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ABOUT THE PROGRESS JOURNALS

'The Progress Journals' is a flagship initiative of The Progress, which belongs to one of the verticals of Sri Aurobindo Yoga & Knowledge Foundation with a mission of Sustainable & Holistic Development. Begun in 2023, the vision behind this publication is to create an international, cross-disciplinary, peer-reviewed and open-access journal that deals with issues of social, cultural, economic and ecological importance. This bilingual journal (with papers in English and Hindi) seeks to provide a platform for people engaged in innovative studies on subjects related to sustainability and sustainable development.

The journal also aims to highlight the significance of the Sustainable Development Goals (SDGs), also known as the Global Goals, which were set up by the United Nations in 2015. These goals were designed to be a "blueprint to achieve a better and more sustainable future for all." They comprise a universal call to action to promote individual and social well-being on a global scale. The 17 SDGs are (1) No Poverty, (2) Zero Hunger, (3) Good Health and Well-being,

(4) Quality Education, (5) Gender Equality, (6) Clean Water and Sanitation, (7) Affordable and Clean Energy, (8) Decent Work and Economic Growth, (9) Industry, Innovation and Infrastructure, (10) Reducing Inequality, (11) Sustainable Cities and Communities, (12) Responsible Consumption and Production, (13) Climate Action, (14) Life Below Water, (15) Life On Land, (16) Peace, Justice, and Strong Institutions, (17) Partnerships for the Goals.

This journal, which shall be published quarterly, will allow researchers from various backgrounds to share their opinions and findings on topics related to these goals. Through this exchange of knowledge, we hope to better understand how to implement these principles for the development of our communities, our nation and the world.

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सह-प्राध्यापक, केन्द्रीय संस्कृत विश्वविद्यालय, जयपुर परिसर,
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EDITOR'S NOTE

THE PROGRESS, established in 2020, is one of four recent initiatives of Sri Aurobindo Yoga and Knowledge Foundation. The core objective of our organization is the transformation of consciousness in higher education. The inspiration for this goal is the philosophy of Sri Aurobindo and the Mother, especially the principles of Integral Yoga. We believe that true progress requires consciousness of one's role in one's family, community, nation and the world. We seek to create this distinctive awareness, especially among students, professors, researchers and other key stakeholders in the field of education. At present, we are associated with more than 28 higher education institutions, including IIT Delhi.

In Integral Yoga, it is written that there are five layers of the mind: Physical, Vital, Mental, Psychic, and Spiritual. In higher education institutes today, the teaching-learning process is such that it functions till the Vital layer. There is no formal curriculum for anything beyond that. That kind of learning only comes through community, social and spiritual initiatives. Most higher education institutions have already started different types of developmental projects, social work, etc. Our objective is to create an organization that can connect all these other institutions and then collectively, we can be a force for universal transformation. To the broad vision of progress, we each bring our own unique perspective. Together, we can refine our approach and make a difference globally, while being rooted in our regional heritage.

In 2023, we launched a new initiative, 'The Progress Journals' with a mission to highlight scholarly work on Sustainable Development in general and the significance of the Sustainable Development Goals (SDGs) proposed by the UN, specifically. This is our first issue and we are very grateful to all our contributors and supporters. We aim to release this bilingual journal on a quarterly basis and provide a space for new voices and fresh perspectives.

- *Dr. Samarendra Mohan Ghosh*

Editor-in-Chief

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Post Quantum Cryptography Mechanisms for Enhancing Security in Government Healthcare Systems

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Abstract

Government healthcare systems manage massive volumes of sensitive patient data across hospitals, primary care centers, and national health schemes. Digitization initiatives such as electronic health records (EHRs), telemedicine platforms, and wearable medical devices have improved access to healthcare but have simultaneously exposed public health data to cybersecurity threats. Classical cryptographic algorithms like RSA and ECC are increasingly vulnerable due to the rise of quantum computing. Post-Quantum Cryptography (PQC) provides algorithms resistant to quantum attacks, ensuring confidentiality, integrity, and authenticity of patient information. This paper examines the applicability of PQC in government healthcare systems, evaluates different quantum-resistant algorithms, and proposes an adoption framework for large-scale national health networks. Using literature review, simulation experiments, and expert consultation, this study concludes that lattice-based algorithms such as Kyber and Dilithium are optimal for real-time government health data, while hash-based schemes such as SPHINCS+ are ideal for archival systems. Implementation challenges, policy implications, and a roadmap for nationwide deployment are discussed, highlighting a future-ready approach to secure public healthcare infrastructures.

Keywords: ***Post-Quantum Cryptography, Healthcare Security, Lattice-Based Cryptography, Hash-Based Signatures, Electronic Health Records (EHR), Telemedicine Security, Quantum Computing Threats***

1. Introduction

Government healthcare systems are tasked with providing universal, affordable, and efficient medical care. Initiatives like Ayushman Bharat Digital Mission (ABDM) aim to digitize health records and integrate hospitals, clinics, and telemedicine services across India. National health databases store sensitive information including patient demographics, clinical history, lab results, and insurance details. While digitization increases accessibility and efficiency, it also exposes public healthcare data to cyber

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threats, including ransomware, data breaches, and identity theft (Ponemon Institute, 2021).

Traditional cryptographic methods such as RSA and ECC secure communications and storage, but are vulnerable to quantum computing attacks. Shor's algorithm can break RSA/ECC, while Grover's algorithm reduces the security of symmetric encryption (Shor, 1994; Grover, 1996). This is particularly concerning for government systems where millions of patient records are stored and shared across various departments and cloud infrastructure.

Post-Quantum Cryptography (PQC) offers algorithms resistant to quantum attacks. Adopting PQC ensures long-term security, compliance with health data regulations, and trust in national health programs. This paper explores PQC implementation in government healthcare, evaluates algorithm performance, and outlines a framework for large-scale deployment in public health systems.

Government initiatives such as the Ayushman Bharat Digital Mission (ABDM) emphasize secure and interoperable digital health ecosystems. Integrating Post-Quantum Cryptography aligns with national digital health policies by ensuring long-term data protection, regulatory compliance, and resilience against emerging quantum threats in public healthcare infrastructure.

2. Literature Survey

The NIST PQC standardization project evaluates quantum-resistant algorithms suitable for large-scale deployment (NIST, 2022). Lattice-based schemes like Kyber and Dilithium are widely recommended due to their efficiency and scalability (Alkim et al., 2016). Hash-based schemes like SPHINCS+ provide long-term integrity, making them suitable for archival systems (Buchmann et al., 2011). Code-based (McEliece) and multivariate schemes (Rainbow) offer additional security for regulatory compliance, though they require higher computational resources.

Government-focused studies highlight vulnerabilities in EHR systems, telemedicine platforms, and IoT-based public health monitoring devices (Hussain et al., 2022). While private sector healthcare has started adopting PQC pilots, national healthcare frameworks require additional research to ensure scalability, interoperability, and compliance with government regulations (Duong et al., 2023).

3. Research Objectives

- Evaluate quantum-resistant algorithms for government health data systems, telemedicine, and IoT medical devices.
- Analyze performance trade-offs in encryption speed, computational cost, and key storage requirements.
- Identify challenges in integrating PQC with legacy government IT infrastructure.
- Propose a nationwide PQC adoption roadmap for hospitals, primary health centers, and telemedicine networks.
- Assess PQC's impact on compliance with national health

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data policies, privacy regulations, and patient trust.

4. Hypothesis

- Null Hypothesis (H_0): PQC does not significantly improve the security of government healthcare systems.
- Alternative Hypothesis (H_1): PQC mechanisms significantly enhance security, ensuring confidentiality, integrity, and compliance against quantum-enabled attacks.

5. Research Methodology

- Literature Review: Analysis of NIST PQC reports, IEEE papers, and government healthcare cybersecurity frameworks.
- Simulation Tools Used:
  - Python (NumPy, Cryptography libraries)
  - OpenSSL (for cryptographic benchmarking)
  - MATLAB (performance analysis)
  - NS3 Simulator (network simulation for healthcare data transmission)
- Datasets: Simulated datasets representing EHRs, IoT medical sensor data, and telemedicine logs
- Metrics Evaluated: Encryption time, decryption time, key size, latency, computational overhead
- Expert Consultation: Interviews with healthcare IT administrators and cybersecurity professionals

This mixed-method approach ensures both technical rigor and practical applicability in government health systems.

6. Post-Quantum Cryptography in Government Healthcare

Lattice-Based Cryptography

- Algorithms: Kyber (encryption), Dilithium (digital signatures).
- Security: Resistant to quantum attacks, moderate key size, suitable for real-time data.
- Use-Cases: EHR encryption, secure telemedicine communication, IoT-based remote monitoring.

Hash-Based Cryptography

- Algorithm: SPHINCS+.
- Security: Long-term integrity, tamper-proof signatures.
- Use-Cases: Archival patient records, long-term government health data storage.

Code-Based and Multivariate Cryptography

- Algorithms: McEliece (code-based), Rainbow (multivariate).
- Security: Strong theoretical security for regulatory compliance.
- Limitation: Large key sizes and computational cost restrict real-time use.

7. Data Analysis for Government Deployment

Algorithm Type	Security Level	Key Size	Computational Cost	Suitable Government Use-Case
RSA (3072-bit)	Classical	Large	Moderate	Legacy hospital systems

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Algorithm Type	Security Level	Key Size	Computational Cost	Suitable Government Use-Case
ECC (256-bit)	Classical	Moderate	Low	Telemedicine & mobile apps
Kyber (Lattice-Based)	Quantum-Resistant	Moderate-Large	Moderate	National EHR & IoT networks
Dilithium (Lattice-Based)	Quantum-Resistant	Moderate	High	Digital signatures for prescriptions and lab reports
SPHINCS+ (Hash-Based)	Quantum-Resistant	Very Large	High	Archival health records & compliance data

Observation: Lattice-based schemes are most feasible for real-time national healthcare operations, while hash-based schemes are optimal for archival data integrity.

Comparative Interpretation

The analysis indicates that lattice-based algorithms such as Kyber provide an optimal balance between security and performance, making them suitable for real-time healthcare applications. Dilithium ensures strong authentication through digital signatures but introduces higher computational overhead. Hash-based schemes like SPHINCS+ offer superior long-term integrity, making them ideal for archival healthcare records despite larger key sizes. Classical algorithms like RSA and ECC, although efficient, are not suitable for future quantum-secure healthcare systems.

8. Implementation Challenges

- Limited computational resources in rural healthcare centers
- High cost of upgrading legacy hospital IT infrastructure
- Bandwidth limitations in telemedicine networks
- Storage overhead due to large PQC key sizes
- Lack of trained cybersecurity professionals in public healthcare
- Integration challenges with existing EHR systems
- Regulatory and compliance adaptation delays

9. Proposed Framework for Government PQC Adoption

1. Assessment Phase: Evaluate existing IT infrastructure and identify vulnerable points.
2. Pilot Deployment: Implement PQC in selected regional hospitals and telemedicine platforms.
3. Hybrid Model: Integrate PQC with classical cryptography to ensure smooth transition.
4. Training & Policy Development: Staff training, SOPs, and compliance guidelines.
5. National Rollout: Gradual implementation across all government hospitals, health centers, and telemedicine networks.
6. Monitoring & Maintenance: Real-time monitoring of encryption systems, automated key rotation, and incident response protocols.

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10. Future Scope of Work

Nationwide Hybrid Cryptography Models

- Combine classical and PQC for smooth migration across government hospitals and health IT systems.

Optimization for IoT Medical Devices

- Lightweight PQC algorithms for wearable government health monitoring devices, telemedicine kits, and remote diagnostic tools.

AI-Assisted Key Management

- Automate key generation, rotation, and validation using AI across national networks.

Standardization & Policy Compliance

- Develop PQC standards for government hospitals compliant with national digital health policies.

Long-Term Data Archival Security

- Use hash-based schemes for decades-long retention of public health records.

Integration with Emerging Tech

- PQC with blockchain for secure sharing between hospitals, labs, and health insurance authorities.
- Edge computing for real-time encryption at medical IoT endpoints.

Nationwide Performance Monitoring

- Develop dashboards and audit systems for encryption efficiency, key management, and security breaches.

Table: Government Future Scope Summary

Area	Description	Benefits	Research Focus
Hybrid Cryptography	Classical + PQC	Smooth nationwide deployment	Migration strategies, performance optimization
IoT Devices	Lightweight PQC	Efficient & fast	Kyber-Lite optimization
AI Key Mgmt	Automated monitoring	Reduced errors, scalable	AI/ML-based key management
Standardization	Policy compliance	Regulatory adherence	National PQC framework
Data Archival	SPHINCS+ optimization	Long-term integrity	Hybrid archival solutions
Emerging Tech	Blockchain & edge computing	Secure data sharing	AI-PQC integration
Nationwide Monitoring	Dashboards & audit systems	Transparency & accountability	System performance & security metrics

11. Conclusion

This study demonstrates that Post-Quantum Cryptography significantly enhances the security of government healthcare systems against future quantum threats. Lattice-based algorithms such as Kyber and Dilithium are suitable for real-time healthcare applications, while SPHINCS+ ensures long-term archival security. The proposed hybrid implementation model enables a smooth transition from classical cryptography to PQC.

The findings suggest that nationwide deployment of PQC can improve data

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confidentiality, strengthen regulatory compliance, and enhance patient trust. A phased implementation strategy involving pilot testing, infrastructure upgrades, and policy alignment is recommended for successful adoption.

12. Implications

- Strengthens national healthcare cybersecurity.
- Ensures compliance with national digital health policies.
- Enables trustworthy telemedicine services.
- Protects government health databases against future quantum attacks.

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Indigenous Knowledge: An Analysis of the Sun in Indian Culture

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Abstract:
India made significant advancements in indigenous knowledge during the ancient and medieval periods. The Indian Knowledge System (IKS) encompasses the practices, expressions, insights, understandings, beliefs, and experiences of Indigenous groups developed over centuries of profound interactions with a particular territory. The intellectual achievements of Indian thought are found across several fields of study in the Vedas and Upanishads, to a wide range of scientific, technical, scriptural, philosophical, and artistic sources. Sun worship is vital in Vedic worship in the form of gods, such as Surya, Martanda, Usa, Pusan, and Rudra. The sun is regarded as a vital source of life and energy, playing a central role in many Indigenous cultures. It is associated with deities, creation stories and ceremonies. In Hinduism, people observe the sun to understand its connection with local topography and weather. Many Indigenous cultures have unique perspectives on solar and lunar eclipses, often viewing them as powerful events with spiritual or symbolic significance to their people. Indigenous knowledge of the sun is passed down through oral traditions, stories, songs, and ceremonies.

