History of India's Knowledge Systems: A Survey and Its Contemporary Relevance[1]

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Abstract

India possesses a vast, multi-disciplinary body of indigenous knowledge that spans metallurgy, mathematics, astronomy, governance, medicine, architecture, and the arts. Yet, for a large section of educated Indians today, this heritage remains unknown, mischaracterised, or inaccessible. This paper argues that the Indian Knowledge System (IKS) constitutes a rigorous, internally consistent, and comprehensive tradition that merits serious scholarly and practical engagement. Drawing on the Vedic corpus, the *Arthaśāstra*, the *Śulba-sūtra*s, *Rasaratna-samuccaya*, *Chandaḥ-śāstra*, the *Purāṇa*s, and the evidence of living structures, the paper surveys the principal domains of IKS, examines the causes of its discontinuity, and outlines an agenda for its recovery and application in the contemporary world.

Keywords: Indian Knowledge Systems, Arthaśāstra, Metalworking, Mathematics, Astronomy, IKS revival.

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1. INTRODUCTION

The *Nāsadīya Sūkta*[3], the 'Hymn of Creation' is among the earliest speculative enquiries into the origin of the Universe found anywhere in human literary history. Its opening verses pose the foundational cosmological question in a register that is simultaneously philosophical and poetic.[4] Yet today, when these verses are recited before an Indian audience, the dominant reaction is to mistake them for the ritual incantation of a purohit. This response is symptomatic of a broader estrangement. The Rig Veda contains 10,772 *mantra*s addressing topics as diverse as the origin of the universe, natural phenomena, psychology, climate, water, and interpersonal relations. These texts have, for many well-read and well-meaning Indians, been effectively abandoned — not out of malice but out of a pervasive unawareness of what they contain.

This paper takes up the question that has animated the author's enquiry for two decades: What is ancient Indian wisdom, and what are some of the hard facts? The paper proceeds in four stages. It first examines the prevalent misconceptions about IKS and the need for engagement with ancient wisdom generally. It then defines the Indian Knowledge System in a rigorous, three-part sense. It surveys the principal domains of IKS with representative examples. Finally, it analyses the causes of discontinuity and proposes an agenda for recovery.

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[3] All Sanskrit words in this paper are in italics. The IAST convention is being used to reproduce the Sanskrit words using Roman letters in a lossless fashion.

[4] नासदासीन्नो सदासीत्तदानीं नासीद्रजो नो व्योमा परो यत् ।
किमावरीवः कुह कस्य शर्मन्न् अम्भः किमासीद्गहनं गभीरम् ॥ १ ॥
nāsad āsīn no sad āsīt tadānīṃ nāsīd rajo no vyomā paro yat |
kim āvarīvaḥ kuha kasya śarmann ambhaḥ kim āsīd gahanaṃ gabhīram || 1 ||
न मृत्युरासीदमृतं न तर्हि न रात्र्या अह्न आसीत्प्रकेतः ।
आनीदवातं स्वधया तदेकं तस्माद्धान्यन्न परः किंचनास ॥ २ ॥
na mṛtyur āsīd amṛtaṃ na tarhi na rātryā ahna āsīt praketaḥ |
ānīd avātaṃ svadhayā tad ekaṃ tasmāddhanyo 'na paraḥ kiṃ canāsa || 2

2. MISCONCEPTIONS ABOUT ANCIENT INDIAN WISDOM

When members of the educated public are asked what they understand by 'ancient Indian wisdom', the responses cluster into several recurring categories, each of which this paper examines in turn.

Mythology

The word 'mythology' is routinely applied to the *Rāmāyaṇa*, the *Mahābhārata* and the *Purāṇas*. This application is epistemically unjustified. Within the *Sanātana Dharma* framework, Rama and Krishna are not fictional constructs but living realities. Using the term 'mythology' for these traditions is therefore both culturally inaccurate and intellectually misleading.

