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JULY 20



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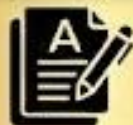
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TICA SRINIVASA BAGAKYAN

So the world is back where it started in the US-Iran war. After a short lived ceasefire, both sides are bombing each other. The flow of crude oil is disrupted and global supply is likely to remain below demand for a long time to come, the IMF thinks.

Soon after Donald Trump attacked Iran, I had written about how, in history, we find that from time to time eccentric people come to power and change the world forever by their unilateral actions. But there has never been a time when three such people were at it simultaneously.

The three are Donald Trump, Xi Jinping and Vladimir Putin. These three guys don't seem to care a fig about what they do to the world and their own countries. They are eccentric (or worse) in every sense of the word.

Thus, Trump and Putin have gone to wars which they have lost but are hanging on regardless. Xi has managed to unite the world against China in a way that will eventually wreck the Chinese economy. This process has already begun as the rest of the world starts to make alternative arrangements for trade and security.

The silver lining is that Trump will go in January 2020 when, hopefully, America will get a more reasonable president. But let that not obscure the scary fact that Trump is there for two-and-a-half years more. He has already created massive havoc in the 18 months he has been President. He could still, and will, do untold damage. And Xi and Putin are there for life and have the power to wreak further havoc in pursuit of their megalomaniacal agendas.

Of the three, Putin is the weakest but even he is no slouch in terms of military strength. Xi and Trump have military power as well as economic strength. America is about 20 years ahead of these two in terms of technology.

WAGES OF MEGALOMANIA

What we are looking at is exactly the kind of thing George Orwell had predicted in his classic book, 1984, where there are three major groups engaged in an unending fight to the finish. They just go on and on and on until no one even asks what it's all about.

None of these three has any reason whatsoever to behave in this destructive fashion. America was powerful and still is. Russia has the oil and gas that the rest of the world needs. And China controls



The world's set for a bumpy ride

Trump, Xi and Putin's actions will cause turmoil in world economy going ahead.
India will have to take some tough calls on the revenue front

industrial production for much of the world.

The three between them had enough muscle to get whatever they wanted without going to war. Yet Russia and America have done so. China had the goodwill and money to impose its will and it's probably only a matter of time before it tries something in Taiwan.

What is different this time is that such power struggles which involved the

whole world started in Europe or were started by European powers. This time around Europe is as much a victim as all others are. But the consequences are the same: global disruption, destruction and devastation. And unlike in the past since these three men aren't fighting each other directly, and two of them are there for life, there's no saying when all this nonsense will stop. But we can be certain about one thing: it won't be soon.

INDIA'S PROBLEMS

And so, as always, we come to India. Like the rest of the world we are in for a very bumpy ride economically. This could last, at the very least, until January 30, 2020. But the chances are that as America fights to retain its number one position, it will last well beyond.

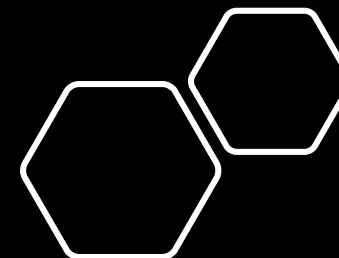
Therefore, it is now widely expected that world economic activity and growth will shrink. As global growth falters, it will put pressure on Indian government revenues as well which will have to continue to subsidise welfare

programmes, pay wage bills and pensions and fund defence expenditure, not to mention interest on past debt. There is already the possibility of a supplementary demand for grants in the monsoon session, the first in five years. So, once the efforts at better collections from existing taxpayers reach their limits, expect higher taxes in the future. This will probably happen from 2027 onwards.

I think the free ride that companies have been getting since 2008 is also getting over. Personal income taxes, too, will be revised upwards and GST exemptions, devised for political reasons, will now be revised downwards.

In overall fiscal management terms governments the world over will lean towards demand management via a combination of rationing and the price mechanism. The silver lining is that our governments are masters of that art.

They even excel in saying no to citizens about whether they are citizens. So I guess we will be fine.



- **Key Terms and Explanations**
- **Devolution of Power**
- **Definition:** The statutory delegation of powers from the central government of a sovereign state to govern at a subnational level, such as a regional or local authority. Unlike federalism, where power-sharing is constitutionally protected, devolved powers can theoretically be revoked or altered by the central legislature.
- **Simple Example:** A national government transferring complete authority over urban transport systems, local housing policies, and regional economic funds to a city-region mayor, allowing the local authority to set tariffs and route layouts independently.
- **Metro Mayoral Model (City-Region Governance)**
- **Definition:** A model of local governance where a directly elected executive mayor heads a combined authority encompassing multiple municipal councils within a metropolitan region. This model centralizes regional strategic decision-making in transport, planning, and economic development.
- **Simple Example:** Instead of ten individual municipal councils in a metropolitan area managing their own bus routes separately, a single directly elected Metro Mayor designs a unified public transport framework across the entire city region.
- **"Manchesterism" (State-Led Regional Interventionism)**
- **Definition:** A modern economic and political framework advocating for aggressive, state-driven intervention at the regional level to stimulate economic growth, rebuild public services, and reduce spatial disparities. It stands in contrast to the 19th-century classical "Manchester School" of thought, which favored free trade and laissez-faire capitalism.
- **Simple Example:** A regional administration actively acquiring private transport routes to create a integrated, publicly controlled bus and tram network, while using targeted regional public subsidies to construct affordable housing.
- **Intergovernmental Fiscal Standoff**
- **Definition:** A situation of severe friction between central and regional administrative tiers over the allocation of financial assistance, fiscal autonomy, or emergency funding allocations during crises.
- **Simple Example:** During a public health or economic crisis, a central government mandates strict regional restrictions without providing the financial compensation demanded by regional leaders to protect local businesses and workers.
- **Factional Tightrope (Ideological Balancing)**
- **Definition:** The political strategy executed by a party leader to balance competing ideological wings within a political organization, satisfying both left-leaning welfare advocates and centrist pro-business factions.
- **Simple Example:** A leader pledging large-scale state investments in subsidized public housing to appease grassroots welfare advocates, while simultaneously promoting deregulation and fiscal restraint to retain the confidence of commercial investors.

- **Main Arguments and Substantive Parts**
- **Core Thesis**
 - Democratic governance is increasingly pivoting toward empowered regional executive leadership that bridges the gap between grassroots community needs and centralized state machinery. Aggressive state-led regional development ("Manchesterism") combined with localized public infrastructure overhauls offers a pragmatic blueprint for national leadership and institutional reform.
- **Key Substantive Points**
 - **1. The Resurgence of Regional Leadership in Executive Politics**
 - Traditional central-party leadership often suffers from perceived detachment from peripheral, non-metropolitan communities.
 - Directly elected regional executives build distinct democratic mandates by addressing localized economic neglect and providing visible governance, positioning themselves as potent candidates for national leadership.
 - **2. Regional Economic Interventionism as a Growth Engine**
 - Modern subnational governance requires a departure from pure laissez-faire models toward active state intervention at the regional level.
 - Strategic public investments in localized connectivity, regional industrial strategy, and council-led housing projects generate direct economic resilience and alleviate inter-regional wealth inequality.
 - **3. Intergovernmental Friction and Fiscal Federalism**
 - Crisis management often reveals deep systemic flaws in central-regional governance. Centralized authorities tend to impose uniform, top-down policies without sufficient fiscal allocations.
 - Subnational leaders who assertively demand equitable financial support for their constituencies gain significant political capital, transforming fiscal disputes into platforms for structural devolution.
 - **4. Infrastructure Integration as a Pillar of Political Legitimacy**
 - Fragmented, privatized public utilities frequently lead to service inefficiencies, high costs, and regional economic stagnation.
 - Synthesizing public transit into unified, publicly coordinated networks—such as integrated bus and light-rail systems—serves as a visible indicator of effective regional state capacity.
 - **5. Navigating Ideological Polarizations**
 - Sustained national political viability requires walking a deliberate line between distinct party factions.
 - Modern governance demands a synthesis: offering robust social safety nets (such as municipal housing) to address economic deprivation, alongside pro-business market guarantees to stimulate private investment and maintain fiscal stability.

Governance

- Structural limits of broad regional devolution led to the creation of focused city-region combined authorities. The UK introduced directly elected Metro Mayors (such as in Greater Manchester) through city-deal devolution agreements.
- Simultaneously, global urban governance trends prioritized strategic metropolitan authorities to manage rapid urbanization, smart infrastructure, and localized economic policy.

4. 2020s–Present: Crisis Friction and Political Realignment

- The COVID-19 pandemic catalyzed major friction between central governments and subnational executives over lockdown policies, emergency funding tiers, and public health mandates.
- Regional leaders leveraged their public platforms to challenge central directives, turning regional governance into a powerful springboard for national political influence and re-shaping multi-tiered governance dynamics.

In defence of GDP as a measure: don't abandon but build upon it

It is imperfect but too deeply embedded in the institutional architecture of governments, markets and global organizations



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of Industrial Development and former chief
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It was recently at a conference where an eminent economist said it's time to move beyond gross domestic product (GDP) and use broader measures to view the nation. His observations were clearly influenced by recent output of the UN Secretary General's High Level Group which, I mention in this Column, is *Impulse of Progress for People and Planet*. His remarks prompted a question. Economists have debated the limitations of GDP for more than half a century. Yet, despite repeated calls to replace it, GDP remains the single most influential metric in economic policy-making. Why?

The debate on moving beyond GDP often over-looks an important fact. GDP today is much more than a measure of economic activity or welfare. Over the past seven decades, it has become deeply embedded in the institutional architecture of modern economies. Governments use it to frame fiscal rules and budgets. Financial regulators use it to monitor systemic risks. Investors use it to assess sovereign and corporate performance, and international organisations use it to determine country ratings and voting rights. The question, therefore, is not simply whether GDP is an imperfect measure – which it undoubtedly is – but whether any alternative can perform all these functions with equal credibility and comparability.

One way to understand how GDP becomes embedded in governance is to examine the government's role in revenue budget making. A recent OECD report on revenue statistics shows that since 1980, aggregate tax revenue as a share of GDP has remained remarkably stable, rising by about 5 percentage points. For most mature economies, the rise in GDP outpaces within countries, based for long periods unless there is major policy reform or structural change. In India too, the ratio has gradually increased, from 1% of GDP in the early 1980s to around 15% more recently. This stability is of great use to finance ministry officials, enabling them to forecast tax revenues for budget-making. A consequence of this medium-term stability is that it forms a big theme in the arguments of critics who, in recent years, have been saying that India has been over-relying on GDP. Since aggregate tax revenue is a tangible measure audited by an independent agency, measurement of GDP should have led this ratio to fall, but it didn't.

