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MESSAGE

It is with great pleasure that I share the *Handbook on Current Affairs* with the academic community, aiming to enhance students' career competencies and support educators in their pursuit of knowledge. I am confident it will serve as a valuable resource, fostering academic excellence and awareness of current events. I appreciate the relentless efforts of our Principal and the Editorial Board in bringing out this volume on time with contributions from distinguished authors nationwide. I wish the readers success in their endeavours. May God Almighty bless you abundantly.

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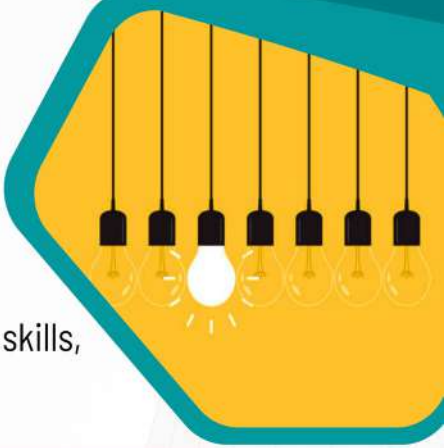

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Forward

I am pleased to introduce the 2026 edition of the Handbook on Current Affairs, a comprehensive resource bridging university curricula with the latest developments across various subjects. This volume, with 42 insightful articles by renowned authors including Civil Service Officers, Vice-Chancellors, and professors, aims to enhance students' career competencies and provide valuable insights for competitive exams, job interviews, and campus placements.

In today's fast-paced world, staying updated on current affairs is crucial for students preparing for civil services, campus placements, and other competitive exams. This handbook addresses the gap in curriculum updates and current global events, covering key topics in Economics, Science, Technology, Culture, Polity, International Relations, History, Environment, Society and Education. Notably, a reference book compiling articles on current events across such diverse subjects is seldom found, making this handbook a unique and valuable resource. It serves as a quick reference for final-year UG and PG students in Kerala and beyond.

I extend my sincere thanks to Msgr. Sebastian Vethanath, Manager, for his visionary guidance and permission to publish this book, enabling the Institute to contribute meaningfully to the academic pursuits of students. I appreciate and am grateful to Dr. Mathew Joseph (Associate Principal), Rev. Fr. Sebastian Chamakkalayil (Vice-Principal & Dean), the Editorial Board, contributing experts, and the team at Civil Service Institute Pala for their dedication in bringing out this volume.

I hope this handbook will be a valuable addition to academic libraries and well-received by the academic community.

Dr. V. V. Georgekutty
Principal & Chief Editor
(Former Controller of Examinations, University of Calicut)

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UN Security Council Reform: A Distant Dream

T. P. Sreenivasan IFS
Former Ambassador of India to the UN

The architects of the UN apparently wanted the Charter to be written in stone. Therefore, they made any amendment of the Charter difficult by prescribing a cumbersome procedure which involves unanimity of the permanent members and a two third majority of the General Assembly and ratification by the legislative processes of the member states. Consequently, the Charter has been amended only a few times for technical reasons. The Charter, therefore, still has several anomalies which have not been removed to allow sleeping dogs lie. The situation may befuddle the new readers of the Charter, but they too will understand the reasons for not amending the Charter.

A major anomaly that surprises every new intelligent reader of the Charter is that the list of the permanent members in Article 23 still contains a country, which does not exist in the world, the Union of the Soviet Socialist Republic. With the possibility of every former Republic claiming to be a successor to the USSR, the Russian President informed the Secretary General that the Russian Federation would continue the membership of the UN, including its permanent seat on the Security Council, and would maintain full responsibility for the rights and obligations under the Charter. Quite obviously, it was the result of intense discussion among the permanent members and others. The other diplomats were aware that intense discussions were taking place, but it was a big surprise when, on a fine morning, the USSR flag was replaced by the Russian flag and the name was changed to Russian Federation. This was a pragmatic way to deal with a major issue, but it remains an anomaly in the Charter. But the quiet settlement of this issue has remained unchallenged till now.

Another anomaly that exists is the name of China, which is called the Republic of China though the seat was transferred to the People's Republic of China by a General Assembly resolution in 1971. In other words, it is not unusual for legal anomalies to be retained in the Charter to avoid the arduous process of amendment when there is a political consensus, forced or otherwise.

Even more politically sensitive is the existence of the word, "enemy states' defined as any state which during the Second World War has been "an enemy of any signatory to the present Charter" in some Articles. These are Germany, Japan and Italy, which are major pillars of the United Nations today. This essentially validates post war actions of

the victors of the Second World War, but the reference has been allowed to become obsolete. An amendment in this case is possible and desirable, but it remains as a sleeping dog in the Charter for fear that any move to change the words would open a Pandora's Box. Against this background, changing the composition of the Security Council is considered impossible.

The fundamental reforms required are an expansion of the permanent membership of the Security Council and change the applicability of the veto. Efforts in this direction began within a few days of my first posting to the UN in 1979, when India proposed on behalf of the Nonaligned Movement that the number of non-permanent members of the Security Council should be increased. This appeared simple to maintain the proportion between the strengths of the General Assembly and the Security Council. But the opposition to the proposal, particularly from the permanent members, was so ferocious that it was decided not to take a vote on our proposal. Every year, the matter was discussed in the General Assembly, but not pressed to a vote.

By the time I returned to the UN in 1992 as Ambassador, the Cold War had ended and there was more cooperation among the great powers. Using this opportunity, Brazil proposed that a few new permanent members should be added to the Security Council, considering the rise of new powers like Germany, Japan, India, South Africa and Brazil. This time, the opposition was strong and despite many discussions and proposals, no change has been accepted by the General Assembly and the permanent members rejected all amendments proposed by the others in the last thirty- three years. There is no likelihood of any change in the composition of the Security Council in the near future. Our wish to become a permanent member of the Security Council is a distant dream.

In more recent times, ways have been found by the great powers, particularly the permanent members, to amend the Charter by stealth. By this method, the text of the Charter remains unchanged, but by a process of adopting resolutions of the Security Council and the General Assembly, the fundamental provisions of the Charter are altered. This is meant to tackle a particular problem for which the Charter has no answer and the veto becomes an obstacle.

An important milestone was the Security Council resolution 681, adopted on April 3, 1991, which has come to be known as the "Mother of all resolutions". The Iraqi invasion of Kuwait turned international opinion against Iraq and the United Nations waged a war under the leadership of the United States, which demanded alterations of the concepts like sovereignty of nations, non-interference and right to self-defence. As a non-permanent member of the Security Council, India witnessed and even supported a doctrine, which contradicted many provisions of the

Charter. Iraq had to unconditionally accept the destruction and removal of all Weapons of Mass Destruction even after the liberation of Kuwait. The Security Council established a mechanism for future ongoing monitoring and verification of Iraq's compliance. Iraq's oil was sold by a UN mechanism, which used the proceeds only for purchasing food and medicines for the people of Iraq. Such a regime was accepted by the Security Council without amending the Charter. India had held the view that disarmament was not a responsibility of the Security Council, but it had to resort to express a reservation on the related resolution. This set a precedent for the Security Council to act similarly in other situations without an amendment of the Charter. The most recent example of this method was the adoption of the Trump Plan for Gaza.

A way to amend the UN Charter through the adoption of Security Council decisions may be desirable to remove the anomalies in the 80-year-old document. Since the Security Council Resolutions are binding on all members of the UN, it may be considered legitimate. But the great powers will accept only those changes which make them more powerful and not dilute or eliminate the veto provisions, which have made the UN paralyzed over the years. If a new world order has to emerge, a consensus is necessary on an amended UN Charter which reflects the reality of the geopolitics of today.

Indo-American trade will grow and bring prosperity in both India and America!

P. C. Cyriac IAS
Former Chief Secretary, Tamil Nadu

1. India and the USA have been having excellent trade relations for a long time. During the last five years, the trade between the two countries steadily increased and the United States has become the largest trade partner of India.

   The value of India's exports to the US, grew in 2024-25, to $ 86.50 billion i.e., an increase of 11.50% from the previous year.

   The major items exported by India were drug formulations, Telecom instruments and smart phones, precious stones and jewellery, gold jewellery, Readymade garments, Iron and steel products, Coffee, Spices, seafood, leather and leather products.

   While the value of our Export goods to America mounted to $ 86.50 billion, our imports from America including oil and some defence equipment and high-tech Machinery, came to $44 billion only, leaving India with a trade surplus of $ 41 billion. Of course, in addition to this, we earn $ 200 billion by exporting our software services.

2. After President Donald Trump began his second term, he started insisting that the trade partners like India should import more American goods and balance the trade accounts and to make this possible, we should reduce the import duties on the American products and make them competitive.in the Indian market.

   For example, the American products like motor cars and bikes arecharged heavy import duties like more than 100 %, making them prohibitively costly for the Indian Consumer.

   Trump was keen to get the trade imbalance corrected by reducing the import duties on machinery items and agricultural commodities. He started a tariff war, by levying higher rates of import duties on the products exported to the US by the Countries having trade surplus with America.

3. India pointed out that 50 % of the Indian population depended on Agriculture and that these marginal farmers with small holdings would never be able to compete with the highly subsidised and heavily mechanised farms of America and that it was impossible to

risk the livelihood of these poor people by importing farm products like food grains, oilseeds and dairy products. And thus, India rightly refused to allow the American farm products into India.

4. Meanwhile another problem cropped up.

   When Russia attacked Ukraine and began the War there, 4 years ago, America and the Western Nations had declared that any country importing the Russian crude oil would be directly supporting the Russian War effort and therefore would be penalised.

   So, President Trump cited the Import of the Russian crude by India (Reliance Industries Refinery and Nayara Refineries in Gujerat) and asked India to stop this import.

   Naturally, a sovereign Nation like India, refused to comply with this demand. India asserted that we would continue to import the crude oil from. wherever it was advantageous for us to import.

   In view of the American sanctions, there were no takers for the Russian crude oil and thus it was available at a low price. Angered by our independent stand, President Trump imposed the punitive import duty at 50 % on certain specified Indian goods. He was clever enough to levy this 50 % tariff only on products he could buy from elsewhere.

   He did not levy the 50 % tax on the items like smartphones which he could not get from anywhere else, cheaper.

   This meant that some of our most labour-intensive export products like cotton garments, sea food, gems and jewellery, finished leather and leather products would find it difficult to sell in the American market. The American importer can get the same product from Vietnam or Cambodia, paying only 19% import duty. Many of the Garment manufacturers in the Tirupur Garment Industry complex in Tamandu have been forced to lay off Workers, as they are not able to find new markets.

   And when this situation remains unchanged, the American importers will cancel the orders on the Indian garment manufacturers and locate new suppliers in Vietnam or Cambodia. And once the business is lost, it becomes difficult to regain it, even if the tariff gets reduced later.

5. So, we have to very quickly engage President Trump in negotiations and get a trade deal signed, and get the 50 percent tariff lifted,

in order to protect our labour-intensive industries like garment manufacturing, leather and seafood.

The Govt of India seems to be making efforts to please America and President Trump, without damaging our standing as an independent and proud sovereign Nation.

For example, we have already passed a Bill in our Parliament for allowing small Nuclear Power Stations, in India, in the Private Sector.

This new Bill, described as the Shanti Nuclear Act. ("Shanti" Act is nothing but "Sustainable Harnessing and Advancement of Nuclear energy for Transforming India" Act!)

President Trump would be pleased with the speedy enactment of this Bill.

6. In addition to this, we may have to give Trump a face-saving entry into our agricultural sector, without harming our marginal farmers.

In this context, we can consider importing Maize from America and use it for cattle feed or manufacturing of Ethanol for mixing it in the Petrol we market.

Another proposal will be to import about 30 million tonnes of Soyabean from America and extract 6 million tonnes of edible soyabean oil.

India is the largest importer of edible oil, as our domestic production of edible oil is only 18 million tonnes against the total demand of about 30 million tonnes.

By carefully evolving proposals like this American agriculture can be given an entry into India. Trump will be able to save his face and Indian farmers will not be affected. And let us hope that with this "win-win formula" we will be able to sign a Trade Agreement with America soon and begin a new era of expanding our trade with them, ushering in a new era of prosperity in both the Nations!

Shared Resources at Political Crossroads: The Future of the Indus Water Treaty

Jose K. Philip
Associate Professor, Govt. College, Kottayam

Freshwater is more than an ordinary natural resource. It is a fundamental life sustaining commodity, a strategic asset and sometimes a medium of political influence or even conflict. Water insecurity today is not just an environmental problem but a national security issue causing excessive concern about the future of water diplomacy in case of shared water resources. Among the several issues that strain India Pakistan bilateral relations, sharing the waters of the Indus River system has emerged as one of the burning concerns today.

The Indus River is a trans boundary river of Asia. It rises from Southwest Tibet and flows through Kashmir region into Pakistan and finally drains into the Arabian Sea near Karachi. Its total length is 3180 km and it has a drainage basin extending over 11 lakh square kilometres. The Indus River is enriched by the tributaries Ladakh and Zanskar on the left bank and the Panjnad river on the right bank. The Panjnad is a large tributary system joining together the Jhelum, Chenab, Ravi, Beas and Sutlej rivers together at various converging points.

The Indus Water Treaty of 1960 is a World Bank brokered water sharing agreement between India and Pakistan. According to this Treaty the eastern rivers of the Indus River system namely Ravi, Beas and Sutlej are given exclusively to India. Pakistan reserves rights over the Western rivers like Indus, Jhelum and Chenab except for their restricted non-consumptive use by India like generating hydro power, navigation and flood control. Since 1960, Indus water Treaty has managed the water sharing between India and Pakistan.

Historically, challenges to Indus Water Treaty stem from geo political mistrust, disputes over Indian hydroelectric projects like Kishanganga and Ratle, Pakistan's reliance on the river for its economy and the inability of the Treaty to address modern issues like climate change and silt management. They have led to occasional tensions and calls for re-negotiation.

The initial water sharing disputes over Indus originated in the post - partition period (1947- 1960). The intensity of the disputes necessitated World Bank intervention and ended up as Indus Water Treaty (1960) drafted to prevent war over the Indus River system. Ever since the Indus

Water Treaty, Pakistan has consistently objected to India's Hydroelectric projects on western rivers like Jhelum and Chenab, claiming that they violate Indus Water Treaty's technical criteria. The disputes sparked as these objections hindered India's development. Indus Water Treaty suffers from certain drawbacks.

(a) It is based on historical flows and has no scope for alterations based on climate change, changing hydrological patterns, erratic rainfall and increasing water demand

(b) Lack of provisions for silt management has led to reduced storage and efficiency of dams especially Pakistan's Tarbela Dam

(c) Lack of provisions for effective dispute resolution has led to criticisms, with both Nations disagreeing on interpretations. The Geopolitical tensions have escalated after the 2019 Pulwama attack and 2025 Pahalgam attack leading to the suspension of Indus water Treaty.

The current disputes regarding Indus Water Treaty are accelerated by the following developments.

(a) India placed Indus Water Treaty in abeyance after the Pahalgam attack

(b) India accelerated its projects like Kiru, Kwar and Pakal Dul on western rivers and is utilising more waters from eastern rivers. There has been a sharp increase in the population and energy demands of India in recent times

(c) Pakistan relies heavily on the Western rivers and has become vulnerable due to water shortage.

(d) A shift in geopolitics has been caused by the alterations in regional water dynamics and increasing tensions.

(e) The legality of the suspension has been questioned because there are no provisions for abeyance in the Treaty.

Pakistan labelled India's suspension of the Indus Water Treaty as an "act of war'. While the 1960 Indus Water Treaty historically insulated water sharing from political conflict, India's move ended this insulation and exerted strategic pressure on Pakistan which relied heavily on the Indus River, its lifeline, for agriculture and hydro power. India's action transformed water from a shared resource into a political weapon. It created panic and diplomatic crisis in Pakistan. India was able to pressurize Pakistan over cross border terrorism and cease fire violations and could demonstrate that there are limits to tolerance in bilateral relations. Moreover, India could assert its sovereign rights over the rivers and its national sentiment against the militant attacks like Uri (2016), Pulwama (2019) and Pahalgam (2025). With increasing water scarcity, India is now able to prioritize domestic agricultural and drinking water needs over Treaty obligations.

However, the suspension of Indus Water Treaty is not without its consequences. It has led to geopolitical tensions and risk of water conflict between two nuclear armed neighbours. As a trans boundary river that flows through China and Afghanistan, along with India and Pakistan, Indus water disputes can become a threat to regional stability. Moreover, it can damage India's image as a responsible global power. It can also damage future negotiations of water Treaties like the Teesta Water Treaty with Bangladesh. The legality of the suspension is also under question as there is no 'Exit clause ' or provision for unilateral withdrawal in the Indus Water Treaty.

Conflict over a shared resource is not a solution to any political grievance or dispute regarding rights. A 'water war' can't solve the Indus water crisis and hence water diplomacy is the need of the hour. Indus water Treaty has three tier provisions for conflict resolution like Permanent Indus Commission, Neutral Expert and Forum of Arbitrators. They can be utilised for resolving issues like the Indus Valley ecosystem conservation, climate change impact, increase in water demand and differences in interpretation of the provisions of the treaty. Moreover, international legal standards like UN Watercourses Convention of 1997 and Berlin Rules on Water Resources of 2004 can be utilised for solving disputes along with rulings and arbitrations like the Brisbane declaration and 2013 ruling of Permanent Court of Arbitration on Kishanganga.

Pakistan's support to cross border terrorism along with climate change and domestic water needs has put the world's most generous water sharing agreement, the Indus Water Treaty, under the threat of a water war. Even though India has the right to re-evaluate the Treaty, its outright suspension poses a lot of strategic and legal challenges before our nation. The best way forward is water diplomacy through assertive bilateral talks, technical readiness and treaty modernisation.

The Dragon and the Elephant: Recalibrating Equations in a Changing World Order (India-China Relations)

Shahin Basheer
Former Mentor & Faculty, CSIP

A Tale of Two Giants

The 21st century has been shaped by the rise of two Asian behemoths—India and China—who now stand at a complex crossroads. Dubbed "The Dragon and the Elephant," these nations symbolize contrasting political systems, strategic cultures, and global aspirations. Both have witnessed rapid economic growth and geopolitical assertiveness, yet their relationship is marred by border tensions, economic competition, and shifting global alliances.

In a world grappling with post-pandemic recovery, energy transition, and emerging multipolarity, the India-China relationship is no longer confined to bilateral issues—it has global implications. Recalibrating this equation in today's evolving world order is not just a diplomatic challenge, but a necessity for regional and global stability.

Historical Backdrop: From Panchsheel to Pragmatism

The roots of modern India-China relations lie in the early 1950s, with the signing of the **Panchsheel Agreement** (1954), emphasizing peaceful coexistence. This spirit, however, was short-lived. The **Sino-Indian War of 1962** created deep mistrust, leading to decades of strategic caution.

Following the **1993 and 1996 agreements** on maintaining peace along the Line of Actual Control (LAC), there was a period of thaw and economic engagement. Yet, the **Doklam standoff (2017)** and the deadly **Galwan Valley clash (2020)** shattered the fragile trust, pulling the relationship into a more adversarial phase.

Border Disputes and Military Standoff

At the heart of the bilateral strain lies the unresolved **3,488-km border**. Despite more than 20 rounds of talks, India and China have failed to reach a mutually acceptable boundary agreement. The **Eastern Ladakh standoff** that began in **May 2020** has led to heavy militarization along the LAC, especially in **Pangong Tso, Galwan, and Depsang**.

As of December 2025, while **disengagement has occurred in some friction points**, **Depsang Plains and Demchok** remain contentious. India has reinforced its infrastructure push in border areas—constructing roads, bridges, and airfields—to match China's advancements in the **Tibet**

Autonomous Region. Military dialogues continue under the Working Mechanism for Consultation and Coordination (WMCC), but no full de-escalation has occurred.

Economic Ties: Strategic Decoupling or Reluctant Interdependence?

Trade remains a paradoxical pillar in the India-China dynamic. Despite geopolitical tensions, **bilateral trade surpassed $136 billion in 2023**, with China maintaining a large trade surplus. Key imports from China include electronics, telecom equipment, and pharmaceuticals.

However, since 2020, **India has adopted a cautious decoupling approach**, increasing scrutiny on Chinese investments and banning over 300 Chinese apps citing national security. The **PLI (Production-Linked Incentive) schemes**, aimed at boosting domestic manufacturing, also reflect India's intent to reduce dependence.

Yet, decoupling remains partial. China continues to be a top trading partner, and Indian industries remain entangled with Chinese supply chains. Experts from **Brookings India** argue that a full decoupling is economically unrealistic in the short term, but a **"strategic recalibration"** is underway.

Geopolitical Alignments and Global Aspirations

India and China are both members of multilateral platforms like **BRICS, SCO, and G20**, but their global visions are sharply diverge.

India's strategic alignment with **the U.S., Japan, and Australia through the Quad** reflects its Indo-Pacific tilt, emphasizing a **free, open, and rules-based maritime order**—a clear counter to China's assertive policies in the South China Sea and Indian Ocean. The recent **Malabar Naval Exercises (2025)** further showcased India's growing naval capabilities.

Conversely, China continues to expand its **Belt and Road Initiative (BRI)**, despite India's consistent refusal to participate, citing sovereignty concerns over the **China-Pakistan Economic Corridor (CPEC)** passing through **Pakistan-occupied Kashmir**.

In the **Global South narrative**, both countries project themselves as leaders. India's **G20 presidency (2023)** and its initiatives in climate diplomacy, vaccine distribution (Vaccine Maitri), and digital public infrastructure (DPI) gained global attention. Meanwhile, China's economic clout remains unmatched in parts of Africa, Latin America, and Central Asia.

Technology, Cybersecurity, and Strategic Competition

The tech domain has emerged as a new battleground. India has intensified efforts to develop indigenous technologies, including **semiconductors, AI, and 5G**, largely to counter Chinese tech dominance. Chinese firms like **Huawei and ZTE** have been effectively excluded from India's core telecom infrastructure.

Cybersecurity concerns have also escalated. Several reports, including from **Recorded Future (2021)** and **CERT-In**, have linked Chinese state actors to attempted cyber intrusions in Indian critical sectors, including power grids and defence. This digital mistrust has become a significant new front in bilateral competition.

People-to-People Ties and Diplomatic Narratives

Cultural exchanges, academic collaborations, and tourism—which once offered soft power avenues—have sharply declined post-2020. Visa restrictions, pandemic-related travel bans, and a nationalist shift in public sentiment have led to reduced civil society engagement.

Media narratives in both countries are often nationalistic, with little room for nuanced understanding. Indian think tanks like **Observer Research Foundation (ORF)** and Chinese outlets like **Global Times** frequently adopt zero-sum tones. Bridging this trust deficit requires a revival of academic, business, and youth exchanges.

Opportunities for Reset: The Way Forward

Despite the challenges, areas of cooperation remain:

1. **Climate Change:** Both nations are key players in global climate negotiations. Cooperation in renewable energy, sustainable development, and technology sharing offers potential.
2. **Global Health and Pandemic Preparedness:** Post-COVID, both India and China have developed vaccine capabilities and pharmaceutical strengths. Collaborative models could be explored for future health emergencies.
3. **Trade Normalization with Safeguards:** Instead of complete decoupling, a calibrated economic engagement with security filters might serve mutual interests.
4. **Reactivating Dialogue Mechanisms:** Diplomatic channels like the **Special Representatives' talks**, **WMCC**, and Track 2 dialogues need to be strengthened with renewed political will.

Competitive Coexistence or Strategic Stalemate?

The India-China relationship is at a critical juncture—neither fully adversarial nor comfortably cooperative. As the global order undergoes tectonic shifts—with the U.S.-China rivalry intensifying, and the Indo-Pacific emerging as a focal point—India and China must decide whether they can **competitively coexist or spiral into prolonged hostility**.

A future of strategic pragmatism, where both nations manage differences while engaging where interests align, is possible—but it requires political maturity, public diplomacy, and mutual respect. The dragon and the elephant may never dance in perfect rhythm, but avoiding a clash is in everyone's interest.

As former Indian Foreign Secretary **Shyam Saran** aptly stated: *"India and China cannot change their geography, but they can change the narrative."*

India-Afghanistan Relations: From Strategic Partnership to Realpolitik Re-engagement

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The bilateral nexus between India and Afghanistan is a sophisticated tapestry woven from historical conduits, geographical imperatives and shared strategic interests. For millennia, the mountain passes of the Hindu Kush served as the primary arteries for the transmigration of ideologies across borders. In the contemporary discourse, the Indo-Afghan relationship has undergone a transformative evolution marked by conflict, reconciliation and diplomatic dexterity that has captured the attention of the global political arena.

Unlike other external powers that have interfaced with Afghanistan through the reductive prisms of invasion or ideological imposition, India's doctrine has traditionally been characterised as that of a 'benign neighbour'. Viewing Afghanistan as an integral component of its 'extended neighbourhood', New Delhi has sought to navigate the regional connectivity constraints imposed by Pakistan's control over transit routes. This relationship finds its roots in Silk Roads and the diffusion of Buddhism into the Bamiyan valley, underscoring a deep civilizational entanglement.

The crucible of September 11, 2001, catalysed a paradigm shift in the modern bilateral landscape. Following the collapse of the first Taliban regime, India initiated an era of 'reconstruction diplomacy', emerging as the pre-eminent regional donor with over 3 billion committed to developmental assistance. This was not merely altruism, but a strategic investment aimed at fostering regional stability to safeguard India's internal security. Symbolic of this era was the Strategic Partnership Agreement (SPA) of October 2011- the first of its kind signed by Afghanistan with any nation. Tangible manifestations of this cooperation include the Afghan Parliament building in Kabul, reflecting shared democratic ideals, and the Salma Dam in Herat, which provided essential utilities despite the persistent threats of insurgent strikes. Furthermore, the construction of Zaranj-Delaram Highway served as a strategic masterstroke, bypassing Pakistan's transit monopoly by linking Afghanistan to the sea via Iran's Chabahar Port.

The precipitous withdrawal of North Atlantic Treaty Organisation (NATO) forces in August 2021 and the subsequent reclamation of Kabul by the Taliban fundamentalists served as a cataclysmic rupture in the established geopolitical order of Central and South Asia. For New Delhi, this transition necessitated a painful, albeit temporary, strategic retreat. Having invested two decades into cultivation of a democratic

republic, India was abruptly compelled to shutter its diplomatic mission and evacuate its personnel, witnessing the systematic dismantling of the institutional framework it had meticulously supported. However, the period spanning 2022 to the nascent months of 2026 has not been defined by continued isolation; rather, it has witnessed a sophisticated and pragmatic recalibration of Indian foreign policy, transitioning from an ideological distance to a calculated 'strategic re-engagement' anchored firmly in the tenets of realpolitik.

The genesis of this diplomatic pivot lies in the unexpected disintegration of the perceived alliance between the Taliban and Islamabad. While Pakistan initially greeted the 'Islamic Emirate's' return as a triumphant victory that would secure its strategic depth against India, this rapport rapidly devolved into a state of friction and open hostility. Sources indicate that the 'Great Game' took a sharp turn as the Taliban and Islamabad entered into a period of acute tension regarding border disputes and the sanctuary afforded to the Tehrik-i-Taliban Pakistan (TTP). As these regional neighbours exchanged ultimatums and engaged in border skirmishes, a strategic vacuum emerged. Exploiting this widening chasm with surgical diplomatic precision, India identified a window of opportunity to re-assert its presence without the historical baggage of Pakistani mediation.

India's initial return to Afghan theatre was couched in the language of humanitarianism, a calculated move designed to signal to the Afghan populace that New Delhi's grievances were directed at political structures rather than the people themselves. Amidst the backdrop of starvation and a freezing humanitarian crisis, India established a 'humanitarian bridge', dispatching thousands of metric tonnes of wheat and life-saving pharmaceuticals. This 'benign' intervention served as the precursor to the formation of a 'Technical Mission' in Kabul in mid-2022. This mission acted as a low-profile conduit, allowing India to maintain a physical presence on the ground while officially withholding formal recognition of the regime.

By late 2024, the tentative nature of the Technical Mission began to give way to more formalised, albeit unconventional, diplomatic arrangements. A pivotal moment in this sequence was the appointment of Ikramuddin Kamil as the acting consul in Mumbai in November 2024, a development that signalled the Taliban's desire for a reciprocal diplomatic footprint on Indian soil. The momentum culminated in October 2025, a month that redefined bilateral relations. Following the first high level ministerial visit by a Taliban official – Foreign Minister Mawlawi Amir Khan Muttaqi – to New Delhi, India announced the landmark upgradation of its Technical Mission to a full-fledged Embassy. This transition was formalised through a joint statement on October 10, 2025, which articulated a renewed commitment to development cooperation. The agreement included the resumption of stalled infrastructure projects and the exploration of new collaborative ventures in healthcare and capacity building. This re-

engagement is not merely symbolic; for the Taliban, it provides a much-needed pathway to economic legitimacy and acts as a vital counterbalance to Pakistani overreach. For India, it provides a direct line to the decision-makers in Kabul, ensuring that Indian interests are represented without intermediaries.

The primary driver of this realpolitik approach is the imperative of securing India's western flank. In the absence of a friendly or at least neutral administration in Kabul, Afghanistan risks devolving into a sanctuary for transnational terror organisations. New Delhi's engagement is specifically designed to prevent the country from becoming a launchpad for groups such as Lashkar-e-Taiba and Jaish-e-Mohammed. High-level security dialogues have become a cornerstone of this new phase; for instance, Indian diplomat J.P. Singh engaged directly with figures such as Mullah Omar in Kabul to ensure that India's security concerns are addressed at the highest echelons of the Taliban leadership. Furthermore, the rise of the Islamic State Khorasan Province (ISKP) has fostered an unlikely convergence of security interests. As a shared existential threat to both the Taliban's internal control and India's regional stability, the ISKP has necessitated a degree of intelligence cooperation that would have been inconceivable in previous years. This cooperation exemplifies the hard necessities of contemporary diplomacy, where security imperatives supersede ideological differences.

The economic dimension of the 2021-2026 pivot is largely defined by the Chabahar port in Iran. By late 2025, trade flows through this maritime corridor surged providing Afghanistan with a critical alternative to the volatile Pak-Afghan border crossings, which are frequently subject to closures. Simultaneously, India has maintained its soft power through the human element. Even during the most strained periods of the relationship, New Delhi continued to offer online scholarships to Afghan youth. This strategy ensures the cultivation of a long-term constituency of goodwill among Afghan population, creating a durable strategic asset that remains resilient regardless of regime changes in Kabul.

The current state of Indo-Afghan relations in early 2026 is best described as a diplomatic tightrope. India remains steadfast in its refusal to grant formal de jure recognition to the Taliban regime, maintaining a principled stance on the necessity for inclusive governance and the protection of the rights of women and minorities. Yet, the exigencies of regional security and the 'Great Game' dynamics have necessitated a high degree of diplomatic dexterity. By balancing these democratic values with the cold, hard requirements of security and intelligence cooperation, India has successfully navigated the post-2021 landscape; transforming a potential strategic catastrophe into a sophisticated, multi-layered engagement that serves its long-term national interests.

Justice Delayed Is Justice Denied: Why India Needs Immediate Judicial Reforms

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The primary function of the judiciary is resolution of disputes, which is a prerequisite of effective social control by the state. The functional efficacy of this organ of the government may be determined to a certain extent by looking into the litigation disposal process.

The use of litigation as an outlet for vindictiveness is not possible unless the court system lends itself to delay. However, delayed justice may become denied justice and may cause damage to the system. It is an accepted fact that the judicial system of the country has been overburdened. The arrears of cases pending before various courts, and the delay occasioned in the administration of justice pose serious questions about the legitimacy of the system. However, this does not seem to have affected the confidence of the litigants because the filing rate of cases is on the rise. So viewed, the matter assumes enigmatic proportions.

In several cases the Supreme Court has emphasised the need for speedy justice. In *State of Bihar v Vakil Prasad Singh* the court has emphasized the need for speedy investigation and trial of constitutional protection enshrined in Article 21 of the Constitution. In the State of Jammu and *Kashmir v Moti Lal Saraf the Court took the view that in order to make the administration of* criminal justice effective, vibrant and meaningful, the Union of India, the State Government, and all concerned authorities must take necessary steps immediately so that the important constitutional right of the accused of a speedy trial does not remain only on papers or is a mere formality. In *Archana Guha v Santosh Dev* Prosecution was pending against the accused for the last 14 years. Since the accused was not responsible for the delay, the proceedings were quashed. Also in the second appeal, there was an unexplained delay for 8 years and the court held that it infringed upon the right to speedy trial. In State of Bihar Vs Raghubir Singh the court held that the infringement of right to speedy trial could not be inferred merely from delay in police investigation. The court pointed out that the delay was due to the nature of the case and general situation prevailing in the country. In *State of Karnataka v P. Ramachandra Rao,* the seven-judge constitutional bench observed that, the mental agony, expense and strain which a person proceeded against in criminal law has to undergo and which, coupled with delay, may result in impairing the capability or ability of the accused to defend himself have persuaded the constitutional courts of the country in holding the right to speedy trial a manifestation of fair, just and reasonable procedure enshrined in Article 21. The delay in criminal trial has caused undertrial crises in overcrowded jails.

India's jails are bursting at their seams. According to the India Justice Report (IJR) 2025, 176 prisons have had more than 200 per cent occupancy, and the proportion of undertrials awaiting completion of investigation or trial stands at 76 per cent.

The problem of delay is not confined to criminal cases. In civil side, one of the reasons for delay is the increase of cases. According to the eminent jurist Rajeev Dhavan, (Litigation Explosion in India,1986) the litigation explosion problems cannot be studied divorced from the political economy of the country, since the lawyers, who are controlled by the market forces of the country, are having. a major role in the problem. The lawyer community can induce a court to confine or extend its jurisdiction beneficially to a particular class of the society. The author cities the growth of special leave appellate jurisdiction of the Supreme Court as an example. The author 's perspective is expressed in the following words:

"Firstly, we need to look at litigation trends over many years and in various parts of the country to consider how the judiciary is being used, by whom and for what purpose.... Secondly, we need to study courts, the system of patronage by which people are appointed to them and the financial and managerial considerations by which their work is organized. Third. both those considerations require the judiciary to keep and publicize its case load and other statistical information systematically. Fourth this organizational perspective must look at the 'local legal culture and power configurations that determine and re-determine its use. Fifth, most importantly-we need to ask what we want the judiciary to be used for (at pp. 40-41). The author suggests two more aspects for examination, viz. the role of judiciary within the state and the bureaucratization of judiciary.

The cases pending before the court of law are broadly classified as civil and criminal cases. The Malimath Committee, formed in 2000 by the Indian Government, aimed to reform the criminal justice system. Chaired by Justice V.S. Malimath, it reviewed the investigation, trial procedures, and sentencing guidelines. The 158 recommendations of the committee, arrived at after examining several national systems of criminal law, especially the continental European systems, essentially propose a shift from an adversarial criminal justice system, where the respective versions of the facts are presented by the prosecution and the defence before a neutral judge, to an inquisitorial system, where the objective is the "quest for truth" and the judicial officer controls the investigation of offences.

In 2014 the Law Commission of India through its 245Th Report on Arrears And Backlog observed:

"That a systemic perspective, encompassing all levels of the judicial hierarchy, is needed for meaningful judicial reform. Taking measures for the timely disposal of cases at all levels of the judicial system, including by monitoring and increasing judge strength throughout the system; encouraging Alternative Dispute Resolution Methods, where appropriate and more efficient allocation and utilization of resources is required to fulfil the goal of providing timely justice to litigants. "

The Alternative Dispute Resolution (ADR) may significantly reduce court arrears by diverting cases (civil, commercial, matrimonial) through faster, cheaper methods like mediation and arbitration, easing judicial burden, and focusing courts on complex matters, promoting quicker, accessible justice, crucial for backlog reduction and efficient legal system.
ADR Mechanisms include following

1. Mediation: In mediation a neutral third party helps parties reach a mutually agreeable settlement, common in family and commercial disputes, often mandated by courts.
2. Arbitration: In arbitration a private, binding decision by an arbitrator, is often used for commercial disputes.
3. Plea Bargaining: In criminal cases, it encourages guilty pleas for lesser charges, reducing trial loads.
4. Lok Adalats: It provides Community-based justice platforms for accessible, amicable resolution, particularly for disadvantaged groups.

ADR may Reduce Court Arrears in the following ways:

1. Case Diversion: It moves on disputes out of the court system, freeing up judges for more complex cases.
2. Speed & Efficiency: Resolves issues in weeks/months, compared to years in traditional courts, saving time and money.
3. Case load management: Eases the overwhelming backlog (pendency) faced by judiciaries, especially in India.
4. Focus on Serious Cases: Allows prosecutors and courts to concentrate on more serious criminal matters by settling petty charges via plea bargaining or mediation.

The Supreme Court of India has addressed the issue of case arrears across all levels of the judiciary. The Court formulated and implemented a multi-pronged strategy focused on **c**onstituting arrears committees, leveraging technology, and improving judicial administration to reduce the significant backlog of cases. The Supreme Court has formed its own Arrears Committee to formulate and monitor strategies for reducing pendency in High Courts and District Courts. Similar committees have been established at the High Court and District Judge levels to clear cases pending for more than five years. Recognizing that the majority of cases are pending in subordinate courts (over 4.7 crore cases), the Supreme Court is actively engaging with district judges to devise methods to expeditiously tackle this backlog through streamlined case management and better human resource utilization. The Court and the government are pushing for the implementation of the e-Courts Project, the computerization of district and subordinate courts, and the use of the National Judicial Data Grid (NJDG) to monitor case pendency data effectively.

In addition to the above initiatives what is needed is the strengthening of ADR, starting of more courts and filling the vacancies of judges.

UPSC @100: A Century of Building India's Civil Services

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'Karmanye vadhikaraste ma phaleshu kadachana,
Ma karma-phala-hetur bhur ma te sango 'stvakarmaṇi.'

'You have the right to perform your duties but not to the results; don't be motivated by rewards, nor be attached to inaction, but focus on your prescribed actions with sincerity and detachment from outcomes to achieve peace and true success.'

Civil service in its original meaning is expected to be as selfless as explained and over the years it has been proving to be the one set up which has kept the trust of the country in becoming the interface between the government and the people for the efficient and effective delivery of services. And the role of UPSC starting from recruitments of the civil servants through to promotion and other aspects seems to have stayed unstained from year one of its establishment

On October 1, 2025, the Union Public Service Commission (UPSC) entered its Centenary Year, marking one hundred years of service to the Indian state. Few institutions in modern India have exercised influence as quietly yet as decisively as the UPSC. Its history is not merely an institutional chronicle; it is inseparable from India's own journey—from colonial administration to constitutional democracy, from a fledgling republic to an aspiring global power. At every stage, the Commission has stood as the custodian of merit, fairness, and integrity in public recruitment.

Speaking at the inaugural session of the Shatabdi Sammelan held at Bharat Mandapam, Union Minister Dr. Jitendra Singh aptly described the UPSC as the "guardian of India's steel frame of governance," invoking Sardar Vallabhbhai Patel's famous characterization of the civil services. The description captures both the continuity and the constitutional responsibility that the Commission has carried across generations. UPSC in fact has been the guardian of the process of recruitment, protecting the process from any external interference or influences keeping it in the same pristine form it was expected to be preserved.

Colonial Origins and Constitutional Transformation

The idea of an independent body to recruit higher civil servants predates Independence. The Government of India Act, 1919 first envisaged such a mechanism, but it was the Lee Commission (1924) that forcefully argued that an efficient civil service must be insulated from political and personal influence. Acting on these recommendations, the Public Service Commission was established on October 1, 1926, under Sir Ross Barker. Its role was initially advisory and limited, functioning as an experiment within the constraints of colonial governance.

The Government of India Act, 1935, elevated it to the Federal Public Service Commission, with a greater role for Indians in administration. The real transformation, however, came with Independence. The Constitution of India accorded the UPSC constitutional status under Articles 315 to 323, firmly embedding its autonomy within the democratic framework. Article 320 entrusted it with the responsibility of conducting examinations and advising on appointments, promotions, and disciplinary matters. From that moment, the UPSC ceased to be a colonial instrument and became a constitutional sentinel of meritocracy.