Religious Prescription

A second misconception equates IKS with a long list of *vidhi* and *niṣedha* (dos and don'ts). This characterisation fails to account for the fact that the animating concern of the overwhelming majority of Indian scriptures, whether the *Rāmāyaṇa*, the *Mahābhārata*, the *Āryabhaṭīya*, the *Sāṃkhya Darśana*, or any other, is a universally human inquiry: How does one find happiness? How does one evolve? How does one reach that fullness to which one is entitled? Religious or devotional framing, where it exists, is typically contextual scaffolding rather than the core substance. The Dharma Sāstras do prescribe several dos and don'ts as much as a modern-day organization does for its employees and business partners. Merely dismissing a repository using this argument is too simplistic and unscientific.

Blind Faith and the Unscientific

The characterisation of IKS as 'blind faith' misunderstands the nature of faith itself. Faith, by definition, operates without requiring proof. It is not a deficiency but a fundamental epistemic posture that undergirds all human endeavour. A Nobel laureate proceeds on faith that a meaningful result lies at the end of years of inquiry. The *Śraddhā Sūkta* identifies *śraddhā* (faith) as the mother of desire[5] and the precondition of all purposive action. To dismiss an entire knowledge tradition as 'unscientific' on these grounds is to misread the very category.

[5] श्रद्धा कामस्य मातरम् हविषा वर्धयामसि । (*śraddhā kāmasya mātaram haviṣā vardhyāmasi)*

Inaccessibility and Extinction

Many respondents describe IKS as extinct, incomprehensible, or simply out of reach. This perception, though widespread, is factually incorrect. The tradition is imperfectly transmitted but not absent. The challenge is one of access, orientation, and institutional support, not fundamental unavailability.

Unqualified Glorification

A final, equally problematic response is the reverse: the uncritical glorification of the past. An illustrative example is the claim that 'string theory is present in the *Bhagavad Gītā* because the seventh chapter uses the metaphor of a thread connecting beads[6]. String theory, however, is a mathematically rigorous physical framework with complex equations and probabilistic structure. To derive it from a single lexical adjacency is a disservice to both the Bhagavad Gītā and to contemporary science. Such claims reduce a rich tradition to a laughingstock and must be resisted with the same vigour as dismissive scepticism.

3. THE CASE FOR ENGAGING ANCIENT WISDOM

Three distinct arguments support serious engagement with IKS. First, the problems confronting business, government, and society today are not historically novel. The challenge of governance, the aspiration for popular welfare, and the conditions of secure living are as old as human civilisation. The *Arthaśāstra*'s account of a king's cardinal duty, to ensure *Yoga-kṣema*, meaning both the acquisition of good things in life (*yoga*) and the preservation of what has already been acquired (*kṣema*), describes a concern that is structurally identical to the concerns of any modern state.

Second, the conceit that significant intellectual progress began only three or four hundred years ago implies that earlier generations were cognitively deficient, a conclusion that, applied consistently, would make our own generation appear equally deficient to those who will follow us in three centuries. Every era has possessed the capacity for rigorous thought. The intellectual output of earlier periods must be understood on its own terms.

[6] मत्तः परतरं नान्यत् किञ्चिदस्ति धनञ्जय । मयि सर्वमिदं प्रोतं सूत्रे मणिगणा इव ॥ *Gītā 7.7 //*
mattaḥ parataraṃ nānyat kiñcid asti dhanañjaya | mayi sarvam idaṃ protaṃ sūtre maṇigaṇā iva //

Third, and most practically, any forward path is a function of the path already walked. This principle of path dependence means that ignorance of one's intellectual inheritance creates genuine discontinuity and impedes future progress. One cannot move a tradition forward without first knowing where that tradition has been.

4. DEFINING THE INDIAN KNOWLEDGE SYSTEM

The term 'Indian Knowledge System' is best understood through its three constituent elements: Indian, Knowledge, and System.

Indian

'Indian' refers to indigenous sources of knowledge generated by Indian society in two senses: geographical and demographic. Geographically, 'India' in this context means *Akhaṇḍabhārat,* the undivided subcontinent from Kandahar to the eastern borders, and in the north – south, captured as *Āsetu Himālaya* (from the sea to the Himalayas). The contemporary boundaries of India and Pakistan represent a political arrangement of the last seventy-five years and do not reflect the cultural and intellectual geography within which IKS was produced.