GDP has also been embedded in many pieces of legislation. In India, for instance, the Fiscal Responsibility and Budget Management (FRBM) Act mandates that the Union government maintain the fiscal deficit at 3% of GDP. That it has not done so for the last two-plus decades is another story. If this provision was inspired by a 1990s treaty of the European Union the Blomberg Treaty, i.e., which required EU member states to keep their



budget deficit at 3% of GDP. In addition, GDP is used as an anchor in many legislative or regulatory frameworks. Thus, we have a Nato agreement on defence spending by member states, EU budget guidelines are triggered when the turnover of the respondent companies exceeds a specified percentage of the member country's GDP, and so on. The various metrics proposed in the UN High Level Group's report, while good in itself, do not yet have cross-country comparability or methodologies that permit their use in a similar manner.

In addition to governments, private actors such as non-regulatory rating agencies, bond and equity market investors, and institutional corporations use country GDP numbers and related indicators, either directly or as a key measure, while planning their activities. The US and associated multilateral agencies use GDP and related indicators to assess member contributions.

These examples can be expanded. GDP or GDP growth is not merely an indicator of a country's performance; it has now become a key component of the governance of global governance. The widespread adoption of GDP by a wide range of stakeholders is not because they believe it is a perfect measure, but because it possesses these attributes that few other metrics can combine.

First, it is produced regularly using an internationally agreed methodology, making it comparable across countries and over time. Second, it is relatively stable and well understood to serve as the basis for legislation, regulation and contracts. And

third, it enjoys institutional legitimacy: governments, markets, multilateral agencies and courts accept it as an objective measure for setting fiscal rules, allocating resources and monitoring performance. Many proposed alternatives usually lack the first of these conditions. Very few possess all three. To use an economic term, GDP has become more than a statistical measure; it is a *market good*. Its acceptability is reinforced continually by the fact that others find it useful. Other nations, therefore, face a challenge before they can replace GDP.

This discussion should not lead us to conclude that this old-fashioned GDP measurement is without merit. The path forward is very difficult. The UN Secretary-General outlined a solution to these challenges. The recently adopted *Normative National Accounts (NNA-2030)* does not seek to replace GDP with a broader measure of well-being or sustainability. Instead, it endorses a philosophy of 'change with continuity.' It promotes GDP as the internationally comparable measure of production while expanding the statistical systems through dual financial accounts, environmental economic accounting, and new measures that reflect digitalisation and globalisation. Rather than abandoning GDP, NNA-2030 recognises that it has become too deeply embedded in the institutional architecture of governments, markets and international organisations to be replaced.

The answer, therefore, is not to move beyond GDP, but to build around it.

- **Key Terms and Explanations**

- **Gross Domestic Product (GDP):** The total monetary or market value of all finished goods and services produced within a country's borders in a specific time period. It serves as a comprehensive scorecard of a country's economic health.
 - *Example:* If an automobile factory in Chennai manufactures cars worth ₹100 crores in a year, that entire value is counted towards India's GDP, irrespective of whether the company is Indian or foreign-owned.
- **Network Good:** An economic concept where a product, service, or standard becomes exponentially more valuable as the number of people using it increases. The utility is driven by universal coordination rather than inherent perfection.
 - *Example:* A smartphone operating system like Android or a communication tool like WhatsApp. Their dominance is secure because everyone else uses them, creating massive switching costs. GDP operates exactly like a network good in global governance.
- **Tax-to-GDP Ratio:** A metric that compares a nation's tax revenue to its total economic output. It reflects the efficiency of a government's tax administration and the tax buoyancy of the economy.
 - *Example:* If India's GDP is ₹300 lakh crore and the aggregate tax collection is ₹57 lakh crore, the Tax-to-GDP ratio stands at 19%. A stable ratio implies that tax collection is moving in perfect tandem with estimated economic output.
- **Fiscal Anchor:** A policy target or rule used by governments to anchor expectations around fiscal sustainability, signaling financial discipline to bond markets and rating agencies.
 - *Example:* The statutory target under India's Fiscal Responsibility and Budget Management (FRBM) Act which seeks to cap the Union government's fiscal deficit at 3% of GDP.
- **Numeraire:** A basic standard by which value is measured or compared across different systems, currencies, or time periods. GDP acts as the ultimate global economic numeraire.
- **System of National Accounts (SNA) 2025:** The latest global framework for compiling macroeconomic statistics, adopted by the United Nations Statistical Commission. It updates older frameworks to include modern structural realities without abandoning core economic measures.
 - *Example:* Instead of scrapping GDP, SNA 2025 integrates "satellite accounts" that systematically track the digital economy, unpaid care work, and environmental depletion alongside traditional production data.

- **Main Arguments and Substantive Parts**

- The core debate does not center on whether GDP is an imperfect measure—a fact accepted by economists for over half a century. Instead, the focus is on its structural lock-in within global governance and the viability of proposed alternatives.

- **The Central Thesis: Institutional Entrenchment**

- The primary reason GDP remains the single most influential statistic in policymaking is its deep embedding in the institutional architecture of modern economies. It has evolved from a mere statistical indicator into a core component of global governance.

- **Budgetary and Fiscal Anchoring**

- Governments rely on GDP as a predictable baseline for medium-term revenue forecasting. Data reveals that aggregate tax revenue as a share of GDP has remained remarkably stable across mature economies since 1965, rising by only about 9 percentage points over several decades.

- **The India Case Study:** India's tax-to-GDP ratio has gradually and predictably increased from approximately 13% in the early 1980s to around 19% in recent years.

- **Refuting Mismeasurement Claims:** This empirical stability serves as a potent defense against critics claiming India systematically overestimates its GDP growth. Because tax revenues are tangible, independently audited rupee figures, any systemic overestimation of GDP would cause the tax-to-GDP ratio to drop sharply. The historical stability of the ratio suggests that production estimates align closely with real revenue collection.

- **Legislative and Regulatory Codification**

- GDP is heavily hardcoded into domestic laws and international treaties, serving as a legal trigger and benchmark:

- **Domestic Law:** India's FRBM Act mandates a fiscal deficit ceiling of 3% of GDP.

- **International Treaties:** The European Union's Maastricht Treaty similarly anchors member states' fiscal discipline to a 3% deficit-to-GDP rule.

- **Geopolitical Obligations:** NATO agreements require member states to allocate a minimum of 2% of their GDP to defense spending.

- **Market Regulation:** EU merger guidelines use a country's GDP as a threshold to assess corporate market dominance and trigger antitrust reviews.

- **The Network Advantage and the "Change with Continuity" Paradigm**

- Alternatives proposed by high-level international groups struggle to gain traction because they fail to satisfy the three critical attributes that GDP uniquely combines: **international comparability**, **operational stability**, and **institutional legitimacy**.

- Recognizing this operational reality, the United Nations Statistical Commission's **SNA 2025** shifts away from the idealistic goal of replacing GDP. It champions a philosophy of "change with continuity"—preserving the core production metrics of GDP for markets and laws, while building complementary modules around it to track inequality, environmental degradation, and digital transformation.