The Pillars: Trust, Integrity, and Fairness

Across a century, the UPSC's greatest achievement has been the trust it commands. Millions of aspirants—drawn from every region, language, class, and social background—approach the examination with the belief that success or failure rests solely on merit. In a deeply unequal society, such faith in a "level playing field" is rare and precious.

This trust has been built painstakingly through transparent procedures, anonymous evaluation, confidentiality, and an uncompromising stance against malpractice. Integrity has meant resisting political pressure and preserving institutional neutrality. Fairness has meant ensuring equal opportunity—whether a candidate writes in English or one of the 22 constitutional languages, whether they come from a metropolitan city or a remote village.

In many ways, the UPSC's ethos resonates with the Bhagavad Gita's injunction to perform one's duty without attachment to outcomes. The Commission does not celebrate individual success or mourn individual failure; it performs its constitutional duty with rigour and detachment.

The World's Largest Competitive Examination

The Civil Services Examination (CSE), conducted by the UPSC, is among the world's largest and most complex competitive examinations. Each

year, nearly 10–12 lakh candidates apply for the preliminary examination, conducted across more than 2,500 centres nationwide. From this vast pool, candidates progress through prelims, mains, and interviews to a final merit list that integrates performance across diverse subjects and languages.

The logistics are formidable. Candidates choose from 48 optional subjects and may write their answers in any of the constitutional languages. Answer sheets are evaluated anonymously by subject experts proficient in the respective languages and subjects chosen by the candidates. Special arrangements are made for persons with disabilities with relaxations from the application stage to the service allotment stage echoing the inclusivity of all categories of the population being part of bureaucracy. All of this is accomplished within strict timelines even amid disruptions such as the COVID-19 pandemic. The scale, precision, and consistency of this exercise remain unmatched globally.

Behind this machinery stand unsung contributors—the paper setters and evaluators—some of the finest academics and practitioners in the country, who work without public recognition, ensuring that the aspirations of candidates are judged with fairness and intellectual rigour.

Evolution Through Reform

The UPSC has never been static. Its examination system has evolved in response to changing administrative needs. The introduction of the preliminary examination in 1979, following the Kothari Committee's recommendations, created a structured, multi-stage selection process. Subsequent reforms broadened the scope of General Studies, introduced the Essay paper, and enhanced the weight of analytical and ethical reasoning.

The 2013 reforms marked a significant shift: the number of General Studies papers increased, the optional subjects were reduced to one, and Ethics (GS Paper IV) was introduced. This reflected a conscious move away from excessive specialization toward testing broad-based understanding, governance aptitude, and moral judgement. The Civil Services Aptitude Test (CSAT), introduced earlier, was later made qualifying to ensure fairness across linguistic and educational backgrounds. Each reform sought to balance inclusivity with excellence, and tradition with relevance.

Beyond Recruitment: A Wider Constitutional Role

While best known for examinations, the UPSC's mandate extends far beyond recruitment. It frames and updates service rules, advises on

promotions and disciplinary matters, and helps maintain ethical standards within public administration. As Lok Sabha Speaker Shri Om Birla noted during the centenary celebrations, the Constituent Assembly deliberately insulated the Commission from executive interference, recognizing that neutrality in public recruitment is foundational to democracy. The credibility of the Indian state owes much to this institutional independence.

Modernisation and the Next Generation

As India confronts challenges such as artificial intelligence, climate change, cybersecurity, and complex national security threats, the UPSC has begun reimagining its role. Recent initiatives reflect a forward-looking orientation. Digital application portals, face-recognition technology to prevent impersonation, and enhanced online engagement mark a shift toward technological integration.

Notably, the PRATIBHA Setu initiative connects candidates who reach advanced stages of selection but do not make the final list with opportunities in other sectors, ensuring that national talent is not wasted. New platforms such as My UPSC Portal and My UPSC Interview seek to humanise the institution and deepen engagement with aspirants, particularly from Tier-2 and Tier-3 cities.

These reforms underline a key insight: while processes may modernise, core values—merit, transparency, and integrity—remain non-negotiable.

A Century, and the Road Ahead

Across decades, UPSC-selected civil servants have administered during wars and pandemics, guided economic reforms, implemented welfare programmes, managed environmental challenges, and upheld constitutional governance in everyday administration. Their work often remains invisible, yet it touches every citizen.

As UPSC enters its second century, the task ahead is not merely to preserve the legacy, but to adapt without dilution. As Dr. Jitendra Singh observed, the architects of Viksit Bharat @2047 will emerge from this institution. The challenge will be to select leaders who combine competence with empathy, efficiency with ethics, and authority with constitutional humility.

One hundred years on, the steel frame of India stands firm—not because it is rigid, but because it has evolved while remaining anchored in principle. In that quiet resilience lies the enduring relevance of the Union Public Service Commission.

Role of AI and Data Analytics in Revamping India's Judicial Delivery System

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The use of AI is unstoppable in any field, including the judiciary. Adoption of Artificial Intelligence helps judges and other officials in improving the process, efficiency and accuracy of the system. Applications of AI include Legal research from a vast historical database, improved speed through automating the recording of statements, predictive analytics helping in deciding possible outcomes, document review, case management, summarising cases, and virtual and remote court proceedings. While the AI applications are vast and can improve the efficiency, efficacy and economy of the judicial system drastically, algorithmic bias, confidentiality and privacy, high resource requirements like digital penetration, infrastructure and training of existing officers and acceptance by judges are major challenges in the adoption of AI.

The Supreme Court of India recently released a White Paper on artificial intelligence and the judiciary, explaining the integration of AI into the judiciary and the risks associated. The paper approaches AI as assistive technology for legal research, translation, speech-to-text translation, transcription, and automating data dashboards for the categorisation of cases and administrative analytics. While SC promotes the use of AI, they do caution on algorithmic bias, hallucinated citations and potential breach of sensitive court records.

Currently, the Supreme Court has deployed AI tools. One form of deployment of AI in the SC is through machine learning, the Supreme Court of India's SUPACE (Supreme Court Portal for Assistance in Court Efficiency) which helps in analysing large case databases and historical data and assists judges in organising complex administrative systems to prioritise cases and categorise them. The second is the rule-based AI system (SUVAS -Supreme Court Vidhik Anuvaad Software) that uses the laws, statutory requirements, etc, to identify procedural defects and report them. AI transcription was recently used in the Maharashtra political controversy case. In phase III of the e-courts project, the adoption of AI across High Courts in India is planned to create a unified technology platform. Some

of the other AI tools include Legal Research Analysis Assistant [LegRAA], Digital Courts 2.1, a single window system for managing all court and case-related information for judges and judicial officers.

Worldwide, AI is increasingly used to reduce the delays and improve the productivity of courts. The European Union has some notable initiatives like Joint Investigation Teams (JIT) that are designed to collaborate between judges, prosecutors and law enforcement agencies for effective evidence sharing and coordinated action. ECODEX supports claim settlements between individuals in two different EU countries by sharing legal documents and accessing the courts online. The UAE is extensively using AI in the judicial context. The notarial and authentication services, AI-enabled platforms automate the processing of documents. AI is used for assisted writing of judgments to increase language accessibility. A delayed disclosure of AI use in the UAE could result in adjournments and loss of trial dates. A survey conducted by UNESCO in 2023, highlights the use of free AI Apps prevalent among the judicial officers and staff that could undermine the privacy of the stakeholders involved. China has gone far ahead by introducing internet courts where AI judges provide judgments. The internet courts are used for settling commercial and civil disputes, and the average case disposal time is 40 days, 80 per cent of users being individuals who accept verdicts without appeals.

The Indian judicial system is mired with huge case backlogs, inefficient court filings, which make AI adoption an essential process. The administrative automation, document review and case analysis using historical data, virtual court proceedings can help reduce the delays. As part of a pilot initiative, a 24/7 court system was launched in the Kollam district of Kerala, where cheque dishonour cases can be filed at any time of the day. The court provides real-time updates to lawyers and litigants regarding filed cases and provides a complete online experience from filing to hearing.

Kerala High Court, in July 2025, released "Policy Regarding Use of Artificial Intelligence Tools in District Judiciary". The guidelines deny the use of cloud-based AI tools like ChatGPT, DeepSeek, etc, citing potential privacy and confidentiality breaches. The judicial officers are allowed to use approved AI tools: however, mandate human verification at all stages. AI tools are not allowed for arriving at judicial rulings, reliefs etc. One of the approved AI tools that is allowed for use in Kerala courts by the High Court is Adalat AI, an artificial intelligence-based speech-to-text transcription

tool, for recording witness depositions from 1 November 2025. This move comes after a pilot phase of adoption of the AI tool in four trial courts in Ernakulam. This move will significantly improve the delays from manual paperwork and scheduling delays to incomplete or inaccurate records.

AI integration, though still in its early stages within the Indian judiciary, has already delivered measurable gains in court efficiency, streamlining processes and reducing delays. The wider adoption of AI is dependent on many factors. One is building the digital infrastructure to manage AI-driven systems, upgrading the laptops/desktops currently used and high-speed internet. Second is training and capacity building of judicial officers, clerks and other non-legal staff. They need training on using these tools, understanding the limitations and identifying the errors. Third, include a curriculum in the law colleges and judicial academies for AI and its ethical applications. The interconnected departments, like law enforcement agencies, must be aware of the AI tools used in the judicial system and must be able to use them effectively. Finally, public awareness is essential for the success of the model in its fullest sense.

Fairness, transparency, and the indispensable role of human judgment should not be compromised in any judicial reforms involving artificial intelligence. Therefore, the Supreme Court's current guidelines on AI are both timely and essential.

Constitutional Authorities, Parliamentary Democracy and the Relevance of Supreme Court Judgement

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The roles of the Governor and the President remain central to India's constitutional and federal discourse. In India's parliamentary democracy, the President and Governors are the ceremonial or the nominal head of the state. The Prime Minister and the Chief Ministers of the States leads the real executive, exercising powers as advised by the Council of Ministers, who are collectively responsible to Parliament or the State Legislative Assemblies. Both the president and the Governors have the status of Constitutional or titular heads as all executive decisions are taken in their name in Parliament and State legislature. Both the President and Governors are integral parts of their respective legislatures but act on ministerial advice, making them nominal executives, crucial for constitutional integrity.

In constitutional practice, almost every Presidential/Governor's decision is taken on the aid and advice of the Council of Ministers. This dual executive structure, inspired mainly by the Westminster model, is carefully calibrated by the Constitution. The binding nature of advice and the limited discretion define the unique Indian equilibrium between symbolism and substance in the highest office. But unfortunately, Governors and the President serve as titular heads and agents of the Center face crucial questions over their discretionary powers, especially Governors delaying state bills, raising federalism and judicial review debates. The Supreme Court recently clarified that indefinite delays are unconstitutional and subject to review, and emphasized their role as constitutional bridges rather than political tools.

Delays by Governors in granting assent to Bills have been observed in several states, particularly in politically sensitive states like Bengal, Punjab, Kerala and Tamil Nadu. In Tamil Nadu between November 2020 and April 2023, the state legislature passed 13 bills, of which 10 were either withheld or sent back to the Assembly by the Governor without any communication. When the legislature re-approved the bills without any material changes, Governor still did not assent to the bills but reserved them for the President's consideration. After a prolonged standoff the Tamil Nadu Government took the matter to the Madras High Court. The High Court used Article 142 and declared 10 Tamil Nadu Bills as having received "deemed assent" because the Governor had not acted for long periods. The two-judge Bench laid down strict timelines for Governors and the President to decide on Bills. This unprecedented move raised constitutional concerns.

Following the judgment, on May 13, 2025, the President of India invoked Article 143 of the Constitution to seek the Supreme Court's

advisory opinion on questions relating to the powers of Governors. To resolve the ambiguity, the President submitted a five-page reference with 14 key questions. Of the 14 questions, seven are related to the exercise of powers by the Governor under Article 200 of the constitution. Three questions are about a similar exercise of power by the President. The important questions are (1) What are the options available to the Governor under Article 200? (2) Is the Governor bound by the advice of the Council of Ministers? (3) Can the Governor's exercise of discretion be judicially reviewed? (4) Can the President's exercise of discretion be judicially reviewed? (5) Is the President required to seek the SC's advice on a reserved Bill? (6) Can the Court review exercise of discretion and the contents of a Bill before it becomes law?

On 08 April 2025, the Supreme Court of India delivered its historical judgment in State of Tamil Nadu v. Governor of Tamil Nadu case clarifying the constitutional limits of the Governor's role under Articles 200 and 201 of the Constitution. The Supreme Court examined the legality of this issue and addressed broader concerns about the permissible scope and timeline of gubernatorial and Presidential actions in the legislative process. In the landmark advisory opinion five-judge Constitution Bench of the Supreme Court clarified the roles of Governors regarding state legislation. In the judgement, the Court reaffirmed that a Governor cannot sit on a Bill indefinitely. A "pocket veto" is not recognized under the Indian Constitution. Under Article 200, when presented with a Bill, the Governor has only three options. (1) Grant assent. (2) Withhold assent and return the Bill to the Legislature for reconsideration (3) Reserve the Bill for the President's consideration. The Court held that Governors enjoy independent discretion under Article 200 when choosing between these three options. The Constitution Bench overruled the April 2025 verdict of the Madras High Court that had set a three-month deadline for assent. It ruled that the judiciary cannot impose fixed timelines. The Court also rejected the doctrine of "deemed assent"—where a Bill would automatically become law after a delay. The decision of the Supreme Court clearly clarifies the constitutional processes for state legislation and reaffirms the foundational principle of representative democracy. By holding that legislative outcomes must not be obstructed by inaction or procedural delays, the Court preserves the functioning of elected state legislatures, reinforces federalism, and ensures that constitutional authorities remain accountable to the democratic will. The judgment reaffirmed that the Governor's involvement in the legislative process must operate within constitutional limits and cannot be used to override legislative outcomes. The same principles apply to the President's role under Article 201, which must respect the authority and autonomy of state legislatures.

The Court's interpretation reinforces the federal structure of the Constitution, which recognizes state governments as constitutionally empowered entities. The debate centers on balancing the constitutional roles of these offices with democratic principles, ensuring they function as constitutional guardians rather than tools of political power.

Between Confrontational Federalism and Cooperative Federalism: The Indian Story

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Confrontational Federalism and Cooperative Federalism represent two contrasting modes of Centre–State relations within a federal system. Confrontational Federalism is marked by conflict, competition, and institutional friction between the Union and the States, where political, fiscal, or administrative powers are asserted in ways that undermine mutual trust. It often emerges when the Centre uses constitutional, fiscal, or investigative instruments to dominate states, leading to legal disputes, policy paralysis, and erosion of the federal spirit. Cooperative Federalism, by contrast, is based on collaboration, consultation, and shared responsibility, where the Union and States work as partners in governance respecting constitutional boundaries. It emphasises dialogue driven policymaking, fiscal fairness, and institutional mechanisms such as interstate councils to strengthen national unity without compromising regional autonomy.

Whenever discussions on power and the state arise, the tension between centralisation and regional autonomy inevitably comes to the fore. This debate is particularly pronounced in the Indian context. In contemporary India, there have been growing discussion and concern regarding the nature of the polity, especially with respect to its federal character. Several sections of the society argue that India is increasingly moving towards a centralised Union, where states are rendered subordinate to the Centre. At this juncture, it becomes necessary to situate the debate within a long historical perspective, rather than viewing it merely as a contemporary political phenomenon.

Questions of centralisation are not new to the Indian subcontinent. From the time of the Indus Valley Civilisation, scholars have debated the nature of political authority, as reflected in archaeological interpretations such as the figure of the so-called "Priest-King." However, it is widely accepted that a highly centralised administrative system was firmly established for the first time on Indian soil during the Mauryan Empire, particularly under the reign of Ashoka the Great. This centralised model weakened during the Gupta period but was later revived and further refined under the Delhi Sultanate and the Mughal Empire, which developed elaborate administrative frameworks to govern vast territories. These pre-modern traditions of centralised governance significantly influenced the structure of colonial administration. The British consolidated and institutionalised centralised authority through a rigid bureaucratic framework, not only in

British India but also indirectly in the princely states through the system of Residents and indirect rule. This colonial legacy of centralisation deeply shaped the political imagination of the Indian state. Any assessment of present-day trends in centralisation must thus be situated against this long history of state formation, colonial governance, and the imperatives of national unity at the time of independence. Therefore, when India attained independence in 1947, the newly formed Union inherited a strong centralised administrative apparatus forged during the colonial period.

The post-independence Indian state, including its federal structure as enshrined in the Constitution, must be understood within this broader historical continuum. India's federal structure emerged from the Constitution of 1950 as a "centralised federation," designed with a strong Union government to ensure national unity amid post-partition diversity and princely state integration. This is evident in Article 1, which describes India as a "Union of States," implying that the federation is not the result of an agreement among sovereign units but a constitutionally created union. The Seventh Schedule further reflects this asymmetry: the Union List (List I) is expansive and includes crucial subjects such as defence, foreign affairs, currency, and inter-state trade, while the State List (List II) is comparatively limited. Moreover, Article 246 establishes the supremacy of the Union Parliament in cases of conflict, particularly through the residuary powers granted to Parliament under Article 248, unlike classical federations where residuary powers rest with states.

Institutionally and administratively, the unitary tilt is reinforced by mechanisms such as the All-India Services (Article 312), where officers are recruited and controlled by the Union but serve in the states, thereby embedding central authority within state administration. The office of the Governor (Articles 153–162) appointed by the President and vested with discretionary powers further exemplifies this vertical imbalance. The unitary bias becomes more pronounced through constitutional emergency provisions, which allow the federal structure to transform temporarily into a unitary one. Under Article 352 (National Emergency), Parliament acquires the power to legislate on State List subjects, effectively centralising legislative authority. Article 356 (President's Rule) authorises the Union to assume control of state administration in cases of constitutional breakdown, an instrument historically used to assert central dominance over states. Additionally, Article 360 (Financial Emergency) permits Union intervention in state financial autonomy. These provisions underscore B.R. Ambedkar's assertion that the Constitution is "federal in normal times but unitary in times of crisis," reflecting a deliberate prioritisation of national unity and integrity over rigid federal autonomy. Collectively, these features indicate that Indian federalism is not a compact among equals but a centrally weighted federal system, designed to reconcile regional diversity with the imperatives of political stability and national integration.

This quasi-federal tilt was reinforced during the one-party dominance era (1950s-1960s) under Congress, where fiscal centralisation via Planning

Commission schemes and All-India Services limited state autonomy, prioritizing nation-building over cooperative balance. The 1970s-1990s saw shifts: Emergency excesses spurred judicial safeguards (e.g., S.R. Bommai case limiting Article 356). Further the coalition governments post-1989 fostered "bargain federalism," empowering states through Finance Commission devolution and the Inter-State Council.

Post-2014, a renewed centralisation has marked a departure, exemplified by GST subsuming state taxes via a Centre-dominated Council, proliferation of cesses/surcharges shrinking divisible pools, and expanded centrally sponsored schemes with conditional grants tying states to Union priorities. Present day India's centralisation manifests across constitutional, fiscal, political, and administrative dimensions, eroding cooperative federalism. Agencies like CBI/ED have increasingly probed state domains, while NITI Aayog's "Team India" rhetoric coexists with governors' assertive roles in opposition-ruled states, signalling a competitive edge over cooperative ethos. Constitutionally, the office of the Governor has increasingly acted as an agent of the Centre, delaying state bills or precipitating crises in opposition-ruled governments. All-India Services centralise elite bureaucracy under Union control, and NITI Aayog's replacement of the Planning Commission has shifted from consultative planning to top-down policy imposition through "aspirational districts" and performance-linked incentives, sidelining state voices. Further the conditionalities on centrally sponsored schemes compel states to align with Union schemes like PM-KISAN or Ayushman Bharat or PM SHRI etc., reducing fiscal autonomy.

Excessive centralisation undermines India's unity by constricting states' policy space to address regional diversity, as uniform national schemes often fail to accommodate linguistic, cultural, or economic variations—such as northeastern states' unique needs or southern states' fiscal grievances over delimitation. This breeds perceptions of "step-motherly treatment" towards opposition-ruled states, evident in delayed funds or selective agency interventions, fostering distrust and legal battles that strain Centre-state relations. Consequently, disempowered states amplify regionalism and sub-nationalism, with demands for separate flag bearers or resource autonomy, risking the federal compact that binds India's pluralistic unity. In the Indian context, cooperative federalism is better suited to preserve both national unity and democratic diversity. India's vast social, cultural, linguistic, and economic heterogeneity requires governance that is consultative rather than coercive, enabling states to respond to region-specific needs while working within a common constitutional framework. Cooperative federalism strengthens trust between the Union and the States, improves policy implementation through shared ownership, and prevents the alienation of regional aspirations that can threaten unity. By balancing a strong Centre with empowered States, cooperative federalism upholds the constitutional vision of "unity in diversity" and ensures that India's federal structure remains a source of strength rather than strain.

Simplifying India's Direct Tax Regime: An Analysis of the Income Tax Act, 2025

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Albert Einstein, the renowned physicist, once quipped during a conversation with his accountant, Leo Mattersdorf, while preparing his tax return: "The hardest thing in the world to understand is income taxes." When Mattersdorf suggested that Einstein's theory of relativity was more complex, the scientist retorted, "Oh, no... that is easy." This anecdote resonates with taxpayers worldwide, who often perceive their national tax laws as labyrinthine and overly intricate. In India, this sentiment has long been echoed, with the Income Tax Act, 1961, criticized for its complexity, frequent amendments, and propensity for litigation. It is against this backdrop that the introduction of the Income Tax Act, 2025, represents a watershed moment in India's fiscal policy. For aspirants preparing for the Civil Services Examination (CSE), understanding this reform is crucial, as it intersects with key themes in polity, economy, and governance, including constitutional provisions, economic policy objectives, and administrative efficiency.

The power to tax is one of the most pervasive instruments of government, enabling resource mobilization for public welfare, infrastructure, and social justice. Taxes are the primary tool of revenue generation for the government. It is through such revenue that government is able to meet its expenses, provide for investments that drive economic growth and implement welfare state policies.

In India, this power is constitutionally delineated to prevent arbitrary imposition and ensure federal balance. Article 246 of the Constitution distributes legislative powers between the Union Parliament and State Legislatures through three lists in the Seventh Schedule: the Union List (List I), the State List (List II), and the Concurrent List (List III). Taxation powers are explicitly assigned to maintain fiscal federalism. Under Entry 82 of the Union List, Parliament holds exclusive authority to legislate on "Taxes on income other than agricultural income." Conversely, Entry 46 of the State List reserves the power to tax agricultural income solely for the states. This division underscores the Constitution's intent to centralize non-agricultural income taxation for uniform national policy while allowing states autonomy in agrarian matters, reflecting India's diverse economic landscape.

Complementing this, Article 265 enshrines a fundamental safeguard: "No tax shall be levied or collected except by the authority of law." This provision restricts executive overreach, mandating that all taxation must

stem from legislative enactments, thereby upholding the rule of law. In practice, the annual Finance Act, presented alongside the Union Budget and enacted by Parliament, operationalizes this by setting tax rates, slabs, and amendments to the Income Tax Act. For CSE candidates, this highlights the interplay between constitutional law and fiscal policy, often tested in questions on Centre-State relations or economic federalism.

Globally, tax systems are bifurcated into direct and indirect taxes, a classification that forms the bedrock of India's revenue framework. Direct taxes are levied directly on individuals or entities based on their income or wealth, fostering progressive taxation where higher earners contribute more. Income tax exemplifies this, alongside others like wealth tax (abolished in 2015) and securities transaction tax. These taxes promote equity and are harder to evade, as they are based on declared earnings. Indirect taxes, in contrast, are imposed on goods and services, collected by intermediaries such as manufacturers or retailers, and ultimately borne by consumers. Prominent examples include the Goods and Services Tax (GST), introduced in 2017 as a unified indirect tax regime, excise duties, and customs duties. GST, governed by the Constitution (101st Amendment) Act, 2016, exemplifies cooperative federalism through the GST Council, comprising Union and state representatives.

India's direct tax regime has evolved significantly since colonial times. The Income Tax Act, 1922, introduced during British rule, laid the initial foundation but was deemed outdated post-independence. Following the Law Commission's recommendations in 1958, it was replaced by the Income Tax Act, 1961, which aimed to consolidate and modernize provisions. This Act governs the levy, assessment, and collection of income tax from individuals, Hindu Undivided Families (HUFs), firms, associations of persons, and corporates. Tax on corporate income is specifically termed Corporation Tax, reflecting its distinct treatment under the Act.

Direct tax is considered progressive in nature because its structure is based on an individual's ability to pay, meaning that the tax rate increases as the taxable income the individual or entity increases. This approach aims to promote fairness and reduce income inequality within society. This structure allows higher earners to bear a larger share of the tax burden, helping to redistribute income, reduce inequality, and fund social programs that benefit lower-income groups. In contrast, indirect taxes like GST or excise duties are considered regressive, as they apply the same rate to all consumers regardless of income, disproportionately affecting the poor who spend a larger portion of their earnings on consumption. Indirect taxes account for differences in financial capacity, exacerbating inequality rather than alleviating it. Overall, direct taxes better embody the "ability-to-pay" principle, making them a more equitable tool for achieving social justice in taxation systems.

Historically, India's tax policy transcended mere revenue generation, serving broader socio-economic goals. During post-independence, it sought to augment savings, promote exports, ensure balanced regional development, and achieve social justice. This led to a proliferation of exemptions and deductions, such as those for export-oriented units, industries in backward areas, rural development expenditures, and investments in specified sectors. While well-intentioned, these incentives complicated the Act, spawning over 4,000 amendments since 1961. The resultant complexity escalated administrative costs, compliance burdens, and litigation, with disputes often clogging courts and delaying revenue realization. For instance, ambiguities in definitions or overlapping provisions fueled interpretive battles, eroding taxpayer trust and voluntary compliance.

The Income Tax Act, 2025, enacted amid these challenges, marks a paradigm shift toward simplification and modernization. Introduced to overhaul India's direct tax framework, it addresses longstanding criticisms by streamlining language, structure, and processes. Unlike previous reforms, it focuses on structural enhancements without altering core taxation principles or rates, ensuring policy continuity. This approach aligns with the government's vision of 'ease of doing business' and 'minimum government, maximum governance,' themes recurrent in CSE papers on economic reforms.

Key objectives of the Act, as outlined in the Press Information Bureau (PIB) release, include simplification, digital integration, a taxpayer-centric approach, and global alignment. Simplification entails replacing archaic, convoluted language with clear, concise provisions. The Act reduces sections from over 700 to 536, reorganizes them logically into fewer chapters, and incorporates schedules, tables, and formulae for clarity. Obsolete clauses, remnants of a pre-digital era, have been excised, making the law more accessible to laypersons and professionals alike.

A notable innovation is the unification of temporal concepts. The erstwhile 'Previous Year' (income earning period) and 'Assessment Year' (tax computation period) often confused taxpayers; these are now subsumed under a single 'Tax Year,' defined as the financial year from April 1 to March 31. This eliminates ambiguity, simplifying filings and assessments.

Digital integration is another cornerstone, reflecting India's digital transformation. The Act promotes faceless assessments, e-filing, and online appeals, minimizing human interaction to curb corruption and bias. Provisions rooted in a 'pen-and-paper' mindset have been updated to accommodate digital realities, such as electronic records and virtual hearings. This builds on initiatives like the Income Tax Department's e-portal and aligns with the Digital India campaign, enhancing efficiency and transparency.

The taxpayer-centric ethos aims to reduce litigation through precise definitions and dispute-resolution mechanisms. By clarifying terms and reducing interpretive scope, the Act minimizes conflicts, fostering a trust-based regime. It also encourages voluntary compliance via user-friendly tools, potentially boosting revenue without coercive measures.

The Act tries to address emerging challenges in taxation, like taxation of virtual digital assets such as bitcoin, reflecting contemporary economic dynamics. The Act incorporates specific provisions on taxation of Virtual Digital Assets (VDAs) like cryptocurrencies. Defined explicitly, VDAs are now taxable under income from other sources, with provisions for capital gains and losses. This positions India in sync with international standards, crucial for handling digital economies.

The drafting process exemplified inclusive governance, incorporating inputs from stakeholders via public consultations. Taxpayers, industry bodies like FICCI and CII, and professionals contributed suggestions, ensuring the Act's practicality. This participatory approach underscores democratic principles in policy-making, a key aspect for CSE aspirants studying public administration.

The Act's implications extend beyond taxation. By simplifying compliance, it eases business operations, attracting investments and spurring growth. Reduced litigation frees judicial resources, while digital tools enhance administrative accountability. Economically, it supports fiscal consolidation, with direct taxes contributing over 50% of India's tax revenue in recent years. Socially, preserving progressive elements promotes equity, aligning with constitutional ideals under Articles 14 (equality) and 21 (right to life and dignity).

However, challenges persist. Implementation requires robust IT infrastructure and capacity building for tax officials. A major component of the tax administration ecosystem is the common taxpayer and the tax professionals like Chartered Accountants. They will also have to be educated about the new Act and its provisions. There has been some criticism based on the past experience of introducing amendments to Income Tax Act along with every budget. If this practice continues, then the simplified Act will also turn complex in time. Thus, while no major policy shifts are introduced, future amendments could reintroduce complexity if not managed prudently.

In conclusion, the Income Tax Act, 2025, embodies a forward-looking reform, transforming an archaic law into a modern, efficient instrument. For civil services aspirants, it exemplifies how fiscal policy intersects with constitutionalism, economic development, and good governance. As India aspires to become a $5 trillion economy, such simplifications are pivotal, echoing Einstein's quip by making taxes less daunting and more comprehensible. Ultimately, this Act not only streamlines revenue collection but also reinforces trust in institutions, fostering a tax compliant and progressive society.

Rising Gold Prices in India: Causes and Consequences

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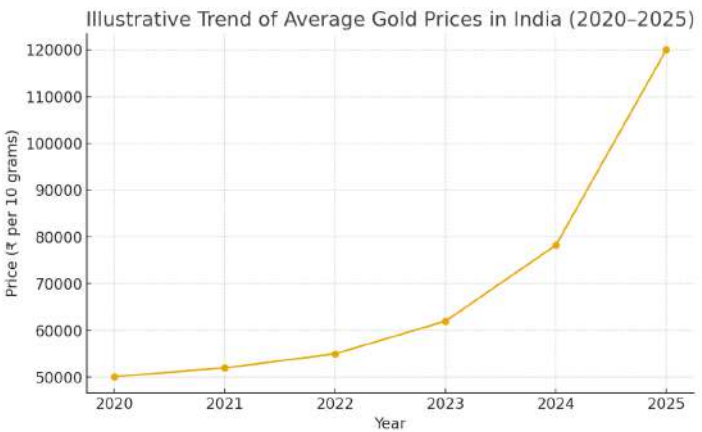
1. Introduction

Gold prices in India have touched historic highs over the past two years, reflecting a combination of global economic uncertainty, domestic currency depreciation, and evolving investment behaviour. By late 2025, retail gold prices in major cities surpassed ₹1.2 lakh per 10 grams, marking an unprecedented surge. According to multiple financial dailies, including *The Hindu* and *The Economic Times*, the 2024–25 rally is part of a wider global phenomenon where gold breached new all-time highs. This surge is not merely a commodity cycle but a symptom of deeper shifts in global economic confidence. There exists a link between the global gold rally and geopolitical tensions, weakening trust in the US dollar, and the movement of global investors—including major countries—towards real, tangible assets. These insights are crucial to understanding the present moment in the Indian gold market.

2. Global Drivers of the Gold Rally



2.1 Flight from the Dollar and De-Dollarisation

The world is gradually distancing itself from the US dollar. In the US, financial instability such as debt-ceiling crises and high inflation, and aggressive rate swings have weakened global confidence in the dollar's long-term stability. The three catching points in the global economy are the following in this respect.

Several emerging economies have reduced reliance on the US dollar in trade.

Gold has become a preferred alternative reserve asset as it carries no sovereign risk.

The sharp rise in gold prices reflects a global flight from fiat currencies into real assets, especially when inflation erodes purchasing power.

This aligns with academic research on safe-haven assets and the classical Keynesian argument that investors shift towards "ultimate liquidity" when trust in financial systems weakens.

2.2 China's Massive Gold Accumulation

Another major factor is **China's aggressive gold buying spree**.

The People's Bank of China has been increasing gold reserves at a rate unmatched by other economies.

Chinese consumers—responding to stock-market volatility, property-sector collapse, and low savings returns—are purchasing more gold than ever before.

China's entry into the gold market at this scale has tightened global supply and driven prices up.

This mirrors the data from the World Gold Council, which shows China an accounting for a significant share of total global gold demand in 2023–25.

2.3 Geopolitical Instability and Investor Fear

Another important point to be mentioned is the "uncertainty in the new global currency". Wars, sanctions, shifting alliances, and global polarisation have created an environment where traditional financial assets appear risky. The gold surge is therefore a rational reaction to:

heightened geopolitical risk,
weakening global growth,
fragmentation of trade and finance.

Reuters and *The Hindu Business Line* similarly note that gold spikes coincide with geopolitical flashpoints.

3. India-Specific Factors

3.1 Rupee Depreciation

India imports nearly all of its gold; thus, the domestic price is heavily influenced by the rupee–dollar exchange rate. When the rupee weakens owing to global oil prices, capital outflows, or widening trade deficits, gold becomes more costly.

Vantage argues that "countries with weaker currencies turn to gold to preserve value"—a trend clearly visible in India.

3.2 Households Holding Gold, Not Selling (Vantage Insight)

A significant point made in Palki Sharma's report is this:

Indians believe gold prices will rise even higher. Households are choosing not to sell their gold—even at record prices—because they expect further gains.

This behavioural shift has real economic effects:

Lower recycling supply
Greater pressure on imports
Persistently high prices in physical markets

This insight is consistent with behavioural finance theory, which states that when asset prices rise due to fear-driven demand, sellers withdraw from the market, expecting even higher prices.

3.3 Cultural Demand and Festivals

India's cultural affinity for gold reinforces the trend: despite high prices, weddings and festivals such as Akshaya Tritiya generate stable demand. Many retail sources report that families are buying lighter ornaments—but still buying.

4. Economic Theory Behind the Surge

4.1 Portfolio Diversification Theory (Markowitz)

Gold has low correlation with equities and bonds, making it a classic hedge. When global stock markets are unstable—as Palki Sharma notes about China's market fall and global recession fears—gold's appeal increases.

4.2 Keynesian Liquidity Preference

Keynes argued that in times of uncertainty, people prefer assets with high liquidity and stability. Vantage's argument that "trust in the dollar is weakening" fits this framework: households shift from currency to gold, a more trusted store of value.

4.3 Inflation Hedge Theory

When inflation is high or expected to rise, gold acts as a hedge. Vantage repeatedly points out that rising prices and weakening currencies push investors toward gold to preserve real wealth.

5. Consequences for India

5.1 Impact on Households

Positive: Families with stored gold have seen appreciation of their wealth.

Negative: Gold has become increasingly unaffordable for young or low-income households.

5.2 Jewellery Industry Stress

Retailers report declining volumes as customers prefer smaller pieces. High prices have reduced footfall in some regions by 20–30%, according to business reports.

5.3 Current Account Deficit Pressure

Gold imports widen India's CAD. If households hold gold instead of selling, as Vantage highlights, recycling declines—raising the need for fresh imports.

5.4 Strengthening RBI's Balance Sheet

As gold prices rise, the RBI's gold reserves (now over 800 tonnes) increase in value, strengthening India's external buffers.

6. Policy Recommendations

Encourage gold financialisation (ETFs, Sovereign Gold Bonds).
Promote domestic recycling to reduce import dependency.
Maintain moderate import duties to discourage smuggling.
Improve financial literacy so that households invest in productive financial assets.

7. Conclusion

The rise in gold prices is not a temporary market movement; it reflects deep structural shifts in the global economy. As highlighted by Palki Sharma in *Vantage*, investors worldwide are losing faith in the US dollar, seeking safety from inflation and geopolitical turmoil, and turning increasingly to gold as a stable store of value.

India's gold price surge is therefore shaped by:

global fear and currency distrust
China's unprecedented accumulation of gold
Domestic cultural demand
Rupee weakness and import dependence

The challenge—and opportunity—for Indian economic policy is to guide this universal attraction to gold into channels that strengthen long-term

financial stability while preserving India's traditional relationship with the metal.

Key Takeaways:

Table 1. Key Global Factors Influencing Gold Prices

Global Factor	Description
Weakening USD	Inflation, fiscal stress, and declining global confidence
Geopolitical tensions	Wars, sanctions, trade conflicts increase safe-haven demand
Central bank gold buying	Diversification away from US assets; large Asian purchases
Global inflation	Inflation pushes real interest rates down, raising gold's appeal
Market volatility	Stock-market instability leads investors to hedge with gold

Table 2. Domestic Factors Influencing Gold Prices in India

Domestic Factor	Economic Impact
Rupee depreciation	Sharply increases domestic gold prices
Cultural demand	Weddings and festivals sustain steady buying
Hoarding behaviour	Households hold gold, reducing recycling supply
Import duties	Raise costs and sometimes encourage smuggling
Rise of gold ETFs	Financialization boosts investment demand

Table 4. Economic Theories Behind the Gold Surge

Theory	Relevance to Gold Prices
Modern Portfolio Theory	Gold reduces risk due to low market correlation
Liquidity Preference (Keynes)	Investors hold gold during uncertainty
Inflation Hedge Theory	Gold preserves purchasing power when inflation rises
Real Interest Rate Theory	Lower real yields make gold more attractive

The Green Economy: Navigating the Transition and Economic Implications for a Sustainable Future

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Introduction: The New Economic Paradigm

For over a century, the global economic engine has been fuelled by a "linear" model: take, make, and dispose. However, as we stand in 2026, this model has reached its ecological and structural limits. The transition to a **Green Economy** is no longer a peripheral environmental concern; it has become the central economic strategy for the 21st century. A green economy is defined not merely by the absence of pollution, but by the presence of sustainable growth, social equity, and the preservation of "natural capital." It is an economy that results in improved human well-being and social equity, while significantly reducing environmental risks and ecological scarcities.

Historical Context: From Warnings to Action

The intellectual foundations of the green economy were laid in **1972** with the publication of the Club of Rome's *Limits to Growth*. This seminal report used computer simulations to predict that if the then-current trends in population, industrialization, and resource depletion continued, the global system would face a collapse within a century. While controversial at the time, its core message— that infinite growth on a finite planet is impossible—provided the impetus for the **Brundtland Commission** in 1987.

The commission's report, *Our Common Future*, introduced the world to "Sustainable Development," defined as meeting the needs of the present without compromising the ability of future generations to meet their own. By 1989, the UK report *Blueprint for a Green Economy* began linking these environmental ideals directly to fiscal policy and market mechanisms. This evolution culminated in the **1992 Rio Earth Summit**, where the international community formally recognized that economic development and environmental protection are inseparable.

The Imperative for Transition: Why Now?

Three inescapable realities drive the urgency of the transition in 2026:

1. The Climate Crisis and Global Stability

Global warming is no longer a future threat but a present economic disruptor. The melting of polar ice caps and the subsequent rise in sea levels are altering coastal economies. Erratic weather patterns—extreme droughts followed by catastrophic flooding—have destabilized global food supply chains. A green economic system is the only viable

mechanism to mitigate these risks by aggressively reducing greenhouse gas (GHG) emissions.

2. The Resource Scarcity Trap

The global economy's historical dependence on fossil fuels and non-renewable minerals has created a "scarcity trap." As these resources become harder to extract, their price volatility increases, leading to economic instability. Transitioning to circular resource management and renewable energy is a strategy for long-term price stability and national security.

3. The Holistic Welfare Mandate

Traditional economic metrics like GDP often fail to account for the "externalities" of production, such as respiratory illnesses caused by smog or the loss of fertile land.A green economy prioritizes holistic welfare—a condition of satisfaction where economic growth is measured alongside the health of the populace and the resilience of the ecosystem.

The Dimensions of a Green Economy

A green economy is built on four interconnected pillars that ensure growth. It is low- carbon, resource-efficient, and socially inclusive.

1. The Environmental Pillar: Respecting Boundaries

This pillar focuses on maintaining "Planetary Boundaries." It involves shifting to renewable energy, managing water cycles sustainably, and protecting biodiversity. In this framework, natural resources are viewed as **Natural Capital**—essential assets that provide services (like carbon sequestration or water filtration) that have immense, though often uncounted, economic value.