This study analyses the indigenous knowledge of the sun in the Indian knowledge system. This knowledge spans various aspects, from observing the sun's movement and its impact on the seasons and weather to its role in religious and spiritual practices in the region.

Key-words: ***Indigenous knowledge, Indian Knowledge System (IKS), scriptural, philosophical, and traditional knowledge.***

Introduction:

Indian culture and traditions have made extraordinary contributions to science and spirituality since ancient times. Traditional and indigenous knowledge is a collective form of awareness and understanding of the behaviors and beliefs of local people, passed down through generations by social transmission. The applications and importance of indigenous knowledge can be experienced through the customs and rituals celebrated across India. Traditional knowledge is a part of the cultural identity

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of Indigenous and local peoples. Indigenous knowledge in India encompasses a vast repository of cosmological, astronomical, philosophical, and spiritual insights passed down through generations. Indigenous knowledge systems are community-based, experiential, and holistic, encompassing practical and symbolic relationships with the environment. The sun has held a central position in Indian culture for millennia, revered as a celestial body and divine and life-giving force. The sun 's great impact has long been observed by the masses. According to modern astronomy, the Earth's orbit around the Sun is not a perfect circle but a slightly elliptical path that varies in distance from the Sun. Because of this elliptical orbit, the distance between the Earth and the Sun changes slightly throughout the year. At its closest point to the Sun, known as the perihelion, the Earth is approximately 91,445,000 miles (147,166,462 km) from it. At its farthest point, called the aphelion, the Earth is approximately 94,555,000 miles (152,171,522 km) away, occurring around July 3 each year. The average distance between the Earth and the Sun is approximately 92,955,807 miles (149,597,870.691 km). The first scientific measurement of this distance was made in 1672 by Jean Richer and Giovanni Domenico Cassini, who estimated it to be 22,000 times the radius of Earth. Given the Earth's radius as 6,371 km, their calculation was 22,000 × 6,371 =140,162,000 km—about 140 million kilometres.

The inclusion of Indigenous knowledge regarding the sun may enrich modern society's knowledge base. This study explores Indigenous knowledge of the Sun in Indian culture and spiritual practices.

Methodology:

This study is based on secondary data collected from different published secondary sources, such as research papers, articles, Upanishads, religious books, and annual reports.

The Sun as a Deity:

- **The Hanuman Chalisa Connection:**

Interestingly, two lines from the Hindu devotional hymn Hanuman Chalisa, composed by Goswami Tulsidas in the 16th century, appear to describe this distance:

जुगसहस्त्रयोजनपरभानु,
लील्योताहिमधुरफलजानू

juga-sahasra-yojana-parabhānu, līlyotā hi madhura-phalajānu

The phrase "जुगसहस्त्रयोजनपरभानु" (juga-sahasra-yojana-para-bhānu) translates to- "The Sun (bhānu) is at a distance of yuga-sahasra-yojanas."

Fig 1: Hanuman Chalisa

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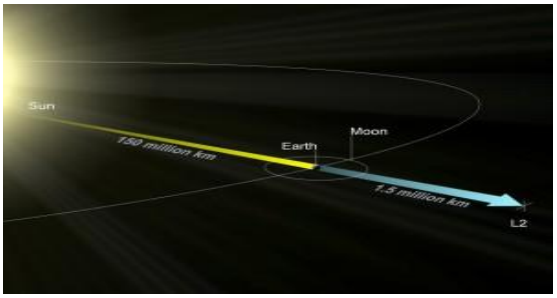

Fig 2: Distance between Sun and Earth

According to traditional Hindu measurements in Vedic literature found in ancient texts:

1 Yuga	A divine era	12,000 (used here as a numerical value)
1 Sahasra	A thousand	1,000
1 Yojana	A measure of distance	8 miles

Therefore:
Yuga × Sahasra × Yojana = Para Bhanu (distance to the Sun)
12,000 × 1,000 × 8 miles =96,000,000 miles
Conversion of miles to kilometers
96,000,000 × 1.6 =153,600,000 kilometres

A Remarkable Comparison

Modern (average)	149,597,870 km
Hanuman Chalisa (interpreted)	153,600,000 km
Cassini and Richer (1672)	140,162,000 km

The value derived from the Hanuman Chalisa differs from the modern scientifically accepted distance by only approximately 3%, which is remarkably close to the text composed centuries before the invention of modern instruments.

Owing to the importance of the Sun, the Vedic Aryans deified and personified the force of nature, which consists of heat and light, and worshipped it as a deity, praising its various aspects. The importance of the sun is noted by Katyayana in the Sarvanukramaṇi as follows:

एकैव वा महानात्मा स तत् सूर्य इत्यचक्षते॥
ekaivava mahanatma *a* tat *surya* ityacakṣate
There is one great god, Surya. In Brhaddevata, Saunaka directs the Sun to be the very soul of all other gods. In the Rigvedic section
इन्द्रं मित्रं वरुणमग्निम्॥
indram mitram varunamagnim,

It is stated that Indra, Mitra, Varuṇa, and Agni are the names of the same divine being, the one Supreme Spirit and universal force, under various indications. Surya is the direct embodiment of the atmospheric Sun. This is the most clearly conceived and defined form of solar divinity in the Rig Veda. Day and night are created by the sun's rising and setting. As the creator of day and night, it provides heat and light to the entire universe and food and vegetation to all living beings. Different aspects and positions of the Sun have given rise to

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independent Sun-gods in Vedic literature; thus, a group of solar divinities was formed in Vedic literature.

- **Surya in Vedic Tradition:**

Fig 3: People of India worshiping the Sun God

In the Indian Knowledge System (IKS), which integrates philosophy, spirituality, science, and daily life, the sun is understood not only as a star in the sky, but also as a life-giving force, deity, and cosmic regulator. In the Hindu pantheon, the Sun and Moon are the only deities that can be seen with the naked eye. The Vedas are not only sacred or religious texts but also a source of knowledge. This literature is a source of pride for the country. In addition, the customs and rituals passed down from our ancestors are effective methods devised by our great sages to transmit this knowledge to future generations. Surya is one of the principal deities in the Rigveda. Surya is portrayed as the eye of the universe (*Chakshu Surya*) and the sustainer of all life.

Rituals and practices involving the sun:

Spirituality is the soul of Indian culture and the science of the 'life-giving substance.' Surya represents truth, order (ṛta), and knowledge. The Sun's movement is closely linked to rituals and the seasonal cycles. In Indian traditional medicine, practices such as Surya Jal (solarised water) and Atapasevana (controlled sun exposure) are prescribed for health and balance. A daily Vedic ritual is performed at sunrise and sunset, emphasising the alignment with solar rhythms. It is a major festival in parts of North India, in which devotees offer prayers to the rising and setting sun, highlighting their gratitude for life and fertility. The atmosphere created during the celebration purifies society. The Yoga philosophy, as propounded by sage Patanjali, attaches great prominence to Sūryanamaskāra. Sūryanamaskāra is a yogic practice that symbolizes reverence to the Sun, combining physical postures with spiritual reflection. It is an ancient exercise aimed at achieving physical and mental equilibrium of human beings. Sūryanamaskāra is performed before sunrise and after sunset. It is a yogic sequence of 12 postures aligned with the Sun's movements that integrates physical health, breath regulation and spiritual reverence. Surya Namaskar practices are now gaining global recognition for their benefits to physical and mental health.

Fig 4: Steps of Surya Namaskar

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Solar Knowledge in Indigenous Calendrical Systems:

A Vedic calendar based on the sun, known as the Saura Maanam, is a solar calendar that follows the apparent movement of the sun around the Earth to mark seasons and months. Unlike the lunar calendar, which is determined by the phases of the moon, Saura Maanam relies on the sun's position in the zodiac. It forms an essential part of the Hindu calendar system, which harmoniously combines both solar and lunar elements to organise time and rituals by adding adhik-maas every two to three years. The concept of Adhik Maas is unique to the traditional Hindu calendar. For example, in the 2023 calendar, there were 13 months with an Adhik-Maas between July 18 and August 16. The Hindu calendar continues to shift slowly with respect to the seasons because of the precession of the Earth's axis.

- **Year, Month, and Day:**

द्वादश प्रधयश्चक्रमेकं त्रीणि नभ्यानि क उ तच्चिकेता |तस्मिन्त्साकं त्रिशता न शंकवोऽर्पिता षष्टिर्न चलाचलासः||

dvādaśa pradhayaś cakram ekaṃ trīṇi nabhyāni ka u tac ciketa |tasmin sākam triśatā na śaṅkavo 'rpitā ṣaṣṭir na calācalāsaḥ ||

The chariot of the Sun has 12 *paridhi*, 1 *chakra*, 3 *nabhi,* and 360 *aare*. This indicates 12 months, 1 year, 3 seasons, and 360 days.

- **Vedic Names of Months:**

वेदमासो धृतव्रतो द्वादश प्रजावतः| वेदा य उपजाय ते ||

vedam āso dhṛtavrato dvādaśa prajāvataḥ | vedā ya upajāyate ||

The solar year is divided into 12 months as follows:

मधुश्च माधवश्च वासन्तिकावृत शुक्रश्च शुचिश्च ग्रैष्मावृत नभश्च नभस्यश्च वार्षिकावृतइषश्चोर्जश्च शारदावृतू सहश्च सहस्यश्च हैमन्तिकावृत तपश्च तपस्यश्च शैषिरावृत ||

madhuś ca mādhavaś ca vāsantikau ṛtū | śukraś ca śuciś ca grīṣmau ṛtū | nabhaś ca nabhasyaś ca vārṣikau ṛtū | iṣaś corjaś ca śāradau ṛtū | sahaś ca sahasyaś ca haimantikau ṛtū | tapaś ca tapasyas ca śaiśirau ṛtū ||

ऋतु	वैदिक महीने	हिन्दू महीने	English Month
वसन्त	मधु,माधव	चेत्र, बैशाख	April, May
ग्रीष्म	शुक्र,शुचि	ज्येस्ठ, आषाड़	June, July
वर्षा	नभस्,नभस्य	श्रावण, भाद्रपद	August, September
शरद	इष,उर्ज	आश्विन, कार्तिक	October, November
हेमन्त	सहस,सहस्य	मार्गशीर्ष, पौष	December, January
शिशिर	तपस,तपस्य	माघ, फाल्गुन	February, March

Two more months are described in the Vedas, which come after the typical intervals of time:

"संसर्प" – अधिकमास, "अंहस्पति" – क्षयमास| ससर्पोस्यअंहस्पत्यायत्वा||

"saṃsarpa" – adhikamāsa, "aṃhaspati" – kṣayamāsa |sa sarpo 'sya aṃhaspatyāyātvā ||

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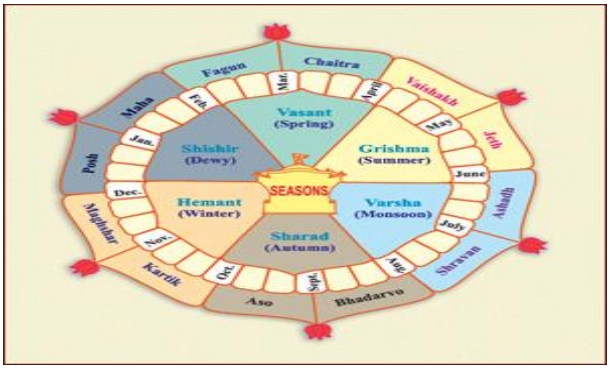

Fig. 5: Months and seasons on the basis of the Movement of the Sun

January is also known as "सहस्य or पौषमास"and is celebrated by worshipping the Sun as 'God.' Indian lunisolar calendars, such as the Tamil calendar and the Bengali Panjika, are guided by the movement of the sun and mark agricultural and religious events.

Ecological and Agricultural Relevance:

Sunlight is considered a divine energy that influences crop yields, animal behaviour, and human health. Traditional farmers worldwide use the sun's path to determine sowing and harvesting times. Indigenous farming communities, particularly those in tribal areas, have long relied on sunlight for agricultural planning purposes. Traditional calendars, such as Vikram Samvat, are solar-lunar and are used to determine sowing and harvesting times in the region. The position and intensity of the sun were observed to predict seasonal changes, monsoons and crop cycles. Surya has the power to control the seasons and the ripening of crops, making him especially significant for agricultural communities. Festivals such as Makar Sankranti and Pongal are dedicated to celebrating good harvests. Festivals such as Makar Sankranti mark the sun's northward movement (Uttarayana) and are celebrated as harvest festivals across India.

Fig 6: Indian farmers working at sunrise during the sowing season.

Sūrya is a great preserver.
विश्वस्य स्थातुर् जगतश् च गोपा॥
(viśvasya sthātur jagataś ca gopā)
which is amplified by Sāyaṇācārya as follows:
विश्वस्य सर्वस्य स्थातुः स्थावरस्य जगतः जङ्गमस्य च गोपा गोपायिता॥
(viśvasya sarvasya sthātuḥ sthāvarasya jagataḥ jaṅgamasya ca gopā gopāyitā ||)

As Sūrya sustains the entire universe, he is rightly called Prajāpati. In the Śatapathabrāhmaṇa, Sūrya is mentioned as both a sustainer and protector of the world:

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एष वै सूर्यः। य एष तपति। एष वैदं सर्वमभिगोपायति साधुनैव असाधुनैव। एष एतत् सर्वं विदधाति॥
(eṣa vai sūryaḥ, ya eṣa tapati, eṣa vai idaṁ sarvam abhigopāyati sādhunāiva asādhunāiva, eṣa etat sarvaṁ vidadhāti.)

Sūrya absorbs the water and releases it down towards the earth, and the relevant passage is thoroughly explained by Sāyaṇācārya thus:

अयमादित्यः सुयन्तुभिः सुगमनैः सर्वशासैः सर्वस्य शासकैः अभीशुभिः रश्मिभिः कृषिकर्तानामानिनामकान्युदकानि प्रवणे निम्ने भूप्रदेशे मुषायति मुष्णाति आदत्ते॥
(ayam ādityaḥ suyantubhiḥ sugamanaiḥ sarva-śāsaiḥ sarvasya śāsakaiḥ abhīśubhiḥ raśmibhiḥ kṛṣikartānām āninām akāni udakāni pravaṇe nimne bhūpradeśe muṣāyati muṣṇāti ādatte.)