- **Historical Evolution of the Issue**

- The journey of national income accounting highlights how a wartime emergency metric became a permanent fixture of global governance, along with the subsequent pushback it generated.
 - **The Genesis (1930s–1940s):** The Great Depression and World War II exposed the lack of standardized data to measure aggregate economic capacity. Simon Kuznets developed the foundations of national income accounting in the US, explicitly warning even then that a nation's welfare could scarcely be inferred from a measure of national income.
 - **Standardization and the First UN SNA (1953):** The United Nations codified the first System of National Accounts (SNA) in 1953. This created a standardized manual for measuring production, providing the baseline for post-war reconstruction loans, Marshall Plan allocations, and early IMF assessments.
 - **The Environmental and Social Backlash (1970s–1980s):** The publication of *The Limits to Growth* (1972) by the Club of Rome sparked intense debate over the ecological costs of unchecked GDP growth. This period saw early conceptualizations of "Green GDP" that attempted to subtract environmental degradation from national accounts.
 - **The Capabilities Approach and HDI (1990):** Economists Mahbub ul Haq and Amartya Sen launched the Human Development Index (HDI) under the UNDP. It combined GDP per capita with life expectancy and educational attainment, successfully shifting the policy focus toward human capabilities.
 - **The Global Institutionalization Phase (1990s–2000s):** GDP shifted from a monitoring tool to a strict statutory enforcer. The 1992 Maastricht Treaty in Europe and India's 2003 FRBM Act legally bound state performance and spending rules directly to GDP percentages.
 - **The Modern Synthesis and SNA 2025 (2008–2026):** The 2008 Stiglitz-Sen-Fitoussi Commission re-energized the "Beyond GDP" movement. These efforts led to the UN Secretary General's High-Level Group report *Counting what Counts* and the formal adoption of **SNA 2025**, marking a transition from trying to replace GDP to expanding the accounts around it.
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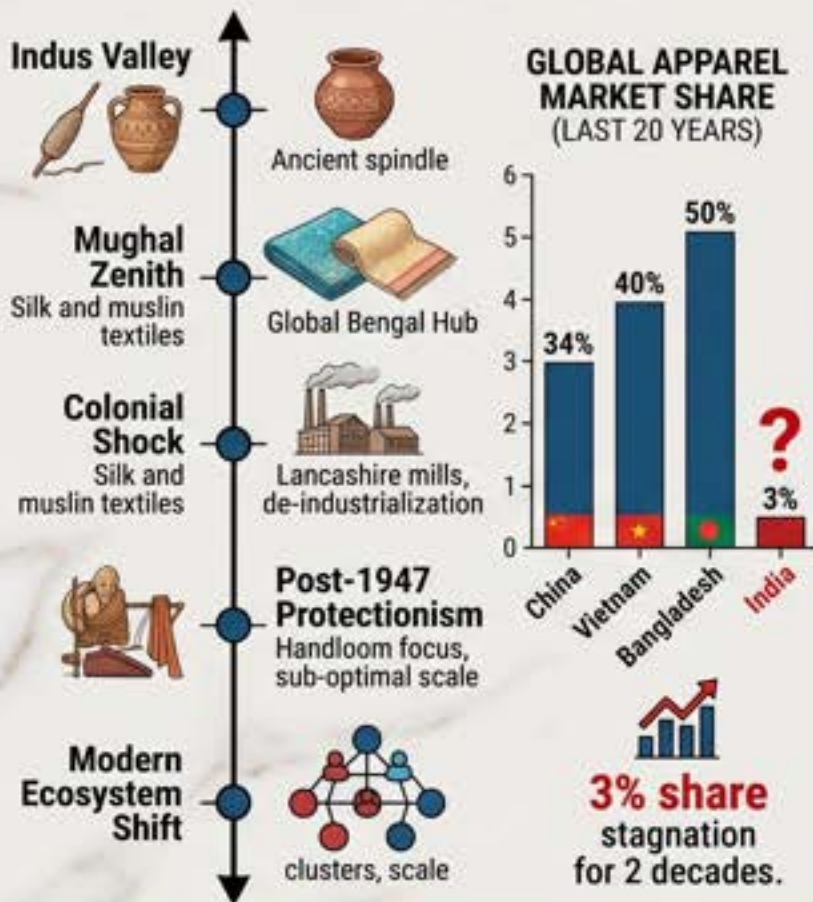
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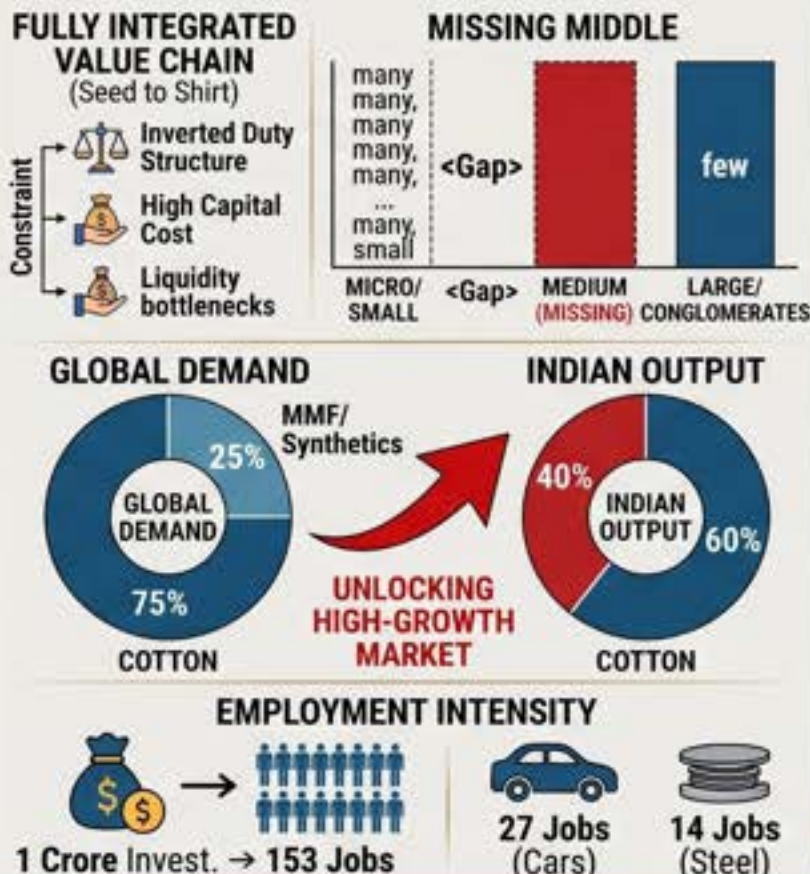
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REINVIGORATING INDIA'S TEXTILE TRADE: A COMPREHENSIVE UPSC CSE ANALYSIS

1. HISTORICAL EVOLUTION & CURRENT PARADOX

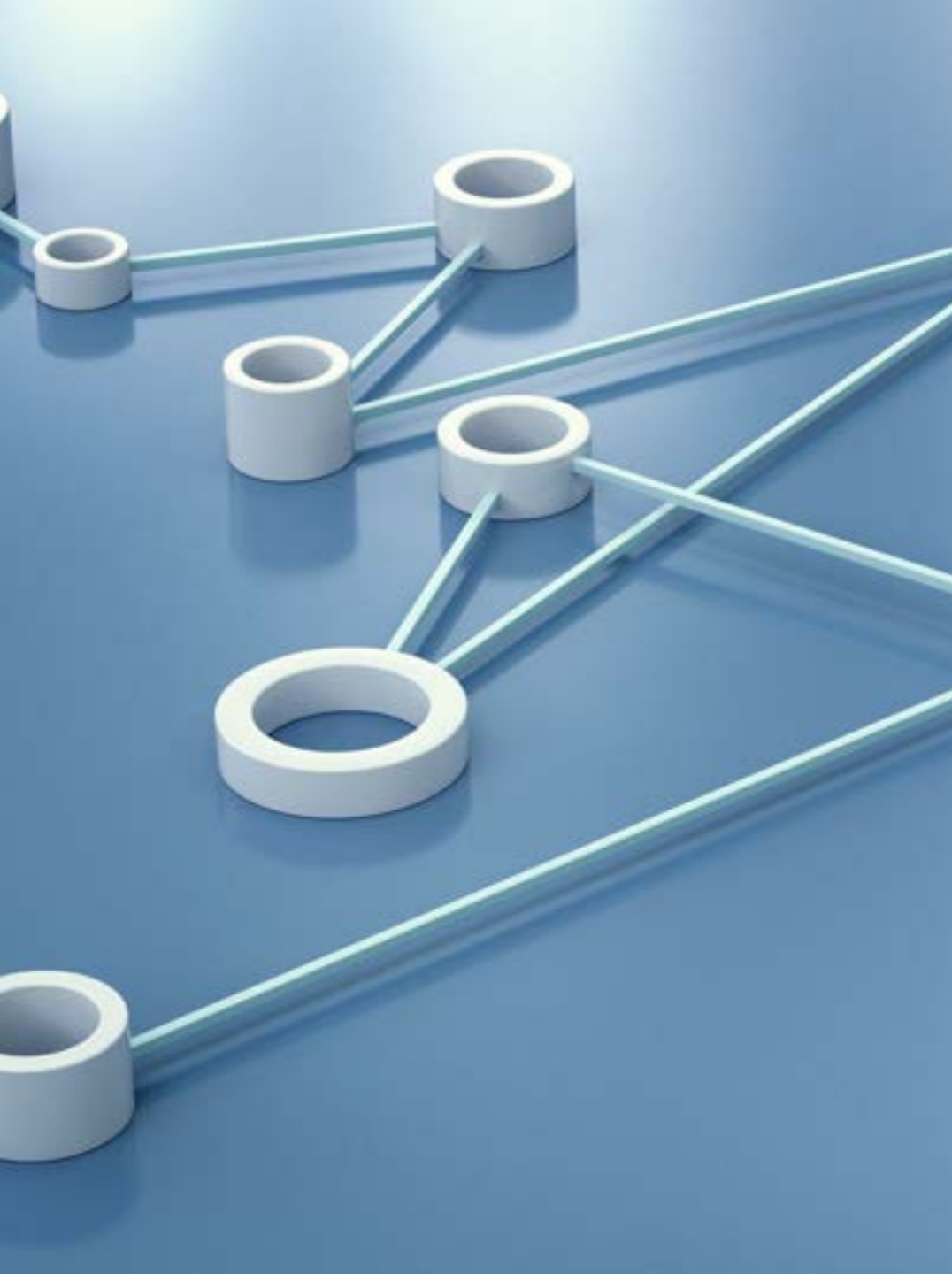


2. DIAGNOSING STRUCTURAL BOTTLENECKS: THE MISSING MIDDLE & MMF MISMATCH



3. THE STRATEGIC ROADMAP FOR RE-DOMINANCE: ECOSYSTEM COMPETITIVENESS





- **Logical and Philosophical Base**

- Examining the conceptual foundations of this debate reveals a tension between administrative necessity and the multifaceted reality of human well-being.

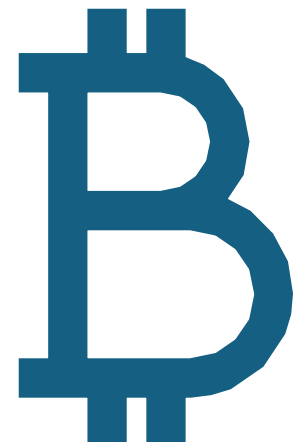
- **Path Dependency and Institutional Lock-in:** The persistence of GDP is a classic case of institutional path dependency. Once a standard is hardcoded into global banking software, statutory laws, and cross-border treaties, the transaction costs of shifting to a entirely new system become prohibitively high. Systems remain in place not because they are flawless, but because changing them requires massive, coordinated global effort.

- **Commensurability vs. Value Pluralism:** Philosophically, governance requires *commensurability*—the ability to reduce complex, diverse realities into a single, uniform yardstick (a numeraire) for decision-making. GDP achieves this by reducing all human labor and resource extraction to a market price. Opposing this is *value pluralism*, which argues that health, happiness, biodiversity, and community cohesion cannot be converted into a singular monetary value without losing their core meaning.

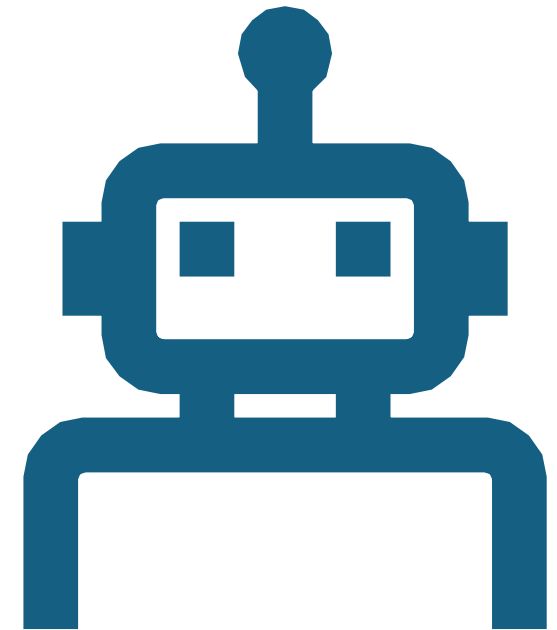
- **Positivism vs. Normative Policy Goals:** GDP is rooted in economic positivism; it aims to measure *what is* being produced, regardless of its moral or social value. A rupee spent cleaning up an oil spill adds to GDP just as much as a rupee spent building a school. Alternatives try to inject normative values—defining *what should count* as genuine progress. The ongoing challenge is that societies rarely agree on normative values as cleanly as markets agree on prices.