2. The Economic Pillar: Innovation and Investment

The transition serves as a catalyst for a new industrial revolution. It drives investment into green infrastructure, such as high-speed electric rail and smart grids. It also fosters **Green Production**, where industries adopt the "6Rs" (Reduce, Reuse, Recycle, Recover, Redesign, and Remanufacture) to enhance material productivity.

3. The Social Pillar: Equity and Justice

A green economy must be a "just" economy. This means ensuring that the benefits of the transition—such as new jobs in the solar sector—are fairly distributed. It focuses on **Intergenerational Equity**, ensuring that today's growth does not bankrupt the environment for the youth of tomorrow.

4. The Governance Pillar: Policy and Transparency

Strong governance is required to shift market incentives. This includes "Green Public Procurement," where governments use their massive purchasing power to support sustainable businesses, and the implementation of carbon pricing to ensure that polluters pay for the damage they cause.

The Great Debate: Growth, Financing, and the North-South Divide

The transition is not a seamless process; it is the subject of intense global debate.

Green Growth vs. Degrowth

A central tension exists between those who believe technology can "decouple" GDP growth from environmental impact (**Green Growth**) and those who argue that high-consumption lifestyles must be scaled back (**Degrowth**). While advanced economies in 2026 are showing signs of absolute decoupling, the challenge remains for emerging economies that need high growth to lift millions out of poverty.

The Financing Challenge

The transition requires an estimated **$4-6 trillion annually** in global investment. The debate centers on who pays. Developing nations argue that the Global North, which grew wealthy through two centuries of carbon-intensive industrialization, has a "climate debt" and must provide concessional financing and technology transfer to the Global South.

Economic Implications and the Shift to "Green GDP"

The economic impact of the green transition is multifaceted, involving both short- term costs and long-term gains.

Job Creation and the Labor Market

While the phase-out of coal and internal combustion engines will lead to job losses in traditional sectors, the green economy is a net job creator. Employment in renewable energy, energy efficiency, and sustainable agriculture are growing at double the rate of the traditional energy sector. However, this necessitates a massive **reskilling** effort to ensure workers are not left behind.

The Rise of Green GDP

We are witnessing a shift away from traditional GDP toward **Green GDP**. This metric provides a more accurate picture of national wealth by subtracting the costs of environmental damage from the total economic output:

$$Green\ GDP = GDP - (Cost\ of\ Environmental\ Degradation + Cost\ of\ Resource\ Depletion)$$

"Greenflation" and Transition Costs

In the short term, the transition can lead to "Greenflation"—rising prices for the raw materials (like copper, lithium, and nickel) required for green technologies. Governments must manage these inflationary pressures through strategic stockpiling and diversified supply chains to ensure the transition remains politically viable.

Case Study: India's Strategic Green Leadership

As of 2026, India has positioned itself as a global leader in the green transition, using it as a vehicle for energy independence and industrial modernization.

The Energy Revolution

India is on track to reach its target of **500 GW of non-fossil fuel capacity**. Key initiatives include:

- **National Green Hydrogen Mission:** Positioning India as a global hub for the production and export of green hydrogen.
- **PM Surya Ghar:** A revolutionary rooftop solar scheme providing free electricity to millions of households and reducing the burden on the national grid.
- **PM-KUSUM:** Transforming the rural economy by replacing diesel irrigation pumps with solar-powered alternatives, allowing farmers to sell surplus power back to the grid.

Industrial and Agricultural Innovation

Through the **Production Linked Incentive (PLI) schemes**, India has localized the manufacturing of solar cells and advanced batteries. In agriculture, the shift toward **Natural Farming** and the **Green Credit Programme** incentivizes soil health and water conservation, ensuring that the primary sector is resilient to climate shocks.

Conclusion: The Path Forward

The transition to a green economy is the most significant structural shift in the global economy since the first Industrial Revolution. It is a journey from a "cowboy economy"—viewing the earth as a limitless frontier—to a "spaceman economy," where we recognize our planet as a single spaceship with limited reservoirs for extraction and waste.

While the challenges of financing, infrastructure, and social equity are formidable, the alternative is an economically stagnant and ecologically depleted world. By embracing the green economy, nations can unlock a new era of innovation, create millions of high-quality jobs, and ensure a prosperous, equitable future for all. The green transition is not a cost to be borne; it is an investment in the survival and flourishing of human civilization.

Strategic Role of India's SME Sector: Potentials, Financial Needs, and Future Prospects in Advancing the Government's Vision of Viksit Bharat 2047

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India's aspiration of becoming a *Viksit Bharat* by 2047 represents more than a numerical increase in economic output. It reflects a broader national objective of building an economy that is resilient, inclusive, technologically advanced, and institutionally sound. Achieving this vision will require growth that is both sustained and widely distributed. While large corporations and public investment play a visible role, the depth and durability of India's development will ultimately depend on the strength of its productive base. In this context, the **Small and Medium Enterprises (SME) sector** assumes strategic importance.

SMEs constitute the connective tissue of the Indian economy. Operating across manufacturing, services, trade, and emerging digital segments, they form the primary interface between enterprise and employment. With an estimated **63 million units**, contributing nearly **30 per cent of GDP**, around **45 per cent of manufacturing output**, and providing employment to more than **110 million people**, SMEs are not a marginal segment. They are central to India's economic architecture.

Despite their scale, the performance of Indian SMEs has been uneven. A large number of enterprises continue to operate with low productivity, limited access to finance, and restricted market reach. These challenges stem not from lack of entrepreneurial capability, but from structural and institutional constraints. As India moves towards its centenary of independence, unlocking the full potential of the SME sector will be indispensable to the realisation of *Viksit Bharat 2047*.

SMEs in India's Economic Structure

The strategic relevance of SMEs lies in the specific economic functions they perform rather than in their numerical strength.

Employment Generation and the Demographic Context

India's demographic profile presents a significant opportunity as well as a policy challenge. The working-age population is expected to expand steadily over the next two decades, requiring large-scale job creation.

SMEs, due to their labour-intensive nature, are particularly suited to absorb this workforce. Compared to large, capital-intensive industries, SMEs generate employment at a lower capital cost per job, making them essential for addressing underemployment and informal labour.

Equally important is the geographic dispersion of SME activity. By operating in small towns, industrial clusters, and rural regions, SMEs promote decentralised economic development. This spatial distribution reduces pressure on metropolitan centres and supports more balanced regional growth.

Inclusive Entrepreneurship and Social Mobility

SMEs provide an accessible platform for first-generation entrepreneurs, including women and individuals from traditionally underrepresented communities. Across India, industrial clusters—ranging from traditional craft-based industries to modern manufacturing hubs—illustrate how SMEs foster local prosperity and social mobility. Their contribution to inclusive growth aligns closely with the broader developmental priorities of the state.

Linkages with Industry and Supply Chains

SMEs play a critical role as suppliers, subcontractors, and service providers to large domestic and multinational firms. In sectors such as automobiles, pharmaceuticals, electronics, infrastructure, and defence manufacturing, the competitiveness of large enterprises depends heavily on the strength of their SME partners. As global supply chains undergo diversification, Indian SMEs face an opportunity to integrate into international production networks, subject to improvements in quality, compliance, and scale.

Untapped Potential and Emerging Opportunities

Despite persistent challenges, recent developments suggest that the SME sector is undergoing gradual transformation.

Formalisation and Digital Transition

Government initiatives such as **Udyam Registration, GST, e-invoicing, the Account Aggregator framework, and ONDC** have accelerated the formalisation of SMEs. Although the transition initially imposed compliance costs, formalisation has improved transparency and data availability. For many enterprises, this has translated into better access to institutional finance and digital markets.

Manufacturing, Exports, and Domestic Demand

Policy measures including **Make in India**, **Production Linked Incentive (PLI) schemes**, and **Districts as Export Hubs** have created opportunities for SME participation in manufacturing and exports. Sectors such as engineering

goods, food processing, electronics components, specialty chemicals, and textiles present significant scope for SME-led growth.

Growth of Service-Oriented SMEs

Alongside manufacturing, service-based SMEs have expanded rapidly in areas such as IT services, logistics, healthcare support, fintech, and professional services. These enterprises are often asset-light and scalable, but they require financing frameworks that move beyond traditional collateral-centric lending.

Financial Needs of the SME Sector

Access to finance remains the most persistent constraint on SME growth.

The Credit Gap

Despite multiple policy interventions, the SME sector faces an estimated **credit gap of over ₹20–25 lakh crores**. Banks remain the primary source of formal credit, yet conventional lending frameworks—largely focused on collateral and historical balance sheets—often exclude smaller or younger enterprises.

Structural Financial Constraints

The key challenges affecting SME finance include:

- Dependence on collateral, which many SMEs lack
- Working capital stress arising from delayed receivables
- Reliance on informal credit at high interest rates
- Weak accounting practices and limited financial planning

Recognising these constraints, **Union Budget 2025–26 revised MSME investment and turnover limits**, enabling enterprises to scale operations without losing MSME-linked benefits. [1] In addition, **CGTMSE guarantee coverage was enhanced from ₹5 crore to ₹10 crore**, strengthening the framework for collateral-free lending. [2]

Policy Measures and Institutional Support

Credit Guarantees and Priority Sector Lending

The **Credit Guarantee Fund Trust for Micro and Small Enterprises (CGTMSE)** has become a central pillar of SME credit policy. Its expanded coverage reflects a policy shift towards risk sharing, improving lender confidence and supporting first-time and growth-stage borrowers.

Digital Lending and Alternative Credit Assessment

Fintech lenders and digital NBFCs increasingly rely on GST data, bank transaction trails, and invoice flows to assess creditworthiness. This data-driven approach has reduced turnaround times and widened access for enterprises previously excluded from formal credit systems.

Addressing Working Capital Stress

Delayed payments continue to pose serious challenges for SMEs. The **Trade Receivables Discounting System (TReDS)** enables enterprises to convert receivables into immediate liquidity by discounting invoices raised on large buyers. Recent policy emphasis on expanding TReDS adoption reflects the recognition that liquidity constraints are structural in nature. [3]

Role of Chartered Accountants and Financial Professionals

Policy frameworks alone are insufficient unless enterprises can engage with them effectively. In this context, professional advisory services play a crucial role. Chartered Accountants act as trusted intermediaries who translate business operations into structured financial information acceptable to banks and regulators.

Beyond compliance, professionals contribute by improving accounting discipline, assisting in credit structuring, advising on cash-flow management, and strengthening governance practices. Such interventions significantly enhance an SME's capacity to access and utilise institutional finance.

Chartered Accountant's Perspective on SME Financing and Governance

From a practitioner's standpoint, the most common limitation faced by SMEs is weak financial structuring rather than lack of business potential. Many enterprises engage with banks only when liquidity stress emerges, at which point financing options become limited.

A commonly observed case involves a manufacturing SME supplying to established OEMs but facing chronic working capital pressure due to delayed receivables. Through a transition to accrual-based accounting, systematic GST reconciliation, receivable ageing analysis, and structured cash-flow statements, such enterprises become credit-worthy. In several instances, access to **CGTMSE-backed working capital facilities** and participation in **TReDS** have stabilised liquidity and reduced borrowing costs within a year.

This experience highlights a key policy insight: the effectiveness of government schemes depends not only on their design but also on enterprise readiness. Strengthening financial governance at the SME level is therefore essential for achieving policy objectives.

Policy Takeaways

1. SME credit constraints are partly demand-side governance issues.
2. Financial formalisation improves access to collateral-free finance.
3. Professional advisory support enhances SME scalability.
4. Credit schemes require financial literacy to be effective.
5. Strong SME governance aligns with *Viksit Bharat 2047* goals.

Market Access, Technology, and Regional Growth

To support global integration, the Government has expanded assistance for SME participation in international exhibitions and buyer–seller meets.[4] This reflects a strategic effort to position SMEs as export-capable enterprises rather than solely domestic suppliers.

Technology adoption is also reshaping SME operations. Digital compliance tools, ERP systems, and AI-enabled advisory platforms are improving efficiency and decision-making. In 2025, AI-based digital support tools were introduced to assist MSMEs with compliance and operational guidance, highlighting the growing role of technology in enterprise formalisation. [5]

At the regional level, state governments have increased focus on **cluster-based development**, funding infrastructure upgrades and common facility centres. Such initiatives enhance productivity and competitiveness of both traditional and emerging SME clusters. [6]

SMEs and the Road to *Viksit Bharat 2047*

Over the coming decades, SMEs are expected to evolve from informal, survival-oriented units into value-driven and innovation-led enterprises. This transition will be shaped by technology adoption, sustainability imperatives, digital commerce, and deeper integration with formal financial systems. A mature SME sector will be indispensable to India's aspiration of becoming a high-income, globally competitive economy by 2047.

Conclusion

The vision of *Viksit Bharat 2047* cannot be realised without a strong and resilient SME sector. While challenges—particularly in finance and governance—remain, recent policy reforms and institutional innovations indicate a clear direction of travel.

The next phase of SME growth will depend not only on government support but also on improvements at the enterprise level. With coordinated efforts involving policymakers, financial institutions, professionals, and entrepreneurs, SMEs can emerge as engines of employment, innovation, and inclusive growth. Their success will ultimately determine the depth and sustainability of India's development journey.

Viksit Bharat 2047: Assessing India's Roadmap to a $30 Trillion Economy

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Abstract

As India approaches its centennial of independence, the aspiration to emerge as a developed nation by 2047, has solidified into the ambition of achieving an economic size of $30 trillion. The vision of Vikasit Bharat as a dynamic platform for collective visioning extends beyond a quantitative expansion of gross domestic product and is characterized by structural transformation, institutional strengthening, productivity enhancement, and inclusive growth. Viewed in light of growth theory, the article examines the economic feasibility of this target through dynamics of demography, structural changes, technological progress and macroeconomic stability. The realization of a $30 trillion objective is numerically achievable through structural reforms in factor markets, human capital formation, innovation systems and governance frameworks. This paper contextualizes India's development trajectory while reinforcing its unique institutional and demographic context.

Introduction

India's *Viksit Bharat 2047* vision can be defined as a generational mission that is signaling a move beyond short term expectations into a 25-year unified project aimed at total structural transformation. In that sense it is not merely a process of income expansion but a comprehensive shift involving changes in production structures, labor allocation, technological capability, and social outcomes. The explicit quantitative benchmark of a $30-trillion economy—belongs to the category where they function as coordination devices that shape expectations, investment horizons, and institutional behavior. It is not merely a projection of aggregate output, but a statement about the desired structural, institutional, and distributional characteristics of the economy at a specific historical milestone. From a growth-theoretic perspective, the $30-trillion target is both challenging and credible. Straightforward compound arithmetic indicates that such an expansion is attainable under sustained high growth, yet development economics cautions that growth persistence is qualitatively distinct from growth acceleration. At that juncture, the sources of growth must shift toward productivity enhancement, workforce development, and institutional maturity as well as capability.

Achieving a $30-trillion economy by 2047 implies nearly a tenfold expansion over 25 years. From a purely mathematical perspective, this requires sustained nominal growth of roughly 10–11 percent annually, which—under moderate inflation assumptions—translates to real growth of approximately 7–8 per cent per year. Such growth rates are not unprecedented in India's post-reform history, nor are they anomalous in the experience of rapidly developing economies. However, sustaining

them over multiple decades is qualitatively different from achieving them intermittently. Long-run growth persistence depends less on cyclical stimulus and more on structural productivity gains, capital deepening, and institutional quality. The $30-trillion vision implicitly presupposes disciplined macroeconomic management, credible fiscal frameworks, and a resilient financial system capable of intermediating long-term savings into productive investment as macroeconomic stability forms the necessary baseline.

Structural Transformation and Sectoral Dynamics

In classical development models, this transition typically involves a shift from agriculture to manufacturing and subsequently to modern services. India's trajectory, however, has diverged from this stylized path. While the share of agriculture in output has declined significantly, a large proportion of the workforce remains engaged in low-productivity agricultural and informal activities. For India to achieve both scale and quality of growth, a renewed focus on manufacturing and modern tradable services is essential. Manufacturing offers unique advantages: it exhibits economies of scale, facilitates technology transfer, and generates employment for moderately skilled labor. At the same time, India's comparative advantage in knowledge-intensive services—such as information technology, digital platforms, and professional services—must be deepened and broadened.

India's demographic profile constitutes both a potential dividend and a latent risk. Over the coming decades, the working-age population will remain large relative to dependants, creating a window of opportunity for accelerated growth. However, demographic advantage is not automatic; it materializes only when the workforce is productively employed. Human capital accumulation—through education, health, and skill formation—is therefore central to the development strategy. From an economic perspective, improvements in human capital raise growth not only by increasing labor productivity but also by enhancing the economy's capacity to adopt and generate new technologies. While segments of the population possess world-class skills, large sections lack foundational literacy, numeracy, and employable competencies. Bridging this divide requires systemic reform in education delivery, vocational training, and public health provisioning. Without such reforms, demographic expansion could manifest as surplus labor, downward wage pressure, and social stress rather than economic momentum.

Education-focused initiatives such as the Samagra Shiksha programme and the National Education Policy–aligned reforms seek to improve learning outcomes, reduce regional disparities in educational access, and strengthen foundational skills that determine future workforce productivity. These initiatives aim to address persistent gaps between schooling attainment and employable skill acquisition, which constitute a binding constraint on structural transformation. Skill development schemes, including the Pradhan Mantri Kaushal Vikas Yojana and the Skill India Mission, are structured to synchronize technical education with the contemporary labour market dynamics particularly in manufacturing, logistics, and modern services. These programs enhance labor mobility

and raise the marginal productivity of labor, thereby supporting both employment absorption and wage growth. Health-related interventions under Ayushman Bharat contribute to human capital accumulation by reducing the economic impact of health shocks and improving labor-force participation and productivity. Better access to preventive and curative healthcare minimizes workplace absence and enhances the longevity of human capital, generating long-term economic benefits.

Sustained high growth necessitates high levels of investment. Historically, economies that have achieved rapid development have maintained gross capital formation rates well above global averages. For India, raising and sustaining investment requires both adequate domestic savings and efficient financial intermediation. The role of the financial system extends beyond credit provision; it involves risk assessment, capital allocation, and long-term project financing. Weak balance sheets, regulatory uncertainty, or misallocation of capital can significantly dampen growth potential. Therefore, banking sector resilience, deep corporate bond markets, and alternative financing mechanisms are integral to the development agenda. The recently published World Bank's Financial Sector Assessment report emphasizes the necessity of financial sector reforms and mobilization of private capital to help India achieve the idea of a USD 30 trillion economy.

Public investment plays a complementary role, particularly in infrastructure. Roads, ports, logistics, energy systems, and digital networks exhibit strong positive externalities and crowd in private investment. Several flagship initiatives introduced under the Prime Minister's leadership operationalize the mission's core economic principles into implementable policy instruments. Infrastructure development is coordinated through the PM Gati Shakti National Master Plan and the National Infrastructure Pipeline, which aim to reduce logistics costs, improve inter-sectoral coordination, and raise the productivity of public and private capital. Manufacturing and industrial upgrading are supported through the Production-Linked Incentive (PLI) schemes, which target strategic sectors to encourage scale, technological adoption, and integration into global value chains. These initiatives prioritize targeted incentives rather than being distributed as broad financial assistance.

The diffusion of digital technologies offers a unique opportunity. Digital public infrastructure, data-driven governance, and platform-based markets can reduce transaction costs, expand market access, and improve service delivery. From an economic standpoint, such technologies enhance total factor productivity by improving coordination and information flows. Platforms such as Aadhaar, the Unified Payments Interface (UPI), and interoperable digital service delivery systems have reduced transaction costs, improved targeting of public expenditure, and facilitated transition to the organized sector. These systems increase the effective participation of households and firms in formal markets by minimizing information imbalances and regulatory hurdles, thus strengthening the foundations of sustainable growth.

Initiatives under the Digital India programme and the India Stack framework have supported the integration of technology across sectors, including finance, welfare delivery, and small enterprise activity. These interventions augment capital absorption rates by refining inter-sectoral coordination, transparency, and scalability, thereby raising the productivity of both public and private investment. However, innovation ecosystems require supportive institutions: intellectual property regimes, research funding, university–industry linkages, and competitive markets. Achieving a $30-trillion economy thus demands not only technology consumption but also indigenous innovation capacity.

External Sector and Global Integration

Given its size and labor force, India's integration into global value chains has increased but remains below its potential. Trade, investment, and knowledge flows are critical channels through which productivity gains are realized. A measured and balanced external strategy integrating broad-based export expansion, strategic trade partnerships, and prudent external borrowing—is essential. From a market standpoint, global integration promotes specialization and exposes domestic firms to competitive pressures that incentivize efficiency. At the same time, relying heavily on volatile capital flows or restricted export baskets can generate vulnerability. The $30-trillion target implicitly assumes that India will expand its role in global markets while maintaining external sustainability.

The concept of self-reliance, frequently emphasized in India's growth history, is often misunderstood as turning inward. The objective is to participate in global markets from a position of resilience. Targeted investments in industrial ecosystems, logistical frameworks, and quality controls accelerate learning-by-doing effects and minimizes suspectability to global price swings. This improves long-run productivity while retaining the benefits associated with trade liberalization.

The current trade facilitation initiatives, including the Foreign Trade Policy reforms and targeted bilateral and regional trade agreements, aims to improve export competitiveness by reducing transaction costs, enhancing standards compliance, and diversifying export markets. These measures are intended to pivot export structure towards high end manufacturing and specialized services, fostering efficiency-based expansion that aligns with the 2047 economic targets.

Institutions, Governance, and the Quality of Growth

The *Viksit Bharat 2047* vision treats governance and institutional capacity as essential architects of sustained growth rather than merely passive background conditions. Economic theory increasingly recognizes institutions as fundamental determinants of development outcomes. Over the past decade, India has undertaken a series of institutional reforms aimed at improving state capacity and reducing transaction costs across markets. The establishment of a single comprehensive consumption tax system through the Goods and Services Tax (GST) has simplified inter-state trade and expanded the formal tax base, effectively widening the formal economy and boosting overall revenue stability and regulatory compliance.

Restructuring through the Insolvency and Bankruptcy Code(IBC) has bolstered creditors rights and accelerated the reallocation of capital from unproductive to productive firms, thereby improving allocative efficiency. By adopting these reforms, the government demonstrates a commitment to transparent economic oversight thereby sustaining the investor confidence needed to reach 2047 targets.

Institutional effectiveness has been further enhanced by digital governance initiatives. Platforms such as Aadhaar-enabled service delivery, Direct Benefit Transfer (DBT) mechanisms, and integrated public financial management systems have reduced leakages, improved targeting, and enhanced fiscal transparency. Faceless tax administration and digital compliance platforms have lowered transaction costs for firms and households, contributing to higher compliance rates and improved revenue mobilization. This level of institutional integration is essential for navigating the vast scale and complexity of a large scale economy targeting a developed status by 2047.

Conclusion

The vision of *Viksit Bharat 2047* and a $30-trillion economy requires a sustained commitment to productivity-enhancing reforms, human capital investment and institutional strengthening. From an economics perspective, a long-term outlook facilitates intergenerational optimization where strategic initiatives are assessed by their cumulative impact on social well-being rather than just its short-term economic returns. Thus, the target of a 30 trillion goal serves as a critical benchmark for the ongoing fundamental restructuring of the economy.

NITI Aayog serves as the primary architect of this long -term vision, providing a collaborative framework for cooperative federalism, outcome-based monitoring, and evidence-driven policymaking. The strategic initiatives in infrastructure, digital services and skill development contribute to reducing structural bottlenecks and enhancing capital absorption efficiency. By offering strategic foresight and analytical guidance, NITI Aayog establishes the essential framework required for sustained, inclusive and high-quality growth.

To conclude, India's target of a $30 trillion economy should be viewed as a deep process of economic evolution. When interpreted through an economic lens this vision serves as a unifying framework that harmonizes policy and investment towards steady progress. The 'Vikasit Bharat' framework synchronizes central policies with public expenditure, prioritizing qualitative benchmarks alongside consistent developmental progress. Looking forward, the path to 2047 requires an intentional transition from a factor driven expansion towards an endogenous growth framework where growth is fueled by innovation, skill intensity and governance trust. The ultimate validation of this roadmap goes beyond just the size of the economy but on building robust institutions and human capital that helps sustain prosperity beyond it.

GST Reforms and Economic Simplification: Myth or Reality for the Common Man?

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The year 2025 stands as a watershed moment in the history of Indian fiscal policy. Nearly a decade after the initial rollout of the **Goods and Services Tax (GST)** in 2017, the nation has witnessed "GST 2.0"—a suite of aggressive reforms designed to prune the overgrown thicket of tax slabs and compliance hurdles. For the common man, the discourse surrounding these changes is often polarized. On the one hand, government communiqués celebrate a "New Era of Affordability"; on the other, the man on the street often stares at his monthly bills, wondering why the promised "Bachat" (savings) feels so elusive.

To understand whether economic simplification is a blossoming reality or a persistent myth, one must look beyond the headlines and dissect the structural, psychological, and logistical layers of the modern Indian marketplace.

The Anatomy of the Overhaul: From Five Slabs to Three

At its inception, India's GST was famously one of the most complex in the world. With five primary rates (0%, 5%, 12%, 18%, and 28%) and a myriad of cesses, it was a "One Nation, One Tax" system that required a thousand-page manual to navigate. The 2025 reforms have sought to rectify this by moving toward a **Triadic Structure**:

1. **The Merit Rate (5%):** Reserved for the "Social Minimum"—food, basic medicine, and essential clothing.
2. **The Standard Rate (18%):** The engine of the economy, covering nearly 70% of all goods and services.
3. **The De-merit Rate (40%):** A high-entry bracket for luxury and "sin" goods, designed to generate revenue without hurting the poor.

This consolidation was intended to end the "Classification Wars." For years, the judiciary was clogged with cases debating whether a fruit-based drink was a "juice" (lower tax) or a "carbonated beverage" (higher tax). By collapsing the middle brackets (12% and 18%) into a unified standard, the government has ostensibly removed the incentive for litigation. For the common man, this means less "hidden" costs associated with legal disputes that companies eventually pass down to consumers

The Reality: Tangible Victories for the Household

When we speak of the "Common Man," we speak of the middle-class family, the rural farmer, and the urban gig-worker. For these demographics, the 2025 reforms have delivered three significant "Realities."

1. The Social Safety Net: Insurance and Health

Perhaps the most profound shift is the total exemption of **Health and Life Insurance premiums** from GST. Previously taxed at a steep 18%, insurance was viewed by the tax code as a service, but by the citizen as a necessity. By removing this tax, the government has effectively given every insured Indian an 18% "discount" on their safety net. In a country where medical emergencies are a leading cause of debt, this is not just a tax reform; it is a social intervention.

2. The Kitchen Budget and "Plate Inflation"

The reduction of GST on daily staples—from packaged oils to processed dairy and hygiene products—from 12% to 5% has acted as a buffer. While global commodity prices for wheat and oil have fluctuated due to geopolitical tensions, the tax cut has prevented "Plate Inflation" from spiralling. For a family spending ₹15,000 a month on groceries, a 7% tax reduction translates to an extra ₹1,000 in their pocket—a reality that pays for a child's school books or a monthly utility bill.

3. The Aspirational Threshold

For decades, items like Air Conditioners and Small Cars were taxed at 28%, the same bracket as tobacco and luxury yachts. The 2025 reform moved these "Middle-Class Aspirations" to the 18% bracket. This recognizes that in a country where heatwaves are becoming more frequent, an AC is no longer a luxury; it is a tool for productivity and health.

The Myth: Why the "Bill" Doesn't Always Shrink

If the tax rates have dropped, why does the common man still feel the pinch? This is where the "Myth of Simplification" takes root, fuelled by three distinct economic frictions.

1. The Greed Gap: Profit vs. Passing It On

Tax cuts only work for the consumer if the business passes them on. In a perfectly competitive market, if GST drops 5%, the price should drop 5%. However, many sectors in India operate as oligopolies. When the tax on cement was slashed, many manufacturers did not lower the MRP; instead, they absorbed the difference to bolster their quarterly profits. Without a robust, decentralized Anti-Profiteering watchdog, the common man's "tax relief" often ends up in a corporate "dividend check."

2. The ITC Paradox: The Hidden Cost of "Simple"

In its quest to simplify, the government moved several services (like small restaurants and fitness centers) to a flat 5% rate but **removed the Input Tax Credit (ITC)**.

The Logic: A flat 5% is easier to calculate than 18% minus credits. **The Reality:** Since the business owner cannot claim back the taxes they pay on their rent, electricity, and raw materials, their *cost of doing business* increases. To stay profitable, they keep the menu prices high. The consumer sees a "low" GST of 5% on their bill, but the base price of the pizza or the gym membership has risen to compensate.

3. The Fuel and Power Blind Spot

The greatest myth of "One Nation, One Tax" is that it covers the entire economy. As of 2025, **Petrol, Diesel, and Electricity** remain outside the GST ambit. Because these are the primary inputs for logistics and manufacturing, their "cascading tax" (tax on tax) continues to seep into the price of every tomato and every shirt. Until these are brought under GST, the common man will continue to pay a "hidden tax" that no slab-rationalization can fix.

The Entrepreneurial Experience: A Digital Double-Edge

For the common man as a "Creator"—the small-scale manufacturer or the digital freelancer—the reforms present a paradoxical reality.

The Reality of Efficiency: The "GST 2.0" portal is a marvel of Gov-Tech. Features like automated refunds, pre-filled returns, and the "Unified E-way Bill" have reduced the time a small business spends on paperwork by an estimated 40%. The removal of state-border checkpoints has turned India into a truly single market, allowing a craftsman in Rajasthan to ship to Kerala with the ease of a local delivery.

The Myth of Ease: However, "Simplified" does not mean "Easy." The shift toward **Mandatory E-Invoicing** and **Biometric Authentication** has created a digital divide. For a 50-year-old trader in a Tier-3 city, these requirements are a source of immense anxiety. They are forced to spend a significant portion of their income on "Tax Intermediaries"—accountants who navigate the portal for them. In this sense, the tax may be simple, but the *process* remains an expensive hurdle.

Macroeconomics: The Revenue Gamble

From a broader perspective, the 2025 reforms are a gamble on the **Laffer Curve**—the theory that lower tax rates will lead to higher total revenue because more people will be willing (and able) to pay.

The government has intentionally accepted a short-term revenue loss of approximately ₹55,000 crore by cutting rates on essentials. The "Reality"

we are waiting for is whether this triggers a massive surge in consumption. If 100 million more people buy health insurance because it is 18% cheaper, the sheer volume of new taxpayers will eventually fill the government's coffers.

Tax Buoyancy. If GST collections remain robust despite lower rates, it proves that the common man is finally "buying into" the formal economy.

The Path to "True" Reality: What Remains?

To transform the myth of simplification into a permanent reality, three "Final Frontiers" must be crossed:

1. **Direct Benefit Transfer of Tax Cuts:** Just as subsidies are sent to bank accounts, we need a mechanism (perhaps through the "GST Consumer App") where consumers can see exactly how much tax was saved on a purchase and report businesses that refuse to lower prices.
2. **Inclusion of Energy:** Bringing Petrol and Electricity under GST would be the single largest "anti-inflation" move in Indian history.
3. **Humanizing the Portal:** Providing multilingual, voice-assisted GST filing for small traders would bridge the digital divide.

The Road Ahead: The Final Frontiers

To truly move from myth to reality, the GST reform must tackle its "unfinished business." The common man still pays a fragmented tax on **petrol, diesel, and electricity**. Because these are outside the GST ambit, the "cascading effect" still lives on in our transport and utility bills. Until a truck carrying vegetables can claim GST credit on the fuel it consumes, the price of those vegetables will remain artificially high.

Conclusion:

Is GST simplification a myth or a reality? The answer is that it is a **Reality in Structure** but still a **Work-in-Progress in Spirit**.

The structural logic of 2025—fewer slabs, lower rates on essentials, and the exemption of insurance—is an undeniable win for the common man. It reflects a government that is listening to the fiscal anxieties of its citizens. However, the benefits are often diluted by a lack of price enforcement and the exclusion of the energy sector.

What Keeladi Whispers to Indian History: Archaeology, Politics and History

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"The archaeologist is digging up, not things, but people." (Mortimer Wheeler)

Keezhadi compels Indian history to confront the conditions under which material remains acquire historical meaning. A stone encountered during a morning walk does not, by virtue of its mere presence, belong to the Stone Age; only sustained excavation, stratigraphic coherence, and rigorous scientific analysis enable such objects to speak historically. It is in the movement from isolated fragments to assemblages of artefacts, features, and spatial relationships that the archaeologist enters the terrain of the past, not by inscribing history upon matter but by recovering the lived worlds already embedded within it. Stones, pottery, tools, and architectural remains preserve the social histories of human communities, and it is through the disciplined application of scientific techniques and methodological reasoning that archaeology transforms material residues into historical knowledge. Ancient Indian history itself emerged through such empirical labour, gradually revealing a subcontinent shaped by diverse cultural formations and economic structures. The ethical obligation of archaeologists and historians lies not in legitimising the political imperatives of institutions such as the Archaeological Survey of India, but in identifying the layered, often obscured structures of the past and, through them, reconstructing India as a historically plural space. It is precisely this epistemological intervention that Keezhadi represents. In recent years, South India has assumed renewed archaeological significance, producing interventions that unsettle dominant grand narratives and furnish historians with substantial evidence to reconsider civilisational chronologies. Keezhadi, in particular, illuminates the history of Tamilakam, a vast cultural region that once included Kerala, complementing earlier discoveries such as the Indo Roman maritime trade evidenced at Pattanam, Paravur, and Kodungallur, which enriched regional historical consciousness and stimulated new forms of public history. Excavations at Keezhadi by the Tamil Nadu State Department of Archaeology reveal an urbanised, mercantile, and literate society flourishing as early as the sixth century BCE, a finding that challenges entrenched periodisations and destabilises Aryan and Vedic centred historical frameworks. In its material complexity and urban form, Keezhadi lends renewed force to arguments regarding indigenous Dravidian roots of early civilisation, a possibility that has provoked predictable resistance from Hindutva oriented ideological

formations. The demand that the Keezhadi report be revised, advanced through the institutional authority of the ASI, reflects a broader political effort to align Indian nationalism with a narrowly defined Vedic and North Indian past, rather than acknowledging a historically grounded, regionally diverse, and empirically verifiable civilisational history.

The archaeological excavations at Keeladi in the Vaigai river valley compel a fundamental rethinking of early historic urbanisation in South India. Long marginalised within dominant narratives of Indian urban history, the Tamil region has often been positioned as peripheral to the processes described as the Second Urbanisation. The material evidence from Keeladi disrupts this assumption, revealing a planned, literate, and economically complex urban settlement dating to the early first millennium BCE. This article situates Keeladi within broader debates on urbanisation and the Second Urbanisation, arguing that the site necessitates a plural reconfiguration of the concept itself. It further examines the politics surrounding the excavation, documentation, and public dissemination of Keeladi's findings, demonstrating how archaeological knowledge becomes entangled with contemporary ideological struggles.

Advent of Amarnath

The rediscovery of Keeladi is inseparable from the intellectual perseverance and professional courage of K. Amarnath Ramakrishna, an archaeologist whose commitment to empirical evidence transformed an unassuming landscape into one of the most consequential sites in early Indian history. Trained within the disciplined conventions of archaeological fieldwork yet guided by a rare interpretive clarity, Amarnath approached Keeladi not as a routine excavation but as an unresolved historical problem. His work unfolded with the patience of an investigator, attentive to fragmentary clues and resistant to inherited chronologies that had long constrained the writing of early South Indian history. In this sense, Amarnath may be understood as a detective archaeologist, assembling a coherent urban narrative from scattered material traces and allowing the stratigraphy itself to challenge entrenched assumptions.

The setting of this discovery was neither monumental nor spectacular. It was a quiet coconut grove along the Vaigai river valley, cultivated across generations, its surface shaped by agrarian continuity rather than historical rupture. Beneath this seemingly ordinary landscape lay the material remains of an early urban settlement, preserved not by abandonment but by sustained human use. Brick structures, ceramic assemblages, industrial installations, and inscribed pottery fragments surfaced gradually, revealing a dense and carefully organised urban fabric. The grove thus functioned as an inadvertent archive, sheltering a buried city whose historical significance had escaped recognition precisely because it was embedded within a living landscape

Maharaja and the Accidental Turn

An important yet often overlooked moment in this rediscovery involves a lorry driver named Maharaja engaged in transporting soil from the coconut grove. Repeated encounters with brick fragments and pottery embedded in the earth prompted his observation that the land concealed something more than agricultural soil. His attentiveness, and his decision to report what he encountered, played a crucial role in drawing scholarly attention to the site. This episode underscores archaeology as a social practice, where knowledge emerges not solely through institutional foresight but through contingent acts of observation by those whose labour brings them into direct contact with the material past. The unearthing of Keeladi thus reflects an intersection between professional archaeology and vernacular witnessing.

Despite the significance of these discoveries, the subsequent trajectory of Keeladi has been marked by institutional resistance. The central government's refusal to release the excavation reports and documentation submitted by Amarnath Ramakrishna as public records raises serious concerns regarding transparency and scholarly accountability. Such documents constitute collective intellectual resources, essential for independent scrutiny and historical debate. Their continued suppression introduces a disquieting disjunction between archaeological evidence and its official circulation.

The political context of this silence cannot be overlooked. Keeladi destabilises a homogenised civilisational narrative that privileges a singular northern core while relegating southern trajectories to cultural peripheries. Its implications for early literacy, urbanisation, and social organisation in the Tamil region sit uneasily with the ideological imperatives of right wing cultural nationalism, which seeks legitimacy through a narrowly curated past. In this context, bureaucratic delay assumes the character of ideological containment. Keeladi thus emerges not merely as an archaeological site, but as a contested historical intervention, where the authority to define the past becomes a matter of contemporary political struggle.

Artefacts Talking Real History

During the fourth season of excavation at Keezhadi, a total of 5,820 artefacts were recovered, all situated within a context indicative of organised urban activity. This included brick built architectural remains, terracotta ring wells, double vented roof tiles, and finger impressed channels used probably for rainwater harvesting, each pointing to a high degree of cultural organisation and technological competence. Among the more significant finds were fragments and remnants of gold ornaments, copper artefacts, iron tools, gaming pieces such as chessmen and hopscotch markers, ear ornaments, spindle whorls, sculptural fragments, and a substantial assemblage of terracotta figurines. Particularly noteworthy

is the recovery of terracotta beads, glassware, and semi-precious stones including agate, carnelian, and crystal, suggesting active engagement in personal adornment, craft production, and possibly long-distance trade networks.

The excavation also yielded a remarkably diverse range of ceramic types, distinguished by both quality and chromatic variation. These included black and red ware, black polished ware, red slipped ware, rouletted ware, and fragments of Arretine ware, collectively reflecting a synthesis of local technological expertise and sustained contact with external cultural spheres.

Of special significance is the recovery of a substantial number of graffiti marked potsherds, both pre firing and post firing, which point towards symbolic practices or modes of communication within the community. The presence of Tamil Brahmi inscribed fragments further substantiates the literacy of the early Tamil population and the existence of an established epigraphic tradition.

Given Keezhadi's geographical proximity to the temple city of Madurai, these findings together attest to the cultural complexity of an early Tamil urban civilisation. The material record indicates a well-developed socio economic and technological system functioning during the Early Historic period, situating Keezhadi firmly within the broader landscape of ancient urbanism in South India.

Urbanisation and the Limits of Existing Frameworks

Urbanisation is not reducible to the presence of large settlements alone. It entails durable social, economic, and spatial arrangements capable of sustaining dense populations over time. These include planned architecture, craft specialisation, systems of exchange, water management, and mechanisms of social coordination.

The concept of the Second Urbanisation, shaped primarily through evidence from the Gangetic plains, has privileged particular markers such as monumental architecture, coinage, and strong political centralisation. While these features characterise some early historic cities, their elevation to normative status has marginalised alternative urban forms. Keeladi demonstrates that urbanisation could emerge through different configurations, grounded in regional ecologies and social practices rather than imperial monumentalism.