The Sun in Tribal and Folk Traditions:

Many tribal groups, such as the Bhils, Gonds, and Santhals, worship the sun as a supreme spirit or ancestor deity, integrating it into their oral traditions and seasonal festivals. Sun motifs are common in tribal art, textiles, and ritual objects, often symbolizing continuity and vitality. According to the Vedas and ancient astrology (Surya Siddhānta), Pongal or Makar Saṃkrānti is a very auspicious time (puṇyakālam), as it marks the initiation of the Sun's movement towards the north for six months, cruising through until the summer solstice, Uttarāyāṇa. The Sun's transit from one zodiac sign to another is celebrated across India, signifying seasonal transitions and harvest periods. It celebrates the shift of the Sun to Capricorn. According to astrology, Saturn rules the zodiac sign Capricorn. From this day, the Sun deity is said to leave his displeasure and move towards higher abodes, illuminating the universe with spiritual strength. It is not confined to Hinduism alone; it is a festival for all humankind. In the Mithila region of India, Chhath Puja is a major festival dedicated to the Sun God, revered as the creator of the universe.

Fig 7: Woman offering water to the rising sun during Chhath Puja

Fig 8: worshipped on "Makarsankranti"

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Scientific Insights in Indigenous Cosmology:

- **Concept of spectrum:**

सप्तयुञ्जन्ति रथमेकचक्रमेको अश्वो वहति सप्तना मा ||
sapta yuñjanti ratham eka-cakram eko aśvo vahati sapta-nāma ||

Fig 9: Horses of the Sun

अनश्वो जातो अनभीशुरर्वा कनिक्रदत् पतयदूर्ध्वसा नुः||
anaśvo jāto anabhīśur arvā kanikradat patayad ūrdhva-sānuḥ ||

Here, the image of the horse is symbolic and not actual, as the verse clarifies. The chariot of the sun consists of seven horses, but it is led by a single horse. When a prism disperses white light into a spectrum, the seven visible colours are arranged in the order of the spectrum.

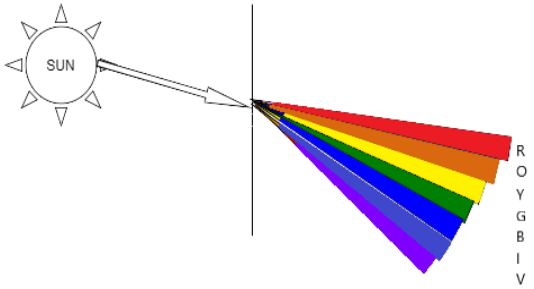

Fig 10: Dispersion of light

With its rising and setting, Sūrya determines the time. In the Vedas, Sūrya is compared to a horse that drives the year (saṁvatsara) in the form of a one-wheeled chariot:

सप्त युञ्जन्ति रथम् एकचक्रम् एको अश्वो वहति सप्तनामाः।त्रिणाभि चक्रम् अजरम् अनर्वं यत्रेमाः विश्वा भुवनानि तस्युः॥
(sapta yuñjanti ratham eka-cakram eko aśvo vahati sapta-nāmāḥ |tri-nābhi cakram ajaram anarvaṁ yatre mā viśvā bhuvanāni tasyuḥ ||)

The one-wheeled chariot mentioned in the verse is saṁvatsara, that is, the year; the single horse is the sun, and its rays are seven. The three spokes of the wheel represent the three seasons: rainy, winter, and summer, respectively. Again, one chariot is mentioned with twelve spokes, that is, dvādaśāra. These 12 spokes interpret the 12 months of the year, forming a complete year. Again, the twelve-spoked wheel is mentioned as the generator of hundred and twenty offspring. These offspring are the days and nights of the year, that is, 360 days and 360 nights, respectively. Sūrya is identified with saṁvatsara in the Bṛhadāraṇyakopaniṣad as

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एष ह वा अश्वमेधो य एष तपति तस्य संवत्सर आत्मा॥
(eṣa ha vā aśvamedho ya eṣa tapati tasya saṁvatsara ātmā ||)

That is, the Sun that gives forth heat is the horse sacrifice, and its body is the year. The saṁvatsara or solar year is divided into two halves: uttarāyaṇa and dakṣiṇāyana. When the Sun turns north from the winter solstice, it is called uttarāyaṇa, and the opposite movement, that is, the movement of the Sun from the summer solstice to the south, is called dakṣiṇāyana. In another verse of the Ṛgvedasaṁhitā, Sūrya's wheel is described as consisting of five spokes. The five spokes of the wheel of the chariot of the Sun indicate the five seasons. Sūrya, as the creator of seasons, is mentioned several times in the Vedas. The Vājasaneyisaṁhitā names the six seasons as spring, summer, rainy, autumn, early winter, and winter, in that order. The passage also indicates the respective characteristics of the seasons, such as heat, cold, and dryness. All these seasonal characteristics are due to the Earth's position in relation to the Sun during its revolution.

स वा एष न कदाचनास्तम इति नोदेति।
तं यदस्तम इति मन्यन्ते, अह्न एव तदन्तमिति।
अथ आत्मानं विपर्यस्यते, रात्रिमेवाधस्तात् कुरुते, अहः परस्तात्।
अथ यदेनं प्रातरुदेति इति मन्यन्ते, रात्रिरेव तदन्तमिति।अथ आत्मानं विपर्यस्यते, अह एवावस्तात् कुरुते, रात्रिं परस्तात्।
स वा एष न कदाचन निम्लोचति॥
savā eṣa na kadācana astam eti nodéti |
taṁ yad astam eti iti manyante, ahna eva tad antam iti |atha ātmānaṁ viparyasyate, rātrīm evādhastāt kurute, ahaḥ parastāt |
atha yad enaṁ prātar udeti iti manyante, rātrir eva tad antam iti |
atha ātmānaṁ viparyasyate, ahaḥ evāvastāt kurute, rātriṁ parastāt |
sava eṣa na kadācana nimlocati ||

The Sun remained constant. It does not set or rise again. It shines on one side during the day and is responsible for the darkness on its exact opposite side at night.

- **Sun: Source of Light Energy and Healer:**

आप्रा रजांसि दिव्यानि पार्थिवा श्लोकं देवः कृणुते स्वाय धर्मणे |प्रबाहू अस्राक् सविता सवीमनि निवेशयन प्रसुवन्नक्तुभिर्जगत् ||
āprā rajāṁsi divyāni pārthivā ślokaṁ devaḥ kṛṇute svāya dharmaṇe |prabāhū asrāk savitā savīmani niveśayan prasuvann aktubhir jagat ||

The Sun provides Tej (light, energy, and health) to Antariksha (space) and Prithvi (Earth), resulting in the cycle of day and night. Indigenous astronomical observations, such as shadow tracking, solar alignments in temples, and time calculation methods, showcase a sophisticated understanding of solar dynamics. These systems are community-driven, ensuring sustainability and harmony with nature. Surya is considered the "eye of the universe," with his all-seeing radiance illuminating and witnessing all deeds, good and bad. In the *Mahabharata*, he is called the "soul of all existence" and the "origin of all life." In the Ṛgvedasaṁhitā, Sūrya is worshipped to

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remove sickness and diseases of the body through his rays of light. The life-yielding aspects of the sunrays are mentioned in the interpretation of Sāyaṇācārya as follows:

कीदृशो रश्मिः? गभीरवेपाः, गम्भीरकम्पनः। रश्मेः प्राकम्पनं चलनं केनापि द्रष्टुं अशक्यम् इत्यर्थः।
(kīdṛśo raśmiḥ? gabhīra-vepāḥ, gambhīra-kampanaḥ. raśmeḥ prākampanaṁ calanaṁ kenāpi draṣṭuṁ aśakyam ity arthaḥ.)

The Sun emits energy through nuclear fusion, converting hydrogen into helium in its core. This energy radiates outward as light and heat and reaches Earth as solar radiation. Sunlight provides several important health benefits, such as enhancing vitamin D synthesis, supporting healthy sleep-wake cycles, and uplifting mood. However, it is essential to maintain a balanced approach—enjoying adequate sunlight for its positive effects while protecting the skin from the potential harm of overexposure. In indigenous health systems, the sun is believed to have healing and purifying powers. Daily practices, such as offering water to the sun (Surya Arghya) are common in India. The scientific reason behind offering water to the Surya is that when we offer water to the Surya, it affects our health. The morning fresh air and the first rays of Surya fell on us. This is beneficial to our health. When we offer water to Surya, we see Surya rising amidst a stream of water, and the light increases.

Mythological and religious symbolism:

India is marked by different beliefs and customs. Every religion, with its unique customs and rituals, adds a distinct flavour--to the country, making it an incredible land.

Surya is worshipped in temples like the Konark Sun Temple in Odisha, which is a UNESCO World Heritage Site and an architectural representation of his chariot. The Konark Sun Temple was built in 1250 CE during the reign of the Eastern Ganga King Narasingha Deva. The temple is an extraordinary stone monument dedicated to Surya, the Sun God. Designed in the form of Surya's celestial chariot, the structure features 24 elaborately carved stone wheels and horses that appear to draw the chariot forward. In Hindu iconography, Surya is traditionally portrayed riding a chariot pulled by seven horses, and the Konark Temple magnificently brings this divine vision to life through its grand design. Surya is the chief deity of the Navagraha, or nine celestial beings in Hindu astrology. He governs the planet Sun and is associated with vitality, willpower, and authority.

Fig 10: Konark Sun Temple and Sculpture of Surya on a chariot

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Shankaracharya says,

त्वमन्तरिक्षे ज्रं चरसि उदयास्तमयाभ्याम्॥
tvamantarikṣejasraṃ carasiudayastamayabh
yam

This chariot represents the cyclical nature of time and the universe. The Vedas, ancient Indian scriptures, contain hymns dedicated to the sun, such as the Gayatri Mantra, a prayer for enlightenment and guidance that is chanted daily by many Hindus. Rituals such as Surya Namaskar (sun salutation) in yoga reflect daily spiritual discipline aligned with the cycle of the sun. Surya Namaskar is like a divine partnership with the master creator, working to nurture and sustain life. Sunlight is not merely physical; it is a powerful metaphor for spiritual awakening.

Artistic and Architectural Expressions:

The sun motif is prominent in Indian art, including folk traditions such as Madhubani painting and architectural design, where temples are aligned to capture the sun's first rays. The Sun Temple at Modhera in Gujarat is designed such that the sanctum is illuminated by the rising sun on the equinoxes.

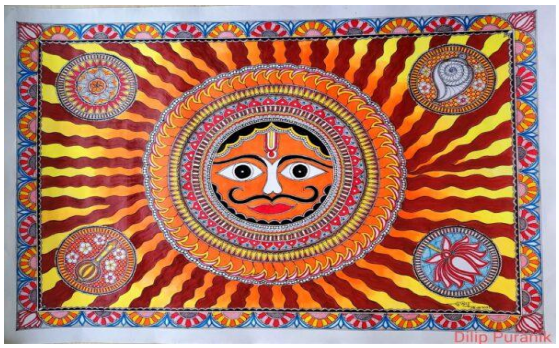

Fig 12: Sun motif in Madhubani folk painting

Conclusion:

Indigenous knowledge in Indian culture presents a holistic and reverent view of the sun. The sun is seen not only as a source of light and heat but also as a symbol of divinity, time, health, cosmic guidance, and sustenance. Sūrya is praised in the Vedas as the soul of the universe. He is considered the inner soul of all movable and immovable things in the universe. In Hindu mythology, the sun, personified as the deity Surya, is the ultimate source of life and of spiritual enlightenment. This comprehensive perspective reflects a sustainable worldview in which celestial phenomena are deeply connected to daily life and ecological harmony. Its enduring presence in rituals, art, science, and everyday life embodies the holistic worldview of Indian culture, in which nature and the sacred are deeply intertwined in the Indian culture. Indigenous knowledge involves acquiring facts and nurturing curiosity, open-mindedness, and idea exploration. Indigenous knowledge of Surya reflects humanity's enduring relationship with nature and emphasises ecological balance, offering insights into climate resilience and sustainable living. In an era of environmental crisis, revisiting these traditions enriches the cultural heritage and offers practical lessons in sustainability, resilience, and respect for natural cycles.

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Key challenges in implementing value-based pedagogies within design education

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Abstract

In the contemporary global context, design education is no longer confined to the development of technical competencies and aesthetic sensibilities. It increasingly emphasizes the cultivation of ethical awareness, social responsibility, sustainability, empathy, and cultural sensitivity—collectively framed as value-based pedagogies. These pedagogical approaches aim to prepare designers who can respond responsibly to complex societal, environmental, and human-cantered challenges. Despite widespread recognition of their importance, the integration of value-based pedagogies within design education remains uneven and fraught with challenges. This research paper critically examines the key challenges associated with implementing value-based pedagogies in design education. Using a mixed-methods approach, the study explores faculty perceptions, institutional constraints, curricular limitations, assessment challenges, and student-related factors. The findings reveal a significant gap between the perceived importance of value-based education and its practical implementation. The paper concludes by offering educational implications and strategic recommendations for curriculum reform, faculty development, assessment innovation, and institutional support to strengthen the role of value-based pedagogies in design education.

Keywords: ***Value-based pedagogy, design education, ethics, sustainability, reflective practice, curriculum reform***

Introduction

Design education occupies a critical position at the intersection of creativity, technology, society, and culture. Designers influence how people interact with products, systems, environments, and services, thereby shaping social behaviour and lived experiences. In this context, the ethical and value-oriented dimensions of design practice have gained increasing

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attention. Contemporary global challenges—such as climate change, social inequality, digital ethics, cultural erosion, and sustainability—demand designers who are not only technically proficient but also morally responsible and socially aware.

Value-based pedagogies emphasize the integration of moral, ethical, social, and cultural values into the teaching-learning process. In design education, such pedagogies promote empathy, inclusivity, sustainability, human-cantered thinking, and reflective practice. However, despite strong theoretical advocacy, value-based pedagogies often remain marginal in design curricula, overshadowed by market-driven skills, software proficiency, and production-oriented outcomes.