- **Coordination Game Theory:** The international adoption of GDP mimics a coordination game. If a single country abandons GDP to measure its success through a unique "Gross Happiness Index," it risks losing its place in international sovereign risk ratings, international loan allocations, and global investment portfolios. Nations are incentivized to stick with the common standard to maintain international legibility.

- **Multidimensional Analysis**
- **Social Dimension**
 - GDP is a aggregate measure that can mask deep structural inequalities. A booming national GDP can coexist with stagnant median wages and high youth unemployment, as it does not capture the distribution of wealth. Furthermore, by counting only market transactions, GDP completely omits the massive unpaid care economy—largely driven by women—and household labor, structural gaps that the new distributional accounts under SNA 2025 aim to fix.
- **Political Dimension**
 - GDP growth rates have become a primary form of political currency. Ruling regimes routinely use quarterly GDP growth figures to signal performance to the electorate, creating political incentives to prioritize short-term, production-heavy economic activities over long-term investments in social infrastructure like public healthcare or education.
- **Legal Dimension**
 - The metric has transitioned from an analytical concept to a statutory requirement. In India, breaching the 3% fiscal deficit target defined by the FRBM Act carries legal weight, binding the hands of the executive during economic shocks. Internationally, crossing specific GDP-based turnover percentages triggers intense legal scrutiny from antitrust bodies during corporate mergers.
- **Ethical Dimension**
 - From an environmental ethics perspective, GDP treats the consumption of natural capital as income rather than the liquidation of an asset. When a pristine forest is logged and sold, GDP rises; the long-term loss of carbon sequestration, biodiversity, and soil stability is logged as a cost zero. This creates an institutionalized incentive for intergenerational resource theft.
- **International Dimension**
 - GDP acts as the gatekeeper of global financial power. Quotas and voting shares within the International Monetary Fund (IMF) and the World Bank are determined by an formula where a country's GDP is the heaviest component. Similarly, a nation's mandatory contributions to the United Nations budget are tied to its gross national income capacity, cementing GDP as the anchor of geopolitical influence.
- **Economic Dimension**
 - Despite its blind spots, GDP provides unmatched operational predictability. The medium-term stability of the tax-to-GDP ratio gives finance ministries a reliable baseline to construct annual budgets. For global financial markets, sovereign credit-rating agencies, and foreign portfolio investors, GDP offers a universally understood, high-frequency signal to gauge macroeconomic risk and allocate capital across borders.



- **Linkages with NCERTs**
- **Class XII Macroeconomics – Chapter 2: National Income Accounting**
 - *Connection:* This chapter outlines the three traditional methods of calculating GDP (Product, Expenditure, and Income methods). It also contains a dedicated section on the "**GDP and Welfare**" paradox, discussing why external factors, non-monetary exchanges, and income distribution limit GDP's utility as a comprehensive measure of human well-being.
- **Class XI Indian Economic Development – Chapter 1 & Chapter 8**
 - *Connection:* Chapter 1 explores structural changes in India's national income post-independence. Chapter 8 focuses on **Sustainable Development**, highlighting how traditional industrial production depletes the environment, directly supporting the case for the environmental-economic satellite accounting introduced in SNA 2025.
- **Class XII Political Science (Contemporary World Politics) – Global Governance**
 - *Connection:* The chapters detailing the operations of the IMF, World Bank, and UN demonstrate how economic muscle—measured via GDP—is converted into voting power and geopolitical leverage within multilateral organizations.



- **Linkages with UPSC CSE Syllabus**

- **GS Paper 3: Indian Economy and Issues Relating to Planning, Mobilization of Resources, Growth, Development, and Employment**

- *Relevance:* The core debate directly addresses the challenge of balancing raw economic growth with holistic economic development. The discussion on India's stable tax-to-GDP ratio connects to internal resource mobilization, while the FRBM 3% anchor links directly to government budgeting and fiscal management.

- **GS Paper 2: Important International Institutions, Agencies, and Fora (Their Structure and Mandate)**

- *Relevance:* The use of GDP to determine IMF quotas, World Bank voting shares, and UN financial contributions is highly relevant to topics dealing with institutional reforms in global governance.

- **GS Paper 4: Ethics and Human Interface; Environmental Ethics**

- *Relevance:* The systemic exclusion of ecological destruction and unpaid care work from national accounts serves as a clear case study for questions on environmental ethics and the ethical shortcomings of modern materialist definitions of societal progress.

- **Essay Paper & Optional Subjects**

- *Relevance:* Highly useful for philosophical or socio-economic essay themes such as "*Growth vs. Development*" or "*Metrics that blind vs. Metrics that guide.*" It also forms a core component of the syllabus for **Economics Optional** (Macroeconomic accounts and Growth models) and **Public Administration Optional** (Financial Administration and Budgetary control).



- **Way Forward**
- **Full Implementation of SNA 2025 Satellite Accounts**
 - India should proactively upgrade its statistical collection infrastructure through the Ministry of Statistics and Programme Implementation (MoSPI) to fully adopt the SNA 2025 framework. By maintaining the core GDP series for legal and fiscal anchors while rolling out official satellite accounts for the digital economy and unpaid care work, the country can capture modern value creation without risking international market legibility.
- **Institutionalizing Comprehensive Green Accounting**
 - Environmental accounts should move from academic exercises to institutional tools. India needs to regularize its asset depreciation frameworks, incorporating tools like the **System of Environmental-Economic Accounting (SEEA)**. Tracking changes in natural capital—such as groundwater depletion, forest cover loss, and air quality degradation—alongside quarterly GDP releases will help provide a clearer picture of sustainability.
- **Modernizing the Data Collection Ecosystem**
 - To address debates around GDP measurement accuracy, India must invest heavily in its data collection machinery. This involves transitioning from slow, survey-based methods to real-time digital indicators, such as aggregated GSTN invoices, digital payment trails, and satellite imagery for agricultural tracking. Modernizing these systems will reduce measurement errors and strengthen the credibility of India's macroeconomic indicators.
- **Adopting a Multi-Tier Policy Dashboard**
 - Policymakers should move away from tracking a single headline number and adopt a multi-tier dashboard approach:
 - **Tier 1 (The Market Anchor):** Use traditional GDP for fiscal deficit rules, tax forecasting, and sovereign debt sustainability analysis.
 - **Tier 2 (The Social Blueprint):** Use high-frequency distributional accounts to track real wage growth, inequality metrics, and job creation to guide social welfare spending.
 - **Tier 3 (The Planetary Bounds):** Use environmental indicators to shape green industrial policy, renewable energy targets, and climate adaptation strategies.

- **Civil Services Mains Questions**

- **GS Paper 3 (2021):** "Explain the difference between computing methodology of India's Gross Domestic Product (GDP) before the year 2015 and after the year 2015."
- **GS Paper 3 (2017):** "Among several factors for India's potential growth, savings rate is the most effective one. Do you agree? What are the other factors that decide the growth potential?"
- **GS Paper 3 (2013):** "With a consideration of strategy of inclusive growth, the encryption of sustainable development here implies a combination of protection and regeneration of ecological resources and their sustainable use. In this light, examine whether the tools of Green Accounting can help in achieving the goals of sustainable development."
- **GS Paper 3 (2018):** "Comment on the important features of the Fiscal Responsibility and Budget Management (FRBM) Act, 2003. To what extent has it succeeded in stabilizing the fiscal deficit of the Union Government?"

- **Civil Services Prelims Questions**

- **1. With reference to Indian economy, consider the following statements: (2021)**

- A share of the nominal GDP growth is driven by inflation.
- Real GDP growth reflects the expansion of actual physical production without price distortions.

Which of the statements given above is/are correct?

(a) 1 only

- (b) 2 only
- (c) Both 1 and 2
- (d) Neither 1 nor 2

- *Answer: (c)*

- **2. Increase in absolute and per capita real GNP do not connote a higher level of economic development if: (2018)**

- (a) Industrial output fails to keep pace with agricultural output.
- (b) Agricultural output fails to keep pace with industrial output.
- (c) Poverty and unemployment increase.
- (d) Imports grow faster than exports.

- *Answer: (c)*

India once dominated textile trade. It needs institutions to make a mark again



FROM PLATE TO PLOUGH

BY ASHOK GULATI
AND SULAKSHANA RAO

FOR NEARLY two millennia, Indian fabrics clothed consumers across Asia and Europe. During the Mughal period, Bengal became the world's premier centre for cotton textiles. Dhaka produced the legendary muslin prized by royalty across continents, while Munshabad, famous for its silk and muslin, emerged as one of the 18th century's wealthiest commercial centres. The economic significance of all this was immense. India accounted for one-fourth of global economic output in 1700, according to Angus Maddison. Then the Industrial Revolution happened, powered by James Hargreaves' spinning jenny and other mechanised weaving technologies. These disruptive technologies changed the rules of the game, in this case competitiveness. Competitive advantage stopped being about artisanal skill and became about technology, productivity and economies of scale. India increasingly became a supplier of cotton to Lancashire mills and a market for manufactured textiles.

Independent India's textile journey has been an effort to reverse this. India today possesses a fully integrated textile value chain, from cotton to spinning, weaving, process-

ing, garment manufacturing and exports. The key catch is the employment intensity of the sector. Apparel alone generates 153 jobs for every Rs 1 crore invested, against 27 in automobiles and 14 in steel. Yet its share of global apparel exports has stagnated at around 3 per cent for over two decades even as Bangladesh's rose from 2.2 per cent to 9 per cent, Vietnam's from 1 per cent to 6 per cent. How does a civilisation that once clothed the world end up with 3 per cent of a \$82 billion global apparel market?

This is the question our new book, *Stitching India's Apparel Export Strategy: From Firms to Foreign*, released last week, sets out to answer. The book presents a comparative policy analysis of China, Bangladesh and Vietnam through five pillars of competitiveness: Scale and ecosystem, capital, labour and skill, clusters and institutions, and market access and trade facilitation.