The Vaigai Valley and Regional Urban Ecology

The Vaigai river valley provided an ecological foundation conducive to early urban growth. Flowing from the Western Ghats to the eastern plains, the river enabled agricultural surplus, facilitated mobility, and connected inland settlements to maritime trade networks. Keeladi's position within this landscape reflects deliberate spatial choice rather than accidental settlement. The density of early historic sites along the Vaigai suggests

that Keeladi formed part of a broader urban constellation. This regional pattern parallels river based urban systems elsewhere in the subcontinent, yet follows a distinct ecological trajectory shaped by monsoonal rhythms and coast connectivity.

Urban Form and the Built Environment

Architectural remains at Keeladi reveal a settlement marked by sustained infrastructural investment. Brick structures, tiled roofs, drainage systems, ring wells, and industrial installations indicate civic planning and collective regulation. Stratigraphic continuity points to long term habitation rather than episodic occupation. Urban life at Keeladi appears to have prioritised functionality and habitability over monumental display. Spatial differentiation suggests the coexistence of residential, productive, and possibly commercial zones, reinforcing its urban character.

Economy, Craft, and Exchange

The material assemblage at Keeladi reflects an economy characterised by craft specialisation and circulation. Ceramics of varied types, bead making debris, metal artefacts, and spindle whorls indicate both household and specialised production. The presence of imported materials suggests participation in wider exchange networks extending beyond the immediate region.

This economic structure complicates assumptions that early urbanisation in India was uniformly state driven. Keeladi points instead to a commercially vibrant urban society sustained through networks of production and exchange.

Literacy and Urban Society

The presence of Tamil Brahmi inscriptions on everyday ceramic fragments indicates that literacy was embedded within daily urban life. Writing functioned as a practical social technology rather than a restricted elite instrument. Its diffusion suggests a society in which economic and social transactions required symbolic marking and record keeping. Literacy at Keeladi thus aligns with, yet also expands, conventional understandings of the Second Urbanisation.

Keeladi and the Second Urbanisation Reconsidered

Chronologically, Keeladi belongs firmly within the temporal horizon of the Second Urbanisation. Conceptually, however, it challenges the spatial exclusivity of the model. Rather than a singular northern phenomenon, the Second Urbanisation must be understood as a set of parallel, regionally specific processes.Keeladi represents one such trajectory, shaped by the ecological, economic, and cultural conditions of the Tamil region. Its recognition pluralises early Indian urban history and resists hierarchical civilisational narratives.

What AMS Dating Reveals

To establish the chronology and authenticity of the Keezhadi finds, the Tamil Nadu State Department of Archaeology subjected selected artefacts to Accelerator Mass Spectrometry (AMS) dating, a highly precise method of radiocarbon analysis capable of dating even minute organic samples. During the fourth season of excavation in 2018, six carbon samples were analysed at the Beta Analytic Laboratory in Florida, yielding dates ranging from the sixth to the third centuries BCE. The deepest stratigraphic layer, at 353 cm, corresponds to the late sixth century BCE, while material from 200 cm dates to the early third century BCE; when read alongside the substantial cultural deposits above and below these layers, the occupational span of Keezhadi can be securely placed between the sixth century BCE and the first century CE. These results challenge earlier assumptions that the Early Historic phase in Tamil Nadu commenced only in the third century BCE. As noted by Prof. K. Rajan, the discovery of extensive brick-built structures and associated economic indicators points to a second phase of urbanisation beginning as early as the sixth century BCE, a chronology now corroborated by comparable AMS dates from sites such as Kodumanal, Alagankulam, and Porunthal. The material record further reveals a stable and technically advanced settlement, with high-quality construction materials and Tamil-Brahmi inscriptions attesting to early literacy, alongside faunal evidence indicating an agrarian economy grounded in animal husbandry.

Placed within a wider temporal frame, Keezhadi assumes even greater historical significance. Palaeolithic samples from nearby Attirampakkam, dated through cosmogenic nuclide analysis, situate the region within the Lower and Middle Palaeolithic, while Mesolithic, Neolithic, and Megalithic remains across the Vaigai, Tirunelveli, and Gundar river valleys attest to long-term human occupation. AMS dates from Iron Age megalithic sites such as Salem, Adichanallur, Mayiladumparai, and Sivagalai, released in 2024, push the use of iron in southern India back to the third millennium BCE, suggesting its possible contemporaneity with the Bronze Age Indus civilisation and repositioning the Dravidian regions as early centres of metallurgical innovation. Together, these findings compel a reassessment of the Sangam period chronology and decisively undermine the notion that the second urbanisation was confined to the Gangetic plains. While officially framed in scholarly terms, the implications of Keezhadi are unavoidably political: in a landscape where archaeology is repeatedly mobilised to authorise competing nationalisms, the past is no longer treated solely as an object of empirical inquiry, but as a contested terrain of civilisational legitimacy.

Keeladi compels a reconsideration of both urbanisation and the Second Urbanisation in early India. Its evidence reveals a form of urban life that was planned, literate, economically complex, and socially embedded, yet distinct from northern paradigms. Equally significant is the

contemporary politics surrounding its documentation and interpretation, which reveal how archaeological knowledge itself becomes a site of contestation. By restoring southern India to the centre of early historic debates, Keeladi destabilises inherited hierarchies and invites a more plural, regionally attentive understanding of India's urban past. ***While I interviewed Amarnath Ramakrishna, he remarked that he had unearthed data, objective data, pertaining to the past of South India and, consequently, he was disinclined to amend the report submitted to the Government and remained prepared to confront any challenge to his report predicated upon a scientific understanding of the past rather than political considerations. That is where science assumes primacy in shaping perspectives on the past, not fiction.***

Recap of Major Findings/ Perspectives

- Keezhadi, located in the Vaigai river valley, constitutes one of the most significant archaeological sites for rethinking early historic urbanisation in South India.
- Excavations led by K. Amarnath Ramakrishna established the site as a planned and enduring urban settlement through rigorous stratigraphic and material analysis.
- AMS dating securely places Keezhadi's principal occupation between the sixth century BCE and the first century CE, extending the Early Historic phase of Tamil Nadu by several centuries.
- Architectural remains including brick-built structures, ring wells, roof tiles, and water management systems indicate sustained civic planning and infrastructural sophistication.
- The site provides clear evidence for a southern trajectory of the Second Urbanisation, challenging the long held Gangetic centred model of early urban resurgence.
- Material culture points to specialised craft production, commercial exchange, and long-distance trade networks connecting inland Tamil settlements to wider Indian Ocean circuits.
- Tamil Brahmi inscriptions on everyday pottery demonstrate that literacy functioned as a social practice embedded within urban life rather than as an elite or ritual monopoly.
- Faunal and artefactual evidence indicates a stable subsistence economy based on agriculture, animal husbandry, and artisanal production.
- Keezhadi repositions Tamilakam as a central, not peripheral, participant in early Indian civilisation, with implications for Kerala and the wider southern peninsula.
- The contested circulation of excavation reports highlights the growing politicisation of archaeology and the use of the past in contemporary ideological projects.

An Intellectual Exchange Between Mahatma Gandhi and Sree Narayana Guru

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Both Mahatma Gandhi and Sree Narayana Gurudev require no special introduction to the academic world of budding civil service aspirants. Sree Narayana Guru, popularly known as Gurudevan, was born in 1854, 15years prior to the birth of Mahatma Gandhi. Viewed from that angle, both of them were contemporaries, though living in two distant corners of India. Legendary icons of any nation earn a niche in the social and historical firmament of that nation by virtue of their cultural impact. Thus, both Mahatmaji and Gurudevan may be described as characters timeless, inspirational and larger than life. Both of them led legendary lives and are still remembered today for their contribution in strengthening the social fabric of their mother land. Both Mahatmaji and Gurudevan shaped values, ideas and also the identity of their country, in a manner unparalleled in the history of mankind. Stories about Gandhiji and Gurudevan can be re- told umpteen number of times, each narration having a fragrance of its own. Mahtmaji and Gurudevan are undoubtedly legendary icons whose impact transcends time and continues to inspire generations.

To begin chronologically, Sree Narayana Guru was an Indian social reformer, poet and also a Hindu sage who led a movement against the cursed caste system in Hinduism. According to Gurudevan all people are equal in the eyes of God and hence belong to one caste, the cast of humanity. Gurudevan expressed this outlook of his through his world famous saying "One caste, One religion, One God for humanity". Gurudevan sought to end the oppression of people in the lower strata of society and emphasized the importance of education by asking the subaltern to get educated. As part of his attempts to eradicate casteism, he founded temples that were open to people of all castes.

Mahatmaji needs no special introduction to humanity. Perhaps the best tribute Mahatmaji received was when Albert Einstein said on hearing of the death of Mahatmaji that 'Generations to come will scarce believe that such a one as this ever in flesh and blood walked upon this earth." Gandhiji believed that political freedom was meaningless without social equality and moral uplift. Knowingly or unknowingly Gandhiji was echoing the words of Gurudevan who too tried to remove deep rooted social evils.

Both Gandhiji and Gurudevan were against the curse of untouchability. Gandhiji considered the untouchables Children of God and so he called them Harijans, although that word is taboo now. (Hari means God and Jan means people, meaning people of God).Gandhiji and Gurudevan emphasized the importance of education. Gandhiji too established places of worship and exhorted the public to treat all human beings as equals. Gandhiji and Gurudevan emphasized the need for communal harmony and worked to unite the people of not only different communities, but also different religions. Similarly, both of them stressed the importance of simple living, cleanliness and self-reliance.

It is in this connection that the meeting of Gurudevan and Mahatmaji on 12th March, 1925 assumes significance. The historic meeting took place in Shivagiri Mutt. The main topics of discussion were the Vaikom Satyagraham in particular and social discrimination, untouchability religious conversion and the uplift of the downtrodden. in general. Gandhiji had come to Kerala in connection with the Vaikom Satyagraham, a protest against caste-based discrimination that prevented lower castes from using the roads around the famous Mahadevar temple in Vaikkom.Kerala was notorious for its caste-based discrimination, a curse that made Swami Vivekananda lament that Kerala was a lunatic asylum.

The meeting highlighted their shared vision for a society free of all discrimination. It is said that Mahatmaji was deeply impressed by Gurudevan's emphasis on education. Like Gurudevan, Mahatmaji too believed that emancipation and enlightment were possible only through education. Gurudevan's arguments appeared to possess crystal clear clarity. His opinions were logical. During the historic meeting, Gurudevan told Mahatmaji that equality of all people was identical to a single sap flowing through all the leaves of a tree. This analogy highly impressed Gandhiji and greatly influenced his views on the Varna system. Gandhiji was taken on a campus tour of Shivagiri Mutt and it is said that he was highly impressed with the ambience as well as the meticulous administration of the Mutt.

This meeting between the two legendary icons of India can be rightly considered as an important inter section in modern Indian social and spiritual history. Beyond a mere courtesy visit, that meeting carried symbolic, social and moral significance. It was an exchange of ideas between two great reformers who were also the apostles of non-violence.

Gandhiji's and Gurudevan's 'karma bhoomi' as well as approaches were totally different. But their messages tallied and synced. Uplifting the oppressed and ensuring equality were of utmost importance to both of

them. Gurudevan's message, the Adwaitha manthram "Oru Jaathi, Oru Madhom, Oru Dhaivam Manushyanu" was the need of the hour, according to Gandhiji, who felt that this message had the potential to reform the entire nation, not just the state of Kerala. The meeting between these two iconoclasts amplified Gurudevan's message to a national audience and earned for it pan Indian significance. Ironically, today this is the message that need to spread its aroma in the nook and corner of India. The movement initiated by Gurudevan for eradicating untouchability and to get rid of casteism also came to be noticed by the social workers across the country. The historic meeting between the two legends strengthened temple entry movements, educational reforms and also social equality movements.

Gurudevan had succeeded in uplifting the backward classes of Kerala, especially the Ezhavaa community and Gandhi's recognition validated this progress. Their meeting symbolized a joint effort against caste discrimination within the Hindu community. Both Gandhiji and Gurudevan were opposed to confrontations of all sort. Theirs was the path of attaining their goals through education, internal reformation and peacefully uniting to attain their goals. What both Gandhiji and Gurudevan desired was the moral purity to weed out casteism. If Gurudevan was the leading light of universal spirituality, Mahatmaji succeeded in elevating political activism to ethical levels. Their meeting was an amalgamation of spiritual reforms, social upliftment and also national freedom. For both of them, India's freedom struggle was not a mere political tool to get rid of the English from India, but an opportunity for moral and spiritual awakening.

Later history has proved that the meeting of these two luminaries was a morale booster and catalyst for SNDP Yogam, pro temple activists and educational reformers. Social activists were awakened to the truth that social equality and national progress go hand in hand. Gandhiji and Gurudevan felt immense respect for each other after the historic meeting. For both of them, their lives were their greatest messages to the world. Gurudevan respected Gandhiji's efforts to unite the whole of India using the twin weapons of Ahimsa and Nonviolence. Naturally this mutual respect for each other created a moral foundation for India's social reformation. It represented the convergence of two powerful philosophies –the philosophy of equality and human dignity. It also reinforced Kerala's social reformation and connected it to national awakening.

Re-Industrialisation Towards the End of the Colonial Rule

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The history of industrial development in India is a narrative of profound transformation, moving from a position of global dominance to systemic decline, and finally to a hard-won re-industrialisation. This process of re-industrialisation began to take root toward the beginning of the 20th century, primarily through the persistent efforts of indigenous capital and entrepreneurship. This movement was not merely a commercial endeavour but a deeply nationalistic one, gaining its primary thrust from the Swadeshi movement, which advocated the establishment of new, native-controlled industries.

Before this revival, India had suffered a period of de-industrialisation as a direct consequence of the Industrial Revolution in Britain and Europe. During this era, imperial powers viewed colonies primarily as sources for raw materials and captive markets for finished European products. As Karl Marx famously noted, Britain "inundated the very mother country of cotton with cottons," highlighting the exploitative economic cycle that dismantled traditional Indian manufacturing.

The Context of De-industrialisation

To understand the re-industrialisation of the late colonial period, one must first examine the scale of the economic erosion that preceded it. In the pre-colonial period, India was an economic powerhouse, holding a 25% share of world GDP. However, by 1900, this share had plummeted to less than 5%, a decline driven by the industrialisation of Britain and the simultaneous de-industrialisation of the Indian subcontinent.

One of the primary agents of this decline was, paradoxically, a hallmark of modern technology: the railways. While often viewed as a tool of progress, the sources indicate that railway technology—itself a product of the British Industrial Revolution—acted as an agent of de-industrialisation by facilitating the rapid movement of raw materials from the interior to the ports and the distribution of British finished goods back into Indian markets. This dynamic shifted further after 1857, as colonial policies transformed India into a supplier of raw materials for Britain's industrial base. The opening of the Suez Canal further intensified this "systematic de-industrialisation" by serving as a trade highway that accelerated the drain of Indian wealth. Consequently, indigenous handicrafts declined, leading to massive unemployment and widespread poverty.

The Pre-Colonial Industrial Legacy

The sources highlight that before British intervention, India possessed a stable and independent economy characterized by self-sufficient agriculture and a flourishing trade in silk, handicrafts, and fine cotton textiles. Textiles such as malmalshahi were world-renowned. Furthermore, Indian metallurgy was exceptionally advanced; the Tamils of the Chera Dynasty produced Wootz steel, which was used to forge the legendary Damascus swords.

Internal demand was sustained by royal Kharkhanas, which met the needs of princes for fine textiles, weapons, and ornaments. However, the British structure dismantled this indigenous framework. Economic historians like Dadabhai Naoroji argued that a primary element of the "drain of wealth" was the British policy of making store purchases directly from British markets rather than from Indian producers.

Intellectual Critique and the "Drain of Wealth"

The path toward re-industrialisation was paved by intellectual resistance. By the late 19th century, Indian thinkers began advocating the use of native products to bolster the domestic economy. Early critics like Raja Rammohan Roy highlighted how the British East India Company's monopoly, high export duties on Indian goods, and land revenue policies were devastating to Indian farmers and artisans.

The "drain of wealth" was quantified by several key figures:

Dadabhai Naoroji, in Poverty and Un-British Rule in India, estimated that one-fourth of the total annual revenue—approximately 12 million pounds—was drained out of India.

M.G. Ranade, in his 1899 work Essay on Indian Economics, argued that one-third of India's national income (roughly 16 million pounds) was being drained away.

William Digby, a British journalist, calculated the annual drain at a staggering 30 million GBP.

This systematic drain resulted in a critical absence of capital accumulation in Indian hands, which significantly delayed the possibility of indigenous industrialisation.

The Export-Oriented Phase and European Dominance

Industrialisation began to reappear at a slow pace toward the end of the 19th century. This was driven by several factors, including rising production costs in Britain caused by labour movements like the Chartist movement and new labour laws. By the 1850s, the British began investing in plantations—tea, jute, timber, and sugar—which led to the emergence of allied industries.

However, the colonial government was careful to exclude indigenous capital from these developments to ensure that all profits favoured British investors. This era is described as an Export-Oriented Phase, characterized by the rise of cotton textiles in Bombay and Ahmedabad and jute in Bengal. These industries were dominated by European managing agency houses, which acted as local agents for companies floated in Britain.

By 1914, six large expatriate firms—Andrew Yule & Company, Jardine, Skinner & Company, Bird & Company, Shaw Wallace & Company, Begg Dunlop & Company, and Heilgers & Co.—controlled more than half of the rupee capital in the tea (51%), jute (57%), and coal (52%) industries. These agencies enjoyed British patronage and actively discouraged Indian entry into this oligopolistic complex. These firms focused on foreign markets and benefited from an open economy that encouraged exports while offering no protection to Indian industries from imported goods.

The Swadeshi Movement: A Catalyst for Economic Self-Reliance

The true turning point for re-industrialisation was the Swadeshi movement. While the "Proto-Swadeshi" movement (1820–1857) and the efforts of intellectuals like Gopal Hari Deshmukh in 1849 laid the foundation, the movement gained massive momentum in 1905 following the Partition of Bengal by Lord Curzon. This political provocation led to a national call to boycott British goods and revive indigenous industries to achieve economic independence.

The movement fostered a spirit of self-help and "swadeshi temperament," supported by initiatives like the "Hindu Mela" in 1867 and the efforts of leaders like Nabagopal Mitra and Rajnarain Bose. A major concern for the movement was that the British owned all pharmaceutical and chemical industries, making a boycott of medicine difficult. This motivated Indian scientists to establish science-based swadeshi industries.

Pioneer Areas of Indigenous Industry

Textiles: As the primary focus of the movement, Manchester-made cloth was replaced by "Swadeshi" fabric. This led to the founding of the Banga Lakshmi Cotton Mills (1906) and Mohini Mills in Bengal, and provided a boost to mills in Ahmedabad, such as Arvind Mills

Pharmaceuticals: Acharya Prafulla Chandra Ray established the Bengal Chemical and Pharmaceutical Works Ltd. in 1901, pioneering the Indian pharma sector.

Shipping and Logistics: To challenge the British maritime monopoly, V.O. Chidambaram Pillai founded the Swadeshi Steam Navigation Company (SSNCo) in 1906, operating ships between Tuticorin and Colombo to compete with British firms.

Banking and Insurance: Indian entrepreneurs recognized that growth required native capital, as British banks often refused to lend to Indian ventures. This led to the birth of the Punjab National Bank (1894), Bank of India (1906), Canara Bank (1906), and the Central Bank of India (1911).

The Indian Industrial Conference

To provide a "practical" side to the political boycott, the first Indian Industrial Conference was held in December 1905 at Benares. Presided over by R.C. Dutt and attended by leaders like Lala Lajpat Rai, the conference served as a platform for entrepreneurs to share technical knowledge and discuss capital shortages. These discussions were instrumental in the founding of TISCO and various Swadeshi banks.

The Impact of Global Conflicts and the Great Depression

External global events further accelerated the shift toward indigenous manufacturing. The First World War and the Great Depression disrupted foreign trade, which inadvertently encouraged import substitution. During this period, industrial output began to be driven by the domestic market rather than foreign exports.

Significant transitions occurred within Indian business houses. The Birla Brothers, for example, moved from "bazaar" activities and opium speculation into mainstream manufacturing, eventually breaking European monopolies in the jute sector.

The Second World War necessitated a further shift into capital goods and technology-intensive areas. Indian managing agencies began producing textile machinery, chemicals, and engineering products to fill gaps caused by wartime supply chain disruptions.

Conclusion: The Legacy of the Colonial Era

By the end of the Second World War and the arrival of Independence, the landscape of Indian industry had fundamentally changed. The European managing agencies that had once dominated the economy began to pass into the control of Indian houses, particularly the big Marwari houses. In technologically complex industries, new arrangements were formed between Indian agencies and multi-national companies.

Ultimately, despite the systemic de-industrialisation imposed by colonial rule, the late colonial period witnessed a resilient revival. Independent India did not start from scratch; it inherited a strong indigenous business class forged through decades of advocacy, the Swadeshi spirit, and the strategic utilization of global economic shifts. This class provided the foundation for the modern industrial state, proving that indigenous capital and entrepreneurship could successfully reclaim the nation's economic agency.

It Is Fifty Years Since the Emergency: Lessons on Liberty, Power, and Constitutional Morality

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On the night of June 25, 1975, a proclamation issued under Article 352 of the Constitution ushered India into a period that would later be recognised as one of the most consequential episodes in its democratic history. Civil liberties were suspended, political dissent was curtailed, and constitutional governance entered an extraordinary phase. Fifty years later, the anniversary of the National Emergency serves not merely as a historical marker, but as an occasion to reflect on the relationship between liberty, power, and constitutional morality in a democratic system.

The Emergency, which lasted until March 1977, formally ended with the restoration of electoral politics. Yet its institutional and legal implications continue to inform debates on constitutional safeguards, executive authority, and the role of courts. Revisiting this period is therefore not an exercise in nostalgia or attribution of blame, but an attempt to understand how constitutional systems respond under sustained political stress.

Context and Conditions Preceding the Emergency

The Emergency emerged against a backdrop of economic and political strain. The early 1970s witnessed rising inflation, food shortages, and the impact of the global oil crisis. Public dissatisfaction found expression through popular movements, most notably the Navnirman movement in Gujarat and the Bihar movement led by Jayaprakash Narayan, which articulated demands for systemic political reform under the banner of "Total Revolution."

The immediate constitutional trigger came on June 12, 1975, when the Allahabad High Court set aside Prime Minister Indira Gandhi's election on grounds of electoral malpractice. The judgment introduced significant political uncertainty. In this context, the emergency powers provided under the Constitution were invoked, marking a decisive shift from political contestation to constitutional exceptionalism.

Executive Power and Suspension of Liberties

Once the Emergency was proclaimed, the constitutional landscape changed rapidly. Fundamental rights under Article 19 were suspended, preventive detention laws were widely applied, and press censorship was instituted. A large number of political leaders and activists were detained, often without prompt judicial review.

These measures were carried out through legal instruments that were constitutionally authorised, illustrating a critical distinction between legality and legitimacy. The Emergency demonstrated how constitutional

provisions, when interpreted expansively and applied without adequate restraint, can result in significant curtailment of democratic freedoms.

Judicial Response and ADM Jabalpur

The role of the judiciary during the Emergency remains a central element of constitutional reflection. In *ADM Jabalpur v. Shivkant Shukla* (1976), the Supreme Court held, by a majority of four to one, that during the Emergency, citizens could not approach courts for enforcement of the right to life and personal liberty.

This judgment is widely regarded as a moment when judicial protection of fundamental rights receded in deference to executive authority. Justice H.R. Khanna's dissent, which affirmed that the right to life existed independently of constitutional suspension, later assumed lasting significance in constitutional jurisprudence.

The eventual overruling of *ADM Jabalpur* and subsequent rights-expansive judgments reflect institutional self-correction. Nevertheless, the case remains a reminder that constitutional courts play a crucial role during periods of exceptional power concentration, and that judicial independence is most tested not in ordinary times, but during crises.

Preventive Detention and Post-Emergency Continuities

One of the enduring legacies of the Emergency has been the continued reliance on preventive detention within India's legal framework. The 44th Constitutional Amendment sought to introduce safeguards, including limiting detention periods and strengthening oversight mechanisms. However, key provisions of this amendment were never operationalised.

Judicial decisions such as *A.K. Roy v. Union of India* (1981) upheld preventive detention laws while recognising delays in reform. Over time, statutes such as the National Security Act and the Unlawful Activities (Prevention) Act have continued to permit detention without trial under specific conditions.

While these laws operate within a constitutional democracy and under judicial oversight, their persistence raises broader questions about balancing national security and individual liberty—questions that trace their lineage to Emergency-era legal reasoning without equating present conditions with that period.

Federalism and Institutional Balance

The Emergency also affected India's federal structure. Through constitutional amendments and parliamentary action, the balance between the Union and the States shifted significantly. The 42nd Constitutional Amendment expanded parliamentary authority, limited judicial review, and altered the federal equilibrium.

Although many of these changes were later reversed, the episode highlighted the vulnerability of federal arrangements during periods of political centralisation. It underscored the importance of multiple centres of power and institutional checks in maintaining democratic resilience.

International Human Rights Perspective

Contemporary assessments by international human rights bodies provide an additional lens for reflection. Observations by the UN Human Rights Committee under the International Covenant on Civil and Political Rights have noted areas where domestic legal frameworks diverge from international norms, particularly in relation to preventive detention, undertrial populations, and access to bail.

These observations do not characterise present-day India as operating under emergency conditions. Rather, they underscore the importance of continuous review and alignment of security laws with constitutional and human rights standards.

Commemoration and Democratic Memory

Initiatives to commemorate fifty years of the Emergency—through exhibitions, public programmes, and educational efforts—serve an important civic purpose. Democratic memory functions not only to recall past excesses, but to cultivate awareness of constitutional values among newer generations.

Such remembrance is most meaningful when it encourages institutional introspection and civic vigilance, rather than when it is reduced to symbolic observance.

Constitutional Morality as a Safeguard

The Emergency illustrates that constitutional governance depends not solely on textual provisions, but on constitutional morality—the restraint exercised by those in authority and the commitment of institutions to their foundational principles. As Dr. B.R. Ambedkar cautioned, constitutional morality must be consciously cultivated.

The events of 1975–77 demonstrate how the erosion of institutional restraint can occur incrementally, even within a formal constitutional framework. At the same time, the restoration of democracy illustrates the capacity for correction through electoral accountability and institutional reform.

Conclusion

Fifty years after the Emergency, India continues to function as a constitutional democracy with robust political participation and resilient institutions. Yet the Emergency remains relevant as a reference point for understanding how democratic systems respond to stress.

Its principal lesson is not confined to a specific historical moment. It lies in the recognition that liberty requires sustained protection, institutional independence demands constant reinforcement, and constitutional morality must guide the exercise of power. Remembering the Emergency, therefore, is less about revisiting the past than about reinforcing the constitutional commitments that safeguard the future.

A Millennium of Conquest: Rajendra Chola I's Northern Expedition and the Legacy of Gangaikonda Cholapuram

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The Chola Empire reached the pinnacle of political, military, and cultural power during the reign of Rajendra Chola I (1014–1044 CE), who had inherited a strong and organised kingdom from his father, Rajaraja Chola I. While Rajaraja had laid the foundations of a unified and prosperous South Indian empire, it was Rajendra who expanded its influence beyond regional boundaries, creating a pan-Indian and overseas power. His most celebrated achievement, the northern expedition that culminated at the banks of the river Ganga, marked not only a turning point in early medieval Indian history but also a redefinition of imperial authority. The expedition earned him the enduring title of "Gangaikonda Chola," and symbolised the reach of a southern kingdom into the traditional political heartland of India.

The Northern Expedition: Strategy, Symbolism, and Prestige Politics

The northern expedition, undertaken between 1019 and 1022 CE, was not aimed at permanent annexation but at asserting symbolic supremacy. Contemporary inscriptions, especially the Tiruvalangadu Plates, detail the journey of Rajendra Chola's forces across eastern India. His army is said to have subdued several regional powers, including the rulers of Kalinga, Andhra, and parts of Bengal, before confronting the Pala ruler Mahipala. The symbolic act of reaching the Ganga and carrying its sacred waters back to the Tamil country was a calculated assertion of imperial legitimacy. In Indian political thought, control over the Ganga had long been associated with sovereignty, and Rajendra's expedition demonstrated that political authority could emanate from the South, challenging the traditional north-centric conception of power. Scholars like K.A. Nilakanta Sastri emphasise that this campaign was as much about ritual legitimacy and prestige politics as about military conquest.

A Contrasting Historical Interpretation: Limits of Chola Power

Some historians, however, offer a more cautious interpretation of the northern expedition. Scholars such as Burton Stein argue that the Chola campaign should be understood primarily as a symbolic raid rather than an indicator of sustained pan-Indian political control. According to this view, the absence of permanent administrative structures or long-term military presence in the Gangetic region suggests that Chola authority remained fundamentally regional in nature. The expedition, therefore, reflected the performative aspects of kingship and ritual sovereignty rather than a transformation of India's political geography. This interpretation

highlights the limits of imperial reach in early medieval India and balances celebratory narratives of Chola expansion.

Gangaikonda Cholapuram: Architecture as an Expression of Sovereignty

To commemorate this extraordinary achievement, Rajendra Chola founded a new imperial capital, Gangaikonda Cholapuram, designed as a rival to Thanjavur, the earlier capital of the Chola dynasty. The city's layout and monumental structures reflected imperial ambition, blending functionality with grandeur. The Shiva temple of Gangaikonda Cholapuram, which echoes yet refines the architectural style of the Brihadeeswara Temple, became the focal point of the city. Its towering vimana, intricate carvings, and precise alignment with cardinal directions symbolised both religious devotion and imperial authority. The ceremonial integration of Ganga water into the temple and city further reinforced the notion that the Chola kings were universal sovereigns capable of connecting southern India with the sacred northern river. In essence, the capital was a statement of power written in stone—a lasting testament to Chola confidence and sophistication.

Administrative Maturity and Governance of a Vast Empire

Rajendra Chola's reign also represented the maturity of Chola administrative systems. Governance was characterised by a balance between central authority and local self-governing institutions, particularly the village assemblies known as ur and sabha. Land surveys and meticulous revenue assessments ensured the collection of taxes, while temple-centred economic activities acted as hubs of wealth, production, and employment. These administrative innovations made it possible to manage a sprawling empire, finance long-distance campaigns, and maintain political stability across regions as diverse as present-day Tamil Nadu, Andhra Pradesh, Odisha, and Bengal. Such organisational efficiency was key to sustaining the Chola military machine and projecting power over both land and sea.

Maritime Expansion and Overseas Power Projection

Indeed, Rajendra Chola's vision was not limited to continental conquest. He extended Chola influence beyond the Indian subcontinent through maritime expeditions against the Srivijaya Empire in Southeast Asia. These campaigns, conducted with a well-organised navy, aimed at controlling key maritime trade routes in the Bay of Bengal and the Malacca Straits, securing both wealth and strategic advantage.

Inscriptions recovered in Sumatra, the Malay Peninsula, and Java record the presence of Chola forces and tribute collection, confirming that the Cholas were active participants in early medieval maritime diplomacy. By projecting power across the seas, Rajendra Chola anticipated a global strategy centuries before the rise of modern colonial empires. His expeditions also facilitated cultural exchange, spreading Tamil art, architecture, and religious practices throughout Southeast Asia, evidence of India's early soft-power diplomacy.

Cultural Integration and the Reimagining of Tamil Kingship

The northern expedition and subsequent capital-building had profound cultural and symbolic implications. By integrating northern sacred geography into the southern empire, Rajendra Chola reshaped the perception of Tamil kingship and imperial authority. The Gangaikonda Cholapuram temple became a model of Chola temple architecture, inspiring later developments in the Hoysala and Vijayanagara kingdoms. Literary works, inscriptions, and temple sculptures from this period celebrate the king as a dharmic ruler, a conqueror, and a cultural patron, illustrating how political power and cultural patronage were inseparable in medieval South India.

Contemporary Relevance and Strategic Legacy

The legacy of Rajendra Chola continues to resonate in contemporary India. Gangaikonda Cholapuram, now part of UNESCO's tentative World Heritage list, has become a focal point of heritage conservation, tourism, and cultural diplomacy. Historians and policymakers increasingly invoke the Chola model of continental and maritime engagement to highlight India's historical links with Southeast Asia and the Indo-Pacific region. The Act East Policy, in particular, mirrors aspects of Chola-era diplomacy: balancing regional power projection, maritime trade, and cultural exchange. In addition, the temple's architectural and urban innovations continue to inform heritage management and restoration practices, linking medieval history with modern governance and planning.

UPSC-Relevant Analytical Dimensions

From a UPSC perspective, Rajendra Chola's northern expedition provides multiple analytical dimensions: military strategy, political symbolism, administrative efficiency, cultural patronage, and international relations. Evidence from inscriptions, temple architecture, and contemporaneous literary works underlines the Cholas' ability to combine territorial ambition with symbolic authority, while overseas campaigns demonstrate an early understanding of maritime power projection. Modern parallels in India's foreign policy reinforce the relevance of this history, showing how past models of integrated governance and cultural diplomacy can inform contemporary strategic thinking.

Conclusion: Vision, Power, and Enduring Influence

In conclusion, Rajendra Chola I's northern expedition was far more than a military triumph. It represented a visionary redefinition of political authority in early medieval India, demonstrating that imperial power could emerge from regions outside the Gangetic plain. The founding of Gangaikonda Cholapuram symbolised this shift, leaving behind a legacy of administrative efficiency, cultural brilliance, and strategic foresight. A millennium later, the lessons from Rajendra Chola's reign—effective governance, confident cultural identity, and strategic ambition—remain instructive for India's regional and global aspirations. In understanding the Chola model, one appreciates how political vision, administrative skill, and cultural patronage together form the foundation of enduring power.

Information, Artificial Intelligence and the Quantum Future

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Well-known author Yuval Noah Harari, in his latest book Nexus, highlights the central role of information in human development and argues that information is, in fact, power. Throughout history, information has been used to build great civilizations, to govern societies, and, at times, to destroy them. Human history is replete with evidence of how control over information has shaped the fate of societies. Today, armed with the transformative power of artificial intelligence (AI), humanity stands at the threshold of yet another era—one whose true nature may only become clear after we have fully entered it. Social scientists describe the present phase of technological transformation as the Fourth Industrial Revolution. This phase is distinct from the Third Industrial Revolution—driven by semiconductor electronics—because of the emergence of technologies capable of processing vast amounts of data and learning from it in ways that resemble human cognition, using the tools of mathematics, statistics, and data science. The Fourth Industrial Revolution has already begun to influence nearly every aspect of daily life. Society is undergoing rapid change as it seeks to harness the benefits of AI for social good while simultaneously grappling with the profound challenges it poses. Today, even the attention of ordinary citizens is increasingly shaped by this emerging technology. It is in this context that we are witnessing another major scientific development: the Second Quantum Revolution. At its heart lies quantum information science, or more specifically quantum computing, which is widely expected to become a key enabler of the future of AI and data science. Human history is therefore entering a unique phase marked by the convergence of artificial intelligence and quantum technology.

Physics has repeatedly revolutionized human life, beginning with Sir Isaac Newton and his formulation of the laws of motion. These foundational discoveries ignited the earliest industrial revolutions. As physics progressed, other branches of science and technology evolved alongside it. At the dawn of the twentieth century, great scientists such as Einstein, Schrödinger, Dirac, and Heisenberg showed that Newton's laws were only approximate, valid primarily for macroscopic systems. At the fundamental level, nature is governed by the principles of quantum mechanics. The consequences were profound: quantum physics transformed electronics and communication engineering and gave rise to

semiconductor technology, without which modern computing would be unimaginable. This transformation is now referred to as the First Quantum Revolution.

What, then, characterizes the Second Quantum Revolution? In brief, while today's electronic devices—such as transistors—already rely heavily on quantum mechanical effects in semiconductor materials, they still perform computations using classical digital (binary) logic. Quantum computers, in contrast, aim to perform computation by directly exploiting quantum mechanical behavior itself. In other words, classical computers use quantum physics to build devices that compute classically, whereas quantum computers use quantum phenomena as the computational resource. These phenomena include uniquely quantum concepts such as superposition and entanglement.

The fundamental unit of a quantum computer is the qubit (quantum bit), the analogue of the classical bit used in today's digital electronics. A classical bit can represent either a 0 or a 1, forming the basis of all digital computation. A qubit, however, can exist in a superposition of both states simultaneously—a purely quantum mechanical property. From a computational perspective, this enables the processing of an enormous amount of information in parallel, provided suitable mechanisms exist to control and manipulate these qubits. Such mechanisms are known as quantum gates, analogous to logic gates in classical computing.

A functional quantum computer, however, requires far more than qubits and quantum gates alone. It depends on a complex ecosystem of supporting systems, many of which are built using highly specialized classical electronic technologies. As a result, today's quantum computers are hybrid systems, combining delicate quantum components with sophisticated classical control and measurement infrastructure. This interdisciplinary field is commonly referred to as quantum engineering or quantum technology.

Since the emergence of quantum computing as a serious technological pursuit, major technology companies such as IBM and Google have invested heavily in building quantum processors with increasing numbers of qubits. The technical challenges are immense: qubits are extremely small and highly sensitive to environmental disturbances, or "noise." To preserve their quantum properties, most systems must operate at temperatures close to absolute zero, requiring advanced cryogenic technology. While IBM currently leads in terms of qubit count, with its latest Condor processor exceeding one thousand qubits, Quantinuum's Helios processor—based on superconducting qubits and featuring fewer than one hundred qubits—is widely regarded as among the most accurate. Other major players, including Google and D-Wave, have developed their own platforms with distinct strengths. Leading universities worldwide

have also launched aggressive research and training programs in quantum science and technology. Even if the much-discussed milestone of "quantum supremacy," popularized by physicist and author Michio Kaku, is not achieved in the immediate future, quantum computing is certain to reshape the long-term landscape of computation and communication.

It is generally accepted that quantum computers will not replace personal devices such as laptops. Instead, they are expected to revolutionize scientific and high-performance computing, tackling problems with unprecedented speed and accuracy—especially those long considered computationally intractable. In certain domains, quantum computers offer exponential advantages over classical machines, and current research suggests that aspects of AI may be among these beneficiaries. This prospect underlies the expectation that the convergence of AI and quantum computing will usher in a fundamentally new digital—or even quantum—age. Beyond AI, quantum computing is poised to transform quantum physics itself, enabling breakthroughs in materials discovery, quantum chemistry, drug design, and related fields. In short, the future promises to be quantum.

Axiom Mission: A Catalyst for India's Next Phase of Space Exploration and Global Collaboration

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Abstract

Axiom missions are orbital spaceflight missions that carry private and sponsored astronauts to the International Space Station (ISS). The missions are part of a broader effort to commercialize spaceflight beyond government programs to a sustainable market where research, tourism and national space goals coexist. Four Axiom missions are completed so far and our county played a crucial part in the fourth Axiom mission, Axiom-4 (Ax-4). For us, the mission serves as a catalyst that accelerated technological learning, international cooperation, scientific discovery and policy reorientation toward a more ambitious and globally integrated space programme.

Introduction

Axiom missions aim to commercialize human spaceflight by sending private astronauts to the International Space Station (ISS) for scientific research, technology demonstrations and outreach, fostering global collaboration and advancing space-based research. ISS is the largest human assembled structure in space, measuring about 109 meters end to end, roughly the length of a football field, orbiting the Earth roughly every 90 minutes. The structure is built through a partnership between different countries, including the U.S., Russia, Europe, Japan and Canada, serving as a unique platform for scientific research in microgravity and a testing zone for long-duration spaceflight technologies. Axiom space missions use SpaceX's Falcon 9 rocket and Crew Dragon spacecraft for crew transport to the space station. SpaceX is a private aerospace company founded by the technology entrepreneur and business magnate Elon Musk in 2002, with the aim of reducing the cost of space travel and making life multi-planetary. SpaceX is best known for developing reusable rockets like Falcon 9 and spacecrafts designed for missions to the Moon and Mars.