Demographically, 'Indian' refers to persons who were born and lived on the subcontinent, or who came to it and spent substantial time integrating with its culture. Those who visited briefly, translated portions of the tradition, and departed cannot count as authoritative interpreters of IKS, not because of cultural nationalism, but because the vocabulary and pulse of these texts can only be grasped from within a living engagement with the culture. This *jñāna-yajña,* the sacred offering of knowledge, belongs to those who are embedded in its living matrix. The mistranslation of the *Śatapatha Brāhmaṇa* by the Dutch scholar Caland in the nineteenth century, who rendered '*Uttarādara Sahasra gavāḥ*' as 'the earth is moved away from the heavenly bodies by stacking thousands of cows', illustrates the epistemic cost of translating without cultural immersion (Mahadevan et al., 2022).

Knowledge

Knowledge in the IKS context is both tacit and explicit. The movement from tacit to explicit knowledge involves processes of contemplation, synthesis, observation, experimentation, analysis, and validation, processes that Indian society cultivated systematically. The Vedic literary tradition

is *apauruṣeya*, not of human authorship, and was preserved through oral transmission of extraordinary precision. Knowledge may be formal (textual repositories) or informal (oral traditions). Oral knowledge encompasses health traditions, folk practices, music, and dietary customs transmitted through living communities. Both formal and informal knowledge pervade three domains: religion and spirituality on the one hand, and practical disciplines, what might today be called secular or applied knowledge, on the other.

System

A system implies internal consistency, comprehensiveness, and organisation such that individual bodies of knowledge can be understood in relation to one another. Indian tradition organised its knowledge in multiple ways, the most prominent being the *Caturdaśa-Vidyāsthāna* framework, which encompasses the *Veda*s, the *Vedāṅgas*, the *Darśana*s, the *itihāsas*, and the subsidiary disciplines. The capacity of this tradition to hold together mathematics, astronomy, aesthetics, and philosophy as an integrated whole, rather than as separate compartments, reflects its fundamentally holistic epistemology.

5. THE STRUCTURE OF THE IKS REPOSITORY

The IKS repository may be mapped along two axes: literary (formal) and non-literary (oral or informal) (Mahadevan et al., 2022). Within the literary tradition, three broad streams are identifiable. The first and largest is the *Sanātana Dharma* tradition, which encompasses the Vedic corpus, *Saṃhitās*, *Brāhmaṇas*, *Āraṇyakas*, and *Upaniṣads*, and the six *Vedāṅga*s: *Śikṣā* (phonetics), *Kalpa* (ritual procedure), *Vyākaraṇa* (grammar), *Nirukta* (etymology), *Chandas* (prosody), and *Jyotiṣa* (Astronomy). Together with the *Darśana*s, the *Itihāsa*s (*Rāmāyaṇa*, *Mahābhārata*), and the *Purāṇa*s, as well as the vast secondary literature in mathematics, astronomy, medicine, architecture, metallurgy, politics, economics, and the arts that flows from this foundation.

The second stream comprises the *Bauddha* and *Jaina* traditions, which, while theologically distinct, contributed substantially to mathematics, alchemy, and applied sciences. The *Jātaka* tales, for instance, contain references to shipbuilding and navigation. Jaina works on mathematics constitute an important strand of the broader Indian mathematical tradition. The third stream is

regional and vernacular literature. By and large, an outgrowth of the *Sanātana Dharma* framework, regional texts retell, emphasise, and occasionally supplement the parent tradition through the lens of local contexts and languages. Given the extraordinary diversity of languages and dialects across the subcontinent, a diversity so granular that taste, preparation, and foodways change every forty or fifty kilometres, this regional dimension is not peripheral but constitutive.

Alongside the textual tradition stands a rich oral and practical knowledge system encompassing art forms, health practices, food traditions, and life practices. The practice of producing the Aranmulla mirror in Kerala, a polished metal alloy that functions as a mirror and whose precise composition has been preserved by a small community of artisanal families, exemplifies this form of knowledge. Much of the intricate detail of metalworking, Ayurvedic preparation, and classical arts was transmitted through the *guru-śiṣya* or family lineage (*jāti*) mechanism, which served precisely as a vehicle for preserving specialised know-how across generations.

6. A BRIEF SURVEY OF THE IKS REPOSITORY

The following sections offer representative illustrations across several domains. They do not constitute an exhaustive survey; the objective is to demonstrate the breadth and technical depth of IKS.