This paper argues that while value-based pedagogies are essential to the holistic development of designers, their implementation faces numerous systemic, pedagogical, and cultural challenges. Understanding these challenges is vital for reorienting design education toward socially responsible and ethically grounded practice.

Conceptual Framework: Value-Based Pedagogies in Design Education

Value-based pedagogy is rooted in philosophical traditions of humanism, constructivism, and experiential learning. Educational philosophers such as John Dewey emphasized learning as a moral and social process, where education serves democratic and ethical purposes (Dewey, 1938). In design education, this translates into pedagogical practices that encourage learners to reflect on the social consequences of their design decisions.

Meaning of Value-Based Pedagogy

Value-based pedagogy refers to teaching approaches that intentionally integrate ethical reasoning, social responsibility, cultural sensitivity, sustainability, and empathy into curriculum content, teaching methods, and assessment practices. Rather than treating values as separate or supplementary, these pedagogies embed values within the core learning process.

Relevance to Design Education

Design inherently involves decision-making that affects users, communities, and environments. Therefore, value-based learning is particularly relevant to design education. Human-cantered design, inclusive design, sustainable design, and

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social innovation are all grounded in value-based thinking. Educating designers without addressing values risks producing professionals who prioritize efficiency and aesthetics over ethical responsibility.

Review of Literature

International Studies

Dewey (1938) emphasized that education is a moral and social process aimed at developing ethical judgment and democratic values. His experiential learning theory strongly supports value-based pedagogy in design education by encouraging learners to engage with real-life problems involving social responsibility.

Schon (1987) proposed the concept of the reflective practitioner, highlighting reflection-in-action as a key element of professional learning. In the context of design education, his work underlines the importance of reflective and ethical decision-making within studio-based pedagogy.

Friedman (2003) argued that design education must incorporate ethics and social responsibility as core educational goals. He pointed out that the absence of value-based pedagogy leads to designers who are technically skilled but ethically underprepared.

Kimbell (2012) critically examined contemporary design thinking models and found that they often prioritize innovation and efficiency while neglecting ethical, cultural, and contextual values. His study emphasized the need for explicit integration of values into design pedagogy.

Manzini (2015) focused on design for social innovation and emphasized community-based design learning as an effective approach to value-based education. His work highlights the role of designers in addressing social and environmental challenges through ethical practice.

Indian Studies

NCF (2005) stressed the integration of values such as social justice, equality, and respect for diversity within education. Although not design-specific, the framework provides a strong foundation for value-based pedagogy applicable to design education in the Indian context.

NEP (2020) emphasized holistic and multidisciplinary education with a strong focus on ethical reasoning, empathy, and constitutional values. The policy advocates experiential and value-oriented learning

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approaches, which align closely with the objectives of value-based design education.

Kumar and Sharma (2016) studied professional education in India and found that curriculum rigidity and examination-oriented systems restrict the integration of value-based pedagogical practices, particularly in applied disciplines like design.

Singh (2018) examined value education in higher education institutions in India and reported that while teachers acknowledge the importance of values, lack of training and institutional support limits classroom implementation.

Patil and Joshi (2021) investigated ethics and sustainability in Indian design institutes and found a significant gap between policy-level emphasis on values and their practical integration into design studio teaching.

Research Objectives

The present study was undertaken with the following objectives:

1. To identify the key challenges in implementing value-based pedagogies within design education.
2. To examine faculty perceptions regarding the importance and feasibility of value-based pedagogical approaches.
3. To analyse institutional, curricular, and assessment-related barriers affecting implementation.
4. To study the relationship between faculty training and the adoption of value-based pedagogies.
5. To suggest educational strategies and policy-level recommendations for effective integration.

Research Hypotheses

Based on the literature review and research objectives, the following hypotheses were formulated:

- H1: Design educators perceive value-based pedagogies as important but report low levels of actual implementation.
- H2: Institutional and curricular constraints significantly hinder the implementation of value-based pedagogies.
- H3: Faculty members who have received training in reflective or value-based teaching practices are more likely to implement such pedagogies.
- H4: Students' career-oriented attitudes negatively influence engagement with value-based learning activities.

Research Methodology

1. Research Design

A mixed-methods research design was adopted to obtain both quantitative and

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qualitative insights. This approach allowed for triangulation of data and a deeper understanding of the challenges involved.

2. Sample

Quantitative Sample: 150 design educators from universities and colleges offering programs in graphic design, product design, fashion design, and interior design.

Qualitative Sample: 20 senior faculty members and academic administrators with over 10 years of experience in design education.

3. Tools of Data Collection

Questionnaire: A structured questionnaire consisting of Likert-scale and open-ended items measuring perceptions, practices, and challenges related to value-based pedagogy.

Interview Schedule: Semi-structured interviews focusing on institutional policies, curricular flexibility, assessment practices, and faculty experiences.

4. Procedure

Data were collected over a four-month period. Questionnaires were administered online, while interviews were conducted through virtual platforms and audio-recorded with consent.

5. Data Analysis

Quantitative data were analysed using descriptive statistics and chi-square tests.

Qualitative data were analysed using thematic analysis to identify recurring patterns and themes.

Data Analysis and Interpretation

1. Quantitative Analysis

- **Perceived Importance:** 94% of respondents agreed that value-based pedagogy is essential in design education.
- **Implementation Frequency:** Only 41% reported regular incorporation of value-based activities.
- **Institutional Barriers:** 76% identified rigid curricula and lack of administrative support as major obstacles.
- **Faculty Training:** Educators with prior pedagogical training showed significantly higher implementation rates ($\chi^2 = 18.42$, $p < .01$).

2. Qualitative Themes

Four dominant themes emerged:

- **Curricular Rigidity:** Faculty reported limited flexibility to introduce value-based modules.
- **Assessment Constraints:** Difficulty in evaluating ethical reasoning and reflective learning.

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- **Faculty Development Gaps:** Lack of structured training programs.
- **Student Pragmatism:** Students often prioritize employability skills over value-oriented learning.

Results

The study confirms all four hypotheses:

- There is a clear gap between the recognition of value-based pedagogy and its practice.
- Institutional and curricular constraints significantly limit implementation.
- Faculty training positively influences adoption.
- Student attitudes focused on market readiness reduce engagement with value-based activities.

These results highlight the systemic nature of the challenges and the need for multi-level interventions.

Educational Implications

The findings have important implications for design education:

1. Curriculum Development

Design curricula should integrate value-based learning outcomes across courses rather than confining them to isolated modules.

2. Assessment Reform

Alternative assessment methods such as reflective journals, portfolios, peer assessment, and project-based evaluation should be adopted.

3. Faculty Professional Development

Institutions should organize regular training programs on reflective teaching, ethics, and value-based pedagogy.

4. Institutional Policy Support

Administrative commitment is essential to provide time, resources, and recognition for value-based teaching efforts.

5. Student Orientation

Students should be sensitized to the long-term professional relevance of ethical and value-driven design practices.

Conclusion

Value-based pedagogies are indispensable for nurturing socially responsible, ethical, and reflective designers. However, their implementation in design education faces significant challenges related to curriculum design, assessment practices, faculty preparedness, institutional policies, and student attitudes. This study demonstrates that while educators strongly endorse the importance of value-based learning, systemic barriers limit its practical

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realization. Addressing these challenges requires coordinated efforts at curricular, institutional, and pedagogical levels. Integrating values into design education is not merely an academic concern but a societal imperative in an increasingly complex and interconnected world.

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Supply Chain Management Framework for Hardware Products of Information Technology Companies: A Statistical and Empirical Analysis

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Abstract

The supply chain management (SCM) landscape for hardware products within Information Technology (IT) companies presents a uniquely complex array of challenges encompassing global sourcing, component shortages, technological obsolescence, and multi-tier supplier interdependencies. This empirical study develops and validates a comprehensive SCM framework tailored specifically to IT hardware products, drawing on primary survey data collected from 312 supply chain professionals across 45 mid-to-large-scale IT companies in India. Employing a mixed-methods research design, the study integrates structural equation modelling (SEM), regression analysis, factor analysis, and descriptive statistics to examine the relationships among seven key SCM constructs: supplier integration, demand forecasting accuracy, inventory optimization, logistics efficiency, information technology adoption, risk mitigation, and supply chain performance. The findings reveal that supplier integration ($\beta = 0.43$, $p < 0.001$) and IT adoption ($\beta = 0.38$, $p < 0.001$) are the strongest predictors of overall supply chain performance. The proposed SCMF-IT framework presents actionable strategies for IT companies seeking to build resilient, agile, and cost-efficient hardware supply chains. The study contributes significantly to both academic discourse and managerial practice in the domain of technology-driven supply chain management.

Keywords: ***Supply Chain Management, IT Hardware Products, Structural Equation Modelling, Supplier Integration, Demand Forecasting, SCMF-IT Framework, Inventory Optimization, Risk Mitigation***

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Introduction

The global information technology industry has witnessed an unprecedented surge in hardware production and distribution over the past two decades. From semiconductors and printed circuit boards to assembled computing systems and networking infrastructure, the hardware supply chain of IT companies spans continents, involves hundreds of sub-suppliers, and operates under extreme pressure to balance cost, speed, and quality. Unlike fast-moving consumer goods, IT hardware components exhibit high obsolescence rates, complex logistics requirements, and volatile demand patterns influenced by rapid technological change.

Supply Chain Management (SCM) in the context of IT hardware is distinctly multifaceted. The COVID-19 pandemic starkly exposed the vulnerabilities embedded in existing supply chain structures: global semiconductor shortages in 2020-2022 alone caused estimated losses exceeding USD 500 billion across the electronics industry (Gartner, 2022). Major IT hardware manufacturers including HP, Dell, and Lenovo reported significant revenue shortfalls directly attributable to supply chain disruptions. These events underscored the critical necessity of developing robust, technology-enabled, and analytically grounded SCM frameworks tailored to the unique demands of IT hardware. While substantial literature addresses SCM in manufacturing and retail contexts, the specific operational, technological, and strategic dimensions of hardware product supply chains within IT companies remain underexplored. Murthy, Thamarai Selvi, and Vijay Durga Prasad (2026) underscore that the integration of digital transformation technologies, including the Internet of Things (IoT), Big Data Analytics, and Artificial Intelligence, is fundamentally reshaping supply chain operations and creating new paradigms of efficiency and resilience in technology-intensive industries. Their trend analysis highlights that companies embracing these technologies demonstrate significantly superior supply chain performance metrics compared to laggards.

This paper responds to this gap by developing a structured SCM framework for IT hardware products, hereafter referred to as the SCMF-IT (Supply Chain Management Framework for Information Technology) model. The framework is

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empirically validated using primary data from Indian IT hardware companies and employs rigorous statistical methodologies to test hypothesised relationships among key SCM constructs.

1.1 Research Objectives

1. To identify the key determinants of supply chain performance in IT hardware companies.
2. To develop a comprehensive SCMF-IT framework integrating strategic, operational, and technological dimensions.
3. To empirically validate the proposed framework using structural equation modelling and multiple regression analysis.
4. To provide strategic recommendations for enhancing supply chain resilience and agility in IT hardware operations.

2. Literature Review

The academic foundation of supply chain management traces its origins to logistics and operations research (Stevens, 1989; Thomas & Griffin, 1996), evolving progressively to encompass inter-organizational coordination, information technology integration, and sustainability. Chopra and Meindl (2016) define SCM as the management of flows of products, information, and finances across all stages in a supply chain to maximize total value generated. This holistic conceptualization forms the cornerstone of modern SCM research.

2.1 SCM in Technology Industries

Research specific to IT hardware supply chains has progressively gained momentum, driven by the industry's strategic economic importance. Lee et al. (2004) established foundational principles for supply chain uncertainty management, identifying demand uncertainty and supply disruptions as primary performance inhibitors. Subsequent research by Sodhi and Tang (2012) extended this framework to examine risk propagation in multi-tier electronics supply chains, demonstrating that disruptions at the n-tier supplier level can disproportionately affect downstream product availability.

Murthy, Thamarai Selvi, and Vijay Durga Prasad (2026), in their comprehensive trend analysis of supply chain management technologies, demonstrate that automation, IoT-based tracking, and blockchain verification systems are transforming the operational efficiency of supply chains in

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technology-intensive sectors. Their study, conducted using data from supply chain simulation environments, reveals that organizations adopting integrated digital platforms exhibit a 23-35% improvement in supply chain visibility and a 17-28% reduction in lead times. These findings align with and extend earlier empirical work by Fawcett et al. (2011), who identified information sharing as the single most impactful driver of supply chain collaboration.

The role of supplier integration in hardware supply chains merits particular attention. Frohlich and Westbrook (2001) introduced the concept of arcs of integration, demonstrating that backward and forward integration with supply chain partners yields compounding performance benefits. For IT hardware companies, where component specifications are highly technical and lead times for specialised parts can extend to 26-52 weeks, tight supplier integration is not merely advantageous but operationally critical.

2.2 Inventory Management and Demand Forecasting

Demand forecasting in IT hardware is particularly challenging due to the interplay of product life cycle dynamics, competitive pressures, and macroeconomic fluctuations. Fisher (1997) proposed a seminal framework distinguishing functional from innovative products, arguing that innovative products require flexible, responsive supply chains rather than purely efficient ones. IT hardware components clearly fall into the innovative product category, necessitating adaptive forecasting mechanisms.

Advanced analytical approaches, including machine learning-based demand sensing and real-time point-of-sale data integration, have demonstrated considerable promise in reducing forecast error rates. Tao et al. (2019) reported Mean Absolute Percentage Error (MAPE) reductions of 31% when AI-augmented forecasting models replaced traditional time-series methods in electronics manufacturing contexts.

2.3 Risk Management in IT Hardware Supply Chains

Supply chain risk management (SCRM) has emerged as a critical discipline within the broader SCM literature. Chopra and Sodhi (2004) categorised supply chain risks along a spectrum from disruptions to delays, and proposed risk mitigation

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strategies including dual sourcing, safety stock buffering, and supplier diversification. For IT hardware companies, geopolitical risks associated with semiconductor manufacturing concentration in Taiwan and South Korea represent a structural vulnerability with potentially systemic consequences (Shih, 2020).