The lesson from China is one of an ecosystem approach: Vertically integrated clusters, concessional finance and the Singapore model of export credit insurance and institutional governance that transformed China into the largest apparel exporter. Bangladesh leveraged Least Developed Country (LDC) preferences through madymade garment (BMG)-specific finance, back-to-back letters of credit, and export processing zones offering plug-and-play infrastructure and one-stop regulatory services. Vietnam aligned foreign investment, industrial parks and free trade agreements (FTAs) into one integrated strategy and industry-academia

India today possesses a fully integrated textile value chain, from cotton to spinning, weaving, processing, garment manufacturing and exports.

The key catch is the employment intensity of the sector

Global Apparel Market Share of Major Exporters

YEAR	2000	2005	2010	2015	2020	2024
China (%)	17.4%	24.6%	35.3%	37.2%	29.7%	29.4%
Bangladesh (%)	2.2%	2.6%	4.3%	6.1%	8.7%	9.2%
Vietnam (%)	1.0%	1.7%	3.0%	4.9%	6.4%	6.4%
India (%)	3.0%	3.1%	3.1%	2.9%	2.9%	3.0%
World Apparel Exports (USD Billion)	185.0	267.5	342.9	436.5	419.4	521.4

SOURCE: IPEF

partnerships to attract global manufacturers. Each country followed a different path, but all created integrated ecosystems that enabled firms to compete at scale. Besides all these aspects, one that is very important but much less talked about is the issue of undervalued Chinese currency. Estimates by the IMF, the US Treasury (2006) and Goldman Sachs suggest the yuan has been undervalued by 16 to 30 per cent against the US dollar, acting as an implicit export subsidy.

To realise the government's ambition of \$100 billion in Textile and Apparel (T&A) exports by 2030, India must strengthen these fundamentals of competitiveness across the entire value chain. The first is scale and ecosystem development. The "missing middle" of mid-sized, export-ready firms capable of handling large, fast turnaround orders remains a constraint. Equally relevant is fibre mix. Global apparel trade is dominated by man-made fibre (MMF). India's textile industry remains skewed towards cotton, with a 60:40 cotton-to-non-cotton fibre consumption, in contrast to the global average of 25:75. This mismatch locks India out of the fastest-growing segments such as activewear, technical textiles and athleisure.

The recent rationalisation of the inverted duty structure in the MMF segment must now be complemented by investment in MMF spinning and weaving. Second is capital. India's real interest rates of 6.2 to 8.2 per cent remain significantly higher than those of China (3.1 per cent), Vietnam (around 3 per cent) and Bangladesh (negative real rates). Delays in Goods and Services

Tax (GST) refunds and export incentive disbursements also constrain liquidity. Next is labour and skill. India's apparel sector is highly dependent on migrant labour, moving from Bihar, Odisha and Jharkhand into production clusters such as Bengaluru, Tiruppur, Surat etc. There is high attrition and absenteeism during the festival season, when assembly lines fall short. In our opinion, a more sustainable model is to move factories to where the cheap labour is. Pearl Global's Muzaffarpur unit in Bihar is a step in that direction. The gains are multiple: Higher female labour participation, lower migration costs and a pathway for labour-surplus states like Bihar to accelerate manufacturing-led growth.

Finally, with the UK-CETA (Comprehensive Economic And Trade Agreement) and EU-FTA, India has achieved tariff parity with competitors such as Bangladesh and Vietnam. But competitiveness extends far beyond tariffs. India needs seamless end-to-end integration of trade processes so exporters can move goods, documents and approvals with minimal compliance costs, speed and predictability.

The reform agenda for India is clear: Build an ecosystem approach to competitiveness. PM-MITRA (PM Mega Integrated Textile Region and Apparel) parks, announced in 2021, embody this approach by integrating the five pillars of competitiveness — scale, infrastructure, finance, skills and market access — within a single institutional framework. Their timely implementation is critical if India is to seize the current window of opportunity in global apparel trade. Complemented by the export promotion mission and the integrated programme for the textiles, these reforms can reposition India as a scale-driven, digitally-enabled, sustainable and women-inclusive global sourcing hub. History tells us that India once clothed the world through craftsmanship. The future will depend on whether it can stitch together an ecosystem where firms, finance, institutions and supply chains move with the speed, scale and predictability that global value chains demand.

Gulati and Rao are distinguished professor and senior fellow, respectively, at AICRE. Views are personal.

- **Key Terms and Explanations**

- **Fully Integrated Value Chain:** This describes a comprehensive industrial structure where every single stage of production—from the raw material stage to the final product—occurs within the same geographic or economic boundary. In textiles, this spans from cotton cultivation and harvesting to spinning yarn, weaving fabric, chemical processing or dyeing, and final garment assembly for export. India is one of the very few global economies that inherently possesses this entire spectrum internally, reducing reliance on intermediate imports.

- **Employment Intensity:** This metric measures the capacity of a specific industrial sector to generate employment opportunities relative to the size of monetary investment made. For instance, an investment of ₹1 crore in apparel manufacturing yields approximately 153 jobs, which stands in stark contrast to capital-intensive sectors like automobiles (27 jobs) or steel (14 jobs). This characteristic makes the sector vital for absorbing surplus, low-skilled agricultural labor.

- **The "Missing Middle":** This structural vulnerability describes an industrial ecosystem dominated by a massive number of micro-enterprises on one end and a few giant conglomerates on the other, but severely lacking mid-sized manufacturing firms. These mid-sized units are critical for export competitiveness, as they possess the necessary agility, financial backing, and technological capability to fulfill large-scale, rapid-turnaround international orders.

- **Fibre Mix Mismatch:** This term highlights the structural divergence between domestic manufacturing output and actual global consumer demand regarding textile raw materials. While global apparel markets are heavily skewed toward Man-Made Fibres (MMF) like polyester, nylon, and technical synthetics in a 75:25 ratio against cotton, domestic industrial production remains inverted, consuming cotton and non-cotton at a 60:40 ratio. This mismatch locks domestic industries out of high-growth segments like activewear and athleisure.

- **Inverted Duty Structure:** A tax anomaly where the import duties and domestic taxes levied on raw materials or inputs are significantly higher than the taxes imposed on the finished end product. In the synthetic textile domain, high taxation on basic chemical inputs alongside lower tariffs on imported finished garments creates severe domestic cost disadvantages, discouraging local value addition.

- **Real Interest Rates:** The nominal interest rate adjusted for prevailing inflation, representing the true borrowing cost for businesses. When domestic real interest rates hover at elevated levels (between 6.2% and 8.2%) compared to major global competitors like China (3.1%) or Vietnam (~1%), it escalates capital costs, compresses profit margins, and acts as a barrier to long-term industrial modernization.

- **Main Arguments and Substantive Parts**

- **The Paradox of Structural Stagnation**

- Despite the global apparel export market expanding to a massive \$521 billion valuation, domestic export shares have remained remarkably stagnant at roughly 3% for over two decades. In stark contrast, agile global competitors such as Bangladesh and Vietnam have experienced meteoric rises, capturing market shares of 9.2% and 6.4% respectively. This highlights that raw material self-sufficiency alone cannot guarantee international market dominance without robust institutional support.

- **The Employment Leverage and Socio-Economic Transformation**

- Apparel manufacturing serves as a highly effective tool for inclusive economic growth due to its extraordinary labor absorption capacity. Unlike heavily automated, capital-intensive sectors, the textile value chain provides an immediate livelihood pathway for semi-skilled and unskilled labor, offering an institutional mechanism to transition populations out of low-yield subsistence agriculture.

- **Ecosystem Competitiveness Over Fragmented Inventions**

- International trade success depends heavily on integrated institutional ecosystems rather than isolated cost advantages. Competitors like China successfully implemented vertically integrated clusters and robust export credit insurance frameworks, while Bangladesh utilized readymade garment-specific financing and plug-and-play export processing zones. These structural frameworks significantly minimize transaction costs and administrative delays.

- **Financial and Supply-Side Friction Points**

- Domestic manufacturing potential is frequently constrained by systemic financial headwinds and raw material imbalances. High domestic real interest rates combined with liquidity bottlenecks—often caused by administrative delays in processing Goods and Services Tax (GST) refunds—severely restrict working capital. Furthermore, an over-reliance on traditional cotton fabrics cuts off domestic enterprises from high-demand global synthetic export markets.

- **Decentralization as a Strategic Solution**

- Transitioning production centers away from traditional, congested urban industrial hubs directly into labor-surplus states offers a sustainable operational model. Moving factories closer to labor pools in regions like Bihar, Odisha, and Jharkhand helps mitigate high labor attrition and seasonal migration shocks. This geographic shift also unlocks untapped female labor participation and lowers migration-associated social overheads.

- **Historical Evolution of the Issue**

- **Civilizational Foundations and Maritime Dominance**

- The roots of Indian textile expertise run deep, stretching back over 4,500 years to the Indus Valley Civilization, where archaeological excavations at Harappa and Mohenjodaro uncovered spindle whorls and advanced dyeing artifacts. For nearly two millennia, Indian handlooms and artisanal fabrics occupied a central position in global commerce, clothing populations across vast maritime trade networks spanning Asia and Europe.

- **The Mughal Zenith and Regional Specialization**

- During the 17th and early 18th centuries, the Indian subcontinent—particularly the Bengal region—became the premier global hub for cotton and silk textile manufacturing. World-renowned fabrics such as Dhaka muslin and Murshidabad silk were highly prized across international royal courts. Driven primarily by this textile preeminence, India accounted for nearly one-fourth of total global economic output around the year 1700.

- **The Colonial Shock and De-industrialization**

- The advent of the British Industrial Revolution in the late 18th century structurally disrupted India's traditional manufacturing base. Inventions like James Hargreaves' spinning jenny and mechanized weaving technologies shifted competitive advantages away from artisanal craftsmanship toward mechanical automation and massive economies of scale. Consequently, colonial policies transformed India into a primary exporter of raw cotton to Lancashire mills and a captive consumer market for British manufactured textiles.

- **Post-Independence Protectionism and Fragmentation**

- Following independence in 1947, state policy prioritized protecting traditional handloom weavers and promoting small-scale cottage industries to maximize rural employment. While socially well-intentioned, these strict regulatory limits on factory capacity discouraged large-scale technological upgrades and corporate investments. This led to a highly fragmented, sub-optimal manufacturing landscape that struggled to compete globally as international trade modernized.