Metallurgy

India's tradition of metalworking can be traced through both archaeological and textual evidence. Mauryan seals of the fourth century CE and finely worked gold ornaments of comparable antiquity require, for their production, a sequence of knowledge: ore identification, ore mining, metal extraction, processing, forming, and embossing (Prakash 1997). Each stage presupposes antecedent technical knowledge. Of particular significance is India's pioneering role in zinc smelting. Zinc vaporises at approximately 500–550 degrees Celsius and, if the temperature exceeds this range, oxidises into zinc oxide. Indian metallurgists resolved this problem through the downward drift distillation process, a technique in which the vapour is cooled and collected (Sen and Subbarayappa, 2009). The antiquity of this process is attested by textual references and archaeological evidence, and the details have been investigated in collaborative research between Hindustan Zinc, IIT Kanpur, and the University of Baroda (Biswas, 1993).

The famous wootz steel, known as ‘ukku’ in Kannada and ‘urukku’ in Tamil, was produced in the region encompassing present-day Salem, Erode, and the tri-junction of Kerala, Tamil Nadu, and Karnataka. Ingots of wootz steel were exported to the Middle East, where they were fashioned into the celebrated Damascus blades (Ranganathan and Srinivasan, 2006; Prakash, 1977). The exact composition of wootz steel remained unreplicated by modern material science at least as late as the early 1960s, testifying to the sophistication of the original process.

The corpus of Indian iron pillars provides compelling evidence of metallurgical sophistication in ferrous carbon alloys. The iron pillar at the Qutub Minar complex stands exposed to the atmosphere and remains rust-free after more than a millennium. Some seventy-seven iron pillars have been identified across the subcontinent, from Mount Abu to the Konark temple complex, all sharing the property of atmospheric corrosion resistance. An iron pillar at Dhar in Madhya Pradesh is twice the weight of the Delhi pillar.

Textual corroboration comes from Vagbata’s eleventh-century *Rasaratna-samuccaya*, which classifies iron into three primary categories (Vidyābhūṣaṇa and Vidyāratna, 1927):

- *Munda* - Cast iron, with three sub-varieties: *mṛdu* (मृदुः), *kunda* (कुन्दः), and *kadara* (कदरः)
- *Tīkṣṇa* - hard iron, with six sub-varieties and
- *Kānta* - Magnetic iron, with five sub-varieties.

The passage demonstrates not only classificatory sophistication but the existence of an infrastructure for working with ferrous carbon alloys.

The Chola bronzes were produced through the *madhūcchiṣṭa-vidhāna*, the lost-wax casting process (*ucchiṣṭa* meaning ‘left over’, *madhu ucchiṣṭa* being beeswax). Procedural details are available in the third chapter of the second *khaṇḍa* of the *Viṣṇudharmottara Purāṇa*. This process, which allows the faithful reproduction of complex shapes in metal, predates by many centuries the equivalent technique credited to Pierre in seventeenth-century France. Many of these idols are cast in *pañca-loha*, an alloy of five metals, indicating mastery of multi-metal composition.

The surgical tradition associated with *Suśruta* deployed carbon-steel tools of extraordinary sharpness. Textual sources cite tools capable of splitting a human hair longitudinally, an aspiration that points to a culture of precision instrument-making (Sharma, 1977). The feasibility of such precision is further supported by the evidence of granite temple architecture. The ability to chisel the hardest known stone requires cutting tools harder still, implying a command of ferrous carbon metallurgy at a high level.

Mathematics

Indian contributions to mathematics are exemplified in two areas that are especially illuminating: geometric construction and combinatorics. The *Śulba-sūtra*s, that form part of the *Kalpa Vedāṅga*, present a system of geometric construction based on the circle. The word *śulba* means 'thread' or 'rope'. All constructions were performed with a thread staked to a pole mounted on the ground, generating circles from which all other shapes were derived. Their practical impetus was the design and construction of Vedic altars in precise geometric forms. Complex and nonstandard shapes such as the *Śyena Citi* (a falcon in flight), a tortoise, a semicircle, and many others were generated using sulba-sūtras. The *Kalpa Sūtra*s prescribe nearly over seventy distinct altar shapes. For example, the *Śyena Citi* requires exactly 200 bricks of five distinct shapes in specific quantities. Contemporary educators at certain Canadian and American universities have developed courses in 'rope geometry' drawing on the methodological framework of the *Śulba-sūtra*s.