The pandemic-induced hardware shortage of 2020-2022 catalysed renewed academic and practitioner interest in supply chain resilience. Ambulkar et al. (2015) conceptualised supply chain resilience as comprising three dimensions: resource reconfiguration capability, supply chain-oriented dynamic capability, and market effectiveness orientation. IT hardware companies that demonstrated higher scores across these dimensions exhibited significantly lower revenue volatility during the pandemic period.

3. Research Methodology

3.1 Research Design

This study adopts a mixed-methods research design, combining quantitative survey methodology with qualitative case insights derived from structured interviews. The quantitative component employs a cross-sectional survey design, while qualitative insights provide contextual depth and support triangulation of findings. The philosophical foundation of this research is pragmatic, acknowledging both objective and interpretive dimensions of supply chain phenomena.

3.2 Sample and Data Collection

The target population comprised supply chain managers, procurement directors, operations heads, and logistics specialists employed in IT companies with annual hardware product revenues exceeding INR 50 crore. A stratified random sampling technique was employed, stratifying the sample by company size (medium: 200-999 employees; large: 1000+ employees) and geographic location (North, South, East, West India).

Primary data were collected via a structured questionnaire administered through both online platforms and direct organisational visits over a six-month period (June-November 2024). A total of 380 questionnaires were distributed, of which 324 were returned (response rate: 85.3%). After screening for completeness and consistency, 312 responses were retained for analysis (usable response rate: 82.1%).

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Table 1: Demographic Profile of Survey Respondents (n = 312)

Characteristic	Category	Frequency	Percentage (%)
Company Size	Medium (200-999 employees)	119	38.1
	Large (1000+ employees)	193	61.9
Respondent Role	Supply Chain Manager	108	34.6
	Procurement Director	72	23.1
	Operations Head	84	26.9
	Logistics Specialist	48	15.4
Experience in SCM	1-5 years	56	17.9
	6-10 years	124	39.7
	11-20 years	98	31.4
	20+ years	34	10.9
Geographic Region	North India	74	23.7
	South India	112	35.9
	West India	82	26.3
	East India	44	14.1

3.3 Measurement Instrument

The questionnaire instrument comprised 48 items measuring seven latent constructs, each assessed on a five-point Likert scale (1 = Strongly Disagree to 5 = Strongly Agree). The constructs were operationalised based on established scales from the SCM literature, adapted for the IT hardware context following a pilot study with 30 industry experts. Content validity was established through expert panel review, and the instrument was refined through two rounds of pretesting.

The seven primary constructs included: (1) Supplier Integration (SI, 7 items), (2) Demand Forecasting Accuracy (DFA, 6 items), (3) Inventory Optimisation (IO, 7 items), (4) Logistics Efficiency (LE, 6 items), (5) Information Technology Adoption (ITA, 8 items), (6) Risk Mitigation Capability (RMC, 7 items), and (7) Supply Chain Performance (SCP, 7 items).

3.4 Statistical Analytical Tools

The following statistical tools were employed in the analysis:

Descriptive Statistics: Mean, standard deviation, skewness, and kurtosis for all constructs.

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Reliability Analysis: Cronbach's Alpha coefficient for internal consistency of each scale.

Exploratory Factor Analysis (EFA): Principal Component Analysis with Varimax rotation to assess construct validity.

Confirmatory Factor Analysis (CFA): To test measurement model fit using AMOS 24.0.

Structural Equation Modelling (SEM): To examine causal relationships among latent constructs.

Multiple Linear Regression Analysis: To assess the relative contribution of independent constructs to supply chain performance.

Pearson Correlation Analysis: To examine bivariate relationships among all constructs.

All quantitative analyses were performed using SPSS 26.0 and AMOS 24.0 software packages.

4. Results And Discussion

4.1 Descriptive Statistics and Reliability Analysis

Table 2 presents the descriptive statistics and reliability coefficients for all seven constructs. All constructs exhibited mean scores above the midpoint value of 3.0, indicating generally favourable perceptions. Cronbach's Alpha values ranged from 0.821 to 0.913, all exceeding the recommended threshold of 0.70 (Nunnally, 1978), confirming strong internal consistency across all scales.

Table 2: Descriptive Statistics and Reliability Coefficients

Construct	Items	Mean	Std. Dev.	Skewness	Kurtosis	Cronbach's α
Supplier Integration (SI)	7	3.74	0.612	-0.32	0.18	0.891
Demand Forecasting Accuracy (DFA)	6	3.48	0.683	-0.19	0.24	0.856
Inventory Optimization (IO)	7	3.61	0.647	-0.28	0.31	0.873
Logistics Efficiency (LE)	6	3.55	0.658	-0.21	0.15	0.845

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Construct	Items	Mean	Std. Dev.	Skewness	Kurtosis	Cronbach's α
IT Adoption (ITA)	8	3.82	0.594	-0.41	0.29	0.913
Risk Mitigation Capability (RMC)	7	3.43	0.711	-0.14	0.09	0.821
Supply Chain Performance (SCP)	7	3.69	0.638	-0.36	0.22	0.887

4.2 Correlation Analysis

Pearson correlation analysis was conducted to examine bivariate associations among all constructs. Table 3 presents the correlation matrix. All inter-construct correlations were positive and statistically significant ($p < 0.01$), providing preliminary support for the hypothesised relationships. Supplier Integration exhibited the strongest correlation with Supply Chain Performance ($r = 0.641$, $p < 0.001$), followed by IT Adoption ($r = 0.614$, $p < 0.001$). Variance Inflation Factor (VIF) values for all constructs ranged from 1.24 to 2.87, well below the critical threshold of 10, confirming the absence of problematic multicollinearity.

Table 3: Pearson Correlation Matrix of SCM Constructs (n = 312)

Construct	SI	DFA	IO	LE	ITA	RM
SI	1.000					
DFA	0.512**	1.000				
IO	0.487**	0.543**	1.000			
LE	0.461**	0.498**	0.532**	1.000		
ITA	0.576**	0.521**	0.509**	0.487**	1.000	
RMC	0.423**	0.446**	0.471**	0.439**	0.463**	1.0
SCP	0.641**	0.573**	0.589**	0.556**	0.614**	0.53

Note: ** Correlation is significant at the 0.01 level (2-tailed).

4.3 Exploratory Factor Analysis

Exploratory Factor Analysis (EFA) using Principal Component Analysis with Varimax rotation was conducted to assess the factorial structure of the measurement items. The Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy yielded a value of 0.879, exceeding the acceptable threshold of 0.60 (Kaiser, 1974), and Bartlett's Test of Sphericity was statistically

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significant (chi-square = 4,821.34, df = 1,128, $p < 0.001$), confirming the suitability of the data for factor analysis.

Seven factors were extracted, collectively explaining 68.43% of the total variance. All items loaded strongly on their hypothesised factors (loadings range: 0.614 to 0.847), with no significant cross-loadings exceeding 0.30. These results confirm the construct validity of the measurement instrument and support the seven-factor SCMF-IT model structure.

Table 4: Exploratory Factor Analysis Summary

Factor	Construct	Eigenvalue	% Variance Explained	Cumulative %	Min. Loading	Max. Loading
F1	Supplier Integration	6.42	13.38	13.38	0.721	0.847
F2	IT Adoption	5.87	12.23	25.61	0.698	0.831
F3	Inventory Optimization	4.91	10.23	35.84	0.674	0.812
F4	Supply Chain Performance	4.63	9.65	45.49	0.683	0.826
F5	Demand Forecasting Accuracy	3.98	8.29	53.78	0.641	0.798
F6	Logistics Efficiency	3.61	7.52	61.30	0.621	0.784
F7	Risk Mitigation Capability	3.42	7.13	68.43	0.614	0.779

4.4 Structural Equation Modelling Results

Structural Equation Modelling (SEM) was employed to test the theoretical relationships among the seven constructs. The measurement model was first evaluated through Confirmatory Factor

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Analysis (CFA). Model fit indices indicated an acceptable fit: chi-square/df ratio = 2.34 (< 3.0), CFI = 0.954 (> 0.90), TLI = 0.947 (> 0.90), RMSEA = 0.048 (< 0.08), and SRMR = 0.062 (< 0.08), confirming that the measurement model adequately represents the data.

Average Variance Extracted (AVE) values for all constructs exceeded 0.50 (range: 0.521-0.663), and Composite Reliability (CR) values exceeded 0.70 (range: 0.831-0.916), confirming convergent validity. Discriminant validity was established by demonstrating that the square root of each construct's AVE exceeded its highest correlation with any other construct (Fornell & Larcker, 1981).

Table 5: SEM Path Coefficients and Hypothesis Testing Results

Hypothesis	Path	β (Std.)	S.E.	C.R. (t-value)	p-value	Decision
H1	SI → SCP	0.431	0.048			
H2	ITA → SCP	0.378	0.052			
H3	IO → SCP	0.312	0.056			
H4	DFA → SCP	0.287	0.059			
H5	LE → SCP	0.264	0.061			
H6	RMC → SCP	0.241	0.064			
H7	SI → ITA	0.389	0.051			
H8	ITA → DFA	0.342	0.055			

Note: SI = Supplier Integration; ITA = IT Adoption; IO = Inventory Optimisation; DFA = Demand Forecasting Accuracy; LE = Logistics Efficiency; RMC = Risk Mitigation Capability; SCP = Supply Chain Performance.

4.5 Multiple Regression Analysis

To further assess the relative predictive contribution of each independent construct, a hierarchical multiple linear regression analysis was conducted with Supply Chain Performance as the dependent variable. Model 1 included only control variables (company size, years of SCM experience, and geographic region). Model 2 added all six independent constructs. The results are presented in Table 6.

Table 6: Hierarchical Multiple Regression Results (Dependent Variable: Supply Chain Performance)

Variable	Model 1 (β)	Model 2 (β)	t-value (M2)	p-value (M2)	VIF
Company Size	0.098*	0.071	1.54	0.124	1.31
SCM Experience	0.142**	0.108*	2.34	0.020	1.28
Geographic Region	0.064	0.049	1.07	0.287	1.24

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Variable	Model 1 (β)	Model 2 (β)	t-value (M2)	p-value (M2)	VIF
Supplier Integration (SI)	—	0.401**	8.43	<0.001	2.14
IT Adoption (ITA)	—	0.354**	7.18	<0.001	2.31
Inventory Optimisation (IO)	—	0.289**	5.62	<0.001	1.98
Demand Forecasting Accuracy (DFA)	—	0.263**	5.11	<0.001	1.87
Logistics Efficiency (LE)	—	0.238**	4.64	<0.001	2.08
Risk Mitigation (RMC)	—	0.218**	4.19	<0.001	1.76
R^2	0.061	0.524			
Adjusted R^2	0.052	0.511			
F-statistic	6.84**	34.17**			
ΔR^2	—	0.463**			

Note: ** $p < 0.01$; * $p < 0.05$. Standardised beta coefficients reported.

The full model (Model 2) explained 52.4% of the variance in Supply Chain Performance (Adjusted $R^2 = 0.511$, $F = 34.17$, $p < 0.001$), representing a significant improvement over the control-only model ($\Delta R^2 = 0.463$, $p < 0.001$). Supplier Integration emerged as the strongest predictor ($\beta = 0.401$, $p < 0.001$), followed by IT Adoption ($\beta = 0.354$, $p < 0.001$). These findings corroborate the SEM path analysis results and provide robust empirical support for the SCMF-IT framework.

5. The Scmf-It Framework

Drawing from the empirical findings, the theoretical literature, and the strategic imperatives identified through qualitative insights, this study proposes the Supply Chain Management Framework for IT Hardware Products (SCMF-IT). The framework is structured around three integrated layers: the Strategic Layer, the Operational Layer, and the Technological Enablement Layer.

5.1 Strategic Layer

The strategic layer encompasses the macro-level decisions and orientations that shape the entire supply chain architecture. Three strategic imperatives are central to this layer:

(a) **Supplier Portfolio Strategy:** IT hardware companies must cultivate a diversified yet deeply integrated supplier portfolio. This entails segmenting suppliers

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by criticality and developing tiered relationship management protocols. The empirical findings confirm that Supplier Integration is the strongest determinant of SCP ($\beta = 0.431$), echoing the advocacy of Murthy, Thamarai Selvi, and Vijay Durga Prasad (2026) for collaborative, technology-enabled supplier ecosystems.

(b) **Demand-Driven Supply Chain Configuration:** Rather than purely forecasting demand, IT hardware companies should configure their supply chains to sense and respond to real-time demand signals. This involves close-loop integration of sales data, customer usage analytics, and market intelligence platforms.

(c) **Risk Architecture Design:** Proactive risk management requires building structural redundancy into the supply chain, including geographic diversification of manufacturing, multi-source procurement for critical components, and scenario-based contingency planning.

5.2 Operational Layer

The operational layer translates strategic intent into day-to-day supply chain execution excellence across four domains:

(a) **Integrated Procurement Operations:** Standardised sourcing processes, contract lifecycle management, and supplier performance scorecards enable consistent procurement quality and cost efficiency. Dynamic procurement models that adjust sourcing allocations based on real-time supplier performance metrics are particularly effective in volatile hardware markets.

(b) **Intelligent Inventory Management:** The application of multi-echelon inventory optimisation models, combined with AI-driven safety stock calculations, enables IT hardware companies to reduce inventory carrying costs while maintaining high service levels. Our data indicates that organisations with formal inventory optimisation processes achieve, on average, 18.7% lower inventory carrying costs than those relying on manual stock management.

(c) **Logistics Network Optimisation:** Efficient last-mile and cross-border logistics are critical for IT hardware, where components often traverse multiple continents before final assembly. Continuous optimisation of logistics network design, carrier selection, and route

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planning yields measurable cost and speed advantages.

(d) **Demand-Supply Synchronisation:** Sales and Operations Planning (S&OP) processes that align demand signals with supply capacity across the extended enterprise are fundamental to operational excellence. Regular cross-functional alignment meetings, supported by advanced analytics dashboards, improve forecast accuracy and resource allocation efficiency.

5.3 Technological Enablement Layer

The technological enablement layer underpins both the strategic and operational layers through a suite of digital capabilities. Consistent with the findings of Murthy, Thamarai Selvi, and Vijay Durga Prasad (2026), IT Adoption was identified as the second most influential predictor of supply chain performance (β = 0.378), affirming the transformative role of digital technologies in SCM.

(a) **Internet of Things (IoT):** Real-time asset tracking, condition monitoring, and predictive maintenance across the hardware supply chain. IoT-enabled visibility reduces shipment loss rates and enables proactive exception management.