The Ax-1 mission (April 2022) was the first all-private crew to the ISS, featuring a four-person crew that conducted over 25 science experiments during a 17-day stay. Subsequent missions continued this, with Ax-2 (May 2023) and Ax-3 (January 2024), advancing microgravity research,

commercial activities and education. The Axiom Mission 4 (Ax-4), launched from NASA's Kennedy Space Center in June 2025, was an 18-day mission, which marked a significant milestone for our country by featuring the first astronauts from India, Shubhanshu Shukla, Peggy Whitson (USA), Sławosz Uznański (Poland) and Tibor Kapu (Hungary). Peggy Whitson was the commander and Shubhanshu was the pilot of the mission. Together, the international crew conducted 60 scientific studies representing 31 countries - making Ax-4 one of the most globally collaborative missions to date. As a key scientific contributor, the Indian Space Research Organisation (ISRO) utilized the Axiom-4 mission to conduct seven advanced microgravity experiments on the ISS. The experiments addressed global challenges in biology, agriculture and material science, reinforcing India's growing role in global space bioscience.

Strategic significance of Axiom-4 for India

The successful launch of the Axiom - 4 marked a watershed moment for India's space program. Forty-one years after wing commander Rakesh Sharma's historic voyage in 1984, Shubhanshu became the second Indian to travel to space and the first to visit the International Space Station under a government-sponsored initiative. As the pilot of the Ax-4 mission, Shubhamshu's mission was more than a symbolic gesture of national pride. It served as a critical catalyst for India's next phase of space exploration, bridging the gap between national aspiration and international collaboration. Shubhanshu gained invaluable, hands-on experience in spacecraft navigation, docking and crew coordination aboard the ISS. Ax-4 serves as a vital stepping stone in building India's own crewed mission operations infrastructure, offering first-hand experience in managing human spaceflight operations. The mission's objectives closely align with India's long-term space roadmap. The training modules, which covered advanced spacecraft systems, emergency protocols and microgravity adaptation, have directly enhanced the preparedness of the Indian human spaceflight programme.

The mission highlights a new era of 'democratized space' where smaller nations and private enterprises can engage in cutting-edge research. For India, it is a preparatory step for the upcoming Gaganyaan mission and the future Bharatiya Antariksha Station (BAS), demonstrating that 21st-century space exploration is best achieved through global partnerships. The experience gained from the stay aboard the ISS will definitely provide a template for BAS, which is set to be operational by 2035. Insights into in-orbit logistics, crew-ground communication and health telemetry are

crucial for designing India's independent space habitation modules. The Axiom-4 mission also underscores the shift toward commercializing Low Earth Orbit (LEO), which creates significant opportunities for the Indian space start-up ecosystem, encouraging private players to engage in global commercial missions. The partnership between Axiom Space and ISRO sets a precedent for public-private partnerships (PPP) in India. The mission, featuring 'Meet the Astronaut' sessions, will definitely inspires our students to pursue careers in STEM (Science, Technology, Engineering and Mathematics).

India's engagement in space economy is not incidental. Rather, it is a strategic choice to harness private innovation, reduce costs and cultivate an environment where scientific curiosity and economic opportunity coexist. Whether through research payloads, launch services or orbital platforms, Indian companies now have a foothold in the global space economy.

Conclusion

Axiom-4 is a watershed moment in India's space journey, transforming the nation from a spacefaring entity with high aspirations into a key stakeholder in the 21st-century global space race. By conducting critical scientific research and providing hands-on training to astronauts, the mission has laid a robust foundation for the Gaganyaan mission and the future Bharatiya Antariksha Station. The sight of an Indian astronaut aboard the ISS sparked a new wave of interest among students, scientists and entrepreneurs across India. Space exploration has always captured the human imagination.

The AI Revolution: Balancing Innovation with Ethical Governance and Human Dignity

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Artificial Intelligence (AI) is no longer science fiction. It is now a powerful reality, changing how we work, live, and think. From chatbots that answer our questions, to algorithms that decide who gets a loan or a job, AI is quietly reshaping the very social fabric we live in.

In India, we see AI in Aadhaar-based services, in health care applications, in agriculture advisories, and in smart city projects. Globally, AI is helping in drug discovery, climate modelling, and even in space exploration. But with great power comes great responsibility. As AI grows stronger, we must ask: Are we building a future that is not only smart, but also fair, just, and respectful of human dignity?

What is AI and Why Does It Matter?

AI means machines that can do tasks that normally requires human intelligence. These include understanding language, recognizing images, learning from previous data, and most of all, making decisions. For example, an AI system can look at millions of medical scans and learn to detect cancer better than many human doctors.

According to a 2023 report by McKinsey, AI could add about $500 billion to India's GDP by 2025. Globally, the AI market is expected to grow from about $150 billion in 2023 to over $1.5 trillion by 2030. In India, the government has launched the National Strategy for Artificial Intelligence and is promoting AI in education, health, and agriculture. Many startups and big companies are also investing heavily in AI. With such rapid development, today, AI is not just a tool; it is becoming a decision-maker. It decides who gets hired, who gets a loan, who is flagged by police systems, and even what news we see online. When machines make such important decisions, we must be very careful, or else, it will deepen inequality, spread bias, and harm human dignity.

The Promise of AI for Society

AI has many benefits in many areas, especially for a large and diverse country like India. In health, AI can help doctors diagnose diseases faster and more accurately. For example, AI tools are being used to detect diabetic retinopathy from eye scans, which is very useful in rural areas where there are few eye specialists. In education, AI based edtech applications can personalize learning, helping students learn at their own pace. In agriculture, AI can predict weather, soil conditions, and crop yields, helping farmers take better decisions.

AI can also improve governance. It can help in better targeting of welfare schemes, reduce corruption, provide early warnings and make

public services faster. In cities, AI can manage traffic, reduce pollution, and improve emergency response. In business and jobs, AI can increase productivity. It can automate routine tasks, freeing humans for more creative and meaningful work. A NASSCOM report says that AI could create 2–3 million new jobs in India by 2027, especially in data science, AI engineering, and digital services. All this shows that AI is not just a luxury; it is a necessity for development, growth, and inclusion.

Risks to Ethics and Human Dignity

But every powerful technology has a dark side. AI is no exception. If not developed with due diligence, AI may turn out to be a double-edged sword. One major risk is bias and discrimination. AI systems learn from data. If the data are biased, the decisions put forward by the AI system will also be biased. For example, if a hiring AI is trained on data where men were mostly hired for technical jobs, it may learn to prefer men over women. Similarly, if a loan-approval AI is trained on data where certain communities were denied loans, it may continue that discrimination. Studies from the US and Europe show that some facial recognition systems are less accurate for women and people with darker skin. In India, there are concerns that AI-based policing systems may unfairly target certain communities. This is not just a technical problem; it is a serious ethical and legal problem. It violates the right to equality and non-discrimination, which are part of our Constitution.

Another risk is loss of privacy. AI systems often need large amounts of personal data: our location, health records, financial details, and even our emotions (from voice and facial analysis). If these data are misused or leaked, it can lead to identity theft, blackmail, or surveillance. In 2023, a major data breach in a health app exposed the records of millions of users. This shows how fragile our digital privacy is.

Mass surveillance is another danger. Some economies and organisations are using AI to monitor people on a large scale. In some countries, AI is used to track political activists, journalists, and minorities. Even in India, there are concerns about the use of facial recognition in public places without proper laws or oversight. When people feel they are always being watched, they may stop speaking freely, which harms democracy and human dignity.

AI can also threaten jobs and economic security. While AI creates new jobs, it also automates many routine jobs, especially in manufacturing, call centres, and data entry. A World Bank report estimates that about 25% of the jobs in India are at high risk of automation. If we do not prepare our workforce with new skills, many people may lose their livelihoods, leading to unemployment and social unrest. There is also the risk of loss of human control. As the CEO of Google, Mr. Sundar Pichai once stated, "AI systems are growing to be more complex 'black boxes' – we cannot easily understand and explain how they make decisions." If an AI denies someone a loan or a job, it may be hard to explain why. This lack of transparency makes it difficult to hold anyone accountable. It also raises

philosophical questions: Should machines have the final say in matters that affect human lives? Where do we draw the line between human judgment and machine decision?

The Need for Ethical Governance

Given these risks, we cannot leave AI to the market alone. We need strong ethical governance – rules, institutions, and values that ensure AI is used for the common good.

Ethical governance means that AI should be:

- Fair and non-discriminatory: AI systems should not treat people unfairly based on caste, religion, gender, or any other ground.
- Transparent and explainable: People should be able to understand how AI decisions are made, especially when those decisions affect their rights.
- Accountable: There should be clear responsibility when AI causes harm. We cannot blame the "algorithm" and escape responsibility.
- Privacy-respecting: AI should not collect or use personal data without consent and proper safeguards.
- Human-centred: AI should serve humans, not the other way around. Human dignity, autonomy, and well-being should be at the centre.

In India, we already have some legal and institutional tools. The Constitution guarantees equality, privacy, and dignity. The Personal Data Protection Act, 2023 (once fully implemented) will provide a strong legal framework for data protection. The Digital Personal Data Protection Act, 2023, for example, requires consent, limits data use, and gives individuals rights to access and correct their data.

But laws alone are not enough. We need:

1. Clear AI regulations: India should have a specific AI Act or framework that sets rules for high-risk AI systems (like those used in hiring, policing, credit scoring, and health). These rules should require impact assessments, bias audits, and human oversight.
2. Independent oversight bodies: We need strong regulators – like a National AI Authority or a Data Protection Authority with AI expertise – that can monitor AI systems, investigate complaints, and impose penalties for misuse.
3. Ethical standards and certification: Companies and government agencies should follow ethical AI guidelines. There should be a system to certify AI systems as "fair", "transparent", and "privacy-friendly", similar to how we certify food or electrical appliances.
4. Public participation and consultation: AI policies should not be made only by experts and big companies. We must involve citizens, civil society, and affected communities in shaping AI rules. Public consultations, citizen juries, and ethics committees can help ensure that AI serves all sections of society. A Multistakeholder model needs to be implemented.
5. Global cooperation: AI does not respect national borders. India should actively participate in global AI governance efforts, such as those by

the UN, OECD, and G20, to shape international norms on AI ethics, safety, and human rights.

Protecting Human Dignity in the Age of AI

Human dignity is not just a philosophical idea; it is a legal and moral foundation of our society. The Indian Constitution, international human rights law, and many religious and cultural traditions, all emphasize that every person has inherent worth and must be treated with respect. AI can threaten dignity in many ways:

- When an AI system wrongly denies someone a job, a loan, or a welfare benefit, it can make that person feel powerless and humiliated.
- When AI is used for mass surveillance or social scoring (as in some economies), it can reduce people to mere data points, stripping them of their freedom and individuality.
- When AI replaces human interaction in care, education, or justice, it can make people feel isolated and dehumanized.

To protect human dignity, we must ensure that:

- AI does not replace human judgment in sensitive areas: In courts, hospitals, schools, and welfare offices, AI should support, not replace, human decision-makers. Final decisions on life, liberty, and livelihood should remain with humans.
- People have the right to opt out: In many cases, people should have the right to choose a human instead of an AI system, especially when the decision is important (like hiring, evaluation, sentencing, or providing medical treatment).
- AI systems be designed with empathy and inclusion: Developers should consult psychologists, social workers, and community leaders to ensure that AI systems respect cultural values, mental health, and emotional well-being.
- There is strong social safety net: As AI changes the job market, we need strong education, skilling, and social protection systems. Universal basic income, lifelong learning, and robust labour laws can help people adapt without losing dignity.

A Balanced Path Forward for India

India is in a unique position. We are a large democracy with a young, tech-savvy population and a strong tradition of justice and equality. We can show the world how to use AI for inclusive development, not just for profit or control.

Some practical steps India may consider are:

1. Prioritize high-impact, low-risk AI: Focus AI on areas like health, education, agriculture, and disaster management, where the benefits are clear and the risks can be managed. Avoid rushing into high-risk uses like predictive policing or social credit systems without strong safeguards.
2. Invest in AI literacy and ethics: Lawyers, judges, bureaucrats, and regulators must understand AI basics and its ethical implications.

Training programs, workshops, and courses on AI and law should be made mandatory for public officials.

3. Promote responsible innovation: The government should support startups and researchers who build ethical, transparent, and inclusive AI. Public funding for AI should be linked to compliance with ethical guidelines and data protection norms.
4. Strengthen data protection and privacy: The Data Protection Authority must be given real power, independence, and resources. Data should be collected only when necessary, stored securely, and deleted when no longer needed. Special care must be taken with sensitive data like health, caste, religion, and biometrics.
5. Ensure inclusive and participatory governance: AI policies should be debated in Parliament, state legislatures, and public forums. Marginalized communities, women, and youth should have a voice in shaping AI rules.
6. Build a culture of accountability: When AI causes harm, there should be clear legal remedies. Companies and government agencies should be liable for AI failures, just as they are for other products and services.

Reflections

The AI revolution is here. And it is here to stay. It brings great opportunities for growth, inclusion, and progress. It also brings serious risks to ethics, rights, and human dignity. The risks force ourselves to ask deeper questions about what kind of AI and what kind of a social fabric are we looking forward to.

Who benefits from this AI system? Who is at risk? Is it fair? Is it transparent? Is it accountable? Is it respectful of human dignity? Do we want a society where every decision is optimized for efficiency, but people feel alienated and powerless? Or do we want a society where technology serves human values – justice, compassion, freedom?

AI is a mirror. It reflects our data, our biases, our values. If we feed it with inequality and prejudice, it will amplify them. If we feed it with fairness, inclusion, and care, it can help build a better world.

The choice is not between AI and no AI. The choice is between a human-centred AI and a machine-centred AI. India, with its rich philosophical and legal traditions, can lead the way in building an AI that respects not only intelligence, but also wisdom, justice, and human dignity.

India must walk a careful path: embracing innovation while putting strong ethical governance in place. We must ensure that AI is fair, transparent, accountable, and respectful of privacy and human dignity. This is not just a technical challenge; it is a moral and political challenge. It requires the combined effort of scientists, engineers, lawyers, regulators, bureaucrats, civil society, and citizens.

If we act wisely and courageously, we can build an AI-powered future that is not only smart, but also just, inclusive, and truly human.

Sky High: The Rise of Drones

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The human desire to conquer the heavens has always been tied to our need to communicate and explore. Long before the first engine ever roared into life, we looked to the sky as a canvas for our dreams. In the famous Sanskrit poem *Meghadooth*, the poet Kalidasa wrote about a lover who sent his deepest thoughts to his beloved on a passing cloud. For centuries, this remained a beautiful story—the "messenger cloud" was a symbol of a reach that seemed impossible. Today, that ancient dream has moved from the paper of old India to the computer chips of the 21st century. The modern "*Meghadooth*" is the drone, or Unmanned Aerial Vehicle (UAV). From delivering mail in Singapore to watching over the high Himalayan mountains, drones have changed from secret military tools to a common part of our lives. They are now the eyes, ears, and hands of our digital world, changing how we see, protect, and live in our environment.

What is a Drone?

At its most basic level, a drone is an aircraft that flies without a pilot inside. However, this simple idea hides a very complex technology. Formally called Unmanned Aerial Vehicles (UAVs) or Remotely Piloted Aircraft Systems (RPAS), these machines combine flight science, robotics, and communication tech. Unlike regular airplanes that need a human in the seat to fly, drones use a smart "brain" called an onboard flight controller. This controller looks at data from many places. GPS satellites tell the drone where it is on Earth. Small sensors called gyroscopes and accelerometers help it stay balanced in the air, and barometers measure how high it is flying. By talking through radio waves or satellites, these machines can be controlled from a few meters away or even from the other side of the world. Drones were first made for high-stakes military scouting, but they have opened up to everyone over the last ten years. The same tech once used to track targets is now used by families to film vacations, by farmers to spray crops exactly where needed, and by rangers to keep wild animals safe from hunters.

The journey of drones from science experiments to daily essentials has several big moments. It began as far back as 1849, when Austria sent balloons with bombs against Venice. Modern drone history really started during World War I and II with radio-controlled "aerial targets" like the British *Queen Bee*. A big change happened in the 1990s and early 2000s

when the U.S. added GPS and satellite links to drones like the *Predator*. This turned them from simple cameras into very accurate tools for war. The 2010s brought the "consumer explosion," led by companies like DJI. They made flight tech small and cheap enough for regular people to buy stable quadcopters. Today, the newest step is using Artificial Intelligence (AI) and "Swarm" technology. This allows drones to fly in groups by themselves, showing a future where human pilots might not even be needed.

The Three Pillars of Drone Technology

To understand the many kinds of drones, we must look at how they are controlled. While all drones fly without a pilot on board, their "*intelligence*" is quite different. We can put them into three main groups:

1. The Pre-programmed Drone

These are like the clockwork machines of the sky. A pre-programmed drone follows a list of instructions given to it before it takes off. Using a timer and GPS points, it follows a set path in the sky. These are very good for repetitive jobs, like scanning a farmer's field or flying a set delivery route. Once the job is done, these drones often have a safety system—sometimes even a parachute—to land on the ground safely.

2. The Smart Drone

These are the "*thinkers*." A smart drone has advanced "*Sense and Avoid*" technology. Using sound sensors and laser light (LIDAR), these drones can see obstacles like tree branches or power lines. They can change their path in real-time without a human helping them. They are the start of a future where thousands of drones will fly in the sky together without hitting one another.

3. The Remote-Piloted Drone

This is the most common kind, where a human operator is always in control. Using a handheld controller or a computer station, the pilot sees what the drone sees through a live video feed. This is often called First Person View (FPV). This gives the pilot the freedom needed for filming movies or for search-and-rescue jobs where they must make fast decisions based on what they see

A Revolution in Commercial and Civil Skies

The impact of drones is seen most in the creative world. Before drones, getting a "*bird's-eye view*" meant renting a helicopter and a pilot, which cost a lot of money. Today, a filmmaker can pull a drone out of a bag and get movie-quality footage in minutes. This has changed wedding photos, real estate ads, and how we watch sports. Beyond cameras, drones are becoming vital for nature. In the deep jungles of the Amazon or the plains of Africa, researchers use drones to track animals and count

them without being there to scare them. They are also used to plant trees. Special drones can fire "seed pods" into the ground very fast, reaching places where humans cannot plant trees.

In the world of delivery, the "postal cloud" is now a reality. Singapore Post recently made news by delivering a letter and a t-shirt over two kilometres using a drone that flew itself. This project proved that in crowded cities or far-away islands, drones can fly over traffic and hills. It gives us a look at a future where your morning coffee or life-saving medicine might arrive through the air.

The New Face of Warfare: Power and Precision

While their use in daily life is helpful, the history of drones is closely tied to war. Modern war has moved away from huge armies and toward a high-tech game of information and speed.

The Global Stage: The Great Equalizer

The war in Ukraine is often called the first true "Drone War." It has shown that expensive tanks and big ships can be broken or destroyed by drones that cost only a few hundred dollars. Ukraine has used "Kamikaze" or "suicide" drones—small flying machines with bombs—to hit deep into enemy areas. This has made the drone a "great equalizer," letting smaller, less-funded groups challenge big military powers.

Precision in the Middle East

In the crowded cities of the Middle East, drones are the main tool for modern war. Some countries have led the way in using UAVs for constant watching. Instead of sending many soldiers into a city, a drone can stay silent high in the air, find a single target using face-recognition tech, and strike with very little damage to things nearby. However, this accuracy comes with a heavy mental cost for people living under the constant sound of drones in the sky.

Security in South Asia

For India, drone tech is a necessity for national safety. India has very long borders with Pakistan and China, many of which are in the high, dangerous mountains of the Himalayas. Walking these borders is very dangerous because of the freezing cold and thin air. Drones give India a "persistent eye," letting them watch for troop moves or people crossing without putting soldiers in danger. Through the "*Atmanirbhar Bharat*" plan, India is now quickly making its own drones, like the *Rustom-2* and *Tapas BH-201*, so they do not have to rely on other countries.

Drones in Industry and Agriculture

Drones are changing many other industries, especially farming. In "*smart farming*," drones with special sensors fly over fields to check

crop health. They can find bugs and make maps that tell farmers exactly where to put water or fertilizer. This helps grow more food and uses fewer chemicals. Drones are also used to check bridges, power lines, and oil pipes for leaks or cracks that humans cannot easily see. In disasters, they save lives by using heat-cameras to find people trapped in rubble or by bringing food and medicine to flooded areas where roads are gone. From counting trees to managing city traffic, drone uses are growing as fast as the tech itself.

The Future: Swarms, AI, and Autonomous Decisions

The next step for drones sounds like science fiction: Swarm Intelligence. Inspired by how bees and birds move together, researchers are making "*swarms*" of hundreds of small drones that talk to each other. A swarm does not have just one leader; it acts like one big machine. If some drones are lost, the rest immediately change their spots to finish the job. Also, Artificial Intelligence (AI) is taking the human out of the decision-making. Some drones can now stay in the air for hours, find targets on their own, and attack without waiting for a person to click a button. This leads to the hardest talk of the drone age: the ethics of machines that can kill.

Ethical Clouds on the Horizon: The Cost of Vigilance

As we use the convenience of drones, we must also face the "ethical clouds" they bring. The biggest worry is privacy. In a world where a drone with a strong zoom lens can fly near a window or over a yard, "*private space*" is at risk. There is also a big mental impact. In war zones, the constant, invisible presence of drones makes people feel very anxious. Knowing a strike could happen at any time from something you cannot see changes the life and mood of whole towns. Finally, using face-recognition on drones brings up "*automated profiling*." If a drone can know who you are by how you walk or your face from far away, who owns that data? We must prevent this from being used to hurt people or stop their freedom.

Conclusion: A Responsible Flight Path

The journey from the "*messenger cloud*" in Kalidasa's poem to the high-tech drones of today shows how smart humans can be. Drones have given us the power to save lives, protect nature, and link our cities. But they have also created new ways to fight and watch us. As we move toward the 2030s, the challenge is not just to make drones faster. The challenge is to make strong rules that keep up with the tech. We need laws that protect privacy and control how robotic weapons are used. If we can do this, the drone will truly be like the modern *Meghadooth*—not a tool of fear, but a messenger of progress, bringing hope and trade across the sky, and ensuring the clouds bring growth and peace.

Vitamin D Deficiency: A Silent Epidemic Amongst Indians

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India is a country that rarely lacks sunlight. From the arid plains of Rajasthan to the coastal stretch of Kerala, the sun remains a constant presence, shaping climate, agriculture, and daily life. And yet, quietly and almost counter-intuitively, India is facing one of the highest burdens of vitamin D deficiency in the world. It is a problem so widespread that it has begun to feel ordinary: normalised fatigue, vague body aches, fragile bones in later life. Its scale, however, places it firmly in the realm of a public health crisis.

Large datasets now leave little room for doubt. Analysis of more than two million vitamin D test results from across the country shows that nearly half of those tested are deficient, while another quarter fall into the insufficient range. In effect, roughly three out of every four Indians do not have adequate vitamin D levels. Other population studies, spanning different regions and age groups, suggest that prevalence may be even higher, reaching 70 to 90 per cent in some cohorts. These are not marginal figures. They point to a systemic nutritional failure unfolding quietly and at scale.

A Nutrient the Body Is Meant to Make

What makes this particularly striking is that vitamin D is unlike most nutrients. It is not primarily meant to be consumed; it is meant to be made. Human skin synthesises vitamin D when exposed to ultraviolet B rays from sunlight. In countries with long winters, deficiency is understandable. In India, it demands explanation.

Part of that explanation lies in how the country lives today. Urbanisation has reshaped daily life in subtle but consequential ways. Work has moved indoors. Education has shifted onto screens. Leisure has become increasingly sedentary. Millions now commute from enclosed homes to enclosed offices, with little meaningful exposure to direct sunlight in between. Even when people do step outside, dense air pollution in many Indian cities acts as a physical barrier, filtering out the UVB rays required for vitamin D synthesis.

Cultural and biological factors compound the problem. Clothing that covers much of the body, whether for social, professional, or climatic reasons, reduces the skin surface available for sun exposure. Darker skin tones, common among Indians, naturally require longer exposure to produce the same amount of vitamin D as lighter skin. None of these factors are harmful in themselves. Together, however, they significantly reduce the body's capacity to generate vitamin D, even under bright skies.

Diet offers little compensation. Traditional Indian diets, while diverse and often nutritionally rich, contain very few natural sources of vitamin

D. Fatty fish, egg yolks, and fortified dairy products are either consumed infrequently or excluded altogether for cultural, economic, or personal reasons. Unlike several Western countries, India does not mandate widespread fortification of staple foods such as milk, flour, or cooking oil with vitamin D. The result is a population with limited sun-derived synthesis and minimal dietary backup.

The Quiet Toll on Health

The health consequences of this deficit unfold gradually, which is precisely why they are so easy to overlook. Vitamin D's most established role is in calcium absorption and bone health. Severe deficiency in children leads to rickets, a condition often assumed to belong to the past. In adults, it manifests as osteomalacia, the softening of bones, and contributes to the development of osteoporosis, increasing fracture risk. For an ageing population, this translates into loss of mobility, independence, and quality of life.

But vitamin D's influence extends well beyond bones. Research over the past two decades has shown that vitamin D receptors are present in nearly every tissue in the body. Low levels have been linked to reduced muscle strength, impaired balance, and persistent fatigue, symptoms frequently misattributed to stress, ageing, or overwork. There is also growing evidence of vitamin D's role in immune regulation. Deficiency has been associated with increased susceptibility to infections and poorer immune responses, adding another layer of concern in a country already managing a substantial infectious disease burden

More complex associations continue to emerge. Studies have explored links between low vitamin D levels and conditions such as diabetes, cardiovascular disease, and mood disorders. While scientists caution against assuming direct causality, the consistency of these associations suggests that vitamin D deficiency may function as a background risk factor, subtly shaping long-term health outcomes rather than triggering acute illness.

Who Bears the Burden

Certain groups bear this burden more heavily than others. Adolescents are among the most affected, a troubling finding given that these years are critical for building peak bone mass. Data indicate that nearly two-thirds of Indian teenagers tested have deficient vitamin D levels. Long hours indoors, academic pressure, and screen-dominated leisure leave little room for outdoor activity, even in sun-rich environments.

Women, particularly in urban settings, show some of the highest deficiency rates, often exceeding 80 per cent in clinical studies. Limited sun exposure, dietary gaps, and increased physiological demands during pregnancy and lactation all contribute. Older adults face a different set of challenges. Ageing skin produces less vitamin D, mobility may be restricted, and existing bone loss magnifies the consequences of deficiency.

A Gap in Public Health Response

What is striking is how little attention this receives at the policy level. India has made meaningful progress in addressing certain micronutrient

deficiencies through national programmes targeting iron, iodine, and vitamin A. Vitamin D, however, remains largely absent from nutrition strategies. The National Family Health Survey highlights widespread nutritional challenges but does not currently assess vitamin D status directly. As a result, the problem remains under-measured and under-prioritised.

Public health experts have long pointed to food fortification as a practical and effective solution. Fortifying commonly consumed items such as milk, edible oils, or flour could improve vitamin D intake across socioeconomic groups without requiring significant behavioural change. Countries that have adopted such strategies have seen measurable improvements in population vitamin D levels. In India, fortification remains limited and inconsistent, driven largely by voluntary industry initiatives rather than coordinated national policy.

Between Awareness and Action

In the absence of systemic solutions, responsibility falls unevenly on individuals. Safe sun exposure remains the most efficient and natural way to improve vitamin D levels. Regular exposure of about 15 to 20 minutes several times a week on uncovered arms and face can make a meaningful difference. Dietary adjustments, though limited in impact, can offer modest support. For those with documented deficiency, especially among high-risk groups, supplementation under medical supervision is often necessary.

The danger lies in both neglect and excess. Many people remain unaware of their deficiency, while others turn to high-dose supplements without testing or guidance, risking toxicity. Vitamin D deficiency occupies an uncomfortable middle ground: too silent to alarm and too common to feel urgent.

A Preventable Crisis

Its implications, however, are far from trivial. A population with weakened bones, compromised immunity, and reduced physical resilience carries long-term economic and social costs. Increased fractures strain healthcare systems. Chronic fatigue affects productivity. Poor musculoskeletal health reduces independence in older age. These outcomes are not inevitable. They are the result of a gap between knowledge and action.

Vitamin D deficiency in India is not a failure of sunlight, culture, or biology. It is a consequence of rapid social change outpacing public health adaptation. As lifestyles move indoors and diets modernise, nutritional strategies must evolve in parallel. Recognising vitamin D deficiency as a widespread and preventable condition is the first step. Treating it as a public health priority rather than an individual inconvenience must follow.

The solution does not require dramatic innovation. It requires attention, measured policy decisions, consistent fortification, informed clinical practice, and a cultural shift that values everyday preventive health. India's sunlight has always been abundant. Ensuring that its benefits reach the bodies of its people is now a matter of intent, not possibility.

From 5G to 6G: India's Digital Sovereignty Quest in Global Technology Competition

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The shift from 5G to 6G is far more than a technical upgrade—it signals a deep geopolitical, economic, and strategic transformation. In today's world, control over digital infrastructure matters as much as control over territory did in earlier eras. For India, one of the globe's largest digital societies, this shift is intimately linked to digital sovereignty: the ability to design, deploy, regulate, and secure its digital ecosystem in line with national priorities. With active engagement from industry, academia, and research institutions, India is aiming to emerge as a global hub for next-generation telecom, aligned with the broader national ambition of a Viksit Bharat by 2047.

As the world moves from 5G's familiar terrain to the uncharted realm of 6G, the stakes extend well beyond faster downloads. For India, this transition is a strategic pivot from being primarily a consumer of global technology to becoming a principal architect of the future digital landscape. The 5G rollout itself was a watershed moment: deployed at unprecedented speed, it laid the groundwork for IoT and ultra-low latency services. Looking ahead, 6G—targeted for commercial reality around 2030—promises a civilization-scale leap. Where 5G relies on sub-6 GHz and mmWave bands, 6G is expected to harness the Terahertz spectrum, unlocking theoretical speeds up to 1 terabit per second and near-zero latency. Crucially, it will move beyond merely connecting devices; with Integrated Sensing and Communication (ISAC) and AI-native networks, it aims to merge the physical, digital, and biological worlds.

Digital sovereignty itself is a nation's power to exercise independent control over infrastructure, data, technology, standards, and cyberspace, consistent with constitutional values, security interests, and developmental goals. In an age where digital technologies drive economic growth, governance, social interaction, and global influence, 6G could become the backbone of future societies, making mastery of it central to sovereignty.

Globally, 6G is already a battleground of strategic competition. The United States, China, the European Union, Japan, and South Korea are investing heavily in research, patents, and standards. China frames 6G as part of its self-reliance and civil-military fusion strategy; the EU links it to values-based regulation and technological sovereignty; the U.S. leans on private-sector leadership backed by strategic alliances. This rivalry risks fragmenting the global digital order into competing blocs, potentially limiting strategic autonomy for countries such as India.

India's case is particularly acute: it is one of the world's largest digital markets but still relies heavily on foreign vendors for telecom equipment, core network technologies, and semiconductors. That dependence brings economic exposure via high imports, strategic risk for national security and critical infrastructure, and democratic vulnerability if external factors influence data and platforms. Yet India has notable strengths:

a vast skilled workforce, a vibrant software ecosystem, proven digital public infrastructure like Aadhaar and UPI, and a track record of scalable, affordable solutions.

Recognizing these realities, India has articulated the Bharat 6G Vision to position itself as a global leader in 6G by 2030. This vision stresses indigenous design and development, leadership in international standards, fostering innovation-driven startups, creating test beds and research clusters, and collaboration among government, industry, and academia. It marks a shift from India's more passive stance in earlier telecom generations to a proactive strategy. Official statements confirm the goal of becoming a frontline contributor to 6G design, development, and deployment by 2030, emphasizing affordability, sustainability, and ubiquity.

The quest for 6G leadership offers multiple opportunities to bolster digital sovereignty. Indigenous development can cut technological dependence, strengthen security, and drive economic self-reliance. Active roles in global standard-setting can help shape inclusive, open norms, while people-centric 6G applications could narrow the digital divide and foster equitable growth. Secure, trusted networks would also reinforce strategic autonomy in defence, space, and critical infrastructure.

Yet the path is steep. Building 6G infrastructure—especially in Terahertz bands—demands massive investments: dense small-cell networks, extensive fiber backhaul, and billions in capital. Talent gaps persist; despite a large engineering pool, specialized expertise in AI-native networks and quantum-secure communications remains limited. Regulatory challenges are complex; especially balancing data privacy under the DPDP Act 2023 with the data-hungry demands of AI-driven 6G ecosystems. Achieving seamless connectivity from deep sea to outer space is a grand vision, but it must unfold within an intense geopolitical context—a Tech Cold War of sorts—where standards hegemony matters as much as innovation.

Historically, global telecom standards have often been steered by Western or Chinese firms through bodies like 3GPP; India is now asserting itself in forums such as the ITU, aiming to secure a substantial share of 6G patents by 2030. Parallel efforts such as the India Semiconductor Mission recognize that true technological sovereignty is impossible without control over the chip supply chains powering future networks. Yet India faces real challenges: comparatively low investment in advanced telecom research, limited ownership of standard-essential patents, underdeveloped semiconductor and hardware manufacturing ecosystems, brain drain, and policy coordination hurdles. There's also a risk that an overemphasis on sovereignty could slide into protectionism, isolating India from global innovation networks and supply chains.

Therefore, India's strategy must balance strategic sovereignty with global collaboration. This calls for sustained funding in deep-tech research, strengthening semiconductor and telecom manufacturing, aligning regulation with innovation goals, developing specialized talent, and engaging in international partnerships and standards bodies. If pursued with sustained institutional capability and strategic clarity, digital sovereignty and 6G can give India a historic opportunity to shift from technology consumer to technology shaper.

The Global Scramble for Rare Earth Metals: Geopolitics, Green Energy and the New Resource Race

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Part I: Introduction to Rare Earth Elements

Before directly presenting the topics in the title, we will first set the background necessary to understand the elementary ideas about rare earth elements following a pedestrian approach. We understand from the latest IUPAC (International Union of Pure and Applied Chemistry) Periodic Table of Elements that as of now there are 118 experimentally confirmed elements.

Rare-earth elements (hereinafter referred to as REEs) are a group of seventeen chemical elements in the periodic table, in particular the fifteen lanthanides in the lanthanide series (La, Ce, Pr, Nd, Pm, Sm, Eu, Gd, Tb, Dy, Ho, Er, Tm, Yb, and Lu) as well as yttrium and scandium, as defined by the International Union of Pure and Applied Chemistry (IUPAC). Scandium and yttrium are considered REEs since they tend to occur in the same ore deposits as the lanthanides and exhibit similar chemical properties. All REEs are metals and occur in nature. Promethium, the rarest, occurs only in trace quantities in natural materials as it has no long-lived or stable isotopes.

In lanthanide atoms, the configuration of the valence electrons of the outermost shell is the same for all the species while the 4f orbitals are progressively filled with increasing atomic number. The screening of the 4f orbitals leads to the extremely similar physical and chemical properties of the elements. Another related consequence is the so-called "lanthanide contraction" in which the ionic radius progressively decreases from La^{3+} (1.06 Å) to Lu^{3+} (0.85 Å). REEs are the elements that have become extremely important to our world of technology due to their unique magnetic, phosphorescent, and catalytic properties. These elements are critical to technologies ranging from cell phones and televisions to LED light bulbs and wind turbines. To see the average abundances of REE (in mg/g) in Earth's crust in comparison with chondritic abundances, see ref. 1.

High-technology applications of REE

In the last three decades, there has been an explosion in the applications of REEs and their alloys in several technology devices such as computer memory, DVDs, rechargeable batteries, autocatalytic converters, super magnets, mobile phones, LED lighting, superconductors, glass additives, fluorescent materials, phosphate binding agents, solar panels, magnetic resonance imaging (MRI) agents etc. These metals are thus being consumed at an unprecedented rate. Since they are extremely important ingredients in all high-technology gadgets, these elements have come to be known as "The Vitamins of Modern Industry". For example,

Nd is extensively applied in super magnets for disk drives, Ce is a critical ingredient in autocatalysis and all REEs are used in making the flat-panel TVs. Several compounds of REEs are there in smart-batteries that power every electric and hybrid electric vehicle. Because of their unique physical, chemical, magnetic, luminescent properties etc., these elements help to make many technological advancements at reduced energy consumption, greater efficiency and enables to achieve miniaturization, speed, durability and thermal stability. In recent years, their demand is particularly on rise in energy efficient gadgets (green technology). These technologies in turn are helping the analytical instruments to become smaller and more efficient.

Though it is interesting to understand the different ways in which these elements are used for various applications, here we will confine ourselves to their use as magnets in electric vehicles. Electric vehicles are gaining rapid acceptability across global markets and so is the demand for components that make them efficient and reliable. Among the most critical of the components are rare-earth permanent magnets. The magnets are central to the operation of electric motors, which are the heart of electric vehicles.

Let us have a close look at how rare earth magnets power electric motors. Electric motors in battery-driven vehicles replace traditional internal combustion engines. Here propulsion is generated through a large traction battery pack, which powers an electric motor. For optimum battery usage and efficiency, the motor must function with high precision and minimal energy loss. Magnets are a core part of this design. The motor works when a coil of wire surrounded by strong magnets spin. The current in the coil produce a magnetic field that interacts with the field from the permanent magnets, this interaction results in a repulsive force, much like placing similar poles of two magnets close together. The coil spins rapidly due to this force and the resulting movement drives the wheels of the vehicle through a connected axle. Now let us see some of the most common and widely used rare earth-based magnets.

Neodymium magnets

In its pure form, neodymium has magnetic properties. But it is antiferromagnetic and that too at low temperatures below 19 K (-254.2°C, -425.5°F). [Antiferromagnets are not suitable for electric motors because they do not produce a net external magnetic field. While their internal atomic magnets are strongly ordered, they align in opposite directions and effectively cancel each other out.] However, some compounds of neodymium with transition metals such as iron are ferromagnetic, with Curie temperatures well above room temperature. [Curie temperature is the temperature above which certain magnetic materials lose their permanent magnetic properties.] These are then used to make neodymium magnets. The most commonly used neodymium magnets are composed mainly of neodymium, iron and boron (NdFeB), specifically $Nd_2Fe_{14}B$. It derives high field strength from the high magneto crystalline anisotropy

and magnetic moments of lanthanide element Nd, combined with iron-based compounds, usually requiring coating to prevent rapid oxidation. The most common type, $Nd_2Fe_{14}B$, is composed of 30% neodymium, 2% boron and the rest iron (by weight). The large magnetic dipole moment of neodymium magnets can be due to the fact that Nd atoms have 4 unpaired electrons in its electron structure as opposed to (on average) 3 in iron. In a magnet it is the unpaired electrons, aligned so that their spin is in the same direction, which generate the magnetic field. This gives $Nd_2Fe_{14}B$ compound a high saturation magnetization J_s = 1.6 T (or 16 KG) and a remanent magnetization of typically 1.3 tesla. The maximum energy density is proportional to J_s^2. Hence this magnetic phase has the potential for storing large amounts of magnetic energy Bh_{max} around 512 kJ/m^3. This magnetic energy value is about 18 times larger than ordinary ferrite magnets by volume and 12 times by mass. This magnetic energy property is higher in NdFeB alloys than in samarium-cobalt magnets, which were the first type of rare earth magnets to be communicated in practice. The structure consists of alternating layers of iron atoms and a neodymium -boron compound, creating a strong uniaxial tetragonal crystal structure. Magnets with these components are well known for their extremely high magnetic strength, making them the most powerful type of permanent magnet available today. The high magnetic energy density of neodymium magnets allows them to be more compact and efficient. They can generate a strong magnetic field with a relatively small volume, which is particularly beneficial for applications where space is limited such as in electric vehicles, aerospace and high-performance industrial motors. However, neodymium magnets have some drawbacks. They are relatively expensive compared to ferrite magnets and they are more susceptible to corrosion and demagnetization at high temperatures. To overcome these issues, neodymium magnets are often coated with a protective layer and additional measures are to be taken to control the operating temperature of the motor.

