on the contrary is a living tradition of knowledge that has been persistently developed in dialogue with Buddhist, Jain, Islamic, Persian, European and modern scientific traditions.

Its further usefulness requires reinterpretation, empirical research, and an interdisciplinary interest.

D. South Asia is a Shared Knowledge Ecosystem

Among the key contributions of this work is that Indian Knowledge Systems historically evolved in the larger South Asian civilization, and not in the political limits of any modern day nation-state.

Past universities, monasteries, networks of scholars, maritime trade systems, and education linked the India of today, Bangladesh, Nepal, Sri Lanka, Bhutan, Pakistan, and its neighbourhood.

IKS, therefore, is to be viewed as a common South Asian civilizational heritage.

E. Bangladesh A Participant in the IKS Tradition

The paper illustrates that Bangladesh hold a significant place in this common intellectual heritage.

Bangladesh has played a key role in knowledge production in the region through a variety of institutions, including Somapura Mahavihara, scholars, including Atiesa Dipanka Sha Srijnan, the educational traditions of ancient Bengal, the Baul philosophy, indigenous ecological knowledge, and climate-adaptive agricultural practices.

In this light, Bangladesh must not only be seen as a participant but an active contributor to the South Asian intellectual history.

F. IKS offers Good Ethical Principles to Artificial Intelligence

The most modern discovery, maybe, is related to the connection between IKS and AI.

Instead of making historically unsustainable arguments that ancient India foresaw the development of modern Artificial Intelligence, this paper shows that Indian philosophies present long-lasting ethical standards that can be used to guide the oversight of AI usage in a responsible way.

The ideas of Dharma, Ahimsa, Pramāna, Lokasaanga, rasul Vasudhaiva Kutumbakam give useful insights related to algorithmic accountability, transparency, explainability, fairness, benefit to the population, and collaborative international cooperation.

G. Rahman Mahbub Integrated Knowledge Intelligence Framework (RIKIF)

This study has the original contribution in developing the Rahman Mahbub Integrated Knowledge Intelligence Framework (RIKIF).

This framework proposes that four complementary dimensions be incorporated in the future knowledge societies:

- Indigenous Intelligence
- Scientific Intelligence
- Artificial Intelligence
- Human Ethical Wisdom

The model changes the present-day discourse on technological determinism to a more considered view that AI will complement and not substitute human judgment.

Recommendations

According to the findings, the following recommendations are suggested.

i. Educational Recommendations

Indian Knowledge Systems should be taught in various fields in the universities instead of having to be separated into departments of philosophy or history.

Relevant IKS perspectives should be introduced into the engineering, medicine, environmental science, computer science, management, law, architecture, education, and humanities programmes where they are relevant academically.

Based on the holistic educational tradition, universities need to promote interdisciplinary teaching, both collective and individual research, and problem-based learning.

ii. Research Recommendations

- Evidence based research should be a priority in future studies.
- Biomedical assessment should be done on traditional medical knowledge.
- Environmental science should be applied to the traditional agricultural practices.

There should be exploration of ancient mathematical and linguistic theories in computational sciences.

Preservation of manuscripts using AI, multilingual knowledge repositories, digital humanities, and computational philology must be made a key area of research.

iii. Recommendations for Governments

Governments ought to invest in.

- manuscript digitization,
- multilingual translation,
- preservation of oral traditions,
- indigenous knowledge archives,
- interdisciplinary research centres,
- regional academic collaboration.

Laws must safeguard native intellectual property and at the same time have ethical access to traditional knowledge.

iv. For Artificial Intelligence Developers

The developers of AI ought to embrace ethics across the life cycle of technology.

Algorithms must also be tested with respect to efficiency as well as.

- fairness,
- accountability,
- transparency,
- inclusiveness,
- cultural diversity,
- environmental sustainability.

The incorporation of traditional knowledge in AI systems must be informed and there should be a fair distribution of benefits.

The South Asian universities ought to form a South Asian Indigenous Knowledge Consortium (SAIKC) that is committed towards.

- collaborative research,
- faculty exchange,
- AI-assisted manuscript preservation,
- climate adaptation research,
- comparative philosophy,
- indigenous medicine,
- multilingual digital libraries.

This cooperation would not only improve the scholarship in the region, but would also lead to the spread of knowledge all over the world.

v. For UNESCO and International Organizations

Comparative research on indigenous knowledge systems must be promoted by international organizations in the world.