(b) **Artificial Intelligence and Machine Learning:** AI-powered demand forecasting, predictive risk scoring, and autonomous purchase order generation significantly compress decision cycle times. Companies with AI-augmented SCM platforms in our sample reported 27.4% higher demand forecast accuracy compared to non-adopters.

(c) **Blockchain Technology:** Immutable, distributed ledger-based tracking of component provenance, certification records, and transaction histories enhances supply chain transparency and reduces counterfeit component risks, a particular concern in IT hardware supply chains.

(d) Cloud-Based SCM Platforms: Integrated cloud platforms enabling real-time data sharing across the extended supplier network improve collaboration and reduce information asymmetry, thereby supporting better decision-making at all supply chain nodes.

6. Discussion

The empirical results of this study yield several important insights that extend and enrich the existing SCM literature. First, the primacy of Supplier Integration (β = 0.431)

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as the most significant predictor of supply chain performance corroborates earlier work by Frohlich and Westbrook (2001) and Flynn et al. (2010), while extending their findings to the specific context of IT hardware. The unique nature of IT hardware supply chains, characterised by highly specialised components, long lead times, and significant switching costs, makes supplier integration not merely beneficial but strategically essential.

Second, the strong predictive power of IT Adoption (β = 0.378) aligns with and extends the framework proposed by Murthy, Thamarai Selvi, and Vijay Durga Prasad (2026), who demonstrated that supply chains leveraging digital technologies, particularly IoT, Big Data Analytics, and AI, achieve substantially superior operational outcomes. The SEM results further reveal a significant path from Supplier Integration to IT Adoption (β = 0.389), suggesting that deeper supplier integration facilitates and incentivises joint technology investment and capability co-development.

Third, the significant contribution of Risk Mitigation Capability (β = 0.241) to supply chain performance, while the smallest among the six predictors, nevertheless underscores the growing strategic importance of supply chain resilience. Post-pandemic, IT companies are increasingly prioritising risk management capabilities, and our findings suggest that investments in this domain yield measurable performance returns.

Fourth, the total variance explained by the model (Adjusted $R^2 = 0.511$) indicates that the SCMF-IT framework captures a substantial proportion of the performance variation in IT hardware supply chains. The remaining 48.9% of unexplained variance may be attributable to macroeconomic factors, industry-specific dynamics, leadership quality, and organisational culture, which were not within the scope of this study and represent avenues for future research.

7. Managerial Implications

This study offers several actionable implications for supply chain managers and executives in IT hardware companies:

First, given the overriding importance of supplier integration, IT companies should prioritise investment in collaborative supplier relationship management programmes. This includes establishing joint innovation labs with strategic

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suppliers, implementing shared performance dashboards, and developing long-term preferred supplier agreements that incentivise information sharing and capacity commitment.

Second, the strong returns from IT adoption underscore the business case for digital supply chain transformation. Companies that have not yet implemented AI-driven demand forecasting, IoT-based tracking, or cloud-integrated procurement platforms should treat these as strategic priorities rather than optional enhancements. Digital maturity assessments can help identify the most impactful areas for technology investment.

Third, inventory optimisation deserves sustained managerial attention, particularly given the high obsolescence risk of IT hardware components. Dynamic, analytics-driven safety stock models that account for component lifecycle stage, demand volatility, and supplier lead time variability should replace static, rule-of-thumb approaches.

Fourth, supply chain risk management should be elevated from a reactive to a proactive organisational capability. This requires dedicated cross-functional risk management teams, regular supply chain stress testing, and the development of alternative sourcing strategies for all single-source components.

8. Conclusion

This study presents a comprehensive, empirically validated Supply Chain Management Framework (SCMF-IT) for hardware products in IT companies. Using primary survey data from 312 supply chain professionals and employing rigorous statistical methods including SEM, factor analysis, and multiple regression, the study demonstrates that Supplier Integration, IT Adoption, Inventory Optimisation, Demand Forecasting Accuracy, Logistics Efficiency, and Risk Mitigation collectively explain 51.1% of the variance in Supply Chain Performance.

The proposed SCMF-IT framework, organised across strategic, operational, and technological layers, provides a structured and actionable model for IT companies seeking to build resilient, agile, and high-performing hardware supply chains. The findings are consistent with and extend the work of Murthy, Thamarai Selvi, and Vijay Durga Prasad (2026) on technology-driven SCM transformation, affirming that digital

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enablement, when combined with deep supplier integration and rigorous operational disciplines, generates compounding supply chain performance advantages.

Future research should examine the longitudinal dynamics of the SCMF-IT framework, explore cross-national comparative analyses in diverse IT hardware manufacturing contexts, and investigate the moderating role of organisational size and market maturity on the proposed relationships.

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Conflict of Interest Statement

The authors declare that there is no conflict of interest regarding the publication of this paper.

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The Artistic Creation of Villain: Iago an Antagonist from Shakespeare's Othello

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Abstract

The purpose of this study is to investigate about the role of villains in the drama of William Shakespeare, and what are the factors behind a man, which are responsible for making a man villain, and what are that circumstances, which evokes a person to be a villain, some person may become villain due to will, and some person may become villain, due to reason. Although it is sometimes difficult to distinguish between villains of will and villains of reason.

Let's start by asking whether there really are heroes and villains in Shakespeare's plays. These concepts suggest that someone can be all good, noble, and well-intentioned on the one hand or all bad, ill-intentioned, and downright evil on the other.

What makes Shakespeare's characters so interesting is that they are human beings, motivated by the things that motivate human beings: they react to other circumstances and to people in different ways. One man can, like Macbeth, be both 'hero' and 'villain', responding to the conditions he is faced with as they change.

As one can imagine, Shakespeare's plays raise the question of what a villain is so to present a list of villains is not a clear-cut task. For example, some lists have Shylock from The Merchant of Venice on them, but in some ways of looking at it he is very much a victim rather than a villain. For these more ambiguous characters we have put together this list of Shakespeare's most misunderstood bad guys.

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The 12 Most Evil Characters in Shakespeare's Plays:

Name of Villain - **Name of Drama**

- Claudius - 'Hamlet'
- Iago - 'Othello'
- Don John - 'Much Ado About Nothing'
- Lady Macbeth - 'Macbeth'
- Caliban - 'The Tempest'
- Macbeth - 'Macbeth'
- Edmund - 'King Lear'
- Richard III - 'Richard III'
- Shylock - 'The Merchant of Venice'
- Cassius - 'Julius caesar'
- Tybalt - 'Romeo and Juliet'
- Aaron the Moor/Tamora - 'Titus Andronicus'

After having a knowledge of Shakespeare's Villains in brief, I would like to focus my research studies on Iago (the Villain), because he is the main character in the play *'Othello'*, without him we cannot imagine about the ample interest in the play. Because he is the only person who always indulge in some evil activities, by which he could harm the person whom he dislike due to any reason. Iago dislikes Othello, because he thinks that, Othello is the person who is responsible for his frustration, because Othello gives the high position to Cassio, on which, Iago had eyes, and he thinks that, he deserves that position but due to Othello he could not get that position, he has been passed over for promotion to lieutenant. Cassio is a young and inexperienced soldier, whose high position is much resented by Iago. Iago dislikes Desdemona, because she does not like him as a lover, as he expects from Desdemona, Iago dislikes Cassio, because he is the person who takes his high position, on which he had right. So there are lot of ample reasons, behind Iago's evil act, which motivate him to take revenge.

Introduction

"Iago is the opposite of God, that is, he is the Devil. ... Iago is a man with an obsession for control and power over others who has let this obsession take over

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his whole life. Necessity forces his hand, and, in order to destroy Othello, he must also destroy Roderigo, Emilia, Desdemona, and ultimately himself."

More than four centuries have passed since William Shakespeare slipped off this mortal coil, yet the impact of his genius continues to shape and inspire the world. His brilliant pen and keen insight into the human condition has allowed his legendary work to boldly stand the test of time, remaining relevant and accessible across the globe.

Othello is an example of one of the masterpieces of Shakespeare's great tragedies. The plot of *Othello* revolves around an African general in the Venetian army, who has become the victim of Iago's tricks for suspecting his wife of adultery. Othello is a tragedy of dark love and sexual jealousy. The tragedy is an example of racial prejudice that leads to darker side of love. The root of negative love is connected to Othello's complex and misunderstanding as to why a beautiful character like Desdemona could love an African soldier. The present article is based on the critical analysis of three leading characters: Othello (tragic hero), Desdemona (heroine) and Iago (the jealous villain).

One of the purest manifestation of evil in Shakespeare's body of work is Iago, the conniving and deceitful second lieutenant to Othello, the tragic titular character. Displaying malice and jealousy without clear reason, Iago is a force of lies and chaos, double-crossing numerous characters, and ultimately manipulating Othello into murdering his wife Desdemona.

Many scholars see Iago as the most inherently evil of all Shakespeare's villains. He spends the course of the play relentlessly plotting Othello's downfall and his malicious scheming drives the storyline towards its tragic finale.

All Shakespeare villains act in cruel and unpleasant ways. Some of them kill, deceive and otherwise take advantage of their fellow men and women, but they are all only human beings.

Much has been continuously written on different aspects of Shakespearean drama

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in general and tragedy in particular. Othello has not been an exception.

Shakespeare has successfully depicted two sides of love in 'Othello'. Right from the portrayal of an example of strong bond between Desdemona (the heroine) and Othello (the hero) at the start of the play which leads to the culmination as a tragic hero, Othello has become victim of dark form of love, mixed with hateful jealousy throughout the play. Shakespeare has been popularly known as the playwright of tragedies. It does not mean he has not attempted comedies or sonnets. He has been a versatile writer. Othello is a wonderful example of 'romance' basically between Othello (the hero) and Desdemona (the lead heroine). They are in serious love, but Othello can't remove the root of his doubt as to why such a pretty woman would love a man like him (who is not good looking at all). The initial doubt has been increased by the poison of the villain (Iago) which the hero can't understand despite the fact that, she has done nothing wrong. In order to develop a deep understanding of the concept of Shakespearean characters and elements of love through the characters, it is inevitable to delve deep into the socio-psychological analysis of each of the main characters.

Iago is the epitome of **c**onniving and evil character in a play. He is sly and quick witted, untrustworthy, and sexist (which is a counterproductive characteristic). He shows no sympathy after he blackmails people that trust him, and he spends his time, entirely in the play, in planning and executing their demise. He plays a crucial role in the play as the antagonist, and without him, there would be no conflict.

First and foremost, Iago's most useful and perhaps most important attribute is his ability to think quickly and calmly. Iago's nerves of steel allow him to think quickly and delicately, without boxing himself in to his own trap. This is key to his scheming because he is frequently put on the spot by Othello, and if Iago fails to respond in a timely and witty fashion, his plan will be either foiled or, worse, revealed to Othello and others.

A fine example of Iago's quick wit is found in Act III, Scene III. Othello asks

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Iago to provide proof that Desdemona is having an affair, and Iago responds,

"There are a kind of men so loose of soul that in their sleeps will mutter their affairs. One of this kind is **Cassio.** In sleep I heard him **say "Sweet Desdemona, let us be wary, let us hide our loves."** (Act III, Scene III, 413-417).

So far, Iago's only proof that Desdemona was cheating on Othello is the handkerchief Iago plans on planting in Cassio's room. Iago had not yet thought of any other ideas he could use against Cassio prior to Othello asking him to prove what was going on, so Iago quickly formulated this story in order to keep Othello angered and jealous until Iago had time to plant the handkerchief. This is a fine example of how Iago thinks on his feet. Another defining example of Iago's cunning is in Act III, when Othello and Iago enter the scene when Cassio is trying to convince Desdemona to speak in his name. Upon Othello's entrance, Cassio quickly departs, not because he is trying to sneak away undetected, but because he doesn't want to confront Othello just yet. Othello asks Iago if it was Cassio who he saw leave, and Iago responds,

"Cassio, my Lord? No, sure, I cannot think it that he would steal away so guilty-like seeing you coming" (Act III, Scene III, 38-39).

Iago immediately arouses suspicion of Cassio in Othello. This is the ignition of Iago's scheme against the other characters.

While quick critical decision making is an attribute that can be admired, although not in Iago, the trait that makes Iago a true rapscallion is his untrustworthiness to those who think they have befriended him. All of the characters in the play start on great terms with Iago. They trust him, especially since he is a military man. The most obvious event that reveals how untrustworthy Iago is his plot to blackmail all of his so-called friends and colleagues. His intentios sadistic, Iago reveals his plot to extort his first victim, Cassio, in Act II. Cassio takes Desdemona's hand to greet her, and in an aside, Iago says,

"He takes her by the palm. Ay, well said, whisper! With as little a web as this will I ensnare as great a fly as Cassio. Ay, smile

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upon her, do, I will gyve thee in thine own courtship. You say true, 'Tis so, indeed. If such tricks as these strip you out of your lieutenantry, it had been better you had not kissed your three fingers so oft, which now again you are most apt to play the sir in. very good, well kissed, and excellent courtesy! 'tis so, indeed. Yet again your fingers to your lips? Would they were clyster-pipes for your sake! (Act II, Scene I, 162-170).

One might wonder how someone who is supposed to be honourable and trustworthy can really be the root of all evil. There are many examples throughout the play that only support Iago's untrustworthiness. Iago uses Emilia to take possession of Desdemona's prized handkerchief, and as if that isn't enough to send him to hell, Iago also plans to use it as blackmail against Cassio. Throughout the play, characters place their trust in him when they need it most, and they are blind to his treachery. Iago plays Cassio and Othello and they both mistakably name him an honorable man. It is important that Iago is an agile thinker in the play because without it Shakespeare wouldn't be able to create suspense in the moments in which Iago's scheme is challenged.

In addition to these attributes, Iago also has a distinct animosity towards women. This is peculiar because Iago's entire scheme to extort his "friends" seems to be based around his goal to have Desdemona. Iago is sexist, and even displays it to Desdemona.

"Come on, come on. You are pictures out of door, bells in your parlors, wild-cats in your kitchens, saints in your injuries, devils being offended, players in your housewifery, and housewives in your beds." (Act II, Scene I, 109-111).