- **Liberalization and the Modern Ecosystem Shift**

- The economic reforms of 1991 exposed the textile sector to global market dynamics, yet structural bottlenecks like rigid labor laws and infrastructure deficits limited export growth. In recent years, public policy has shifted away from isolated subsidies toward comprehensive ecosystem-driven strategies. This modern approach is reflected in initiatives like the PM-MITRA parks scheme, aimed at integrating scale, modern logistics, and supply chains within unified institutional frameworks.



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SYLLABUS RELEVANCE:

GS 3, Global Apparel,
Structuraments Painatins

PYQS:

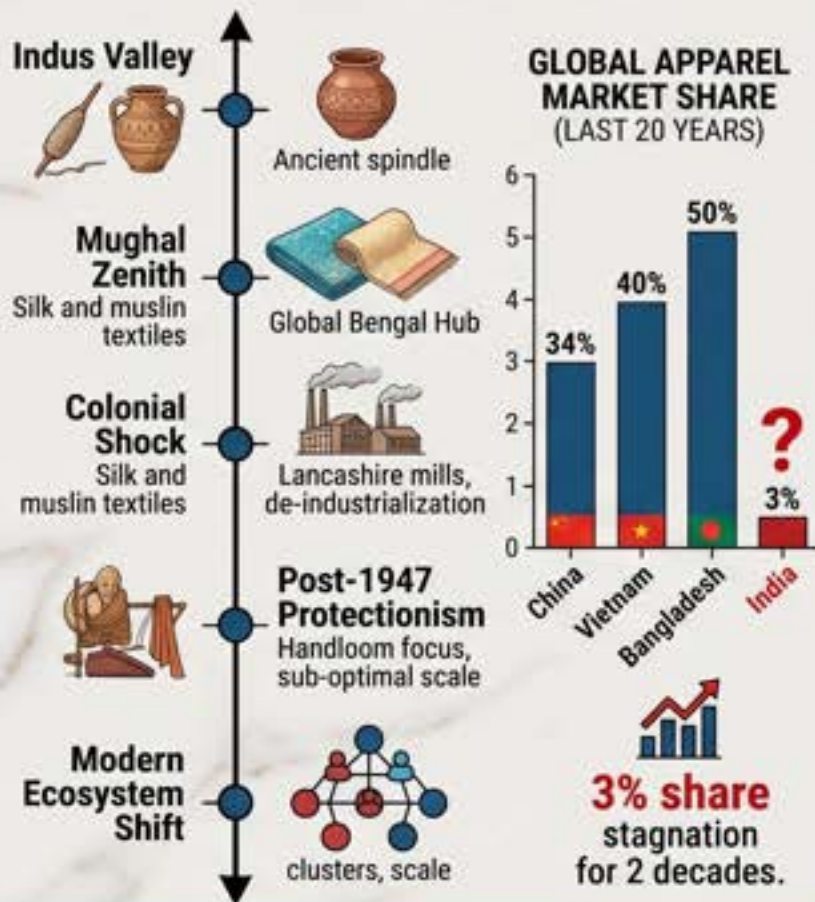
GS 3, Ethics, GST

GS 3, Ethics, Garmenting

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REINVIGORATING INDIA'S TEXTILE TRADE: A COMPREHENSIVE UPSC CSE ANALYSIS

1. HISTORICAL EVOLUTION & CURRENT PARADOX



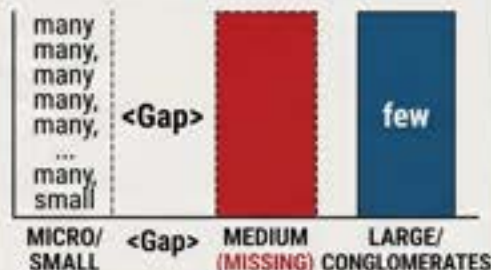
2. DIAGNOSING STRUCTURAL BOTTLENECKS: THE MISSING MIDDLE & MMF MISMATCH

FULLY INTEGRATED VALUE CHAIN
(Seed to Shirt)

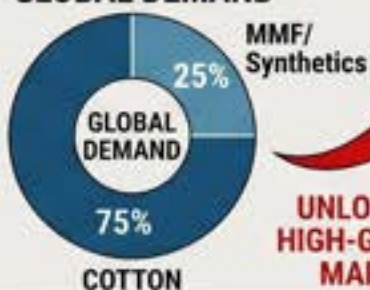
Constraint

- Inverted Duty Structure
- High Capital Cost
- Liquidity bottlenecks

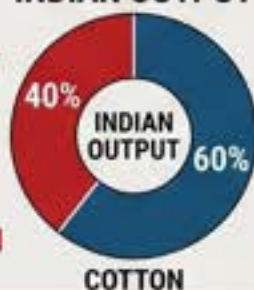
MISSING MIDDLE



GLOBAL DEMAND



INDIAN OUTPUT



UNLOCKING HIGH-GROWTH MARKET

EMPLOYMENT INTENSITY



3. THE STRATEGIC ROADMAP FOR RE-DOMINANCE: ECOSYSTEM COMPETITIVENESS

"FACTORIES-TO-PEOPLE" (Social & Ethical)

Local rural factories in states like Bihar, Odisha



- Decentralized Local Livelihoods
- Lower Attrition
- Raise Female LFP
- Reduce Migration Distress

"PM-MITRA PARKS"
(Ecosystem)

- Vertical clusters of spinning, weaving, garmenting

"PM-MITRA PARKS"
(Ecosystem)



SYNTHETIC (MMF) TRANSITION

- Resolve Inverted Duty on MMF
- Align with Global Demand
- Boost Technical Textiles



TRADE & LIQUIDITY

- Finalize UK-EU FTAs (Tariff Parity)
- Expedite GST Refunds



- **Logical and Philosophical Base**
- **Shift from Comparative to Competitive Advantage**
 - The core economic philosophy rests on the principle that natural factor endowments—such as abundant raw cotton or a large populace—are no longer sufficient to secure trade dominance. In a globalized economy, true competitive advantage is intentionally constructed through institutional design, efficient logistics, and ease of doing business. The argument shifts the focus from what an economy naturally possesses to how efficiently its institutions process those resources.
- **Holistic Ecosystems Over Fragmented Policy Interventions**
 - This analytical approach challenges the traditional policy model that addresses industrial bottlenecks through isolated fixes, such as basic tax rebates or temporary subsidies. It operates on the logic that true international competitiveness requires a deeply integrated ecosystem. Infrastructure, affordable capital, skilled labor, and trade facilitation must be synthesized within unified institutional spaces to achieve meaningful economies of scale.
- **Labor-Intensive Industrialization for Balanced Growth**
 - The underlying development model mirrors classic Lewisian transition economics, which advocates for shifting surplus agricultural labor into higher-productivity manufacturing sectors. Because the apparel sector features high employment intensity, it serves as a practical, egalitarian vehicle for poverty alleviation and wealth distribution, ensuring that economic growth translates into widespread job creation.
- **The Spatial Logic of Localized Production**
 - There is a strong philosophical argument for moving industrial capital to where labor naturally resides, rather than forcing mass human migration toward distant industrial clusters. This "Factories-to-People" model seeks to minimize the socio-economic vulnerabilities, high urban living costs, and cultural displacement associated with distress migration. It fosters a more balanced, regionally inclusive model of national development.

- **Multidimensional Analysis**
- **Social Dimension**
 - The apparel sector serves as a powerful engine for gender empowerment, as garment manufacturing traditionally employs a high percentage of female workers. Shifting production units into labor-surplus rural states like Bihar, Jharkhand, and Odisha provides safe, formalized local employment options. This structural shift raises female labor force participation rates, improves household health and education metrics, and reduces the social vulnerabilities caused by long-distance male migration.
- **Political Dimension**
 - Revitalizing domestic manufacturing directly advances national strategic agendas such as 'Make in India' and helps manage demographic pressures. Creating sustainable livelihoods in rural areas helps state governments reduce regional economic imbalances and mitigate urban infrastructure strain caused by migration. Furthermore, stabilizing rural employment helps address socio-economic discontent, contributing to broader regional stability.
- **Legal and Regulatory Dimension**
 - Overcoming administrative bottlenecks is essential for enhancing industrial agility. Delays in processing regulatory compliance, distributing export incentives, and issuing GST refunds frequently tie up vital corporate liquidity. Enhancing the ease of doing business requires streamlining trade processes, automating customs clearances, and implementing balanced labor frameworks that protect worker welfare while offering manufacturers operational flexibility.
- **Ethical Dimension**
 - Transitioning factories to rural labor pools addresses the ethical necessity of providing dignified, localized employment choices. It directly counters the harsh living conditions, low wages, and lack of social safety nets frequently faced by inter-state migrant workers in congested urban hubs. By creating safe and accessible formal workplaces in economically lagging regions, the model promotes a fairer distribution of developmental benefits.
- **International Dimension**
 - As global brands actively pursue 'China Plus One' strategies to diversify their supply chains, India has a strategic window to position itself as a reliable alternative. Securing tariff parity through comprehensive trade pacts like the UK-CETA and EU-FTA is crucial for competing effectively against zero-duty nations like Bangladesh. Developing reliable trade infrastructure is essential for integrating domestic industries into global value chains.
- **Economic Dimension**
 - A robust apparel export sector helps diversify the national export basket and secure stable foreign exchange earnings, which aids in managing the current account deficit. To unlock high-value global markets, the economy must correct its domestic fiber mix mismatch by shifting focus toward synthetics. Additionally, addressing the high cost of domestic credit through targeted financial reforms will enable mid-sized firms to achieve the scale required for global competition.