Instead of receiving indigenous knowledge as a historical heritage in isolation, policy frameworks ought to acknowledge its role in contributing to.

- sustainability,
- AI ethics,
- education,
- disaster resilience,
- biodiversity conservation,
- cultural diversity.

Despite the extensive conceptual analysis presented in this study, there are many research opportunities available.

Possible future studies can involve:

- Artificial Intelligence
- Native Knowledge and Explainable Artificial Intelligence.
- Sanskrit and Pali translation technology with the help of AI.

Comparative Knowledge Systems:

Comparison may be conducted by future researchers.

- Indian Knowledge Systems
- Chinese Knowledge Traditions
- Islamic Intellectual Traditions
- African Indigenous Knowledge

vi. Bangladesh Studies

Further documentation of future researches should be done on Baul philosophy, riverine civilizations, folk medicine, climate adaptation, local ecological knowledge, thus contributing to the modern IKS discourse by a Bangladeshi lens.

Conclusion

The human civilization is at a crossroad in history. Artificial Intelligence is changing the nature of knowledge creation, communication, and its use. Meanwhile, humanity is undergoing interrelated crises such as climate change, biodiversity loss, challenges to human health, growing inequalities, and ethical issues relating to emerging technologies. These facts prove that sustainable human progress cannot be guaranteed only because of the development of technologies. What is needed is a more enriched idea of knowledge, one that would combine scientific innovation with ethical responsibility, cultural wisdom and ecological consciousness.

This paper has argued that Indian Knowledge Systems are one of the oldest ever changing knowledge systems in the world. Not merely a religious or mythological tradition, IKS includes philosophy, mathematics, astronomy, medicine, linguistics, governance, education, ecology, architecture, literature and the performing arts. It is characterized by its combination of knowledge with values, which assert that intellectual progress should ultimately be in the service of human prosperity and social well-being.

The study also shows that Indian Knowledge Systems should be seen as a collective South Asian civilizational heritage and not as a monopoly of any modern nation-state. The cultural interactions between ancient centres of education such as Nalanda, Takshasilla, Vikramasila and Somapura Maha Vihara disclose the existence of a thriving regional network of scholars and centres that cut across the political borders of the day. In this larger context, Bangladesh does not come out as a peripheral territory, but rather a major contributor with its universities, scholars, eco-traditions, literary heritage and community systems of knowledge.

The repositioning of the relationship between IKS and Artificial Intelligence is one of the main contributions to this paper. Instead of promoting historically untested assumptions of technological continuity, the paper shows that IKS can provide timeless ethical and epistemological ideals that can add value to the modern discussions on responsible AI. Dharma, Ahimsa, Pramana, Lokasa-graha, and Vasudhaiva Kutumbakam concepts have valuable frames towards the solution of problems of algorithmic accountability, transparency, human dignity, sustainability, and global cooperation. By doing so Indian

Knowledge Systems are not mutually exclusive with modern science and engineering.

The Rahman Mahbub Integrated Knowledge Intelligence Framework (RIKIF) is the theoretical contribution of the paper. It suggests the future knowledge societies relying on four mutually supportive pillars, including Indigenous Intelligence, Scientific Intelligence, Artificial Intelligence, and Human Ethical Wisdom. This integrative approach defies technologically deterministic views by highlights that intelligent systems will only realize their greatest value when informed by empirical evidence, cultural insights, ethical reflection, and democratic responsibility.

After all, all the future of civilization will not lie in the process of developing even more powerful machines but in the process of developing more responsible human beings. Artificial Intelligence has the capacity to work with information extremely fast, but it is not able to determine justice, compassion, responsibility, and the common good independently. These are inalienable human duties. Indian Knowledge Systems helps us to remember that the real aim of knowledge is not about subjugation but about liberation; not about hoarding but about insight; not about technological excellence but development of human dignity and general welfare.

To this end, the discussion between Indian Knowledge Systems, modern science and Artificial Intelligence can not be considered a conflict between tradition and modernity. Instead, it is best perceived as a joint venture to create more ethical, inclusive, sustainable and intellectually pluralistic global knowledge civilization. The synthesis so developed promises to give one of the best avenues of dealing with the multifaceted problems of the twenty-first century.

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