Pingala's *Chandaḥ-śāstra* (second century BCE), a treatise on Sanskrit prosody, contains within it a structural isomorphism with binary mathematics. Pingala identifies eight metrical feet (*gaṇa*s) defined by sequences of short (*laghu*) and long (*guru*) syllables. If *guru* is mapped to 0 and *laghu* to 1, the eight *gaṇa*s constitute an exhaustive set of three-digit binary words. The mnemonic device यमाताराजभानसलगम् (y*amātā-rājabhāna-salagam)* encodes this binary sequence in a form that anticipates what modern mathematicians call a De Bruijn sequence, a cyclic binary string in which each possible subsequence of a given length appears exactly once. Further, the *Chandaḥ-śāstra* contains procedures — *Prastāra*, *Naṣṭa*, *Uddiṣṭa*, and *Lagakriyā* for enumerating, indexing, and recovering binary sequences of arbitrary length (Kedārnāth and Paṇaśikar, 1927). The functional equivalent of what in contemporary mathematics is called Pascal's triangle is known in the Indian tradition as *Meru Prastāra,* detailed in *Chandaḥ-śāstra*.

In the domain of combinatorics, the mathematician Nārāyaṇa Paṇḍita (1495 CE) solved the problem of pan-diagonal magic squares. His work was compiled in the *Gaṇitakaumudī*. Whereas a standard magic square requires that rows, columns, and main diagonals sum to the same total, a pan-diagonal magic square requires this property to hold for all diagonals when the square is conceived as a torus. Nārāyaṇa Paṇḍita enumerated the number of distinct four-by-four pan-diagonal magic squares and developed robust properties and an algorithm to solve the problem (Dutta and Singh, 1976). Subsequently, researchers in the US arrived at the same results in the twentieth century.

Astronomy

Astronomy occupies a privileged position within IKS by virtue of its *Vedāṅgic* status: *Jyotiṣa* is one of the six *Vedāṅga*s, and knowledge of the sky, the *nakṣatra* system, the positions of celestial bodies, and the reckoning of auspicious time pervades the Vedic corpus, the *Rāmāyaṇa*, and vernacular literature. References to *nakṣatra* names such as *Kṛttikā* and *Bharaṇī* appear throughout, testifying to sustained and systematic sky observation.

Contemporary planetarium software tools such as SkyMap allow the computational reconstruction of the night sky at any location on Earth across a span from approximately 4000 BCE to 8000 CE. Scholars have begun using such tools to cross-reference astronomical statements in Vedic *mantra*s, with the dual result of potentially dating those texts and confirming the observational acuity they presuppose. The specific computational and observational achievements documented in the *Āryabhaṭīya* are addressed in dedicated sessions within the broader programme to which this paper belongs.

Cosmology and the Life Sciences in the Purāṇas

A common prejudice holds that the *Purāṇa*s are exclusively religious in content. In fact, the *Purāṇa*s were encyclopedic by design, their *pañca-lakṣaṇa* framework requiring that each *Purāṇa* address, inter alia, the origin of the universe (*sarga*), lineages (*vaṃśa*), and their continuation (*vaṃśānucarita*). The *Tṛtīya Skandha* (Third Book) of the *Śrīmad-bhāgavata Mahā-purāṇa* contains an extended treatment of cosmological time, spanning from units of approximately 3×10^{-5} seconds to 10^{17} human years, a unit called *parārdha*, representing an intellectual engagement with a temporal scale of extraordinary range.

The *Padma Purāṇa* contains a dialogue between Mātali, the charioteer of Indra, and *Yayāti*, in the course of which over100 *śloka*s describe the stages of foetal development. *Śrimad Bhāgavata Mahā-purāṇa* also has descriptions such as: by the fifth night, a bubble is formed; by the tenth night, the shape of a plum appears; in the following days, a lump of flesh is formed; by the end of the first month, the head; by the end of the second, the limbs (Goswami and Sastry, 1971). These descriptions attest to sustained observation of biological development integrated into a cosmological framework.