- **Linkages with NCERTs**
- **Class XI Economics: Indian Economic Development**
- **Chapter Linked:** *Employment: Growth, Informalisation and Other Issues.*
- **Nature of Linkage:** This chapter analyzes the structural composition of the Indian workforce and the challenges of informalization. The high employment intensity of apparel manufacturing directly addresses the textbook's focus on transitioning labor from low-productivity agriculture to formal, secondary sector employment.
- **Class XII Geography: India – People and Economy**
- **Chapter Linked:** *Planning and Sustainable Development in Indian Context / Manufacturing Industries.*
- **Nature of Linkage:** The text details the traditional geographic distribution, raw material dependencies, and historical clustering of the textile industry. The shift toward locating production units near labor-surplus regions directly illustrates the textbook concepts of regional development and changing industrial location factors.
- **Class VIII History: Our Pasts – III**
- **Chapter Linked:** *Weavers, Iron Smelters and Factory Owners.*
- **Nature of Linkage:** This chapter provides the vital historical context of India's pre-colonial textile dominance, the global renown of Dhaka muslin, and the subsequent de-industrialization under British colonial rule. Understanding this history helps clarify the long-term structural evolution of the sector.
- **Class X Contemporary India – II**
- **Chapter Linked:** *Manufacturing Industries.*
- **Nature of Linkage:** This chapter highlights the self-reliant and self-contained nature of the textile value chain in India. The current policy focus on addressing the fiber mix mismatch and scale deficiencies directly relates to the textbook's discussion on industrial modernization and international competitiveness.

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- **Linkages with UPSC CSE Syllabus**
 - **General Studies Paper III (Primary Linkage)**
 - **Syllabus Segments:** Indian Economy and issues relating to planning, mobilization of resources, growth, development, and employment; Industrial policy and its effects on industrial growth; Effects of liberalization on the economy.
 - **Analytical Focus:** The core discussions on the "missing middle," high real interest rates, and the fiber mix mismatch are highly relevant to analyzing structural challenges within India's manufacturing sector and evaluating employment-generation policies.
 - **General Studies Paper I**
 - **Syllabus Segments:** Salient features of Indian Society, Diversity of India; Role of women and women's organization; Population and associated issues; Distribution of key natural resources and factors responsible for the location of secondary sector industries.
 - **Analytical Focus:** The socioeconomic impacts of rural industrialization on reducing distress migration and raising female labor force participation provide strong analytical material for questions on societal transformation and industrial geography.
 - **General Studies Paper II**
 - **Syllabus Segments:** Government policies and interventions for development in various sectors and issues arising out of their design and implementation.
 - **Analytical Focus:** Assessing institutional initiatives like the PM-MITRA parks scheme, regulatory reforms in GST refund mechanisms, and negotiating free trade agreements (FTAs) to secure global market access.
 - **Essay Paper & General Studies Paper IV (Ethics)**
 - **Syllabus Segments:** Philosophical and economic essays on inclusive growth; Ethical dimensions of economic development, human migration, and labor dignity.
 - **Analytical Focus:** The concept of relocating factories closer to rural communities serves as an effective case study for ethical corporate governance, sustainable regional development, and promoting worker dignity.

- **Way Forward**

- **Rapid Implementation of PM-MITRA Parks**

- The swift operationalization of Mega Integrated Textile Region and Apparel (PM-MITRA) parks must be prioritized across designated states. By co-locating spinning, weaving, processing, and garmenting units within a single plug-and-play geographic cluster, these parks can help domestic enterprises overcome fragmentation, lower logistics costs, and achieve the scale required by global buyers.

- **Strategic Transition to Man-Made Fibres (MMF)**

- Public policy and fiscal incentives should be aligned to rapidly upgrade domestic synthetic spinning and weaving capacities. Resolving inverted duty structures on synthetic raw materials and incentivizing production in high-growth segments like activewear, technical textiles, and athleisure will help align domestic output with the dominant trends of global apparel demand.

- **Scaling the "Factories-to-People" Production Model**

- State governments in labor-surplus regions should actively collaborate with leading apparel brands to establish dedicated manufacturing clusters within rural districts. Providing targeted state-level incentives—such as subsidized land, uninterrupted power supply, and localized skill-development centers—will help institutionalize this decentralized model, stabilizing labor retention and lowering migration overheads.

- **Enhancing Financial Liquidity and Reducing Capital Costs**

- To help mid-sized exporters expand, the Ministry of Finance and the Reserve Bank of India could introduce targeted interest subvention windows for export-oriented, labor-intensive manufacturing sectors. Additionally, fully automating the verification and disbursement of GST refunds and duty drawbacks will free up critical working capital for firms.

- **Accelerating Trade Agreements and Digital Integration**

- Negotiations for comprehensive free trade agreements with key consumer markets—specifically the United Kingdom and the European Union—should be expedited to secure essential tariff parity with competitors. This must be accompanied by comprehensive digitization of customs and cross-border logistics to ensure the speed and predictability required by modern global supply chains.

- **UPSC CSE Prelims**

- **2020 (General Studies Paper I):** With reference to the history of India, consider the following pairs:

- Aurang — In-charge of treasury of the State
- Banian — Indian agent of the East India Company

- Mirasidar — Designated revenue payer to the State Which of the pairs given above is/are correctly matched?

- **2019 (General Studies Paper I):** Which of the following gave immediate impetus to the British to set up manufacturing units in India during the 19th century?

- **2013 (General Studies Paper I):** The main cause of the stagnation of the Indian textile industry during the later part of the 19th century was:

- **UPSC CSE Mains**

- **2023 (General Studies Paper III):** "Account for the failure of manufacturing sector in achieving the goal of labour-intensive growth in India. Suggest measures to accelerate the growth of manufacturing sector."

- **2019 (General Studies Paper III):** "Can the strategy of regional resource-based manufacturing enterprises help in generating employment in rural areas? Elaborate with examples."

- **2015 (General Studies Paper I):** "Analyze the factors responsible for the location of the jute and textile industries in India. How far has the shift in location occurred in recent decades?"

Skyroot's Moment Is Real. So Is The Distance Still Left To Cover

Isro's hollowing out is not an option, as the agency is the scaffolding on which private players are building their success. Nasa didn't shrink for SpaceX. India needs the same arrangement

Chethan.Kumar@timesofindia.com



Forty-six years ago, on July 18, 1980, an Indian rocket reached orbit for the first time. SLV-3 got there on its second try, after an ignominious first attempt earlier ended in the Bay of Bengal. On Saturday, on the same date, Skyroot Aerospace's Vikram-1 did what SLV-3 needed two attempts to do – reach orbit and deposit its payloads precisely where they were meant to go – on its very first flight.

It's not clear if it were a planned coincidence of dates, but it's hard not to read something into it. Skyroot is now the first Indian private company to have flown an orbital launch vehicle successfully, and it did so in a year that had, until Saturday, given India's space sector very little to point to.

Isro hasn't returned to the launchpad since the PSLV mission failed on Jan 12 – which means the one successful orbital launch from Indian soil in 2026 so far came from the private sector. That fact alone is worth sitting with for a moment, because it says something about how much distance an eight-year-old startup has covered.

The pipeline behind Vikram-1 makes the moment feel less like a one-off. Agnikul Cosmos is preparing to fly its own two-stage, semi-cryogenic rocket, and is chasing something more ambitious than what Skyroot has just done: recovering its first-stage booster.

Pull that off on a debut flight – dates are still being firmed up – and it would mark a bigger technical achievement than Saturday's launch. Why? Because reusability is the one lever that has done more than anything else to bring down the cost of getting to orbit, as SpaceX has spent a decade proving. Skyroot has reusability on its own roadmap too. India's launch startups are working on "next", not "someday".

None of that should be undersold! But none of it should be oversold either. Vikram-1 was a single flight. Before it can carry paying customers' satellites with

confidence, Skyroot has to prove the vehicle is repeatable.

And even repeatability won't be the finish line: nowhere in the world has a company managed to make the business of launching rockets alone commercially sustainable. Every serious player, SpaceX included, has had to lean on satellites, in-space services, or govt anchor contracts to make the arithmetic work. Skyroot and Agnikul will run into that same wall eventually, but flies on the wall tell us that both have begun work on building satellites, or at least have plans for it.



Scaling in a market where domestic demand is still thin is a problem no single successful launch solves. The satellite side of the ecosystem is a useful reminder of how uneven journey in this sector can be. Pixxel has a constellation in orbit, but there's been little public sense of what its imagery is actually being used for, if being used.

GalaxyEye lost a satellite earlier this month. Two efforts meant to give private players a real stake – the Satellite Based Surveillance (SBS) project and the Earth Observation public-private partnership – have both

gone quiet after their initial fanfare. A launch industry that finds its footing while the demand side stays underdeveloped is only half a sector standing up.

Which brings up the point that matters most: none of this can be allowed to become an excuse for govt to ease off on Isro. It would be easy, in a week like this, to read private success as a licence for the state to step back. That reading would be a costly mistake. Space remains a capital-intensive, high-risk, patience-testing business, and India's startups, whatever they achieve, are still borrowing heavily from Isro's tech base, its launch infra and its accumulated credibility to get where they're going. Meanwhile, the country's strategic requirements – functioning navigation, adequate defence and surveillance satellites – don't wait politely for the private sector to mature.

They need an Isro that is fully resourced now, not an Isro quietly hollowed out because a startup finally had a good day. And that Isro is already under strain: nearly three in every ten sanctioned posts at the Department of Space stood vacant at the end of the last fiscal year, the widest gap in 25 years, even as the agency took on its most ambitious slate of missions yet.

This isn't a question of Isro versus the private sector. This cannot be an "either-or". Doing so misreads how every functioning space power has actually built its industry. Nasa didn't shrink to make room for SpaceX; Nasa's contracts and expertise were the scaffolding SpaceX built on.

India will need the same arrangement, not a smaller version of it. Isro has to do more than survive this transition – it has to thrive through it, properly staffed and funded, pushing ahead on its own frontier projects, even as it opens more room for Skyroot, Agnikul and the rest to grow into.

"Aagaman" earned its celebration, and it should get an unqualified one. But whether July 18, 2026 turns out to be the start of something or just a very good day will depend less on how fast the startups fly next, and more on whether the state keeps building the foundation everything else in Indian space still stands on.