Samarium magnets

Another common rare earth magnet is samarium-cobalt type. They are composed of samarium and cobalt, along with other elements such as iron, copper and zirconium.Samarium-cobalt magnets offer several advantages over other types of magnets. One of the main benefits of the SmCo magnets is their high resistance to demagnetization, even at high temperatures. They have very high Curie temperature, which allows them to maintain their magnetic properties in extremely hot conditions. This makes them suitable for applications such as in military and aerospace applications, where the motors may be exposed to intense heat during operation. In addition, SmCo magnets have excellent corrosion resistance, eliminating the need for complex coating procedures. However, like neodymium magnets, they are relatively expensive, which limits their use to applications where their unique properties are essential.

Worldwide Rare Earth Element Resources (T) (as in 2024)

Ref.:https://pubs.usgs.gov/periodicals/mcs2025/mcs2025-rare-earths.pdf

Country	Rare Earth Reserves (T)	Rare Earth Production (T)
China	44 M	2,70,000
Brazil	21 M	-
India	6.9 M	2,900
Australia	5.7 M	13,000
Russia	3.8 M	2,500
Vietnam	3.5 M	300
United States	1.9 M	45,000
Greenland	1.5 M	-

The biggest rare earth element mine in the world is Bayan Obo Mine, located at Inner Mongolia, in China.

Key strategic and critical minerals of India (mines.gov.in/admin/download/649d4212cceb01688027666.pdf)

The Ministry of Mines, Govt of India had identified 30 critical minerals (both rare earth related and others), which are essential for high-tech electronics, telecommunication, transport and defence, etc. They are: Lithium, Cobalt, Nickel, Silicon, Titanium, Graphite, Gallium, Germanium, Tantalum, Indium, Beryllium, Niobium, Tungsten, Potassium, Phosphorous, Vanadium, Platinum Group Metals (PGMs: namely, Ruthenium, Rhodium, Palladium, Osmium, Indium and Platinum), Zirconium, Cadmium, Selenium, Tellurium, Rhenium, Copper, Tin, Hafnium, Bismuth, Antimony, Strontium and the Rare Earth Elements. These minerals and extracted elements are crucial for India's goal to achieve net-zero emissions by 2070 and for driving the 'Make in India' program in defence and manufacturing. Hence these have top national priority.

Strategic initiatives of the Govt of India

Amendment to Act: The Mines and Minerals Development and Regulation Act of 1957 was amended in 2023, to permit the commercial mining of these minerals, previously reserved for state-owned entities.

Auctioning: The government has begun auctioning 24 critical mineral blocks to boost domestic production.

Overseas Sourcing: Khanij Bidesh India Ltd. (KABIL) was formed to acquire critical mineral assets abroad.

Focus on REE: Increased efforts are underway by the Geological Survey of India (GSI) to explore deposits for minerals like lithium and rare earths.

Rare earth availability in Kerala

Rare earth elements in Kerala are primarily sourced from monazite found in the coastal beach sands, particularly in the Kollam district (Chavara–Neendakara area). It is estimated that around 0.892

million tonnes of monazite present here contains 9-10% thorium oxide and 55-60% total rare earth oxides. Indian Rare Earth Limited (India) operates a rare earth division in Udyogamandal, Aluva, which provides rare earth oxides including Lanthanum, Cerium, Neodymium, Praseodymium, Samarium, Europium, Gadolinium and Yttrium. Kerala is thus a key player in India's strategy to develop rare earth corridors and reduce import dependence. In the 2026-2027 union budget, the finance minister had included the setting up of rare earth corridor in Kerala, along with others in Odisha, Andhra Pradesh, and Tamil Nadu to promote mining, processing, research, and manufacturing.

Part II Global Scramble for Rare Earth Elements

With the matter presented above as a background, let us now consider the global scramble for rare earth elements. We know that the energy available globally at any time is constant and it is getting reduced as we consume the natural resources like coal, oil etc. Understanding this, we have initiated tapping other energy resources such as solar, wind, nuclear etc. Over the years we have marched along these directions to certain extent. Whatever way we proceed, the ultimate use of the generated energy is in the operation of transducers, which generally means devices which convert one form of energy to the other. This is the crucial stage, and we are now at this stage of inventing more efficient methods and techniques for harnessing the available energy. Thus, globally we are focussing not only on energy generation methods such as nuclear fusion etc., but also gives equal importance to effective ways of energy utilization. In all types of motors or in other words, all types of transducers, more attention has to be given to maximise the utilisation of the available energy. From what has been understood from the presentation in part I, it is clear that, in this regard there is no better option than utilizing the unique properties of the rare earth elements. Accordingly, the quest for grabbing rare earth elements prompts nations to follow routes which may be healthy or unhealthy. The present trend points to the need for having a new measure or scale to indicate the amount of rare earth resources a nation has for utilizing the available energy sources, not only for the benefit of a particular nation, but for the entire human society.

A healthy approach in maintaining the development rate, which is now more of an exponential nature is to have collaborations in possible fields with other nations. Recently, we have prepared the Vision-2035 roadmaps, focussing on different vital areas. In one among them, the India-UK Vision-2035, proposal for several joint ventures have been suggested. Along with several other things, it had given emphasize to resilient and critical supply chains to power the Fourth Industrial Revolution. This includes rare-earth elements also.

Understanding the School Dropouts in India: Causes, Consequences, and Solutions

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Education is one of the most powerful tools for transforming lives, as well as strengthening the social and economic foundations of a nation. It has undergone major expansion over the past few decades, yet there have also been persisting concerns about enrolment, retention, and transition across levels of schooling. While dropout rates have shown improvements in the past two years, the absolute number of children leaving school continues to be substantial due to the size of India's school-going population. The issue of school dropouts in India has been a worrying public debate, as disruptions to a child's educational journey can have immense long-term consequences. Recent data show that the nationwide dropout rates have actually been declining, especially at the preparatory level. However, the overall picture remains uneven. Enrolment has been falling across several stages of school, and the decline is sharper in some age groups than others.

According to the latest UDISE+ 2024-25 data on school education in India, dropout rates have declined across several stages of schooling. The preparatory-level dropout rate has fallen from 3.7% in 2023-24 to 2.3% in 2024-25. At the middle stage, the rate stands at 3.5%, and at the secondary stage, it has reduced significantly to 8.2%, down from 13.8% in 2022-23 and 10.9% in 2023-24. These figures point toward improvements that suggest that more children are staying in school longer than before.

Yet, the deeper issue lies in the scale of the human impact behind the numbers. Many children continue to face barriers that interrupt their educational journey, especially at the secondary stage, where dropout rates remain the highest. While government sources partly attribute this fall to declining birth rates and demographic change, reports and analyses do not fully explain regional variations or the visible movement of students away from government schools.

When it comes to the reasons, the causes for a high number of school dropouts are varied and multifaceted. Firstly, **economic constraints** remain a persistent factor determining whether the majority of the population can afford to complete the schooling experience till the senior secondary stage. Although formal education is free up to the age of 14 as per the Right to Education Act, the associated costs of school education, especially in the higher stages, including uniforms, stationery, transport, and private tutoring, accumulate, which many families from socio-economically

disadvantaged communities are unwilling to continue. Children from low-income households are more likely to be pushed into domestic work, labour or any informal wage work that contributes to the family income. Such pressures intensify among older learners, especially in rural areas and for those coming from socially disadvantaged communities.

Secondly, **learning gaps** contribute to the dropout rate, especially since the COVID-19 pandemic, when the majority of the classes were shifted online. Students who lost foundational learning during extended school closures often struggle to keep up with the higher-level curriculum. This leads to many falling behind without adequate support as they lack the proficiency expected at the grade level. The eventual withdrawal from schools at the secondary level, as is evident from official data, is a result of such frustrations. In addition, students also lose perspective on the value of continuing school if it does not directly impact their social ability and progress.

Thirdly, many communities in the country continue to be shaped by **gendered expectations** which impact their willingness to continue school education, especially for girls. While female enrolment has improved significantly at early stages, the transition to secondary school remains fragile. Reports by UNICEF and NFHS-5 indicate that states with a higher prevalence of child marriage also show lower secondary school attendance among girls. In addition to this, lack of safe transport, long travel distances and inadequate infrastructure for safety also further contribute to school discontinuation.

Fourthly, **issues of quality, access and infrastructure** in many schools continue to remain unaddressed. Teacher shortages, multi-grade classrooms, single-teacher schools, and inadequate school infrastructure continue to affect retention. Remote regions frequently face challenges such as difficult terrain, long travel distances and limited transport.

The consequences of school dropout are deep and long-lasting. Leaving school before completing secondary education significantly restricts future opportunities for young people. They are likely to be employed in low-wage, insecure jobs and are at a higher risk of being trapped in cycles of poverty. Additionally, if millions leave school without acquiring essential knowledge, the country risks missing the opportunity to harness its demographic advantage. A large unskilled workforce will limit productivity and slow down economic growth.

Given the scale and seriousness of the problem, interventions to reduce the numbers for school dropouts must be contextual to the issues and sensitive to social and regional variations. Strengthening the secondary school system is one of the most urgent priorities. This requires not only building classrooms but also ensuring that children receive academic support during key transitional years. Remedial programmes, bridge courses, and community learning initiatives can help children who fall behind regain confidence and skills.

Second, as recommended in the National Education Policy (NEP) 2020, it is important that vocational pathways are strengthened and encouraged. Adolescents, especially those in rural or economically disadvantaged households, often need education that feels meaningful and connected to real-life opportunities. As such, internships and skill-based programmes need to be integrated within the school curriculum. When schooling is aligned with future aspirations, retention improves naturally. Thus, the design and relevance of the curriculum need to be regularly reviewed and revisited.

Third, infrastructural facilities, such as ensuring functional toilets, creating safe walking routes, subsidising transportation, and involving communities in monitoring safety, can make secondary schools more accessible for young learners from varied communities. The existence of thousands of nearly empty schools in certain regions, alongside overcrowded ones in other regions, points to a need for better planning. At the same time, consolidating under-enrolled schools in a sensitive way, while ensuring transport access, can also improve teacher availability and resource use. At the same time, deploying teachers equitably and ensuring that schools in remote areas are not left underserved is critical.

Improving data systems is another major step. UDISE+ has begun tracking individual students rather than relying solely on school-level aggregates, making dropout identification more accurate. But data must translate into action. Early-warning systems can help schools identify at-risk children so that interventions, home visits, counselling, and academic support can begin before a child drops out.

Finally, any solution must involve parents and communities. Strengthening school management committees, increasing teacher-parent interaction, and involving local leaders can create an environment where education is valued and dropping out is discouraged.

India's commitment to Sustainable Development Goal 4 underscores its determination to deliver inclusive and equitable quality education as well as expanding lifelong learning opportunities across all sections of society. In this regard, a multi-layered approach that combines academic support, financial assistance, infrastructural improvements and community engagement can help strengthen retention in Indian schools. As India continues to enhance its educational landscape by ensuring easier access for learners from all communities, the focus in schooling systems must shift from mere enrolment to ensuring that every child completes his educational journey. Therefore, addressing and improving the school dropout rates is an educational priority and a significant investment in the country's long-term development.

The Imperative for a National Policy on Artificial Intelligence in Higher Education in India

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Abstract

Artificial Intelligence (AI) is fundamentally reshaping global higher education through intelligent tutoring systems, data-driven decision-making, personalized learning and research automation. In India, the adoption of AI tools has accelerated, as evidenced by recent surveys indicating that over 50% of Higher Education Institutions (HEIs) are using generative AI for developing learning materials. However, this adoption remains fragmented, uneven, and largely unregulated. This paper argues for the urgent formulation of a National Policy on AI in Higher Education to ensure equitable access, ethical governance, quality assurance, and alignment with India's educational and economic priorities. Through a review of current adoption trends, national initiatives, and emerging challenges—including the digital divide, data privacy risks, and algorithmic bias—the paper recommends a coordinated and holistic policy framework. Such a framework is essential to guide responsible AI integration, strengthen institutional capacity, foster innovation, and actualize the objectives outlined in the National Education Policy (NEP) 2020, thereby positioning India as a global leader in the ethical and effective use of AI in education.

Keywords: Artificial Intelligence; Higher Education; National Policy; NEP 2020; Digital Equity; Ethical Governance; AI Integration

Introduction

The transformative potential of Artificial Intelligence (AI) in higher education is no longer a futuristic concept but a present-day reality. Applications range from adaptive tutoring and automated grading to curriculum design and strategic research, offering unprecedented opportunities to enhance pedagogical efficacy, administrative efficiency, and institutional governance (Tomar, 2025). For India, which hosts one of the world's largest and most diverse higher education systems, leveraging this potential is critical for national development.

A recent report by Ernst & Young-Parthenon and FICCI (2024-25) highlights that 56% of Indian HEIs have already implemented AI-related policies, with significant usage in generative AI for learning materials (53%) and AI-powered tutoring systems (40%). Despite this rapid adoption, the landscape is characterized by a patchwork of institutional initiatives lacking a unifying national vision. The absence of a comprehensive National Policy on AI in Higher Education creates risks of fragmentation, exacerbated inequality, ethical breaches, and a misalignment with national strategic

goals like the NEP 2020 and the India AI Mission. This paper examines the current state of AI in Indian higher education, identifies critical gaps, and makes a compelling case for a centralized policy framework to ensure that AI serves as a catalyst for equitable and sustainable growth.

The Current Landscape of AI in Indian Higher Education

The integration of AI in India's HEIs is progressing rapidly but unevenly.

Adoption Trends: Surveys indicate that over 60% of HEIs permit the use of AI tools by students, highlighting its penetration into the learning process. Applications are diverse, including adaptive learning platforms (39%), automated grading (38%), and plagiarism detection.

Policy Fragmentation: While over half of HEIs have some form of AI policy, these are largely institution-specific. There is a lack of standardized norms for ethics, data privacy, and academic integrity, leading to an inconsistent and potentially risky adoption environment.

Government Initiatives: Broader national strategies, such as the NEP 2020 the IndiaAI Mission, and the establishment of Centres of Excellence (CoEs), provide a foundational direction. The NEP 2020, in particular, emphasizes technology integration and the creation of a National Educational Technology Forum (NETF). However, these initiatives have yet to coalesce into a dedicated, actionable policy for the higher education sector.

The Rationale for a National Policy: Addressing Critical Gaps

A national policy is not merely beneficial but essential for navigating the following challenges:

Ensuring Equity and Bridging the Digital Divide

Unregulated AI adoption threatens to widen the existing chasm between elite, well-resourced institutions and those in rural or underfunded areas. A national policy can mandate minimum infrastructure standards, promote public investment in AI resources for marginalized institutions, and support the development of multilingual AI tools to cater to India's linguistic diversity, thereby ensuring AI acts as a tool for inclusion rather than exclusion.

Establishing Ethical Governance and Data Security

The proliferation of AI raises significant concerns regarding algorithmic bias, student data privacy, and the transparency of automated decisions. The existing Digital Personal Data Protection Act (2023) provides a baseline but does not specifically address the unique challenges posed by educational AI systems. A national policy can define ethical guidelines, establish accountability mechanisms, and create frameworks for auditing algorithms to prevent discrimination and protect sensitive information.

Standardizing Quality and Protecting Academic Integrity

The widespread use of generative AI by students poses a fundamental challenge to traditional assessment methods and the concept of academic originality. A cohesive policy is needed to standardize definitions of AI-

assisted work versus plagiarism, guide the redesign of assessments, and set benchmarks for the pedagogical quality of AI tools used in classrooms.

Building Systemic Capacity and Faculty Readiness

A significant barrier to effective AI integration is the lack of preparedness among educators. A national policy can orchestrate large-scale faculty development programs, create certification pathways for AI in education, and establish Centres of Excellence for AI pedagogy to build a future-ready academic workforce.

Catalyzing Research and Fostering Global Competitiveness

AI research in Indian HEIs is often siloed and lacks the coordinated thrust needed for global impact. A national policy can align university-based research with national priorities (e.g., healthcare, agriculture), promote academia-industry partnerships, and create dedicated funding streams through bodies like the National Research Foundation (NRF), thereby strengthening India's position in the global AI innovation ecosystem.

Rationale for a National Policy on AI

A National Policy on Artificial Intelligence (AI) is necessitated by the imperative to balance the vast economic and social potential of AI with the critical need to manage and mitigate its associated risks. In emerging economies such as India, the rationale for such a policy is particularly compelling, as it must simultaneously harness AI as a driver of economic growth and innovation while ensuring equitable access, ethical deployment, and public safety. A well-articulated national framework is therefore essential to maximize the benefits of AI while safeguarding societal interests and promoting inclusive and sustainable development. The rationale for a National Policy on AI is enumerated in succeeding paragraphs:

Strategic Alignment with NEP 2020: To realize the vision of technology-enabled, flexible, and multidisciplinary learning, AI provides the practical tools for adaptive platforms, enhanced assessment, and administrative efficiency.

Personalized & Inclusive Learning: AI can tailor content to individual student needs, speeds, and struggles, offering ٧/٢٤ tutoring and real-time feedback, making education more inclusive and effective, especially in bridging urban-rural divides.

Boosting Efficiency & Teacher Support: Automating tasks like grading, attendance, and record-keeping free up faculty time for deeper student engagement and better lesson planning, with AI providing real-time student performance insights.

Developing Future-Ready Skills: A policy is needed to equip students with the AI literacy and skills required for a digitally transforming economy, addressing skill gaps and meeting evolving industry demands.

Fostering Research & Innovation: Establishing Centers of Excellence in AI

for Education will drive cutting-edge research, develop context-specific solutions, and support innovation in areas like patent analysis and startup evaluation within universities.

Ensuring Ethical & Responsible Use: A national policy is essential to set clear guidelines for data privacy, algorithmic transparency, accountability, and bias mitigation, preventing risks like reduced critical thinking from over-reliance on AI.

Data-Driven Decision Making: AI enables universities to use performance data for better curriculum design, intervention strategies, and evidence-based improvements in teaching and administration.

Global Competitiveness: To compete globally, Indian higher education needs a unified strategy to adopt AI responsibly and build future-ready campuses, ensuring all students can «speak the new language of learning» fluently.

Key Reasons for a National Policy

India needs a National Policy on AI in Higher Education (HE) to strategically integrate AI for inclusive development, skill future workforce, boost innovation, ensure ethical deployment, and achieve national goals like Viksit Bharat by 2047, by building robust ecosystems, fostering research, and creating AI-driven solutions for societal challenges in education, healthcare, and governance.

***Viksit Bharat* Vision (Developed India):** AI is seen as a catalyst to achieve India›s goal of becoming a developed nation by ٢٠٤٧, driving growth and empowerment.

Inclusive Development *(AI for All):* A policy ensures AI›s benefits reach all citizens, tackling disparities in education, healthcare, and services, especially in rural areas.

Skilling and Future Readiness: To position India as a tech leader, the policy builds AI literacy and skills (like through NEP ٢٠٢٠ and YUVAi) to create a future-ready workforce and address skill gaps.

Innovation Ecosystem: It fosters research, development of homegrown AI models (like India AI Mission), and entrepreneurship through public-private-academia collaboration, as seen with India AI Innovation Centre.

Societal Solutions: Focuses on applying AI to solve real-world problems in agriculture, health (diagnostics, telemedicine), smart cities, and climate resilience.

Ethical & Responsible AI: Addresses risks like misinformation, algorithmic bias, and deepfakes by creating governance frameworks, ensuring accountability, safety, and protecting citizen rights.

Governance & Coordination: Provides a strategic roadmap, coordinates efforts across ministries (MeitY, DST, etc.), and ensures democratic oversight for sustainable AI advancement.

Proposed Framework for a National Policy on AI in Higher Education
A proposed framework for a National AI in Higher Education Policy focuses on ethics, integrity, capacity building, and transparency, emphasizing AI as a tool to *enhance* human capabilities, not replace them, integrating principles like privacy, equity, and responsible use, with guidelines for faculty training, curriculum integration, and clear usage policies for students, all while ensuring alignment with broader national goals for AI development. A robust policy should be built upon the following pillars:

Governance and Oversight: Establish an inter-ministerial task force (involving the MoE, MeitY, and UGC) to develop and monitor the policy. Create institutional AI ethics boards within HEIs.

Infrastructure and Access: Mandate and fund AI-ready digital infrastructure across all HEIs, with a special focus on bridging the urban-rural divide.

Curriculum and Pedagogy: Integrate AI literacy, ethics, and applications across disciplines. Develop standardized, interdisciplinary AI curricula for undergraduate and postgraduate programs.

Capacity Building: Launch a national mission for faculty upskilling, including workshops, fellowships, and certifications on AI tools and pedagogies.

Ethics and Regulation: Formulate clear guidelines on data governance, algorithmic transparency, and the responsible use of generative AI in assessments and research.

Research and Innovation: Incentivize high-impact AI research aligned with national goals and foster innovation clusters and incubators within university ecosystems.

Key Challenges

Implementing such a policy will face hurdles, including infrastructural disparities, resistance to change, the rapid pace of AI evolution, and the risk of over-regulation stifling innovation. A successful policy must therefore be dynamic, flexible, and developed through continuous consultation with all stakeholders—government, universities, industry, and students.

Key challenges to a national AI policy in Indian higher education include a significant digital divide, insufficient faculty training and readiness, and the need for robust ethical and governance frameworks. The way forward involves strategic investment in infrastructure, comprehensive teacher training, and inclusive policies that align with the National Education Policy (NEP) 2020.

Infrastructure & Digital Divide: There are immense disparities in access to high-speed internet, computers, and reliable power between urban and rural institutions. This limits equitable access to AI-powered learning tools for all students.

Faculty Readiness & Training: A large percentage of faculty members lack the necessary digital literacy and training to effectively integrate AI into their teaching and research. Resistance to change and fear of job displacement are also significant issues.

Data Privacy & Security: The use of AI in education involves collecting vast amounts of student data, raising serious concerns about privacy, security, and potential misuse in the absence of clear regulations.

Ethical Concerns & Algorithmic Bias: Risks include algorithmic bias in admissions or grading systems that could perpetuate existing social inequalities (along lines of gender, region, etc.).

High Costs: Developing and deploying quality AI educational tools requires substantial investment, which can be prohibitive for many government-funded and under-resourced institutions.

Lack of Clear Governance: While many institutions are developing their own policies, a standardized national policy for the responsible and transparent use of AI in academia is still evolving, leading to fragmented implementation.

Over-reliance on AI: Overdependence on AI tools by students may diminish critical thinking, creativity, and problem-solving skills, which are essential for holistic development.

Conclusion

The integration of Artificial Intelligence into Indian higher education is no longer a matter of choice but an ongoing and irreversible transformation. While AI offers unprecedented opportunities to enhance teaching, learning, research, and institutional governance, the absence of a coordinated national policy risks widening existing inequalities, fragmenting adoption, and leaving critical ethical and regulatory challenges insufficiently addressed. Unregulated and uneven implementation may undermine academic integrity, data security, and the foundational values of equity and inclusion. A National Policy on Artificial Intelligence in Higher Education therefore emerges as a strategic and timely imperative. Such a policy is essential to provide a coherent framework for responsible AI adoption, ensuring ethical governance, quality assurance, and equitable access across institutions and learner populations. By aligning AI integration with national priorities and educational values, the policy can transform AI from a disruptive force into a powerful enabler of systemic reform.

Most importantly, a well-articulated national policy wouldoperationalize the transformative vision of the National Education Policy (NEP) 2020 by embedding innovation, digital empowerment, and learner-centricity at the core of higher education. It would strengthen institutional capacity, foster interdisciplinary research and innovation, and prepare graduates with future-ready skills for a rapidly evolving global economy. In doing so, India can not only safeguard the responsible use of AI but also position itself as a global leader and knowledge superpower in the ethical, inclusive, and effective application of artificial intelligence in higher education.

Intergenerational Digital Divide: Grandparents, Parents, and Children in Connected Households

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Introduction

In the twenty-first century, it is impossible to imagine an environment without widespread technological diffusion. Digital tools have become the very infrastructure of social life—governing how we communicate, learn, work, and even care for one another. This transformation has not been equally experienced by all segments of the population. These inequalities can emerge from difference in economic status, gender, age, education and geographic location. In such a context, the digital divide is not a minor inconvenience but a curse, cutting across generations and undermining the equity within households and societies. This divide is not merely about access to gadgets, but about how different groups—by age, gender, and geography—interpret, negotiate, and inhabit digital spaces.

Gravity of the Divide at National Level

As defined by the OECD, the digital divide refers to "the gap between individuals, households, businesses and geographic areas at different socio-economic levels with regard to both their opportunities to access information and communication technologies (ICTs) and to their use of the internet for a wide variety of activities. At the national level, India's digital divide has profound implications. Disparities between urban and rural areas, rich and poor, and regions with varying infrastructure create layered inequalities. Surveys show that urban internet penetration exceeds 70% while rural penetration remains below 40%, highlighting stark contrasts. According to India Inequality Report 2022, only 31 per cent of the rural population uses the internet where as 67 per cent of India's urban population uses the internet (Mahendru, Dutta, & Mishra, 2022). This divide affects access to education, healthcare, financial inclusion, and even democratic participation. During the COVID-19 pandemic, students in metropolitan cities could continue online learning, while many rural children were left behind due to lack of devices or connectivity. The digital divide

thus becomes a question of equity and justice, shaping opportunities for entire communities and reinforcing socio-economic stratification. Bridging this gap is critical if India is to achieve inclusive growth in the digital age and draw equal benefits.

The Issue addressed

The existing gap in intergenerational digital inclusion effects different categories differently since they couldn't fully utilize the advantages which provide and will impact the harmonious development of the nation. Analysing the effects of digital expansion on different people and identifying the barriers is essential for a well inclusive society and for better integrating them into the society for creating a digital social integration.

Historical Context: 25 Years of Digital Change

Over the last quarter century, the digital landscape has transformed dramatically. On **1st July 2025**, India celebrated 10 years of *Digital India* and can proudly say that its benefits are far-reaching, aiming to provide equal access to all. Innovations in artificial intelligence, cloud computing, and a strong infrastructure base have created new opportunities for millions. The early 2000s brought mobile phones and the first wave of internet access, often through cyber cafés in Kerala towns. By the 2010s, smartphones, WhatsApp, and social media reshaped communication and consumption. Kerala's own **Akshaya e-literacy project (2002)** was a pioneering initiative, aiming to make at least one member of every family computer literate. Today, artificial intelligence, digital governance, and platform economies dominate, with Kerala experimenting in **digital classrooms, e-health records, and online cooperative banking**. Each generation has encountered these shifts differently, shaping distinct attitudes toward technology within the same household.

Grandparents' Perspective

For many grandparents, digital tools arrived late in life. While video calls and telemedicine have opened new avenues of connection, the learning curve remains steep. In Kerala, many elderly citizens rely on **Aardram e-health services** or **Aadhaar-linked pensions**, but often depend on children or local volunteers to navigate apps and portals. Trust issues—fear of scams, misinformation, or online fraud— limit their engagement. Yet, when guided patiently by younger family members, technology becomes a bridge: grandparents join family WhatsApp groups, watch grandchildren's milestones on YouTube, or even participate in online bhajan sessions organized by temples. The emotional angle is powerful— technology can reduce loneliness, but also highlight dependence.

Parents' Perspective

Parents occupy a transitional space. They are workers in digital economies, adapting to remote meetings, online banking, and constant connectivity. In Kerala, many parents in the Gulf diaspora use **video calls and WhatsApp** to sustain family ties across continents. At the same time, they act as mediators—monitoring children's screen time, teaching online safety, and helping grandparents navigate apps. For them, technology is both a productivity tool and a source of stress, blurring the line between professional and personal life. The COVID-19 pandemic intensified this role: parents had to manage **online classes through Kerala's "First Bell" digital learning initiative**, while balancing their own work-from-home demands. Technology thus becomes both a lifeline and a burden which depends on their economic, cultural and social aspects.

Children's Perspective

Children, often called digital natives, experience technology as a natural environment. From online learning platforms to gaming communities, their social identities are deeply embedded in digital spaces. In Kerala, children are adept at using **KITE Victors educational channel**, YouTube tutorials, and even coding workshops offered in schools. While this fluency offers opportunities for creativity and global connection, it also exposes them to risks such as cyberbullying, misinformation, and overdependence on screens. Their role in households is paradoxical: both learners and teachers, guiding elders while navigating their own vulnerabilities. A child teaching a grandparent to use UPI payments in a Kannur household is a common sight—symbolizing both empowerment and reversal of traditional knowledge hierarchies.

Social Relations in Connected Households

The digital divide manifests in everyday family dynamics. Children often teach grandparents how to use smartphones, reversing traditional roles of knowledge transfer. Parents negotiate conflicts over screen time, privacy, and shared devices. At the same time, technology creates solidarity—family WhatsApp groups, online shopping together, or streaming movies across generations. In Kerala, **OTT platforms like Hotstar or Netflix** have become family entertainment hubs, while **online cooperative banking apps such as KB Prime** allow joint financial decisions. Yet tensions remain: grandparents may prefer face-to-face conversations, parents worry about digital addiction, and children crave for more autonomy in online spaces. Households thus become microcosms of broader social negotiations around technology.

Gender Divide within Households

The digital divide is not only generational but also gendered. Within many households, women— especially mothers and grandmothers—often face greater barriers to digital participation. In Kerala, despite high literacy rates, studies show that **female internet usage lags behind male usage**, particularly among older women. Cultural expectations, limited time due to caregiving responsibilities, and lower confidence in navigating digital tools contribute to this gap. For instance, while fathers may use smartphones for banking or work, mothers may primarily use them for communication, leaving them less exposed to advanced applications. This gendered divide reinforces traditional hierarchies, where men often act as "digital gatekeepers." Addressing this requires not only literacy programmes but also **gender-sensitive interventions** that empower women to use technology for education, entrepreneurship, and civic participation. According to the GSMA Mobile Gender Gap Report (2022), women in low- and middle-income countries are 16% less likely to use mobile internet than men. While bringing women in front of all spheres India randomly conducting programmes. With the support from Department of Financial Services (DFS), Ministry of Finance and Government of India, a 'Stand Up India program was started in 2015 has a special aim to uplift women entrepreneurship and focused on credit to scheduled caste (SC) and scheduled tribes (ST) in India.

Barriers to digital acceptance

Infrastructural limitation, affordability, digital literacy deficit, income and economic inequality and trust and privacy concerns are some of the main barriers of digital usage. Inefficient infrastructure is often a drawback for the developing country; like wise adequate means of access are often lacking in many households especially where the women are not working. Affordability remains a primary constraint. Many of the households have limited affordability power. The most important one, digital literacy, is a critical factor. Digital literacy gap is particularly pronounced among certain demographic groups, such as women, older adults, rural populations, and low-income communities. Digital literacy can shape people's digital experience. Being a low-income individual is another barrier which resists access to the digital world. Many studies shows that income is the most important vulnerability which effects older people and children.

Removing the major barriers is essential to live in this digital era irrespective of gender and age. These disparities in digital access often effect the educational opportunities of the children, especially in rural areas and of economically weaker families. This digital divide not only affects their learning power but also their career. Vulnerable populations such as the

elderly and economically disadvantaged, who may benefit the most from remote healthcare services, often face significant barriers due to digital literacy. This creates a paradox where those in need have the least access.

Future Prospects & Policy Implications

Bridging the intergenerational digital divide requires intentional and inclusive effort. Kerala has already pioneered digital literacy campaigns and community technology centres, but the challenge now is not only intergenerational learning but also addressing gendered gaps within households. Women, particularly mothers and grandmothers, often face greater barriers to digital participation due to cultural expectations, limited exposure, and lower confidence in navigating advanced applications. Programmes that encourage children to teach elders, or parents to co-learn with children, must therefore be designed with gender-sensitive approaches that empower women equally. At the same time, ethical questions—surveillance, data privacy, and AI replacing human interaction—must be addressed. Kerala's experiments with AI in healthcare diagnostics and robotic surgery raise questions about trust and human oversight, while India as a whole face the larger challenge of bridging the urban–rural digital divide, where internet penetration and device access remain uneven. Ultimately, connected households should evolve into learning households, where technology becomes a shared language rather than a barrier, and where both generational and gender divides are consciously narrowed.

Conclusion

The digital divide is not simply about who owns a smartphone or who can navigate an app. It is about how technology reshapes relationships, authority, and identity within families, and how inequalities— both generational and gendered—play out in everyday life. In Kerala, where digital literacy is high but gaps remain, households illustrate both the promise and the challenge of connectivity. At the national level, the divide between urban and rural societies, and between privileged and marginalized communities, underscores the urgency of inclusive digital policies. By recognizing the unique challenges and strengths of each generation, and by ensuring that women and rural populations are not left behind, families and societies can turn divides into bridges. Digital connectivity must enhance rather than fragment social life, transforming connected households into learning households and connected societies into equitable digital communities, where grandparents, parents, and children grow together in the digital age.

Rethinking Work, Purpose, and Productivity in the Post-Pandemic Society

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The reality of the present times is that we live in a world of continuous disruption, mainly characterized by the rapid advances in technology and the pervasive presence of AI in all aspects of our lives. Our lives are digitalized beyond what we could imagine a few years ago. The most important factor that accelerated this transition was the outbreak of the Covid pandemic that tested us in myriad ways, necessitating rapid and innovative response to continue with our lives; whether it is work, education, healthcare, family, religion, business, communication, or any other community activity.

Parallel to the digitalization process what we witness is a general change in how we view relationships, work, health, and life in general. Covid made us realize the transience of life when most of our plans were shattered, many families lost their young ones, lost their jobs, had to relocate, started facing persisting health challenges, and many had to start from scratch. This resulted in a grave shift in the approach to life; with many reimagining how they viewed success, realizing the value of balance in life, the futility of mindless and aggressive pursuit of material accomplishments, and the centrality of physical and mental well-being and living a holistic life.

This change in approach to life and the great value placed on well-being have also impacted on the approach to life, moving away from traditional notions. With work-from-home option and hybrid work gaining prominence in the post-pandemic environment, individuals now opt for more flexibility at work and a greater degree of work-life balance. The realization that personal time and life are equally important as work has gained momentum. Many are moving away from jobs that gave them only financial rewards and seeking fulfilling assignments that align with their value systems and a sense of purpose. Freelancing and contract work have been increasing in demand, also after the growth of gig and platform economies.

In this context, the way GenZ views life and career has to be understood. They approach their careers strategically and give priority to personal fulfilment and things that matter to them. In addition to the formal jobs that they have for financial autonomy, many also choose a side hustle that gives them the opportunity to pursue their passion and ambition. They want their lives not to be guided and shaped by stereotypes constructed by societal expectations. Money matters to them, but not beyond the

things that they care for. They are willing to quit jobs that are very rigid and do not offer them satisfaction. And, whether it is work or life they value personal freedom, authenticity and being real, valuing self-reliance and autonomy.

This new approach to career is termed career minimalism, where one does not let career consume their whole lives. While career is considered as essential for financial security, many are guided by a search for purpose and aligned to doing the work that makes them feel fulfilled. At workspace, the orientation is more towards collaboration, where individuals of diverse experiences come together as equals and work towards achieving their goals together. Gender diversity and inclusiveness are characteristic features of these workspaces that move away from hierarchy. There is importance given to open communication and continuous feedback where authenticity matters. Workspaces being flexible, adaptive, and accommodative matter much in the context of the changed approach to work.

In general, the thought that guides professionals is that life is not just one's career. Life is much more than work. Fulfilled in life, doing things that one likes, spending time with people who matter, having needed 'me' time, being guided by a sense of purpose, exploring the world, and ultimately leading a full life are what matter. And, most often, individuals are not alone when they redesign their approach to life and work. In many urban areas, there are various communities that work as spaces of togetherness for people pursuing their passion. There are dance, music, travel, and travel and trekking groups that lead to a sense of belonging among individuals, away from their work and family spaces. There are also spiritual groups, with dance and music, also witnessing huge participation of youngsters. In simple terms, a fulfilling life is the most important aim, unaffected by the expectations of the society around. In tune with this, there is also the need to understand the increasing penchant towards celebrations, whether it is religious events, family events, marriages, birthdays, or anniversaries in the post-pandemic era.

And, there is increased focus on health; both physical and mental. The Covid pandemic drastically changed the approach to health. Youngsters are realizing the importance of taking care of their health. The wellness bubble is the most prominent. Fitness has become a common pursuit and wellness centres are booming. Also, the stigma attached towards mental health challenges is gradually waning away. People are openly talking about the mental health challenges they face, are ready to seek help when they need, therapy is being normalized, and are increasingly aware of toxic relationships in life and at work and are ready to move away from them.

This inclination towards wellness is reflected in workspaces with various groupings for dance, music, sports, employee engagement, and community outreach gaining much importance. Organizations are also insisting that employees should take enough breaks and focus on their well-

being. The discussions regarding the right to disconnect and the proposed legislations in some states of the country reflect the understanding that there is the need to legally ensure the well-being of employees and their personal time beyond work need to be protected. And, what matters is not how much time one spends at work; but how productive one is. The concept of vibe working is important here. One of the main features is the collaboration between AI and humans. Allotting repetitive, mundane tasks to AI, human beings focus on creative, innovative aspects. There is smart use of technology that translates itself into high productivity and efficiency at work.

Another noteworthy shift is the tendency towards appreciating autonomy and self-reliance more. The increasing presence of social media in lives has facilitated the spread of a new value system based on equality. This has led to more equal relationships among genders and a king of repulsion towards systems and institutions that are hierarchical; For example, patriarchal marriages and families do not attract youngsters, especially women among them, who have been at the receiving end of the system for centuries. Many of them prefer remaining single to being subjugated by the traditional 'wife' role in an unequal marriage. Also, there is a change in the approach to money and wealth. Instead of accumulating wealth and investing in tangible assets, individuals tend to opt for spending and investment patterns that make them live relaxedly, exploring life, tastes, cultures, and the world around.

This change is not without challenges too. Overreliance on AI and social media have visible unhealthy impacts, making people mindlessly follow guidelines by ChatGPt or Gemini and confiding in them more than in humans, being disconnected to people and around the world. There are also the difficulties encountered while undergoing such a mammoth transformation. But there are more healthy changes that make youngsters more accountable and responsible to life and view life through a realistic and holistic lens. What is imperative for the generation that started working before the pandemic is to adopt the healthy aspects of the changed approach to work and life in the post-pandemic period.

We need to see life as a totality, much more than the job that we do, valuing people and relationships and our personal ambitions and passions. Our relationships at work need to be more egalitarian, moving away from hierarchical structures, giving space to adaptability and flexibility and respecting people and their voices for what they are. In every workspace, there need to be provisions for employee well-being and the foremost investments are to be in people. Only a happy and content workforce that is encouraged to balance work and life can lead organizations to better growth. There should be healthy and smart adoption of technology, especially AI, to assist people in what they do, letting them be more creative. More than everything else, modern times and the post-pandemic society show us the need to be more humane, empathetic, balanced, realistic, and authentic at work, as in life.

Gendering the Gavel: Roadblocks to Indian Political Parity

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Participation Without Power: The Democratic Paradox

In a democracy that prides itself on universal adult franchise and mass electoral participation, the continued under-representation of women in legislative bodies remains one of India's most enduring contradictions. While women vote in numbers comparable to men and often play a decisive role in electoral outcomes, their presence in law-making institutions remains marginal. This gap between participation and power highlights a deeper structural imbalance that electoral processes alone have failed to correct. Against this backdrop, the Women's Reservation Act, passed in 2023, stands not merely as a policy reform but as a critical test of the Indian political system's willingness to redistribute power rather than simply acknowledge inequality.

The Promise of Parity—and Its Built-In Pause

The Women's Reservation Act promises to reserve one-third of seats in the Lok Sabha and State Legislative Assemblies for women, including within seats already reserved for Scheduled Castes and Scheduled Tribes. On paper, this appears to be a transformative step toward political parity. However, the reform is marked by a significant limitation: it does not come into force immediately. Its implementation has been made contingent upon the completion of a future Population Census and a subsequent delimitation exercise. This sequencing allows the political system to claim progressive intent in the present while postponing substantive change to a later electoral cycle. As a result, the promise of equality is deferred, and the structural imbalance in representation remains intact in the near term.

Representation Deficit in Numbers and Global Standing

The delay becomes more consequential when viewed against current representation levels. In the 2024 Lok Sabha, women account for only about 13.6–13.8 per cent of Members of Parliament, roughly 74 to 75 women in a House of 543. Internationally, India ranks around 149th in terms of women's representation in the lower house of Parliament. These

figures underscore a persistent trend: in the absence of binding legal requirements, political parties have not voluntarily nominated women in sufficient numbers to significantly alter the composition of legislatures. The reservation law, therefore, addresses a real democratic deficit, but its postponed implementation weakens its immediate corrective potential.