Governance and Political Economy

The *Arthaśāstra* of *Kauṭilya*, comprising approximately 6,500 *sūtra*s in prose, constitutes perhaps the most systematic treatise on statecraft produced in the ancient world. Its sixth book identifies the seven constituents of a Kauṭilyan state: *Svāmī* (the sovereign); *Amātya* (the council of ministers); *Janapada* (the territory and its population); *Durga* (the fortified capital); *Kośa* (the treasury); *Daṇḍa* (the military and judicial apparatus); and *Mitra* (diplomatic allies). The *Janapada* dimension of the *Arthaśāstra* is elaborated in Book Two, which covers land use and zoning, village founding and administration, and road network design. The criminal justice system is organised around the principle of *Matsya-nyāya*, 'the larger fish shall not eat the smaller fish', as the animating concern of civil and penal law. Books Six through Thirteen address the circle of kings and the strategy of territorial expansion.

The character of the Kauṭilyan sovereign differs fundamentally from the Hobbesian sovereign of Western political thought. In the Indian conception, the king is understood as a descendant and embodiment of *Dharma* whose primary obligation is the *yoga-kṣema* of his subjects. This contrasts with the principal-agent framework that undergirds much of Western management theory, in which the agent is presumed to be in tension with the principal and must be constrained through incentive design and oversight mechanisms. In economic policy, the Arthaśāstra does not resolve to either laissez-faire or a controlled economy. Private enterprise is actively encouraged; at the same time, the state maintains a strong oversight function through taxation, regulation, and commensurate punishment for deviation. The text anticipates contemporary regulatory frameworks, in which the state neither controls production directly nor withdraws from economic governance entirely.

Hydraulic Engineering and Architecture

India's tradition of hydraulic engineering is exemplified by the Kallanai dam (The Grand Anaicut) on the Kāverī River near Tiruchirappalli, constructed in the first century CE by the Chola king Karikalan. Built of granite, Kallanai is described as the world's second-oldest dam still in use and is credited as the fourth-oldest dam overall. It is the only surviving dam of that vintage. In Rajasthan and adjacent territories, stepwells (*vāv*), architectural masterpieces combining deep cisterns, descending staircases, and elaborately carved galleries, provided water storage in arid zones.

The textual record of architectural and hydraulic knowledge includes the *Samarāṅgaṇa-sūtradhāra*, composed by King Bhoja in the eleventh century; the *Mayamatam* on Dravidian temple architecture; and the *Aparājitapṛcchā*, a Gujarat text detailing stepwell design and town planning principles. The *Bṛhat-saṃhitā* describes proportional canons of the human body, five male and five female body types with specified ratios of head width to height, and of head to limb length (Sastry and Bhat, 1946). It served as the basis for iconographic practice and may hold potential applications for contemporary textile and fashion industries.

7. CAUSES OF DISCONTINUITY IN THE KNOWLEDGE TRADITION

The present state of disengagement from IKS is the product of several converging historical forces. The first and most structurally significant is the tradition's substantial reliance on oral transmission. While the Vedic oral tradition is famously precise and self-correcting, many applied knowledge domains, such as metallurgy, medicine, and the performing arts, depended on continuous transmission through family lineages and *guru-śiṣya* chains. When these chains were disrupted, the tacit knowledge they carried was lost irrecoverably, even where some textual scaffolding survived.

The second cause is seven hundred to one thousand years of foreign rule, during which the ruling classes had neither śraddhā nor interest in preserving the indigenous knowledge tradition. The demolition of temples, monasteries, and libraries and the burning of manuscripts constitute what might aptly be described as a tsunami of aggression against India's knowledge-creation

infrastructure. No civilisation can readily absorb such catastrophic shocks; the discontinuities they produce are not easily repaired.

The third cause is the consolidation of colonial policy from approximately 1850 onwards, particularly the Macaulayan educational framework, which replaced indigenous institutions with a European curriculum and effectively severed the umbilical cord between living communities and their intellectual heritage. Those educated in the new system were trained to regard the indigenous tradition as either non-existent, superstitious, inferior, or irrelevant.