Desdemona is offended by Iago's sexist jokes, accordingly. Iago basically states that women are good for nothing but sex, ironically he believes that even at sex, women aren't up to par with his standards. Iago states that if a woman is attractive, she will use her looks to get what she wants, if the woman is ugly and smart, then she will be intelligent enough to find a man to sleep with, and that no "fair" woman is "foolish" because all women like this simply seems intelligent to men

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blinded by the woman's looks. Again speaking of women, Iago says,

"There's none so foul and foolish thereunto, but does foul pranks which fair and wise ones do." (Act II, Scene I, 138-139).

This is confusing because if Iago plans to have Desdemona fall for him, why would he expect her to come for a man that has absolutely no respect for females? Iago's sexist tendencies are pivotal because they press they fact that marriages didn't mean as much as they do in modern society. Iago's wife Emilia has virtually no place in Iago's heart, yet they sewn by marriage. Iago's personality is complicated because of his attraction to Desdemona combined with his hatred towards women.

Simply put, Iago is all that is considered unholy. Whatever higher power he believes in will send him straight to whatever hell he believes in upon his death. He is sly and quick witted, untrustworthy, and sexist, and does everything within his power to manipulate the other characters in a play. In a way, Iago is the perfect villain, however odd it may seem to call Iago perfect in any context. Shakespeare caused Iago to be the most fascinating character in the play because of his paradoxical characteristics.

Conclusion: Thus we can say that, *Othello,* is a wonderful creation of the great dramatist, William Shakespeare, and when we talk about the role of villains, in the drama, we find that, Shakespeare has done a great job in this regard, and he has made true justice with villain's role. Although there are lot of wonderful role of villains in the drama, but when we talk about Iago's character, we find that, his role is very effective and he almost controls and effects the life of main characters in the drama. Without Iago, (the villain) in the Drama '*Othello',* we cannot Imagine about the success of this Drama, because Iago is the main antagonist who Controls the life of all the main characters in this drama, whether he may be the Protagonist, Othello, Desdemona (the heroine), Emilia (Iago's wife and Desdemona's attendant), Michael Cassio (Othello's lieutenant) all are suffered directly or indirectly by him.

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He shows no sympathy after he blackmails people that trust him, and he spends his time, entirely in the play, in planning and executing their demise. He plays a crucial role in the play as the antagonist, and without him, there would be no conflict. Iago due to his bad nature, he plotted to destruct the life of whole person, who are responsible for his dissatisfaction due to some reasons. Actually he hitted many birds with a single stone. He used the weapon of jealousy against Othello, by twisting his deep love for Desdemona, to a great hatred, and finally she murdered by her own husband Othello due to misunderstanding. This play shows that, how a great warrior, like Othello, who cannot be defeated in battle field, can be destroyed, if he has a tragic flaw in his life. One tragic flaw is ample for destroying anybody's life.

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भारत की नैरेटिव कूटनीति: आंतरिक राजनीति से वैश्विक कूटनीति तक प्रभाव का विश्लेषण

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सारांश

कूटनीति में वृतांतों (नैरेटिव्स) की एक महत्वपूर्ण भूमिका होती है जो शासन और विचारधारा को वैद्यता प्राप्त करने या लोकप्रिय बनाने के लिए प्रयोग किए जाते हैं। यह शोध पत्र भारत की नैरेटिव्स की कूटनीति के विश्लेषण पर आधारित है। यह शोध पत्र उपनिवेश कालीन भारत में अंग्रेजों द्वारा फैलाए गए नैरेटिव्स तथा प्रतिकार स्वरूप स्वतंत्रता आंदोलन में स्वतंत्रता सेनानियों के विमर्श से लेकर स्वतंत्र भारत के विभिन्न कालों में जनमत को प्रभावित करने वाले विमर्शों की विश्लेषण के साथ वैश्विक स्तर पर भारत की नैरेटिव कूटनीति का विश्लेषण करता है

यह शोध पत्र भारतीय ज्ञान परंपरा के नैरेटिव के राजनीतिक- सांस्कृतिक संदर्भों एवं प्रभावों की भी समीक्षा करता है। प्रस्तुत शोध पत्र का मुख्य उद्देश्य यह विश्लेषण करना है कि ये नैरेटिव किस प्रकार भारत की घरेलू और वैश्विक राजनीति में जनमत, लोकप्रियता और सांस्कृतिक पहचान को प्रभावित कर रहे हैं तथा किस प्रकार समकालीन संघर्षरत विश्व में भारत की ज्ञान परंपरा एक वैकल्पिक और मानवीय विश्वदृष्टि प्रदान कर सकती है।

शोध प्रश्न एवं पद्धति

शोध में मुख्य प्रश्न यह है कि क्या नैरेटिव कूटनीति भारत की चुनावी राजनीति और जनमत के निर्माण में निर्णायक भूमिका निर्वहन करने के साथ अंतरराष्ट्रीय राजनीति में सॉफ्ट पावर और सांस्कृतिक आधार को सुदृढ़ करने में केंद्रीय भूमिका निभाती हैं। तथा क्या भारत इन कथाओं के माध्यम से वैश्विक राजनीति में एक वैकल्पिक नैरेटिव प्रस्तुत कर सकता है।

शोध पद्धति गुणात्मक एवं विश्लेषणात्मक अध्ययन पर आधारित है।

बीज शब्द : *नैरेटिव, कूटनीति, विमर्श, वृत्तांत, भारतीय ज्ञान परंपरा*

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प्रस्तावना

सामान्यतः नैरेटिव या वृत्तांत वे, कथा ,कहानी या फ्रेमवर्क है किसी स्थिति या घटनाओं की श्रृंखला को विशेष दृष्टिकोण से प्रस्तुत करने या समझाने का प्रयास करते हैं।

हम क्या हैं, कौन थे और क्या कर सकते हैं? अपनी और दूसरों की दृष्टि में हमारी पहचान क्या है? जब इन सभी सवालों के जवाब को यदि किसी एक शब्द में व्यक्त करना हो, तो उसे नैरेटिव (Narrative) अर्थात् विमर्श कहा जा सकता है। ये विमर्श हमारी विश्लेषण करने की शक्ति, हमारे चिंतन की सीमा, हमारी जानकारी की परिधि और ज्ञान को बहुत अधिक प्रभावित करते हैं। **(1)** पुंज बलवीर,2025

रणनीतिक नैरेटिव वे कथाएँ हैं जिनके माध्यम से राज्य अपनी पहचान, भूमिका और उद्देश्य को परिभाषित करते हैं। **(2)** (Miskimmon et al., 2013)

किसी भी देश की आंतरिक राजनीति एवं वैश्विक कूटनीति में वृतांतों (नैरेटिव्स) की एक महत्वपूर्ण भूमिका होती है जो शासन, सत्ता और विचारधारा को वैद्यता प्राप्त करने या लोकप्रिय बनाने के लिए प्रयोग किए जाते हैं।

प्राचीन भारतीय परंपरा की लोक कथाएं एवं विमर्श

भारत में भी प्राचीन काल से ही राज्य नीति और मूल्यों के प्रसार एवं वैधता में कथाओ, संवादों और वृतांतों की महत्वपूर्ण भूमिका रही है क्योंकि इनके माध्यम से किसी भी बात को समझाना या प्रभावित करना अधिक सहज और सुगम होता है। भारतीय परंपरा की ये कहानियां या वृतांत नैतिकता, नेतृत्व और व्यक्तिगत विकास के मामलों में मार्गदर्शन करने के साथ ही संस्कृति और सामाजिक राजनीतिक मान्यताओं का प्रसार भी करते हैं।**(3)**

https://www.drishtiias.com/hindi/blog/life-lessons-hidden-in-indian-folktale

भारतीय ज्ञान परंपरा के रामायण, महाभारत, बौद्ध और जैन दर्शन के महत्वपूर्ण ग्रंथों में राजनीतिक एवं नैतिक वृतांतों के अनेक उल्लेख है जिनमें लोक संग्रह, प्रजा योगक्षेम, धर्म, न्याय, वसुधैव कुटुंबकम, राजधर्म, राम राज्य इत्यादि नैरेटिव्स का सामाजिक-राजनीतिक विमर्श दिखाई देता है। इन नॉरेटिव्स ने प्राचीन भारत के साथ-साथ आधुनिक भारत की राजनीति पर भी प्रभाव डाला है। भारतीय राजनीति और समाज समकालीन परिस्थितियों के साथ-साथ अपनी संस्कृति और दार्शनिक परंपराओं से गहरा जुड़ा हुआ है इसीलिए ये मूल्य या विमर्श आज भी भारत में राजनीतिक व्यवहार को प्रभावित करते हैं।**(4)** (Radhakrishnan, S. 1923).

जन मानस को प्रभावित करने वाले इस प्रकार की विमर्श केवल प्राचीन भारत की लोक कथाओं में ही नहीं दिखाई देते हैं अपितु भारत के इतिहास के विकास क्रम के विभिन्न कालों में भिन्न-भिन्न रूपों में शासन को वैद्यता प्रदान करने के लिए प्रयोग किए जाते रहे हैं। ब्रिटिश काल, स्वतंत्रता आंदोलन, स्वतंत्रता के बाद एवं समकालीन भारतीय राजनीति में अलग-अलग वृतांतों का प्रयोग किया गया

ब्रिटिश कालीन भारत के विमर्श (नैरेटिव)

औपनिवेशिक काल में ब्रिटिश शासन द्वारा भारत पर अपने शासन को दृढ़ करने एवं भारतीय जनता के मनोबल को गिराने के लिए विभिन्न नरेटिव्स का प्रयोग किया गया। अंग्रेजों ने उपनिवेशवाद को वैध ठहराने के लिए, श्वेत जाति का भार (white man's burden) , भारतीय सभ्यता पिछड़ी, भारत कभी एक राष्ट्र नहीं था, डिवाइड एंड रूल , पूर्व का विकृत चित्रण, अंग्रेजी शिक्षा की श्रेष्ठता, ,आर्य आक्रमण सिद्धांत की कहानी का प्रयोग किया जिसके अनुसार आर्य भी यहां के मूल निवासी नहीं थे वे बाहर से आए आक्रमणकारी थे ऐसी कहानी का प्रचार करने में उनका उद्देश्य भारत के लोगों में राष्ट्रवाद की भावना को समाप्त करना था ताकि वे इस भ्रम का शिकार होते रहे कि उनके पूर्वज भी विदेशी थे। इसी तरह एक विमर्श (नैरेटिव) यह बनाया गया कि 1947 से पहले

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भारत राष्ट्र नहीं था और अंग्रेजों ने इस देश को एक सूत्र में बांधा और एक लोकतांत्रिक धर्मनिरपेक्ष राष्ट्र की शिक्षा प्रदान की जिनका उद्देश्य अंग्रेजी शासन को राजनीतिक समर्थन के साथ नैतिक समर्थन प्राप्त करना था। इसी तरह ब्रिटिश शासन ने अपनी फूट डालो राज करो की विभाजनकारी नीति के द्वारा भारतीय समाज की कमजोर कड़ियों को पहचान कर हिंदू बना मुस्लिम, हिंदू बनाम सिख द्रविड़ बनाम आर्य ,दलित बनाम शेष हिंदू समाज, राजा बनाम प्रजा, दक्षिण भारत बनाम उत्तर भारत इत्यादि विमर्श या नॉरेटिव्स के माध्यम से भारत में लंबे समय तक शासन किया और देश के बहुलतावादी और समरसता पूर्ण स्वरूप को तोड़ने का काम किया। इसी प्रकार 1857 की क्रांति (स्वतंत्रता संग्राम) को मात्र सैनिक विद्रोह सिद्ध करने का नरेटिव गढ़ा गया तथा इस प्रकार के विमर्श बनाकर अंग्रेजों ने भारतीय जनता के मनोबल को कमजोर करने उन्हें मानसिक रूप से गुलाम बनाने का कार्य किया। **(5)** (पुंज बलवीर,2025)

स्वतंत्रता आंदोलन के विमर्श (नैरेटिव)

ब्रिटिश शासन के खिलाफ स्वतंत्रता आंदोलन करने वाले स्वतंत्रता सेनानियों ने स्वराज, स्वदेशी, भारत माता, अहिंसा, सत्याग्रह, और राष्ट्रवाद जैसे नैरेटिव्स का प्रयोग कर भारतीय जनता को एक सूत्र में बांध कर जन आंदोलन का स्वरूप प्रदान किया तथा अंग्रेजों द्वारा फैलाए गए भ्रामक कहानियों एवं नरेटिव्स को तोड़ने का प्रयास किया। औपनिवेशिक शासन के दुष्चक्र को तोड़ने के लिए भारतीय स्वतंत्रता सेनानियों ने ऐसे narratives विकसित किए, जिन्होंने जनमानस को जागृत किया और औपनिवेशिक शासन को चुनौती दी। **(6)** (Chandra et al., 1989)।

लोकमान्य तिलक द्वारा "**स्वराज मेरा जन्मसिद्ध अधिकार है**" के नरेटिव के माध्यम से स्वतंत्रता को सबसे आवश्यक अधिकार के रूप में स्थापित कर जनता को विदेशी गुलामी के प्रति जागरूक किया और स्वतंत्रता की मांग को बल दिया। **(7)** (Sarkar, 1983)

इसी प्रकार "**भारत माता और भारत एक राष्ट्र है**" के नैरेटिव के द्वारा ब्रिटिश शासन के इस दावे का खंडन किया गया कि भारत एक राष्ट्र नहीं है तथा भारत की साझी विरासत और साझी संस्कृति की कहानियां प्रस्तुत की गई जिसने भारत को स्वतंत्र करने की मांग को वैधता तथा क्रांतिकारी राष्ट्रवाद को जन्म दिया। **(8)** (Anderson, 1983)

महात्मा गांधी ने अहिंसा, सत्याग्रह और राम राज्य जैसे नैरेटिव्स का ब्रिटिश सरकार की नैतिक वैधता को समाप्त करने तथा भारत की आजादी के लिए जन समर्थन और वैश्विक समर्थन प्राप्त करने में प्रयोग किया। इसी प्रकार औपनिवेशिक शोषण को उजागर करने वाली दादाभाई नौरोजी की ड्रेनेज थ्योरी ने ब्रिटिश शासन के खिलाफ असंतोष को पैदा करने में सहयोग दिया।

इन नैरेटिव्स का राष्ट्रवाद की भावना का विकास कर देश को आजादी दिलाने में महत्वपूर्ण योगदान रहा।