A Reform Decades in the Making—and Compromise

Understanding this delay requires an appreciation of the long and contested history of women's reservation in India. The idea has been debated since the 1990s, with multiple attempts to legislate reservation failing due to political disagreement, coalition pressures, and fears among sitting legislators of losing established constituencies. Even parties that publicly supported women's empowerment often hesitated when discussions shifted from principle to practice, particularly regarding ticket distribution and electoral risk. The eventual passage of the law in 2023, after decades of stalemate, reflected a rare political consensus—but one that came with a built-in postponement. Seen through the lens of political economy, this delay reduces immediate costs for current political actors and preserves existing power structures in the short run.

Census–Delimitation Linkage: A Procedural Roadblock

The most significant structural bottleneck lies in the law's linkage to Census and delimitation. The government has announced that the Population Census 2027 will be conducted in two phases, with March 1, 2027 as the reference date, and October 1, 2026 for Ladakh and certain snow-bound areas. Delimitation, which involves redrawing constituency boundaries based on updated population data, is a time-consuming and politically sensitive exercise. The practical implication is that women's reservation is unlikely to apply in the immediate next general election, despite having already received constitutional sanction. This creates what can be described as a "technical trap," where a reform aimed at correcting democratic imbalance is delayed by procedural sequencing rather than constitutional necessity.

When Procedure Overrides Principle

Critically, women's reservation does not logically require delimitation to be implemented. Existing reservation for SC/ST constituencies operates within current boundaries, demonstrating that seats can be reserved without redrawing constituencies. By tying women's quota to delimitation, the reform is attached to a process that is slow even under ideal conditions and highly contentious in reality. Consequently, the effectiveness of the

reservation law becomes dependent not on political will alone, but on the successful navigation of administrative and political hurdles that are only indirectly related to gender justice.

Federal Fault Lines and Gender Reform

Delimitation itself carries deep federal implications, further complicating the issue. Redistribution of parliamentary seats based on updated population figures can alter the balance of political power between states. States with higher population growth may gain seats, while those with lower growth may lose relative influence. This has long made delimitation a politically charged issue, affecting Centre–State relations, fiscal negotiations, and coalition politics. By linking women's reservation to delimitation, the law inadvertently pulls gender reform into inter-state power negotiations. If delimitation is delayed due to federal resistance, women's reservation risks being stalled as collateral damage, even though the demand for women's representation is conceptually separate from the question of seat redistribution among states.

Party Gatekeeping and Electoral Inertia

Electoral behaviour further reinforces the importance of timely implementation. The 2024 general election provides clear evidence that political parties are not organically moving toward greater inclusion of women. Despite repeated rhetorical commitments to gender equality, candidate selection remains dominated by entrenched male networks. The absence of immediate legal compulsion allows parties to treat women's representation as a future adjustment rather than a present obligation. Had the quota been operational from the outset, parties would have been compelled to identify, train, and promote women leaders more seriously. Delay, therefore, functions less as a transitional necessity and more as a political comfort zone that sustains the status quo.

Gender Is Not a Monolith: Social Stratification Within Representation

Beyond numbers, the social composition of women's representation raises further concerns. Women are not a homogeneous category in Indian society. Caste, class, education, and access to resources profoundly shape political opportunity. While the law provides for reservation of seats for women within SC/ST categories, the absence of clarity on an OBC sub-quota has generated apprehension that relatively privileged women may benefit disproportionately. Without complementary measures, numerical increases in women's representation may coexist with persistent social exclusion, resulting in representation that is gender-inclusive but socially skewed.

From Entry to Authority: The Risk of Proxy Power

Another challenge lies in the risk of symbolic inclusion without substantive power. Experiences from local self-government illustrate both the promise and the limitations of reservation. While quotas at the panchayat level dramatically increased women's participation, in some contexts informal authority continued to rest with male relatives, giving rise to the phenomenon of "proxy representation." At higher legislative levels, this risk may reappear in more subtle forms, with parties preferring women candidates connected to established political families. In such cases, women's entry into legislatures may not translate into independent decision-making authority, limiting the transformative potential of increased representation.

Conclusion

In conclusion, the Women's Reservation Act represents an important constitutional milestone, but it is not a guaranteed solution to India's democratic imbalance. Its greatest weakness lies in the delayed implementation caused by its linkage to Census and delimitation, a process fraught with administrative complexity and political sensitivity. Beyond timing, deeper structural barriers persist in the form of party gatekeeping, social inequality within gender groups, and the risk of proxy leadership. Achieving genuine political parity requires more than constitutional text; it demands timely execution, reformed party practices, and sustained efforts to build women's autonomous political capacity. Without such systemic change, the gavel may be gendered in appearance, but power will remain uneven in practice.

Youthquake in Nepal: The Rise of Gen Z Politics

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1. Introduction

Youth activism is the heartbeat of Nepal's political history. From the courageous struggle against the Rana autocracy to the barricades of the 2006 People's Movement, young people have always been the foot soldiers of change. Yet, the current "youthquake" feels different. It isn't just about bodies in the street; it is about a Generation Z that is more comfortable with a hashtag than a party flag. This cohort—raised in the shadow of the civil war but matured in a world of high-speed internet—is pivoting away from the old, party-centric models of the past. This article argues that we are seeing a fundamental shift in political consciousness, where the demand for "systemic change" is finally outweighing the old loyalty to political "Big Houses."

The most visible face of the Nepali youthquake is found on smartphone screens. While previous generations gathered at tea shops or party offices, Gen Z deliberates on TikTok, Instagram, and encrypted Telegram groups. These aren't just echo chambers; they are staging grounds for rapid, "leaderless" mobilization.

We saw this clearly during the "Enough is Enough" protests, which bypassed traditional student unions to organize via social media. This digital fluency allows for a horizontal power structure—anyone with a smartphone can call for accountability. However, this shift is a double-edged sword. While it makes the movement incredibly inclusive and fast, it lacks the "command and control" of traditional parties. Without a central office or a clear spokesperson, Gen Z activists often struggle to turn viral moments into long-term policy shifts. They are masters of the "protest," but the transition to "policymaking" remains their greatest hurdle.

2. Theoretical Framework: The Rise of the Networked Citizen

To understand the "Youthquake," we must look beyond traditional political science. For decades, Nepali politics functioned on a patron-client model: youth wings (Bhid) served as the enforcement arm of aging party elites in exchange for future jobs or influence. Generation Z is disrupting this hierarchy.

Utilizing the concept of "Networked Individualism," this study suggests that political identity in Nepal is now curated through digital deliberation rather than inherited party lines. The "Networked Young Citizen" in Nepal is a post-ideological actor. They are less concerned with whether a policy is Marxist-Leninist or Liberal and more concerned with whether it is efficient, transparent, and digitally accessible.

3. Structural Drivers: The Economic Pressure Cooker

The story of modern Nepal is often told through the lens of migration.

With youth unemployment hitting record highs, the "Nepali Dream" has increasingly become an airplane ticket to the Gulf, Australia, or the US. This has created a psychological state of "relative deprivation"—the gap between what one has and what one sees others enjoying on a global stage.

While the political elite focuses on power-sharing in Kathmandu, the youth observe the lavish lifestyles of political scions—popularly critiqued under the viral hashtag #NepoBaby. These "Nepo Kids," showcasing designer fashion and exotic vacations on TikTok, became the ultimate antagonists of 2024 and 2025. Their digital footprints provided a vivid contrast to the average youth struggling for a passport or a living wage. This economic frustration turned the Tribhuvan International Airport into a symbol of political failure, fueling a domestic fire that demanded accountability over revolutionary rhetoric.

4. The Digital War Room: Censorship as a Catalyst

In late 2023, the state's ban on TikTok provided the first major spark. By attempting to regulate "social harmony," the government unintentionally unified a fragmented youth population. The state brought a blunt instrument to a digital knife fight.

The situation reached a boiling point in September 2025 with the introduction of the "Social Media Management Directive," which sought to throttle platforms used for political organizing. Within hours, Gen Z mobilized through Discord and encrypted Telegram channels. This was a "leaderless" uprising—a digital-first phenomenon that proved a viral reel could be more potent than a thousand party flags. In a world-first for digital-participatory democracy, youth groups even began utilizing online polls to "vote" on shadow cabinets, signaling to the government that the digital space was no longer just for entertainment, but for governance.

5. Empirical Evidence: The "Balen Effect" and Independent Surge

The narrative of the Youthquake transitioned from the streets to the ballot box through what analysts call the "Balen Effect." The 2022 election of rapper-engineer Balen Shah in Kathmandu and the stone-breaking activist Harka Sampang in Dharan served as a "proof of concept."

They proved that independent, technocratic leadership could dismantle party machines without a single party flag or a massive campaign budget. Their success wasn't just about their personalities; it was about their method—live-streaming city council meetings and physical labor in the streets. This surge culminated in the rise of the Rastriya Swatantra Party (RSP), which leveraged digital transparency to challenge the Gathabandhan (coalition) politics that has dominated the country for thirty years.

6. Generational Rupture and the Death of Deference

The rise of Gen Z politics signifies a permanent break in Nepal's political culture. Older political elites frequently derive their legitimacy from historical struggle—the "jail years" or the "jungle years." However, Gen Z views this as a "legacy tax" they are no longer willing to pay.

This divergence has produced growing tension between symbolic legitimacy (what a leader did in 1990) and functional governance (how a leader manages a city in 2026). Moreover, Gen Z activism rejects the traditional "vanguard" model of politics, where a few elites speak for the masses. Instead, they frame citizenship in terms of rights and participatory engagement. In the Gen Z era, a leader is only as good as their last performance, not their historical resume.

7. Implications for Democratic Governance

The Youthquake in Nepal carries three critical implications for the future:

• Radical Accountability: Youth-led mobilization has demonstrated the capacity to hold political actors publicly accountable in real-time. A corrupt official no longer fears a court case; they fear a viral video.

• Democratic Renewal: The movement signals the potential revitalization of democratic participation by re-engaging younger citizens who had previously "checked out" of public life.

• Institutional Fragility: The absence of formal leadership structures may constrain the translation of protest energy into sustained institutional reform. Without a central office or a clear spokesperson, these movements risk "burnout" if they cannot navigate the slow, messy reality of legislative compromise.

8. Conclusion: Hope or Burnout?

The Youthquake in Nepal represents a critical moment in the country's democratic evolution. Driven by Generation Z's political consciousness, digital fluency, and demand for accountable governance, this movement has successfully cracked the foundation of the old guard.

However, the story is far from over. As Nepal approaches the 2026 General Elections, the challenge shifts from "protest" to "governance." If the new icons fail to deliver tangible changes—paved roads, domestic jobs, and digital transparency—the current surge of hope could dissolve into deep cynicism. The "quake" has cleared the ground; whether it builds a new republic or leaves behind only rubble depends on the institutional resilience of this networked generation. Nepal has crossed a point of no return: the era of the "ruling class" is ending, and the era of the "service provider" has begun.

Author's Note

This article contributes to the emerging scholarship on youth politics in South Asia. It calls for further empirical research into how digital-native populations in developing democracies can sustain political influence without falling into the traps of traditional party institutionalization.

Declining Youth Share and Rise in Aging Population in India

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India's demographic story has long been characterized by its **youth bulge** — a large and growing working-age population that has underpinned the idea of a **demographic dividend**. However, recent demographic trends signal a significant shift: the **share of youth in the population is declining**, even as the **elderly population is rising rapidly**. This demographic transition has profound implications for India's economy, society, and governance.

For decades, India was projected to benefit from a demographic dividend — a period where the proportion of working-age population (15–59 years) is high relative to dependants (both young and old), theoretically boosting growth and productivity. However, **fertility rates have declined rapidly**, and age composition is shifting. This has triggered debates on whether India's demographic dividend will extend long enough and how policy must adapt to an aging population.

Declining Youth Share

The share of younger age groups, particularly children (0–14 years) and youth (15–29 years), has been steadily declining:

The **0-14 age group's share in the population** has fallen from **36.3% in the early 1990s to around 24.2% in 2023**, according to the Sample Registration System (SRS).

The **youth population (15–29 years)** was **27.2% in 2021** and is projected to decline to **22.7% by 2036** as per the *Youth in India 2022* report.

National Family Health Survey (NFHS) data also indicates a drop in the population share under 15 years of age between survey rounds.

These trends reflect both **lower birth rates** and **fertility levels falling below replacement** in many states — a key driver in reducing the relative proportion of children and youth.

Rapid Growth of the Elderly Population

India's older population (traditionally aged 60+) is expanding faster than other age groups:

In **2022**, there were an estimated **14.9 crore persons aged 60 and above**, comprising around **10.5% of the population**.

This share is projected to rise to **15% by 2036** and **20.8% by 2050**, effectively doubling in less than three decades.

By 2046, India's **elderly population is expected to outnumber children (0–14 years)** — a symbolic milestone in demographic shift.

Fertility and Life Expectancy

Underlying the demographic transition are two key variables:

Total Fertility Rate (TFR): India's TFR has declined significantly from over **5 births per woman in the 1970s** to about **1.9 in 2023**, falling below the replacement level of 2.1.

Life Expectancy: With improvements in health services, life expectancy has risen, contributing to longevity and a growing proportion of older adults (though precise official figures await the full 2027 census).

The combination of declining fertility and increasing longevity accelerates the **aging process** — a transition that historically occurred over much longer periods in developed countries.

Regional Variations in Demographic Transition

Demographic aging is not uniform across India:

States such as **Kerala, Tamil Nadu, and Himachal Pradesh** are at the forefront of aging due to lower fertility and greater life expectancy, with elderly shares significantly above the national average.

In contrast, states with higher fertility, such as **Bihar and Uttar Pradesh**, still have relatively younger populations, though projections indicate eventual aging even in these regions.

This variation highlights the **heterogeneous nature of India's demographic transition**, necessitating tailored policy approaches at the state level.

Causes of Declining Youth Share and Aging

1. Fertility Transition

India's fertility decline is central to demographic shifts. Increased literacy (especially female education), rising participation of women in the workforce, urbanization, improved access to contraception, and delaying of marriage contribute to fewer births per woman. Evidently:

The TFR is below replacement level in many states. Urban fertility rates are especially low in southern and developed states.

2. Increased Life Expectancy

Better healthcare, nutrition, and disease control have shrunk mortality rates and extended life spans, increasing the proportion of elderly persons.

3. Changing Social Norms and Aspirations

As socio-economic aspirations change — with delayed marriage, career prioritization, smaller desired family sizes, and increased participation in higher education — the demographic behavior of Indian families has shifted.

Implications for India's Economy and Society

1. Economic Growth and Labor Force Dynamics

a) End of a Prolonged Dividend

India's economic growth expectations have long been tied to a large and expanding workforce. A shrinking youth share signals that the **demographic dividend's window is narrowing**. Reduced growth in the labor force can impact:

National productivity and growth potential

Sectoral labor supply, especially in labor-intensive industries

Governments and private sector actors must pivot toward **enhancing productivity** through technology, skill development, and better utilization of existing human capital.

b) Skill and Employment Mismatch

The decline in the youth population does not automatically translate into a skilled workforce. India still faces significant **youth unemployment and skill gaps**, with periodic labor force data showing youth unemployment rates significantly above averages in some regions.

2. Rising Dependency Ratio

As the proportion of elderly increases relative to the working-age population, the **old-age dependency ratio** rises, placing pressure on the working population to support dependents. This can strain savings, consumption patterns, and public spending on social security.

3. Healthcare and Social Expenditure

A larger elderly population will demand greater healthcare resources, long-term care, geriatric services, and social security systems. India's existing health infrastructure and social protection schemes will need expansion and redesign.

4. Urbanization and Migration

With younger populations moving to urban centers for opportunities, rural areas may experience both **aging in place** and **declining human capital**, amplifying regional disparities.

5. Gender Dimensions

Demographic changes also have gender implications. Increased female participation in education and the workforce is linked to fertility decline, yet elderly women often face greater care burdens, higher widowhood rates, and economic vulnerability.

Policy Challenges and Responses

Addressing demographic transition requires multi-sectoral strategies.

1. Demographic Policy — Balanced and Ethical

There is debate over whether policy should seek to influence

fertility behavior. Some voices, including social leaders, have called for larger families to balance declining fertility.

However, ethical demographic policy should respect reproductive rights, enhance access to quality healthcare, and ensure informed choice.

2. Enhancing Human Capital

As the youth share shrinks, maximizing **human capital quality** becomes crucial:

Skill India and vocational training to align workforce skills with industry needs

Focus on **higher education quality and research**

Lifelong learning and re-skilling opportunities

3. Healthcare Infrastructure and Care for the Elders

Strengthening public healthcare with a focus on age-related conditions is vital. This includes:

Geriatric care services

Preventive health and wellness programs

Support for caregivers

4. Social Protection and Pension Systems

Expanding **pension coverage**, social security nets, and sustainable retirement housing options will be essential to support an aging society.

5. Regional Policy Focus

State-specific strategies can account for heterogeneous demographic profiles. States with older populations might focus more on healthcare and pension systems, while younger regions emphasize education and employment.

6. Data and Planning

Timely and accurate data from the **2027 Census** will offer more precise insights for planning. Robust demographic monitoring systems are necessary for evidence-based policy.

The narrative of India's demographic future is shifting — the **youth bulge is tapering**, and the **aging population is rising**. This shift presents both **challenges and opportunities**. While the demographic dividend may be reaching its peak, the transition also offers a chance to **build a more skilled workforce, invest in quality of life, and design policies for inclusive growth**.

For India's policymakers, understanding demographic data, anticipating structural changes, and crafting forward-looking, humane policies will determine whether demographic transition becomes a strategic advantage or a socio-economic burden. The next decade will be crucial in shaping India's demographic and developmental trajectory.

Terror Renewed: Pahalgam and Delhi Attacks and India's Evolving Security Landscape

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Security experts of the future will classify 2025 as a period of strategic "rupture" with respect to India's long-standing security paradigm of deterrence, restraint, and warfare. This paradigm has been both dismantled and reconstructed by a growing degree of violence, which has extended beyond the localised kinetic violence in Baisaran valley to the urban, asymmetric violence at Red Fort. These dual assaults may be distinct in their geography but unified in their ideological origin, forcing India to transform its defence posture from reactive management to punitive proactivity.

Pahalgam: Tactical Evolution of Proxy Warfare

India was struck by devastating news on April 22, 2025, in the Baisaran Valley, 7 km from Pahalgam, where a brutal Islamist militant group carried out an attack that killed 26 people, including several newlywed couples, who were shot at close range. The Pahalgam attack shows a calculated change in the target selection by these militant groups. Baisaran, also known as the "Mini Switzerland", is celebrated for its natural beauty, with high-altitude meadows. These landscapes were only reachable on foot or horseback and were densely covered with pine trees, which offered perfect natural camouflage to the militants. The area was enclosed in a chain-link fence that was 7 feet high, making it difficult to escape during the attack. These topographical characteristics allowed the militants to form a natural kill box, which cannot be used in urban centres. The assault was carefully organised to occur during a time when an armed security force was not present in the region on a permanent basis. The coordinated assault started around 1:00 pm and lasted until 2:45 pm, a time when there was high tourist activity. Militants wore military-style uniforms to impersonate as security officers. One of the militants was dressed in a traditional Kashmiri pheran to fit in with the locals. The conduct of the onslaught shows surgical precision, with gunfire directed near the exit and entry gates using a "hammer and anvil" tactic to instigate maximum panic, resulting in a chaotic stampede.

A high degree of training in modern weaponry is evident from the use of AK-47 and M4 carbines, the latter being standard issue in several NATO forces, pointing to residual arms from the Afghan conflict being smuggled through the Line of Control (LOC) for Kashmir-based proxies.

The victims were also made to repeat the kalima (Islamic declaration of faith) to separate Muslims and non-Muslims. This sectarian profiling resulted in the killing of 26 people, mostly Hindu tourists. However, the indiscriminate nature of the violence was underscored by the death of a Christian tourist and a local Muslim pony ride operator, Syed Adil Hussain Shah, who wrestled a weapon from a terrorist, an act of valour that defied the communal narrative the terrorists sought to impose.

National Investigation Agency (NIA) in its 1597-page chargesheet attributed the attack to Lashkar-e-Taiba(LeT), and its affiliate militant organisation named The Resistance Front (TRF). LeT chief Hafiz Saeed and TRF operational commander Habibullah Malik were identified as the masterminds behind the massacre. Deliberate utilisation of the TRF brand, a name that evokes a "secular resistance" narrative rather than overt religious jihad, signifies Pakistani handlers aimed at possible deniability and cast violence as an indigenous struggle. NIA investigation dismantled this facade by identifying several Pakistani terrorists as the executors on the ground. Investigation also led to the arrest of two local persons providing logistical support for terrorists, highlighting the challenge of the Over Ground Worker (OGW) network that sustains militant activities.

Operation Sindoor and the Doctrine of Punitive Deterrence

The Pahalgam massacre and its aftermath marked a paradigm shift in Indian military doctrine. On May 7, 2025, the Cabinet Committee on Security approved Operation Sindoor, which was not just a retaliatory attack but a full-scale campaign to destroy terrorist infrastructure deep within Pakistan. Operation Sindoor was significantly different from the previous reactions of India, which are characterised by the concept of strategic restraint to prevent cross-border terrorism. India's response was articulated by the Chief of Defence Staff, General Anil Chauhan, who outlined a three-pronged approach.

1. Preparation for short-duration, high-intensity warfare
2. Readiness for long-duration land conflict
3. Creation of strategic asymmetry through advisory and technological superiority
4. The first prong, Operation Sindoor, requires rapid kinetic punishment to increase the cost of proxy warfare to the Pakistani state. The military reaction was rapid and multidimensional, characterised by a microscopic scan of the terror terrain that pinpointed nine particular terror camps and launchpads. This was followed by coordinated air and missile strikes in Bahawalpur and Muridke, the traditional stronghold of JeM and LeT. The outcome was disastrous for Pakistani terror outfits. India neutralised more

than 100 terrorists, including high-value targets such as Yusur Azar and Abdhul Malik Rauf. By May 10, the conflict escalated into a high-intensity aerial engagement between the Indian and Pakistani armed forces. The IAF utilised Rafale jets and SU-30 MKIs against Pakistan's F-16s and JF-17s. China utilised this as an opportunity to real-time testing ground for its military technologies and weapon systems. U.S. reports specified that Chinese modern systems, including the HQ-9 air defence system, PL-15 air-to-air missiles, and J-10 fighter jets, saw their first combat use during this conflict.

A disturbing trend in internal politics, characterised by increasingly polarising rhetoric on national security, was evident during Operation Sindoor. The government projected Operation Sindoor as a decisive victory. At the same time, senior Congress leader and former Maharashtra Chief Minister Pritviraj Chavan sparked significant political controversy by claiming that India "was defeated on day one" of the operation. He alleged that in the initial aerial engagement, Indian aircraft were shot down, and the IAF was subsequently grounded due to the threat from PAK air defences. The ruling BJP and military analysts aggressively countered this story by providing the successful destruction of PAK radar installations and ammunition as evidence of the victory. War results that are more partisan in perspective may threaten domestic solidarity, which is crucial during an external aggression.

International response to India's retaliation merits close examination as it demonstrates that it clearly does not follow the global tradition of immediate de-escalation. The big powers realised the incitement in Pahalgam and mostly supported India's right of self-defence. U.S. President Donald Trump made an explicit declaration that India had a sovereign right to self-defend. The attack was denounced by French President Emmanuel Macron, who showed high levels of solidarity. The clear indication of support for the actions of India is when the Israeli ambassador Reuven Azar said, "Israel supports India's right for self-defense. Terrorists should know there's no place to hide from their heinous crimes against the innocent". This diplomatic cover enabled India to keep its retaliation going until the four days without the fear of crippling sanctions and succeeded in isolating Pakistan on the terrorism issue.

The incorporation of water as a non-kinetic weapon into the Indian arsenal, aimed at countering state-sponsored terrorism, is regarded as an unprecedented tactical development. India suspended the Indus Water Treaty on April 23, thereby breaking a 65-year-old precedent of water sharing. According to the official statements, IWT is "held in abeyance" until Pakistan dismantles its terrorist infrastructure. Unlike transient military interventions, this strategic measure is regarded as having significant long-term implications, given that 80% of Pakistan's agricultural

land relies on river irrigation and that it also affects flood forecasting in western rivers, including the Chenab and the Jhelum. India utilised this operationalised suspension to expedite the construction of new reservoirs and hydroelectric projects on western rivers to achieve the dual purposes of domestic energy and irrigation. Furthermore, it serves as a tangible leverage point against Pakistan, thereby transforming water from a shared resource into a strategic asset.

Urban Terror & Professional-Class Radicalisation

Despite the ferocity of Operation Sindoor, terrorism mutated in form and struck the Indian capital on November 10, 2025. An incident involving a white Hyundai i10 occurred near a traffic signal adjacent to the Red Fort in Delhi, killing 15 people and injuring 30 others. The choice of the target - Red Fort, a symbol of Indian sovereignty- served a supreme symbolic value and high civilian density during rush hour. NIA forensic team identified the explosive as Ammonium Nitrate Fuel Oil (ANFO), augmented with high-grade boosters to achieve the maximum shockwave velocity. The procurement of ANFO, a dual-use chemical, which is industrially used, highlights the indigenous acquisition by the terror group to evade customs. The complexity of the timing mechanism and the fuel-to-oxidiser ratio denote a high level of technical skills, which is not typical of the crude assembly techniques in the case of lone-wolf attacks.

The Delhi case shows the alarming sociological shift in the terrorism scene, that is, the emergence of white-collar terrorism in India. The investigating agency found a network of doctors who were involved in the plot, including a suicide bomber, Dr Umar Un Nabi, a medical doctor and assistant professor at Al-Falah University in Faridabad, Dr Muzammil Shakeel Ganai (of Pulwama), Dr Adeel Ahmed Rather (of Anantnag) and Dr Shaheen Saeed (of Lucknow). These doctors use their professional identities to hide their terror links and use hospitals and universities as a cover to get logistical support. In contrast to the disenfranchised youth, who are frequently the victims of radicalisation, the presence of doctors and professors indicates that terror modules have a specific recruitment policy, of targeting the intelligentsia. Predictive profiling of such Professional-Class Radicalisation is extremely difficult, as these individuals possess financial means, social camouflage, and the intellectual capacity to execute complex attacks without triggering a red flag in human intelligence (HUMINT) networks.

Cyber and AI Escalation

A silent digital war was fought in the shadow of kinetic warfare during and after Operation Sindoor. There were reported cyber-attacks of about 1.5 million after the operation, which targeted critical infrastructure and government online platforms. 'Anonymous Bangladesh' and 'Anon Black

Flag Indonesian' are hacktivist groups that organised a series of Distributed Denial-of-Service (DDoS) attacks on Indian financial institutions and local governments.

In the Red Fort blast investigation, the attackers were identified to have used the Cyber Dead-Drop method of communication. Members would log in to a common email account, compose a draft message, and log out instead of sending direct emails that can be tracked using servers. The recipient would then log in, read the draft, delete it, and leave virtually no digital footprint. Intelligence was able to identify a Turkey-based handler who was known by the codename, Ukasa. This connection implies that there is diversification of command and control beyond the traditional Pakistan-based handlers. The episode also points to the fact that Turkey is becoming a new centre of anti-India coordination.

The year 2025 has permanently changed the security paradigm in India, which is no longer strategic restraint but punitive deterrence, whereby terrorism acts are now officially defined as acts of war. This has fundamentally changed the strategic stability in South Asia. The Pahalgam-Sindoor-Delhi cycle demonstrated that India possesses the military capability to punish state-sponsored terrorism, while the internal threat has mutated into an increasingly complex "white-collar" form that is hard to detect and interdict. Cyber threats are increasingly becoming more complex due to the emergence of artificial intelligence. AI will have a profound impact on any possible future conflict. Advanced technologies, such as polymorphic malware, are AI-powered and capable of rewriting their own code during an attack, making them near impossible to detect and neutralise. As we advance into the future, India ought to prepare for a two-and-a-half-front challenge, comprising a conventional threat from Pakistan and China, as well as an internal threat from "hybrid militants" who operate under a legitimate civilian guise, including radicalised professionals.

The Cost of Neglect: Why India Needs a Culture of Safety and Ethics

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Abstract

Despite extensive labour and safety laws, India continues to witness high levels of workplace accidents, industrial disasters, and public safety failures due to weak enforcement and ethical indifference. Thousands of workers—mostly from poor and informal sectors—are killed or permanently injured each year, revealing a deeper moral crisis in how human life is valued in development policies. Grounded in Article 21 of the Constitution, this paper argues that safety is not merely a regulatory requirement but a constitutional and ethical obligation. Using official data, recent case studies, and judicial interventions, the study shows how neglect operates as a structural problem sustained by inadequate training, oversight, and the normalisation of risk. While recent labour reforms and social security measures offer progress, a genuine culture of safety requires ethical governance, accountability, and public participation. The paper concludes that India must shift from a culture of compliance to a culture of care, placing human dignity and life at the centre of development.

Introduction

Human resource participation in skilled and unskilled employments, both physical and intellectual, has rarely been adequately recognised or systematically recorded in history. While dominant historical narratives celebrate rulers, institutions, and economic growth, the countless labouring lives that sustained civilisation remain largely invisible. Behind every phase of development lie innumerable workers whose lives were spent, damaged, or lost—often undocumented and forgotten. Progress, thus, has frequently advanced through silent human sacrifice. Despite centuries of cultural, technological, and economic advancement, the question of human safety remains unresolved. The absence of adequate precautionary measures has led to industrial accidents, unsafe workplaces, occupational diseases, and the loss of thousands of lives.

Although labour laws exist in abundance, weak enforcement, fragmented regulatory frameworks, and administrative apathy have severely limited their effectiveness. Safety failures are often treated as inevitable accidents rather than preventable outcomes of neglect. Neglect of workplace safety violates Article 21, which guarantees life with dignity, health, and safety, and breaches the State's constitutional duty to prevent avoidable harm. Persistent unsafe conditions in India reflect not just regulatory failure but also ethical indifference, treating human life as

expendable in the pursuit of growth. Sustainable development in India, therefore, demands a fundamental shift from viewing safety as regulatory compliance to recognising it as an ethical responsibility. Building a robust culture of safety, ethics, and accountability is no longer optional; it is a moral, constitutional, and developmental necessity. Only by placing human life at the centre of policy and practice can India pursue growth that is both just and humane.

Neglect as a Structural Problem

Every year, India registers the deaths of hundreds of workers due to insignificant and unreliable safety measures in factories and construction sites. This year has been no different. According to government data, three workers die every day in Indian factories due to a lack of basic safety measures. The number goes higher for workers who lose their eyesight, fingers, or hands. Despite having strict laws to protect workers, less than 0.4% of cases where employers don't observe safety regulations result in punishment for offenders. Although India has witnessed economic and industrial progress with much safer equipment in place, the disturbing reality continues to exist in the textiles, manufacturing, and construction industries, leaving thousands of people impaired for a lifetime.

Workplace accidents in India leave many workers permanently disabled, while compensation is often delayed or inaccessible, placing heavy financial burdens on families who lose their sole breadwinners. In the past five years, at least 6,500 workers have died in factories, construction sites, and mines due to poor safety measures. Inadequate training, neglect of basic precautions, and failure to use PPE have significantly increased risks. The May fire in a Delhi commercial building, which killed 27 people due to missing fire and police clearances, illustrates how regulatory lapses and weak enforcement continue to cause preventable tragedies.

Experts stress that proper training in machinery use can prevent many industrial accidents. In August 2022, a 21-year-old worker in Uttar Pradesh lost his hand to a power press due to a lack of training—one of thousands of similar cases nationwide. Although Indian laws provide sufficient provisions for workplace safety, strict enforcement and clear communication of guidelines by authorities are essential to protect workers' lives. Official DGFASLI data shows that workplace risks in India's registered factories remain alarmingly high despite comprehensive labour laws. Between 2017 and 2020, an average of 1,109 workers died and over 4,000 were injured each year—nearly three deaths per day. Parliamentary records report at least 6,500 deaths in factories, ports, and construction sites over five years, revealing persistent enforcement failures and serious ethical concerns about the value placed on human life in India's development process.

Official Government Data (DGFASLI), 2018–2022

Year	Fatal Injuries (Deaths)	Non-Fatal Injuries
2018	1,154	4,528
2019	1,127	3,927
2020	1,050	2,832
2021	988	2,803
2022	1,017	2,714

On 30 June 2025, a dust explosion destroyed the Sigachi Industries chemical factory in Pashamylaram, Telangana, killing and injuring several workers producing pharmaceutical-grade MCC. Around 143 workers were believed to be inside, but poor record-keeping created confusion over the exact number. Many bodies were unrecognisable, delaying identification and rescue. Although compensation was announced, families faced delays due to missing documents. The incident exposed serious failures in safety systems, worker registration, and record management.

Industrial accidents remain a serious concern in Kerala's manufacturing and construction sectors, affecting worker safety and productivity. Despite the presence of safety regulations and labour welfare laws, incidents resulting in both fatal and non-fatal injuries continue to occur due to unsafe working conditions, inadequate training, and lapses in safety enforcement. Analysing injury data over time helps to understand the trends, identify risk periods, and assess the effectiveness of existing safety measures.

The Kollam construction site accident in which a migrant worker was found crushed under a mound of soil occurred on Tuesday, 11 November 2025. The body of 48-year-old Mohammed Jubrail was discovered around 9:30 a.m. near the Kureepuzha–Kavanad bridge section of the Kollam bypass construction site (NH-66), prompting an investigation into the incident and concerns over safety lapses at the work site.

On 13 November 2025, around 2:30 a.m. near Chandiroor, Alappuzha, an 8,000-kg concrete girder fell onto a pickup van at the Aroor–Thuravoor NH-66 construction site, killing the driver, Rajesh (44). The accident revealed serious safety lapses, including poor securing of materials, lack of barriers, weak traffic control, and missing warning systems, prompting an official investigation into safety failures.

The following table presents year-wise statistics of fatal and non-fatal workplace injuries in Kerala from 2014 to 2021, highlighting patterns in industrial accidents and gaps in reporting, particularly in the later years.

Year	Fatal	Non-Fatal
2014	24	234
2015	20	326
2016	18	158
2017	16	236
2018	22	145
2019	29	**Not available**
2020	14	**Not available**
2021	12	**Not available**

ILO / DGFASLI references

Key difference of other countries

The key difference between India and many other countries in worksite safety lies in implementation, not in the absence of laws. In India, weak enforcement, unregistered workers, poor safety training, lack of protective equipment and unsafe site management often lead to serious accidents, delayed rescue, and slow compensation. In contrast, countries like those in the EU, Japan, and Australia strictly enforce safety rules through regular inspections, mandatory training, digital worker records, proper use of PPE, organised site management, and strong legal accountability, resulting in better worker protection and fewer fatal accidents.

International Labour Organisation (ILO)

The International Labour Organisation (ILO) is a United Nations agency founded in 1919 to promote social justice and improve working conditions worldwide. It sets international labour standards to ensure safe, fair, and dignified work for all. The ILO brings together governments, employers, and workers to protect labour rights, end child and forced labour, promote equality, and support employment and social protection. According to the ILO, about 2.93 million workers die every year due to work-related accidents and diseases. Around 330,000 deaths are caused by workplace accidents, while most are due to occupational diseases. Nearly 395 million workers also suffer non-fatal injuries each year. This means more than 7,500 workers die daily from work-related causes. These figures show the urgent need for stronger labour law enforcement and better worker safety worldwide.

Legal and Constitutional Perspectives: Safety and Ethics in Indian Governance

A culture of safety and ethics in India is not merely a policy choice but a constitutional mandate, firmly grounded in Article 21 of the Constitution. The Supreme Court has consistently expanded the scope of the Right to Life to include health, safety, and a clean environment. In M.C.

Mehta v. Union of India (Oleum Gas Leak Case, 1987), the Court evolved the doctrine of absolute liability, holding hazardous industries strictly responsible for any harm caused, thereby prioritising human life over economic interests. Through environmental Public Interest Litigations, the judiciary has further recognised the Right to a Healthy Environment as part of Article 21 and enforced principles such as the Precautionary Principle, Polluter Pays Principle, and the Public Trust Doctrine to ensure preventive protection against environmental risks. In the sphere of healthcare, medical negligence cases have established that failure to maintain patient safety violates both tort law and constitutional duties. Together, these judicial interventions reflect India's commitment to an ethical constitutional framework where safety is treated as a fundamental right and a non-negotiable responsibility of the State.

The Supreme Court is enforcing safety as a core part of Article 21, treating worker health, workplace safety, and environmental protection as constitutional duties. Recent directions on POSH compliance, silicosis prevention, and environmental clearances emphasise prevention over post-damage compensation. In PRASAR v. Union of India (2024–2025), the Court ruled that failure to prevent silicosis violates Article 21 and ordered proper surveys, certification, and compensation. In Vanashakti v. Union of India (2025), it quashed retrospective environmental clearances, upheld the Precautionary Principle, rejected post-facto approvals, strengthened POSH implementation, monitored road safety, and supported NGT action on industrial accidents—affirming that safety is a constitutional, not merely administrative, obligation.

Government Policy in India: Safety and Precautions for the Protection of Human Life

In India, the protection of human life through safety and precaution is constitutionally grounded, particularly in Article 21, which guarantees the right to life, health, and dignity. The Directive Principles of State Policy further guide welfare-oriented laws on labour safety, public health, and social security. This constitutional framework promotes preventive governance by encouraging the State to reduce risks before harm occurs. India's labour safety regime, consolidated under the Occupational Safety, Health and Working Conditions Code, 2020, places responsibility on employers to ensure safe working conditions, though enforcement challenges remain. Disaster management policies under the Disaster Management Act, 2005, emphasise risk assessment, early warnings, and preparedness, reflecting a shift from relief-based responses to precautionary protection of human life.

Safety and Ethics: An Inseparable Relationship

Safety without ethics becomes mere rule-following, while ethics without safety remains abstract and ineffective. A genuine culture of

safety requires more than compliance with regulations; it demands responsibility, transparency, accountability, and deep respect for human life. Ethical governance, therefore, asks critical questions about risk and justice: Who bears the danger, and who pays the cost when harm occurs? When risks are shifted onto the poor, workers, or vulnerable communities, safety loses its moral foundation. Only when ethical values guide decision-making can safety measures truly protect human dignity and prevent avoidable harm.

Ethical Inequality in Risk Distribution

Ethical inequality in risk distribution means that poor, informal workers and marginalised communities face greater danger from unsafe workplaces, polluted environments, and overcrowded transport. When safety varies by class or location, it reflects moral failure. Deontological ethics and Article 21 affirm the State's and professionals' non-negotiable duty to protect life and treat humans as ends, not means. Utilitarian cost–benefit logic that accepts "acceptable deaths" is ethically dangerous, while preventing harm best promotes long-term social welfare. Justice and care ethics demand that risks not fall on the vulnerable and that safety focus on prevention, dignity, and compassion.

Professional ethics require doctors, engineers, administrators, and managers to prioritise human life over profit, foresee risks, act with competence and integrity, and remain accountable. In high-risk sectors, safety is a moral obligation. Indian ethical traditions—Dharma, Ahimsa, Ayurveda's preventive wisdom, collective responsibility, good governance ideals, and Gandhian ethics—all affirm that protecting life through prevention and care is a fundamental moral duty.

Human Life in Policy and Practice

Public policy often treats human life as a statistic rather than a moral absolute. Cost–benefit analyses, budget constraints, and administrative convenience frequently override safety considerations. While economic growth is essential, development that sacrifices lives undermines its own legitimacy.

Ethical policymaking requires a human-centred approach, where safety is treated as a non-negotiable value rather than an optional expense. Preventive investment in safety—whether in healthcare infrastructure, road design, industrial regulation, or environmental protection—is not a burden on the economy, but a foundation for sustainable growth.