A fourth cause, perhaps more invidious than the foregoing, is terminological capture. The English vocabulary imposed on the study of Indian thought 'mythology', 'blind faith', 'folk practice', 'tribal knowledge' carries embedded epistemological judgements that disqualify these traditions before they are examined. Recovering IKS requires, at a minimum, freeing it from this terminological cage. Terms such as *itihāsa*, *Purāṇa*, and *Dharma* must be engaged on their own terms and not through the distorting lens of imported categories.

8. AN AGENDA FOR THE RECOVERY AND APPLICATION OF IKS

The recovery of IKS is not an exercise in nostalgia or nationalist sentiment; it is an epistemic and practical necessity. Four priorities constitute a coherent agenda. First, the intellectual property dimension is urgent. India failed to prevent the granting of a US patent for neem as a pesticide partly because it could not demonstrate with sufficient documentary precision when and in what form the knowledge had been codified. Similarly, a turmeric patent was eventually challenged through the painstaking archival work under the leadership of Dr. R. A. Mashelkar at CSIR, a process that took nearly a decade (Jayaraman, 1997). The implication of this is that every practising chemist, metallurgist, pharmacologist, or biologist must develop a professional interest in knowing what their predecessors knew.

Second, specific application areas should be identified and developed. The *Bṛhatsaṃhitā*'s proportional humanoid canons, developed for iconographic purposes, may have applications in textiles and fashion design. The *Arthaśāstra*'s *sapta-prakṛti* framework maps structurally onto modern corporate governance: *Amātya* corresponds to the board and C-suite; *Janapada* to markets, customers, and stakeholders; *Durga* to strategic barriers such as know-how and patents; *Kośa* to

financial management; *Daṇḍa* to audit, compliance, and CSR; and *Mitra* to partnerships, alliances, and market expansion strategies. Many such areas need to be identified and detailed studies undertaken to bring out useful frameworks for modern applications.

Third, deep specialist study is required. Each domain of IKS- mathematics, metallurgy, astronomy, medicine, architecture, law, political economy needs scholars who combine disciplinary expertise in the contemporary sense with the textual competence to read the relevant primary sources. A twenty-to-thirty-year horizon is appropriate. The goal is not merely to catalogue what was known but to carry the line of inquiry forward, drawing on what the tradition offers while moving beyond it.

Fourth, the orientation towards IKS must be that of a practitioner opening a toolbox, not of a museum goer viewing exhibits. The preliminary step is not application but understanding. This understanding must be first-hand, derived from primary texts read with appropriate guidance, not second-hand. Once that first-hand understanding is achieved, new paradigms will emerge organically. As the *Arthaśāstra* teaches, the precondition of wise governance is knowledge of the governed terrain; in the same spirit, the precondition of wise use of IKS is knowledge of what IKS actually contains — its *sūtra*s, its *śloka*s, its reasoning, and its spirit.

9. CONCLUSION

India possesses a knowledge heritage of extraordinary breadth and depth. Its engagement with the origin of the Universe, with the properties of metals, with the structure of language and its relation to binary mathematics, with the governance of states, with hydraulic engineering, with the development of the foetus, and with the proportions of the human body constitutes a record of sustained intellectual achievement across millennia. That this heritage should be kept in a ‘pūjā room’ and never opened or engaged with only through the distorting lens of inherited misconceptions is the greatest disservice that can be done to it.

The appropriate response to this heritage is neither dismissal nor uncritical glorification. It is systematic, first-hand, disciplinary engagement by chemists, metallurgists, architects, mathematicians, political scientists, and legal scholars, combined with the honest acknowledgement that the tradition is a toolbox to be opened and used, not a monument to be

admired. The democracy of ideas and the multiplicity of valid approaches that characterise the tradition at its best are themselves resources for the task of recovery.

As the *Bhagavad Gītā* reminds us: Whichever path one comes by, one is received[7]. *Dharma* of IKS, its self-sustaining, generative principle, is precisely this openness. The task of the present generation is to come to it, in whatever way one can, and to open what has for too long remained closed.

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[7] ये यथा मां प्रपद्यन्ते तांस्तथैव भजाम्यहम् । *ye yathā māṃ prapadyante tāṃs-tathaiva bhajāmy aham* |