स्वतंत्र भारत की राजनीति के विभिन्न विमर्श (नैरेटिव)

स्वतंत्र भारत ने लोकतांत्रिक व्यवस्था को चुना और लोकतंत्र में चुनाव की महत्वपूर्ण भूमिका होती है और चुनाव जीतने के लिए भिन्न-भिन्न राजनीतिक वालों द्वारा भिन्न-भिन्न समय पर अलग-अलग नरेटिव्स का प्रयोग किया गया। ये नैरेटिव्स चुनावी प्रक्रिया के जटिल ताने-बाने को बुनने वाले धागों की तरह काम करते हैं। इन विमर्शों (नैरेटिव) में एकजुट करने या विभाजित करने, प्रेरित करने या निराश करने की शक्ति होती है, जो न केवल चुनाव के परिणाम को बल्कि कथाओ या विमर्शों से गहराई से जुड़े राष्ट्र के भाग्य को भी आकार देती हैं। **(9)**Chintan India foundation

स्वतंत्रता के बाद जनमत को प्रभावित करने के लिए, चुनाव जीतने के लिए और राजनीतिक वैद्यता प्राप्त करने के लिए अलग-अलग दलों और नेताओं द्वारा अपने अपने नरेटिव्स बनाए गए।

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1947 से 1964 तक नेहरू युग में भारत के पुनर्निर्माण के लिए राष्ट्र निर्माण,समाजवाद और धर्मनिरपेक्षता, गुटनिरपेक्षता, पंचशील तथा आर्थिक नियोजन जैसे नरेटिव्स का प्रयोग किया गया। जिसके द्वारा राष्ट्र को एकता के सूत्र में बंधने, विविधता में एकता स्थापित करने, योजनाबद्ध विकास करने, सार्वजनिक क्षेत्र की स्थापना करने लोकतांत्रिक संस्थाओं का विकास करने तथा स्वतंत्र भारत की स्वतंत्र विदेश नीति का अनुसरण करने संबंधी कथाओं (narratives) का प्रचार कर प्रचंड जन समर्थन प्राप्त किया गया ।

1964-1980 के काल में कांग्रेस पार्टी और उनके नेता इंदिरा गांधी ने गरीबी हटाओ के नरेटिव के माध्यम से लोकप्रिय राजनीति एवं कल्याणकारी योजनाओं के लिए समर्थन प्राप्त किया तथा चुनाव में भारी बहुमत से जीत प्राप्त की। साथ ही एक मजबूत केंद्र के नरेटिव को भी गढ़ा गया जिसके माध्यम से शक्ति के केंद्रीकरण और आपातकाल जैसे कार्यों को भी वैद्यता देने का प्रयास किया गया। **(10)** Kohli, A. (2004)

1980 के बाद के दशक में भारतीय राजनीति में एक दल के प्रभुत्व की समाप्ति हुई तथा राजनीति में प्रचारित किए जाने वाले नरेटिव्स या विमर्शों में विविधता दिखाई देने लगी। यह विविधता विशेष रूप से क्षेत्रीय राजनीति और पहचान के संकट से जुड़ी हुई थी। क्षेत्रीय आकांक्षाओं के विमर्शों ने और क्षेत्रीय दलों की विभाजक राजनीति को बढ़ावा दिया तथा जाति, धर्म और क्षेत्र संबंधी पहचान के विमर्शों तथा गठबंधन राजनीति को जन्म दिया।

1991 के बाद देश में उदारीकरण निजीकरण और वैश्वीकरण का युग प्रारंभ हुआ तथा शाइनिंग इंडिया और भारत एक उभरती आर्थिक शक्ति जैसे नैरेटिव्स ने भारतीय राजनीति को प्रभावित किया।

समकालीन भारतीय राजनीति में नया भारत, आत्मनिर्भर भारत, सबका विकास, विकसित भारत, राष्ट्रवाद तथा भारतीय ज्ञान परंपरा के “रामराज्य”, “धर्म”, “आत्मनिर्भरता” और “वसुधैव कुटुम्बकम्” जैसे narratives पुनः राजनीतिक विमर्श के केंद्र में हैं। **(11)** NITI Aayog. (2021)

समकालीन भारतीय राजनीति में भारतीय ज्ञान परंपरा के सांस्कृतिक -ऐतिहासिक वृत्तांतों का प्रयोग भारत की गौरवपूर्ण संस्कृति और सभ्यता की प्रतिष्ठा एवं राष्ट्रवाद की भावना के प्रसार के लिए किया जा रहा है। इन वृतांतों का प्रयोग राष्ट्र की विविधता पूर्ण संस्कृति, विरासत, स्वतंत्रता सेनानियों के योगदान, राष्ट्रीय गौरव, भाषा उत्सव क्षेत्रीय त्योहारों, रीति रिवाज , महत्वपूर्ण दिवस तथा आजादी के अमृत महोत्सव के आयोजन में किया जा रहा है जिससे मतदाताओं के साथ भावनात्मक जुड़ाव बनता है और विविधता में एकता के आदर्श को बल मिलता है। वैश्वीकरण के आर्थिक युग में भारत को वैश्विक आर्थिक महाशक्ति के रूप में प्रस्तुत करने वाले विकसित भारत 2047, जी-20 के भारतीय स्वरूप ,विकास, रोजगार सृजन , गरीबी उन्मूलन, लोकल फोर वोकल की कहानियाँ बुनते हुए मतदाताओं को आर्थिक खुशहाली और सामाजिक प्रतिष्ठा और समावेशन के सपने दिखाते हैं।**(12)** Chintan India foundation

इन्हीं के साथ-साथ सामाजिक न्याय के लिए दलित विमर्श, लैंगिक समानता के लिए महिला आंदोलन, आर्थिक न्याय के लिए किसान विमर्श और सतत विकास के लिए पर्यावरणीय विमर्श भी भारतीय राजनीति में साथ-साथ चलते रहे हैं।

चुनावी राजनीति, जनमत और मतदान व्यवहार पर इन नरेटिव्स का बहुत प्रभाव रहता है। यह नैरेटिव्स जाति, धर्म, लिंग और अलग-अलग आयु वर्ग के लोगों के लिए अलग-अलग रूप से गढ़े जाते हैं और इनका भिन्न-भिन्न प्रभाव पड़ता है। भावनात्मक रूप से प्रभावित और पहचान पर आधारित ये राजनीतिक विमर्श चुनावी राजनीति और मतदान व्यवहार को बहुत अधिक प्रभावित कर रहे हैं। आज ये विमर्श ही दलों की पहचान और कूटनीति को निर्धारित करते हैं लोगों की सोच को बनाते हैं और मतदाताओं को एकजुट कर चुनाव और राजनीति की दशा और दशा को तय करने में महत्वपूर्ण भूमिका निभा रहे हैं। आज

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विमर्श की राजनीति और उसके रणनीतिकार केंद्र में हैं। **(13)** The Effect of Narrative in Indian Politics: Mr. Pragun Kumar N) https://www.ijfmr.com/papers/2025/3/47776.pdf

इन नैरेटिव्स का न केवल घरेलू राजनीति में जनमत को प्रभावित करने अपितु वैश्विक राजनीति में भी सॉफ्ट पावर या सांस्कृतिक कूटनीति के रूप में प्रयोग किया जा रहा है।

आज भारत को एक प्रभावशाली सॉफ्ट पावर देश के रूप में जाना जाता है, जिसका कारण हजारों वर्षों में विकसित विशाल सभ्यता और राजनीतिक व्यवस्था तथा प्राचीन ज्ञान परंपरा के वसुधैव कुटुंबकम, न्याय, "सह-अस्तित्व,अहिंसा, शांति, सर्वजन हिताय", सर्व धर्म समभाव, राजधर्म जैसे सांस्कृतिक नरेटिव्स है जो वैश्विक स्तर पर भारत को एक शांतिप्रिय, समावेशी और नैतिक शक्ति के रूप में स्थापित करते हैं। **(14)** https://www.iasgyan.in/rstv/perspective-indias-soft-power-a-comprehensive analysis?utm_source=chatgpt.com

सॉफ्ट पावर में संस्कृति, राजनीतिक नरेटिव्स और विदेश नीतियां शामिल हैं। इसे अंतरराष्ट्रीय राजनीतिक संबंधों में एक प्रेरक शक्ति माना जाता है जिसमें किसी राष्ट्र के सांस्कृतिक, ऐतिहासिक और राजनयिक प्रभाव का उपयोग शामिल होता है। भारत को स्वयं को वैश्विक मंच पर एक जिम्मेदार और प्रभावशाली खिलाड़ी के रूप में प्रस्तुत करने के लिए सॉफ्ट पावर बहुत प्रासंगिक है। **(15)** मोहन, सी. आर. (2019)

नैरेटिव पावर, सॉफ्ट पावर का ही हिस्सा है लेकिन उसकी तुलना में मनोवैज्ञानिक और भावनात्मक स्तर पर अधिक प्रभावी है। वर्तमान वैश्विक परिस्थितियों, पश्चिमी वैधता के संकट, लोकतंत्र को पैदा हो रहे खतरों, निर्णयों पर जनता के बढ़ते प्रभाव, सोशल मीडिया और डिजिटल प्लेटफॉर्म के बढ़ते प्रभाव के कारण, राज्य की शक्ति मुख्य रूप से धारणाओं को गढ़ने, वैश्विक बहसों को आकार देने और उन्हें विश्व भर में फैलाने की उसकी क्षमता पर निर्भर करती है। इसीलिए अंतरराष्ट्रीय राजनीति में कूटनीतिक सफलता के लिए किसी देश को राष्ट्रीय हित के साथ नैरेटिव कूटनीति में भी प्रभावशाली होना चाहिए। आज भारत वैश्विक स्तर पर अपनी पहचान, वैधता और नेतृत्व को प्रदर्शित करने के लिए नैरेटिव कूटनीति का अत्यंत कुशलतापूर्वक और व्यवस्थित रूप से उपयोग कर रहा है। इसमें मीडिया, बॉलीवुड फिल्म और डिजिटल प्लेटफॉर्म भी एक बड़ी भूमिका निभा रहे हैं

भारत की नैरेटिव कूटनीति का प्रभावी उपयोग कोविड-19 महामारी के समय मिला, जब उसने वैश्विक असमानता के चरम पर विकासशील देशों को टीके उपलब्ध कराकर 'वैक्सीन मैत्री' पहल शुरू की। इससे भारत के वैश्विक कल्याण के प्रति प्रतिबद्ध एक जिम्मेदार राष्ट्र और वैश्विक स्वास्थ्य प्रशासन में एक विश्वसनीय भागीदार के कूटनीतिक विमर्शों को बल मिला। इसी तरह G 20 के मेजबान देश के रूप में भारत को और शासन के समावेशी रूप,वसुधैव कुटुंबकम और वैश्विक दक्षिण की आवाज के रूप में भारत के नैरेटिव कूटनीति को समर्थन मिला। **(16)** https://www.ijfmr.com/papers/2026/1/67798.pdf

वर्तमान में भारतीय ज्ञान परंपरा और उसकी वर्तमान समस्याओं के समाधान में उपयोगिता के वृत्तांत ने भारत की नरेटिव पावर में वृद्धि की है। प्राचीन सांस्कृतिक परंपराओं और आधुनिक वैश्विक मुद्दों को जोड़कर, भारत परंपरा, सार्वभौमिकता और आधुनिकता को जोड़ने या जारी रखने का वृत्तांत प्रस्तुत करता है और स्वयं को पश्चिमी देशों से अलग करता है साथ ही तनावग्रस्त विश्व को शांति स्थापना, मानसिक स्वास्थ्य और पर्यावरण संरक्षण के लिए विकल्प भी प्रदान करता है। भारतीय ज्ञान परंपरा और उसकी लोक-कथाएँ केवल अतीत की स्मृतियाँ नहीं, बल्कि भविष्य की कूटनीतिक पूँजी हैं। नरेटिव कूटनीति के युग में ये कथाएँ भारत को एक नैतिक, समावेशी और सभ्यतागत शक्ति के रूप में प्रस्तुत करती हैं। इस प्रकार, भारत की लोक-परंपरा वैश्विक

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राजनीति में न केवल संवाद का माध्यम बनती है, बल्कि वैकल्पिक विश्वदृष्टि भी प्रदान करती है।

निष्कर्ष और संभावनाएं

समकालीन राजनीति में घरेलू और अंतरराष्ट्रीय स्तर पर जनमत को प्रभावित करने में नरेटिव्स की भूमिका में निरंतर वृद्धि हो रही है। भारत की आंतरिक और अंतरराष्ट्रीय राजनीति में भारतीय ज्ञान परंपरा के माध्यम से नए भारत और सद्भावना पूर्ण विश्व के निर्माण का विचार एक शक्तिशाली नैरेटिव के रूप में उभरा है, जो विश्व गुरु भारत की कल्पना ,आत्मनिर्भर भारत, सांस्कृतिक गौरव , राष्ट्रवाद और राष्ट्रीय शिक्षा नीति पर आधारित है। भारतीय ज्ञान परंपरा इस दृष्टिकोण को और गहन बनाती है, क्योंकि यह राजनीति को केवल तात्त्विक या प्रशासनिक संदर्भ में नहीं, बल्कि धार्मिक, सांस्कृतिक और सामाजिक चेतना के रूप में देखती है। आवश्यकता इस बात की है कि नैरेटिव्स का प्रयोग सकारात्मक रूप में किया जाए तथा वे व्यावहारिक समाधानों पर आधारित हों। घरेलू राजनीति में भ्रमित किए जाने वाले नैरेटिव्स से बचते हुए एक सहभागी समावेशी राजनीति का निर्माण करने वाले विमर्शों को बल दिया जाना चाहिए। अंतरराष्ट्रीय स्तर पर भारत अपनी नैरेटिव कूटनीति का इस प्रकार प्रयोग करे कि संपूर्ण विश्व में उसके प्रभाव और वैधता में वृद्धि हो और वह एक विश्वसनीय सहयोगी और संघर्षों के समाधान करने वाली शक्ति के रूप में प्रतिष्ठित हो। नैरेटिव्स का समझदारी एवं सजगता से प्रयोग करके भारत नैरेटिव कूटनीति के माध्यम से संघर्षरत विश्व में एक महत्वपूर्ण भूमिका निर्वहन कर सकता है।

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