The Culture of Compliance vs the Culture of Care

India largely operates within a culture of compliance, where safety is treated as meeting minimum legal standards rather than as a moral responsibility. What is urgently needed is a culture of care, in which institutions internalise safety as an ethical duty grounded in respect for

human life. Such a culture recognises the precautionary principle—the idea that potential risks should be addressed before harm occurs. In a country where industrial accidents, road fatalities, workplace injuries, and environmental hazards affect thousands every year, the burden of neglect is disproportionately borne by workers, patients, and marginalised communities. Ethical governance must therefore prioritise preventive safety systems, transparent decision-making, and strong accountability mechanisms. Rapid technological and infrastructural development further increases ethical responsibility, as innovation without proper risk assessment can create new forms of harm. Effective claim regulations and compensation frameworks exist, but they often function after tragedy rather than preventing it. A meaningful safety culture requires leadership commitment, ethics education, whistle-blower protection, public participation, and awareness, ensuring that safety becomes a shared social value rather than merely a regulatory obligation.

Key recommendation

These topics are effective for the syllabus because they connect law, ethics, public policy, labour rights, safety, and development in a meaningful way. They reflect real social problems such as industrial accidents, worker exploitation, weak enforcement of safety laws, and the neglect of informal labour. They also encourage critical thinking about how economic growth can be balanced with human dignity and workplace safety. India continues to face workplace accidents, unsafe construction, industrial hazards, and transport fatalities. If neglect continues, more workers will be injured or killed, families will suffer long-term hardship, public trust will weaken, and the legal system will be burdened with compensation claims. This neglect worsens social inequality, as poor and informal workers face the greatest risks with the least protection.

The cost of neglect in India is aggravated by weak enforcement of safety laws, corruption, falsified records, lack of inspectors, and the exclusion of informal workers from legal protection. Although laws like the Factories Act, 1948, exist, disasters such as the Bhopal Gas Tragedy exposed serious accountability failures. Recent self-certification and reduced inspections have further weakened safety enforcement. Labour reforms since the 1990s, including the OSHWC Code, 2020, have prioritised ease of business over worker protection, especially in high-risk sectors. Workplace safety directly affects productivity—safe conditions improve efficiency, while unsafe ones cause losses and fatalities. Informal and contract workers remain most vulnerable due to a lack of registration, social security, and legal awareness. Strong inspections, employer accountability, worker participation, and whistle-blower protection are urgently needed to make safety a real right, not just a formality.

Conclusion

The real cost of neglect is not just economic loss but human suffering, broken families, and loss of public trust. A society that accepts preventable harm weakens its moral foundations. For India, true development lies not only in growth and technology, but in building an ethical culture of safety where human life guides policy and practice. Neglect often works silently through weak enforcement, ignored warnings, and normalised risk, creating a systemic crisis across workplaces, healthcare, roads, and public infrastructure. Accidents and disasters are treated as isolated events, masking deeper ethical and institutional failures. The central question remains: how much does human life truly matter in governance and action? A culture of safety is not just about rules and inspections; it is a moral commitment grounded in ethics. Without ethical responsibility, regulations become hollow and human life is sacrificed for profit, speed, or political convenience. India's development must therefore be ethical development—placing dignity, life, and well-being at the centre. As safety failures mainly affect the poor, informal workers, and marginalised communities, ethical governance demands stronger protection, accountability, and justice for the most vulnerable.

Safety standards must apply equally to all workers, with transparent enforcement and accessible benefits for vulnerable groups. Guided by Article 21, Indian labour laws treat worker safety as a legal and ethical duty. The OSHWC Code, 2020 strengthens employer responsibilities and promotes preventive safety across sectors, though enforcement remains weak for informal workers. On 21 November 2025, India consolidated 29 labour laws into four Labour Codes—the Code on Wages, 2019, Industrial Relations Code, 2020, Code on Social Security, 2020, and the OSHWC (Occupational Safety, Health and Working Conditions) Code, 2020—to simplify laws, modernise employment relations, and enhance worker protection. Reforms include a universal minimum wage, unified wage definition, expanded social security for gig and unorganised workers, written contracts, regulated working hours and overtime, safer night shifts for women, equal pay, and improved health check-ups and welfare facilities.

Overall, worker protection has improved through stronger focus on safety, health, and social security, but the success of these reforms depends on clear rules, strict enforcement, capable institutions, and active stakeholder participation. India needs to move from a culture of compliance to a culture of care. Safety must be ethical, preventive, participatory, effectively enforced, and people-centred. Without strong ethical commitment, even the best laws fail in practice. Human life must therefore remain the core value of development, guiding policies, institutions, and professional conduct toward the protection of dignity and well-being for all.

From Red Corridors to Urban Shadows: The Changing Face of Naxalism in India

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In the dense forests and remote tribal belts of India, where development once moved slower than history itself, a radical ideology took root promising justice through revolution. What began as a peasant uprising in a small village of West Bengal gradually evolved into one of India's most serious internal security challenges—Naxalism. For decades, it dominated vast stretches of central and eastern India known as the Red Corridor, shaping state responses through military operations and development programmes alike. However, though physical space for armed rebellion has shrunk, the movement has not disappeared; instead, it has adapted itself to the changed circumstances. Today, Naxalism increasingly operates in subtler forms within urban spaces, intellectual circles, and digital platforms, marking a significant transformation from jungle warfare to ideological influence.

Naxalism refers to a left-wing extremist movement inspired by Maoist ideology that seeks to overthrow the Indian state through armed struggle. Its origin lies in the 1967 Naxalbari uprising, where landless peasants revolted against exploitative landlords, drawing ideological inspiration from the Chinese Revolution. Over time, the movement consolidated itself into organised armed groups, culminating in the formation of the Communist Party of India (Maoist) in 2004. The Maoists rejected parliamentary democracy, viewing it as a tool of elite domination, and instead advocated a "protracted people's war" to establish a communist state. Their influence spread across tribal and forested regions, where state institutions were weak and socio-economic grievances were deeply entrenched.

The persistence of Naxalism is rooted not merely in ideology but in long-standing structural injustices. Large-scale land alienation of tribal communities due to mining projects, industrial expansion, and poorly implemented forest laws created deep resentment against the state. Developmental deficits in education, healthcare, roads, and employment further reinforced the sense of neglect. In many areas, exploitative practices by contractors, moneylenders, and local officials eroded trust in governance, allowing Naxals to present themselves as protectors of the oppressed. Weak law enforcement, delayed justice, and corruption

compounded these grievances, making revolutionary narratives appealing to marginalised communities. Thus, Naxalism thrived where governance failed to translate constitutional promises into lived realities.

In recent years, however, sustained security operations, improved intelligence coordination, infrastructure development, and targeted welfare schemes have significantly reduced the geographical spread of Naxal violence. The number of affected districts and violent incidents has declined, and several strongholds have been reclaimed by the state. Faced with shrinking rural space for armed struggle, Maoist groups have increasingly shifted focus from territorial control to ideological survival. This strategic adaptation has given rise to what is popularly described as "Urban Naxalism," a term that reflects the movement's changing methods rather than a new organisation.

Urban Naxalism refers to the alleged presence and influence of Maoist ideology within urban areas through non-violent, indirect means. Instead of armed insurgency, the focus here is on narrative-building, recruitment, legal aid, propaganda, and logistical support. Urban spaces such as universities, civil society organisations, cultural platforms, media outlets, and digital networks are used to question state authority, mobilise dissent, and create ideological sympathy for extremist causes. The objective is not immediate overthrow but long-term erosion of institutional legitimacy and radicalisation of minds, especially among the youth.

This urban turn presents complex challenges for a democratic state. Unlike armed insurgents, urban operatives function within legal and constitutional spaces, making it difficult to distinguish between legitimate dissent and covert subversion. Democratic freedoms of speech, association, and protest—cornerstones of the Indian Constitution—are sometimes used as shields to advance extremist narratives. Surveillance and intelligence gathering become more complicated as activities are decentralised, network-based, and digitally encrypted. At the same time, excessive state action risks suppressing genuine civil liberties, leading to allegations of authoritarianism and further alienation. The digital sphere adds another layer of difficulty, enabling rapid spread of propaganda and cross-border ideological influence.

The government's response to Naxalism has evolved into a multi-dimensional strategy combining security, development, and governance reforms. On the security front, specialised forces, better inter-state coordination, and technology-driven operations have weakened armed cadres. Development initiatives focusing on road connectivity, mobile

networks, healthcare, and education have helped integrate previously isolated regions. Governance reforms, including implementation of the Forest Rights Act, land rights recognition, and decentralised local governance, aim to address root causes of discontent. Rehabilitation and surrender policies have encouraged militants to reintegrate into society, while legal mechanisms are employed to monitor and disrupt urban extremist networks within constitutional limits.

The way forward lies in recognising that Naxalism is as much a socio-political challenge as it is a security concern. While armed violence must be firmly countered, lasting peace requires inclusive development, transparent governance, and meaningful political participation. Addressing tribal alienation, ensuring fair resource distribution, and strengthening local institutions are essential to prevent the re-emergence of extremist ideologies. In urban spaces, fostering critical thinking, democratic engagement, and lawful dissent can act as powerful counter-narratives. Ultimately, the battle against Naxalism will not be won by force alone but by restoring faith in the state as an instrument of justice and dignity.

From red corridors carved out of neglect to urban shadows shaped by ideology, Naxalism's journey mirrors India's own development contradictions. The challenge before the nation is to ensure that progress does not leave behind pockets of despair where extremism can regenerate. Only a balanced approach—firm yet fair, vigilant yet democratic—can ensure that the shadows recede and the promise of inclusive democracy shines across every region and class.

Indigenisation of Defence Forces: A Need for Atmanirbharta

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The indigenisation of defence forces is a critical imperative for India to achieve genuine Atmanirbharta (self-reliance), transforming the nation from a major defence importer into a significant defence exporter. This necessity is rooted in strategic security, economic stability, and technological sovereignty. India's defence expenditure is rising, with a record budget of over ₹6.81 lakh crore (around $81 billion) for FY 2025–26, representing 1.9% of GDP and 13.45% of the total Union Budget, with a strong focus on modernisation and domestic procurement under Aatmanirbhar Bharat. Military expenditures worldwide have increased significantly in response to rising geopolitical tensions and uncertainties. The United States leads global military spending, allocating $949.21 billion annually as of 2024. It is followed by China, which spends less than half as much, and Russia; together, these countries account for more than half of global military expenditure. India, trailing behind the US, China, and Russia, is ranked fourth globally and spends approximately $281.74 billion on its military. During the period between 2020 and 2024, India ranked as the world's second-largest arms importer, accounting for 8.3% of global imports, as reported by SIPRI. However, this marked a 9.3% decline compared to the previous five-year period (2015–2019), attributable to India's growing capacity to design and manufacture its own weapons, thereby reducing reliance on imports.

Indigenisation in defence refers to the process of designing, developing, and manufacturing military hardware, software, and systems within the country, thereby reducing dependence on foreign suppliers for critical defence needs.

1. **Strategic Autonomy and National Security**

Reliance on imports for defence equipment creates inherent strategic vulnerabilities:

- Supply Chain Risk: Foreign suppliers can impose restrictions or embargoes during geopolitical conflicts or crises, as seen historically. Self-reliance ensures uninterrupted access to spares, maintenance, and upgrades.
- Sovereign Decision-Making: Dependence on foreign technology can subtly influence India's foreign policy decisions, as users of imported military hardware may hesitate to deploy it in ways that antagonise

supplier nations. Indigenisation ensures complete operational freedom to use assets in accordance with national interests.

- Tailored Solutions: Imported systems are often designed for different operational environments. Indigenous development allows hardware and software to be customised for India's unique terrain, climate, and threat perceptions, such as high-altitude warfare in the Himalayas.

For example, the United States uses various sanctions administered by the Office of Foreign Assets Control (OFAC), including comprehensive bans on entire countries such as Cuba, Iran, North Korea, and Syria, as well as targeted measures against specific individuals, entities, or sectors in countries like Russia, China, Iran, and Venezuela. These include economic, diplomatic, military, sports, and environmental sanctions, involving trade restrictions, asset freezes, travel bans, and secondary sanctions on third parties. These tools aim to achieve foreign policy and national security objectives by restricting access to finance and trade. In 2022, the US House of Representatives passed an amendment exempting India from CAATSA sanctions for purchasing the S-400 missile defence system from Russia.

2. Economic Benefits and Industrial Growth

The push for self-reliance directly fuels the domestic economy:

- Boosting 'Make in India' and 'Aatmanirbhar Bharat': Investment in the Defence Industrial Base (DIB) creates high-value manufacturing jobs, fosters ancillary industries, and promotes MSME participation.
- Reducing the Import Bill: India has consistently been one of the world's largest defence importers. Indigenisation significantly curtails the outflow of foreign exchange, freeing capital for social and developmental sectors.
- Export Potential: Successful indigenous development enables India to emerge as a competitive defence exporter, leveraging global demand for cost-effective and reliable platforms, thereby contributing positively to the trade balance.

India's defence sector is shifting from import dependence to export competence, driven by initiatives such as Innovations for Defence Excellence (iDEX). India exports Dornier Do-228 aircraft, Chetak helicopters, bulletproof jackets, lightweight torpedoes, and interceptor boats to over 100 countries, including the United States, France, and Armenia. India is finalising major BrahMos missile export deals, primarily with Vietnam and Indonesia, valued at around $450 million, following the Philippines' first deal in 2022. With Russia's approval for the sale of the jointly developed supersonic missile, these exports are bolstering India's defence exports and strategic partnerships in Southeast Asia. India aims to achieve ₹50,000 crore in defence exports by 2029 to strengthen its global influence.

3. **Technological Sovereignty and Innovation**

True technological self-reliance goes beyond mere assembly:

- R&D Ecosystem: Sustained indigenous production requires robust investment in research and development through institutions such as DRDO, the Ordnance Factories (now DPSUs), and private-sector collaborations, building core technological competencies.
- Future-Proofing: Rapid technological evolution in areas such as artificial intelligence, quantum computing, and cyber warfare necessitates continuous in-house innovation rather than reliance on foreign technology transfers, which are often outdated or restricted.
- Absorption Capability: Domestic system development ensures that the armed forces gain deep technical knowledge required to maintain, upgrade, and optimise complex platforms throughout their lifecycle.

India's first indigenous aircraft carrier, INS Vikrant, is a significant milestone in Indian naval self-reliance. Designed by the Indian Navy's Warship Design Bureau and built by Cochin Shipyard Limited, it marks India as one of the few nations capable of building aircraft carriers. Commissioned on 2 September 2022, it features 76% indigenous content, carries an air wing, and significantly enhances India's maritime security and 'Make in India' defence manufacturing.

4. **Policy Push: The Role of Government Initiatives**

The government has institutionalised the push for Atmanirbharta through several policy measures:

- Positive Indigenisation Lists: The Ministry of Defence rleases lists of specific defence items that must be sourced domestically, banning imports after a stipulated period.
- Defence Acquisition Procedure (DAP) 2020: DAP 2020 prioritises the 'Buy (Indian–IDDM)' category—Indigenously Designed, Developed, and Manufactured.
- Defence Corridors: Dedicated defence manufacturing corridors have been established in Uttar Pradesh and Tamil Nadu to create robust industrial ecosystems.
- Corporatisation of OFB: The Ordnance Factory Board has been converted into seven Defence Public Sector Undertakings to enhance efficiency, professionalism, and accountability.

The Indian Navy is heavily focused on indigenisation through its Indian Naval Indigenisation Plan (INIP 2015–2030), aiming for self-reliance under Aatmanirbhar Bharat. Major projects include Project 17A stealth frigates, indigenous aircraft carriers such as INS Vikrant, advanced sonar systems like Maareech, BrahMos missiles, electronic warfare suites such as Shakti, and indigenous propulsion systems. Initiatives like Swavlamban 2.0 aim to design, develop, and manufacture critical components including sensors, weapons, and ship systems within India.

Swavlamban 2.0 is the Indian Navy's updated roadmap for achieving Atmanirbharta in defence technology, launched by Raksha Mantri Rajnath Singh in October 2023. It focuses on fostering indigenous development by listing requirements for collaboration among PSUs, the private sector, MSMEs, and academia to reduce import dependence and enhance India's strategic autonomy. It is a collaborative initiative under the Naval Innovation and Indigenisation Organisation to drive innovation and bridge technological gaps.

Mission Sudarshan Chakra is India's ambitious indigenous, multi-layered national security initiative announced by the Prime Minister in August 2025. It aims to create an AI-enabled, integrated defence shield incorporating advanced surveillance, cyber defence, and missile interception capabilities to counter evolving threats such as drones, hypersonic weapons, and cyberattacks. Spearheaded by DRDO, it integrates radars, satellites, sensors, and cyber capabilities for real-time threat detection and response, serving as both a shield and a sword while advancing strategic self-reliance.

Challenges to Full Atmanirbharta

Despite significant progress, several hurdles remain:

- Core Technology Gaps: Critical areas such as aero-engines, advanced sensors, high-grade metallurgy, and specialised electronics still depend heavily on imports.
- Testing and Certification: The testing and certification process for new indigenous equipment can be lengthy and bureaucratic.
- Private Sector Integration: Although improving, the private sector requires greater long-term visibility and assured procurement contracts to confidently invest in high-risk, high-return R&D.
- Lack of Rare Earth Metals: The global shortage of rare earth metals, driven largely by China's dominance in refining and recent export controls, impacts the defence, electronics, and electric vehicle sectors by creating supply bottlenecks, raising prices, and forcing redesigns, prompting India and other nations to develop domestic supply chains.
- Skills Gap: A shortage of specialised engineers and technicians in niche defence technologies persists.

Indigenisation is not merely an economic policy but a strategic national security doctrine. Achieving true Atmanirbharta in defence ensures that India's military posture is guided solely by its own strategic calculus, free from external pressures. While complete self-reliance is a long-term objective requiring sustained R&D investment and synergistic collaboration among the government, DRDO, DPSUs, and the private sector, the current trajectory reflects a decisive shift towards securing India's future through its own technological and manufacturing capabilities.

Microplastics : A Grave Threat to Life on Earth

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Introduction

Thirty years ago, Richard Thompson, then a graduate student in marine ecology at the University of Plymouth, U.K., encountered plastic litter on the sea shores where he had set up experiments. Every day, he would have litter arriving and had to clear it from the experimental set up, but it kept coming back. During voluntary beach cleanups with fellow students, he noticed there was no category to document extremely small pieces of plastic that were barely visible to the naked eye. Later, in a study published in 2004 (Lost at Sea: Where is All the Plastic?, *Science*, 7 May 2004), Thompson and colleagues referred to these microscopic plastic fragments as 'microplastics'. With this sudy recording their abundance in the marine environment and ingestion by marine organisms, Thompson drew attention to these smallest of plastics posing one of the biggest threats to our oceans.

It has been 20 years since that paper in the journal *Science* showed the environmental accumulation of tiny plastic fragments and fibres called 'microplastics'. The paper opened an entire research field. Since then, more than 7,000 published studies have shown the prevalence of microplastics in the environment, in wildlife and in the human body.

So, what have we learned? In a paper released on 19 Sep 2024, an international group of experts, summarised the current state of knowledge (Richard C. Thompson *et al*. Twenty years of microplastic pollution research — what have we learned? *Science* 386,eadl2746(2024). DOI:10.1126/ science. adl2746). In short, microplastics are widespread, accumulating in the remotest parts of our planet. There is evidence of their toxic effects at every level of biological organisation, from tiny insects at the bottom of the food chain to apex predators. Microplastics are pervasive in food and drink and have been detected throughout the human body. Evidence of their harmful effects is emerging.

The scientific evidence is now more than sufficient: collective global action is urgently needed to tackle microplastics — and the problem has never been more pressing.

Figure 1. Close-up image of a collection of microplastics on a finger

Tiny particles, huge problem

Microplastics are small plastic particles 5 mm or less in one dimension. They are persistent, too mobile and hard to remove from nature. A growing volume of microplastics is found in the environment including the sea, soil, food and drinking water. Once in the environment, microplastics do not biodegrade and accumulate unless they are specifically designed to biodegrade in the open environment.

Some microplastics are intentionally added to products, such as microbeads in facial soaps. Others are produced unintentionally when bigger plastic items break down – for example, fibres released when you wash a polyester fleece jacket.

Studies have identified some of the main sources of microplastics as:

cosmetic cleansers
synthetic textiles
vehicle tyres
plastic-coated fertilisers
plastic film used as mulch in agriculture
fishing rope and netting
“crumb rubber infill” used in artificial turf
plastics recycling.

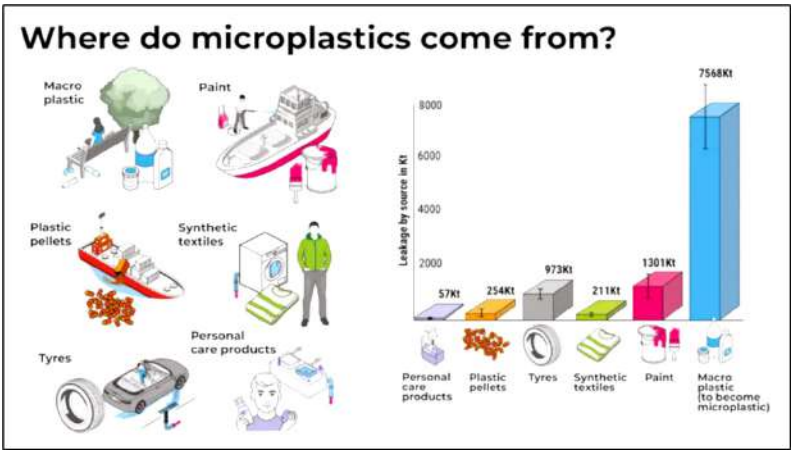

Figure 2. A graphic of where microplastics come from; sources include paint, textiles, personal care products and tyres (Source: *Chemistry International*)

In an ongoing research project at the Indian Institute of Technology (IIT) Madras, investigators kept Petri dishes in different indoor environments. They discovered the filter papers on the dishes loaded up with strands of microplastic fibres within days. The more domesticated a space – with curtains, carpets, towels and upholstery – the more the microfibres, they found.

Science hasn't yet determined the rate at which larger plastics break down into microplastics. They are also still researching how quickly microplastics become 'nanoplastics'— even smaller particles (less than 1 micrometre in size) invisible to the eye.

Measuring the microplastic scourge

It's difficult to assess the volume of microplastics in the air, soil and water. But researchers have attempted it. For example, a 2020 study estimated between 0.8 and three million tonnes of microplastics enter Earth's oceans in a year. And a recent report suggests leakage into the environment on land could be three to ten times greater than that to oceans. If correct, it means between ten and 40 million tonnes in total.

The news gets worse. By 2040, microplastic releases to the environment could more than double. Even if humans stopped the flow of microplastics into the environment, the breakdown of bigger plastics would continue.

Microplastics have been detected in more than 1,300 animal species, including fish, mammals, birds and insects. Some animals mistake the particles for food and ingest it, leading to harm such as blocked intestines.

Animals are also harmed when the plastics inside them release the chemicals they contain – or those hitch-hiking on them.

Invaders in our bodies

From freshly fallen snow in Antarctica to the depths of the Mariana Trench in the Pacific Ocean, microplastics are found everywhere. Microplastics have been identified in the air we breathe, the water we drink and the food we eat – including seafood, table salt, honey, sugar, beer and tea. Sometimes the contamination occurs in the environment. Other times it is the result of food processing, packaging and handling.

More data are needed on microplastics in human foods such as land-animal products, cereals, grains, fruits, vegetables, beverages, spices, and oils and fats. The concentrations of microplastics in foods vary widely – which means exposure levels in humans around the world also vary. However, some estimates, such as humans ingesting a credit card's worth of plastic every week, are gross overstatements.

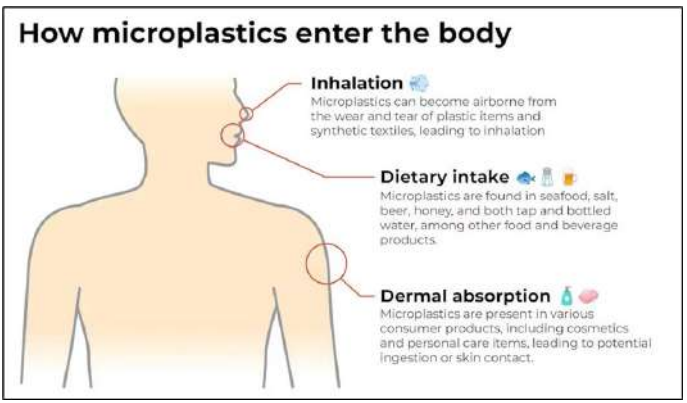

Figure 3. A graphic of how microplastics enter the body, by inhalation, dietary intake and dermal absorption

As equipment has advanced, scientists have identified smaller particles. They have found microplastics in our lungs, livers, kidneys, blood and reproductive organs. Microplastics have crossed protective barriers into our brains and hearts. They have also been detected in human placentas. While we eliminate some microplastics through urine, faeces and our lungs, many persist in our bodies for a long time.

So, what effect does this have on the health of humans and other organisms? Over the years, scientists have changed the way they measure this. They initially used high doses of microplastics in laboratory tests.

Now they use a more realistic dose that better represents what we and other creatures are actually exposed to.

And the nature of microplastics differ. For example, they contain different chemicals and interact differently with liquids or sunlight. And species of organisms, including humans, themselves vary between individuals. This complicates scientists' ability to conclusively link microplastics exposure with effects. With regard to humans, progress is being made. In coming years, we can expect greater clarity about effects on our bodies such as:

inflammation

oxidative stress (an imbalance of free radicals and antioxidants that damages cells)

immune responses

genotoxicity – damage to the genetic information in a cell that causes mutations, which can lead to cancer.

While the pervasiveness of microplastics have been widely documented, their impact on human health is still being studied. Associative data indicate a potential adverse effect – likely toxicity, immunomodulation, respiratory and developmental issues, and cancer. Recent research on preserved organs from cadavers in New Mexico, U.S.A., shows that microplastic concentration are up to 30 times higher in the brain than in liver, kidney, and other organs. The levels are higher in people who have dementia. The researchers studied autopsy samples and found microplastic concentration in the brain has increased from 2016 to 2024.

Plastic footprints, an unwanted legacy

The stockpiling of garbage in cities is a problem that researchers are grappling with. Plastics form a major part of city dumps. The rapidly increasing levels of plastic pollution represent a serious global environmental issue that negatively impacts the environmental, social, economic and health dimensions of sustainable development. According to an estimate, the world produced nearly 500 million tonnes of plastics in 2024 alone, with a large share of these plastics quickly becoming 400 million tonnes of plastic waste. Under a business-as-usual scenario and in the absence of urgent action and necessary interventions, global plastic waste could almost triple, reaching around 1.2 billion tonnes by 2060.

According to a September 2024 study published in the science journal *Nature*, India has emerged as the world's largest plastic emitter. Its conclusion was based on 2020 data gleaned from 50,702 municipalities worldwide. India contributes 9.3 million tonnes (Mt) or 20 per cent of the 52.1 Mt of the annual global plastic waste emissions. This refers to the

waste emitted into the environment that is not subject to any form of management or control. An estimated 5.8 Mt of plastic is openly burned in India, releasing poisonous gases; 3.5 Mt escapes as loose plastic in the environment that eventually enters the oceans. This is not counting the enormous quantum that gets collected and thrown in mismanaged sites, where it eventually decomposes and leaches deadly toxins into the soil.

According to a 2020 study by an international team of scientists nearly 11% of all plastics produced in the world ends up in the oceans. It is reported that, by 2050, there could be more plastic in the oceans than fish. Every time a plastic material is discarded, be it a bottle, bag, wrapper etc., somewhere it is finding its way into the oceans. Approximately eight million pieces of plastic are swept into seas every single day. It is more like dumping a load of garbage truck into the oceans every minute. So, by the end of the year, this adds up to a staggering 12 million tonnes. The pollution is not limited to the oceans, but it has harmful effects on wildlife, human health, and the whole ecosystem.

The scale of harm is heartbreaking. More than one lakh marine mammals and turtles, along with a million seabirds, die due to plastic ingestion or entanglement. Recently, a group of scientists estimated that more than 5 trillion plastic pieces are floating in the oceans. Plastics not only harm marine life but also enter our body as micro/nano plastics. These microplastics contaminate, water and air, which has the potential to cause severe health issues in humans. Therefore, battling against plastic pollution is no longer optional.

Keeping in mind the immediate and long-term harmful effects of plastics, the United National Environmental Programme (UNEP) has chosen "Ending Plastic Pollution" as the theme for World Environment Day 2025 (June 5). This is a powerful reminder that the fight against plastic pollution must begin now, and everyone must come together. UNEP has emphasised that individuals, industries and governments all need to rethink plastic usage, reduce dependency on single-use plastics, and transition toward sustainable alternatives. Plastic pollution is a global crisis, but it is also a crisis to be solved together with a collective effort.

What can we do?

Public concern about microplastics is growing. This is compounded by our likely long-term exposure, given microplastics are almost impossible to remove from the environment. Toxic microplastics are in the air, soil and food – endangering lives and the planet. As scientists studying the impact of plastics have been stressing for the past decade or so, microplastics have to be dealt with urgently as animals – including human beings –

are ingesting tiny plastic particles. Microplastic pollution is the result of human actions and decisions. We created the problem – and now we must find the solution.

Some countries have implemented laws regulating microplastics. The European Union (EU) has implemented new rules to prevent microplastic pollution with effect from December 16, 2025. But these are insufficient to address the challenge. That is where a new legally binding agreement, the UN's Global Plastics Treaty, offers an important opportunity. The treaty aims to reduce global production of plastics. But the deal must also include measures to reduce microplastics specifically. The third part of the fifth session (INC-5.3) is scheduled for 7 February 2026 at Geneva.

Many research groups worldwide are trying to reduce this toxic waste accumulation by developing new materials that can emerge as safer alternatives, or by biodegrading microplastics. Scientists are also looking at biological and chemical remediation methods to hasten the decomposition process of the existing (legacy) plastic waste, exploring plastic-eating microbes and enzymes.

As marine biologist Richard Thompson, who pioneered research in microplastics, said in a recent interview, "We've taken lead out of petrol, microbeads out of cosmetics, and CFCs out of aerosols. It's going to involve all of us working together across the public, society, industry and policy to put an end to plastic pollution". Thompson is now Director of the Marine Institute at the University of Plymouth, U.K., and co-ordinator of the Scientists' Coalition for an Effective Plastics Treaty, a network of scientists contributing evidence to the United Nations (U.N.) Global Plastics Treaty, currently under negotiations.

Ultimately, plastics must be redesigned to prevent microplastics being released. And individuals and communities must be brought on board, to drive support for government policies. After 20 years of microplastics research, there is more work to be done. But we have more than enough evidence to act now.

"It is the worst of times but it is the best of times, because we still have a chance". Dr. Sylvia A. Earle (American marine biologist, oceanographer, explorer and writer)

Conference of Parties (COPs) Around a Boiling Planet

Albert Abraham
Secretary, Ayappancoil Gramapanchayat, Idukki

"Green economy, blah blah blah.

Net zero by 2050, blah blah blah.

Net zero, blah blah blah.

Climate neutral, blah blah blah.

This is all we hear from our so-called leaders: words - words that sound great, but so far have led to no action. Our hopes and dreams drown in their empty words and promises. Of course, we need constructive dialogue, but they've now had 30 years of blah blah blah and where has that led us?"

The above words of Swedish environmental activist, Greta Thunberg, in Youth4Climate forum, an event held two days before dozens of ministers assembled in Milan for a final high-level meeting before the COP26, created much uproar and polarized debates in the print and social media, ranging from a clarion call for environmental protection to recommending anger management class for her. Years have passed since then. Apart from political optics and social media trolls where do we stand now? In November 2025, the 30th edition of the Conference of Parties (COP) concluded in Belem, Brazil, a city chosen for its proximity to the Amazon rainforest. It is high time to reflect on the roles and relevance of the Climate Conference of Parties (COP) itself.

The recent COP, which was framed as "COP of Implementation," "COP of Truth," and the "Forest COP" also coincided with the 10th anniversary of the Paris Agreement (COP 21) which is being considered a landmark in the history of COPs. The United Nations Framework Convention on Climate Change (the Convention or UNFCCC) was adopted at the United Nations Headquarters, New York on 9 May 1992.The Convention entered into force on 21 March 1994, in accordance with Article 23, after the 50th instrument of ratification, acceptance, approval or accession had been deposited. Remember, in 1994, when the UNFCCC took effect, there was less scientific evidence than there is now. The UNFCCC borrowed a very important line from one of the most successful multilateral environmental treaties in history (the Montreal Protocol, in 1987); it bound member states to act in the interests of human safety even in the face of scientific uncertainty. As per UNFCCC, 'The COP is the supreme decision-making body of the Convention. All States that are Parties to the Convention are represented at the COP, at which they review the implementation of the Convention and any other legal instruments that the COP adopts and take decisions necessary to promote the effective implementation of the Convention, including institutional and administrative arrangements. A key task for the COP is to review the national communications and

emission inventories submitted by Parties. Based on this information, the COP assesses the effects of the measures taken by Parties and the progress made in achieving the ultimate objective of the Convention'. The COP meets every year, unless the Parties decide otherwise. The first COP meeting was held in Berlin, Germany, in March, 1995.

Despite having a crucial role in achieving the objectives of framework convention, the COPs have performed much less than what is expected from them in the face of Anthropocene extinction threat. The success and failures of each COP are assessed by different member countries and interest parties depending on their own interests, negotiating goals and climate perception management for global optics. However, from the perspective of its established aims and objectives, the result is indeed mixed or worse than that. For example, the Paris Agreement was signed by 195 countries - a pact to ensure that the globe did not heat up beyond 2°C of pre-industrial times and, as far as possible, contain it to 1. 5°C.However, 2024 ended up being the first time that temperatures breached the 1.5°C mark. Over these years COPs have been persuading national governments to adopt sustainable paths through various instruments and measures including strategies of mitigation and adaptation, transitioning away from fossil fuels, intended nationally determined contributions, financial mechanisms like adaptation fund, mitigation fund, green climate fund etc. Though there has been consensus on the need for climate action and a renewable path to energy security, the gulf between developed countries priorities and developing countries priorities are widening. While developed countries push for hard targets and road maps, developing countries tend to focus on common but differential responsibility and just transition. Along with increasing wedge, increasing noises of climate denialism from the west is another cause of concern for recent COPs.

The Brazil COP sought to bring a change in the narrative by stressing 'implementation' and 'multilateralism'. Adoption of the Belem Package in the COP, by 195 Parties, including agreements on topics such as just transition, adaptation finance, trade, gender, and technology etc. shows a gradual yet positive step. Belem Mission to 1.5°C establishes an action-oriented platform under the COP29-COP31 troika to foster enhanced ambition and international cooperation across mitigation, adaptation, and investment. Similarly, the Global Implementation Accelerator was initiated to support countries in implementing their NDCs and National Adaptation Plans (NAPs). Also, various financial mechanisms like $125B fund 'Tropical Forest Investment Fund' (TFIF) which helps tropical countries to protect and preserve tropical moist broad leaf forests and 'Baku to Belém Roadmap to 1.3T' for mobilizing the New Collective Quantified Goal (NCQG) of $1.3 trillion/year by 2035 were launched. Though the miniscule achievements and long drawn out negotiations leave one skeptical about the progress made by the COPs in all these years, it still holds relevance as the single largest multilateral cooperation and collaboration mechanism in the face of climate change. Also, this is humanity's option to avert Anthropocene extinction threat. (The views expressed are personal.)

A Crisis That Unfolded in India's Cleanest City

Tisha Elizabeth Jacob,

Senior Sub Editor, THE WEEK, New Delhi

Indore — one of India's cleanest cities — is now at the centre of a serious public health emergency that rocked the country and exposed deep flaws in urban water infrastructure and governance.

Reports of widespread illness and deaths linked to contaminated drinking water supplies in the Bhagirathpura locality of the city were an eye-opening situation to many. What began with reports of foul-smelling water quickly escalated into a broad outbreak of waterborne disease, prompting emergency medical responses, political scrutiny, and public outrage.

How did it happen?

Residents of Indore's Bhagirathpura noticed unusual changes in their tap water that included discoloration, foul odours, a bitter taste, and visible impurities. Many reported that the water looked 'acidic' and unsafe long before the outbreak reached its peak. Despite repeated complaints by the residents to the Indore Municipal Corporation (IMC), no action was taken for days, leaving families and whole neighborhoods at risk.

These early warning signs were recorded in local municipal helpline logs and citizen reports, but bureaucratic delays meant systemic issues in pipes and water supply infrastructure went unresolved.

Later, investigations by authorities, corroborated by laboratory tests, revealed a breach in the potable water supply where sewage water appeared to have entered the drinking water pipeline.

It was found that a newly constructed public toilet near police check post was built directly above a crucial water main line, and sewage from the facility was improperly channelled into a pit rather than a sealed septic tank. This resulted in the sewage water seeping into the clean water supply and contaminating it.

Further testing by the regional Pollution Control Board also found faecal coliform bacteria in groundwater samples in the area, suggesting that contamination was not limited to just the municipal pipeline but had also seeped into aquifers and borewell supplies. The presence of these bacteria — which include strains like E. coli — indicates substantial fecal contamination in the water supply.

What were the health impacts?

On the consumption of the contaminated water, residents experienced health impacts like vomiting, diarrhoea, dehydration, fever, weakness and malaise.

These symptoms are typical of acute waterborne bacterial infections, which can take hours to several days to manifest after contamination exposure, depending on the organism involved.

According to official screenings, thousands of residents were examined, and dozens required intensive care support. Hospital camps were set up, and public health teams distributed oral rehydration solutions (ORS), zinc tablets, and antibiotics.

What followed next?

The Madhya Pradesh government ordered disciplinary action against several municipal officials responsible for water and sanitation oversight.

The Madhya Pradesh High Court intervened, calling the state's response insensitive and demanding accountability from top bureaucrats. Court hearings were scheduled to ensure transparency and appropriate compensation for affected families.

A stark contradiction was observed where a city that was lauded for its cleanliness and sanitation ranking could still harbor hazardous failures in basic services like clean water delivery.

The water contamination outbreak in Indore reflects a broader systemic issue affecting water supply networks in growing Indian cities:

Ageing infrastructure and poor monitoring

Pipe networks that carry potable water are often decades old, with weak joints and insufficient safeguards against cross-contamination with sewage lines. Delayed repairs and backlog in maintenance can create conditions where pathogens migrate into water supplies unnoticed.

Lack of grievance addressal

Although residents lodged numerous complaints about water quality long before the crisis, bureaucratic processes were slow or ineffective in addressing them — a failure that may have contributed to delayed action.

Inadequate quality surveillance

Routine water testing, especially for microbiological contaminants, was either absent or sporadic. Without continuous surveillance and automated alerts, early signs of contamination were missed.

Economic burden

For families that were affected by the contamination, it is a serious toll on their physical and mental health. Medical expenses, lost wages, and costs for safe bottled or purified water compounded financial strain, adding stress to their daily lives. Fear of contamination also reduced economic activity in impacted neighborhoods, with small businesses and daily laborers hit hard.

Psychological toll

Beyond physical illness, the crisis fostered anxiety and psychological stress. Parents worried about children's safety, older adults faced isolation due to health risks, and communities distrusted public services previously taken for granted.

The Indore water contamination crisis, while acute, offers important lessons for public health and urban governance:

Prioritise water infrastructure over aesthetics

Cleanliness rankings and public sanitation campaigns are valuable, but they must be matched with robust water safety systems — including pipe replacement, leak detection, and sealed sewage treatment systems.

Continuous monitoring over episodic testing

Routine surveillance using modern sensors, microbial testing, and real-time data collection can catch contamination early, possibly averting outbreaks.

Rapid response and transparency

Timely communication with the public about water quality issues — including interim measures and honest reporting of cases and contamination sources — could help restore trust and improve outcomes in future incidents.

A wake-up call for urban water safety

Indore's water contamination crisis is a stark reminder that no city is immune to waterborne threats, no matter its reputation for cleanliness. Contaminated drinking water remains one of the leading causes of illness and mortality in many parts of the world, and India's rapid urban growth places immense stress on infrastructure systems that were not designed for current population scales.

What happened in Bhagirathpura — where a breach in infrastructure and delayed civic action led to mass illness and avoidable deaths — should inform lasting reforms. Strengthening water quality standards, investing in resilient infrastructure, empowering local communities, and ensuring transparent governance can help prevent similar crises in the future, not only in Indore but across the country.

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