- **Key Terms and Explanations**

- **Orbital Launch Vehicle (OLV):** A rocket designed to accelerate a payload to orbital velocity—approximately 7.8 km/s or 28,000 km/h in Low Earth Orbit—allowing it to remain in continuous free-fall around the Earth without falling back.
 - *Example:* The historical SLV-3, PSLV, and private vehicles like Vikram-1 are orbital launchers, whereas sub-orbital rockets (like Vikram-S) merely reach space altitudes before falling back to Earth.
- **Reusable Launch Vehicle (RLV) Technology:** Systems engineered to allow the return, landing, and refurbishment of rocket components—primarily the expensive first-stage booster—for multiple launches.
 - *Example:* SpaceX's Falcon 9 booster recovery. In India, Agnikul Cosmos and Skyroot are designing booster-stage recovery mechanisms to lower the cost per kilogram of launching payloads.
- **Semi-Cryogenic and Solid Propulsion:** Rocket propulsion systems categorized by their fuel states. Solid propellants are stable and high-thrust but cannot be throttled or restarted once ignited. Semi-cryogenic systems use refined kerosene (Isrosene/RP-1) alongside liquid oxygen, offering higher specific impulse (efficiency) and throttleability compared to solid rockets.
- **Low Earth Orbit (LEO):** An Earth-centered orbit with an altitude ranging from 160 kilometers to 2,000 kilometers above the surface. LEO is the primary destination for small remote sensing, earth observation, and broadband satellite constellations.
- **IN-SPACE (Indian National Space Promotion and Authorization Centre):** An autonomous single-window nodal agency under the Department of Space, established in 2020 to promote, authorize, and handhold private sector space activities in India.
- **Anchor Contracts & Sovereign Demand:** Long-term procurement commitments by government agencies to purchase services (such as satellite imagery, broadband, or launch services) from private vendors, providing early-stage companies with guaranteed revenues to make their financial models viable.

- **Main Arguments and Substantive Parts**
- The ongoing evolution of the Indian space industry marks a structural shift from a state-monopolized ecosystem to a dual-engine model where private enterprise operates alongside the national space agency. A conceptual breakdown reveals several core arguments, structural bottlenecks, and strategic imperatives.
- **1. Private Technical Milestones vs. Commercial Sustainability**
- The transition of private firms from experimental sub-orbital flights to orbital capability is a major technological milestone. However, achieving orbit once does not guarantee immediate commercial viability.
- **The Repeatability Barrier:** A launch system must demonstrate reliability across multiple consecutive flights to secure long-term commercial insurance and customer trust.
- **The Launch-Only Trap:** Globally, no company has sustained a profitable business purely by offering launch services without diversifying. Successful space ventures rely on integrated models—building satellites, offering downstream data analytics, or securing anchor government contracts to balance high fixed capital costs.
- **2. The Asymmetry Between Supply and Demand**
- India's space sector exhibits a structural mismatch between upstream launch capacity and downstream demand utilization.
- While private launch capabilities are progressing rapidly, the domestic private satellite market remains underdeveloped.
- Downstream satellite constellation projects often face operational, financial, and market-adoption hurdles. Without a robust domestic appetite for satellite-derived data (in agriculture, defense, and infrastructure planning), launch capabilities risk remaining underutilized.
- **3. The Fallacy of Public Sector Retrenchment**
- A common policy misinterpretation is that the emergence of capable private startups permits the state to reduce its commitment to the public space agency.
- **The Scaffolding Role:** Private space entities depend heavily on ISRO's institutional base, including testing facilities, launch complexes, historical data, and trained human resources.
- **Strategic Imperatives:** National security priorities—such as defense satellite networks, sovereign positioning systems (NavIC), and deep-space scientific exploration—cannot be delegated to early-stage commercial entities focused on short-term profitability.
- **4. Institutional Vulnerability Within the Public Sector**
- While expectation mounts for ISRO to serve as an enabler for private industry and simultaneously lead planetary missions, institutional capacity faces operational pressure.
- High vacancy rates in scientific and technical posts within the Department of Space constrain project execution timelines.
- Adequate staffing, sustained budgetary allocations, and institutional protection are necessary preconditions for ISRO to act as the primary anchor for the broader space ecosystem.

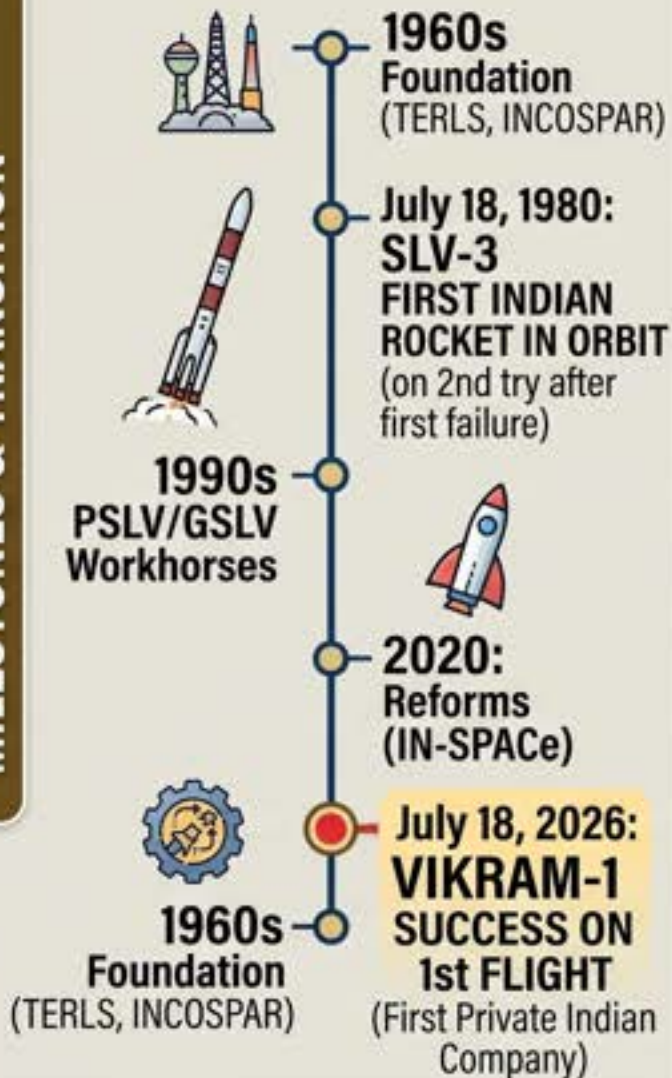
- **Historical Evolution of the Issue**
- **Phase 1: Institutional Foundations (1962–1979)**
 - **1962:** The Indian National Committee for Space Research (INCOSPAR) was established under the leadership of Dr. Vikram Sarabhai and Dr. Homi Bhabha, setting up the Thumba Equatorial Rocket Launching Station (TERLS) in Kerala.
 - **1969 & 1972:** The Indian Space Research Organisation (ISRO) was formed in 1969, followed by the establishment of the Department of Space (DoS) and the Space Commission in 1972.
 - **1975:** Launch of India's first satellite, *Aryabhata*, aboard a Soviet launch vehicle, establishing basic satellite design and operational competencies.
- **Phase 2: Indigenous Orbital Launch Capability (1979–1990s)**
 - **August 1979:** The maiden experimental launch of the Satellite Launch Vehicle (SLV-3) failed due to a valve malfunction, resulting in the payload falling into the Bay of Bengal.
 - **July 18, 1980:** ISRO successfully launched the SLV-3, placing the Rohini satellite (RS-1) into orbit. This made India the sixth nation to achieve independent orbital launch capability.
 - **1980s–1990s:** Development of the Augmented Satellite Launch Vehicle (ASLV) provided a technological stepping stone toward heavier, operational launch systems.
- **Phase 3: Operational Maturity and Deep-Space Capabilities (1993–2019)**
 - **1993–1994:** The Polar Satellite Launch Vehicle (PSLV) debuted. Despite an initial failure in 1993, it became ISRO's primary workhorse, achieving dozens of consecutive successful launches for domestic and international payloads.
 - **2000s–2010s:** Development of the Geosynchronous Satellite Launch Vehicle (GSLV) and the heavy-lift LVM3 (GSLV Mk III), enabling indigenous cryogenic propulsion.
 - **Planetary Milestones:** Execution of Chandrayaan-1 (2008), Mars Orbiter Mission (Mangalyaan, 2013), and Chandrayaan-3 (2023) demonstrated high cost-efficiency in deep-space exploration.
- **Phase 4: Market Liberalization and Ecosystem Expansion (2020–Present)**
 - **June 2020 Space Sector Reforms:** The Union Cabinet approved private sector participation across the space value chain, creating IN-SPACe as an independent regulator and restructuring NewSpace India Limited (NSIL) to handle commercial activities.
 - **Indian Space Policy 2023:** Formalized the operational roles: ISRO focuses on advanced R&D and strategic missions; IN-SPACe acts as the regulator and enabler for Non-Government Entities (NGEs); and NSIL manages commercial transfers.
 - **2022–Present:** Private space startups successfully transitioned from sub-orbital trials (e.g., Vikram-S, Agnibaan SORTED) to orbital flight attempts and reusable propulsion testing.



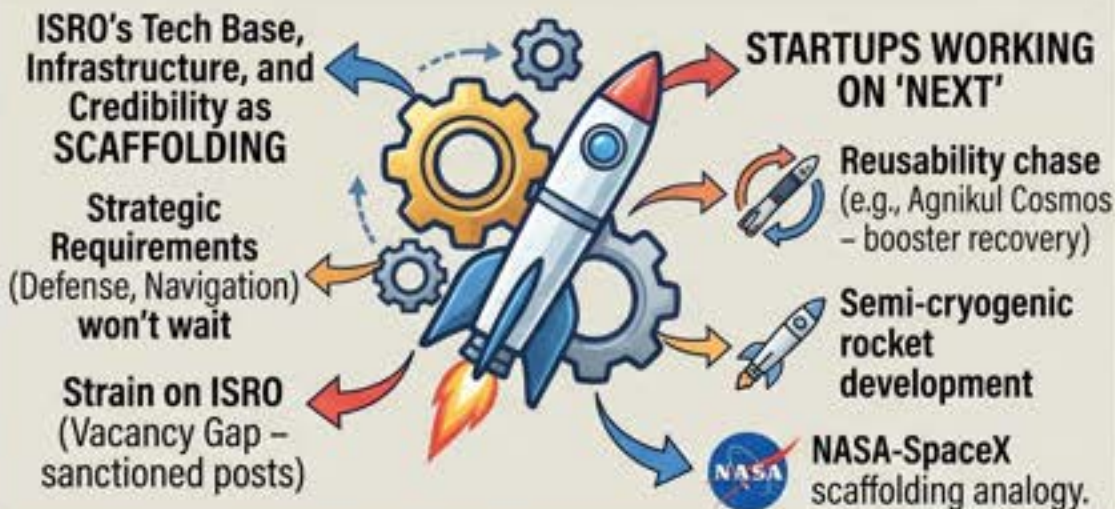
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INDIAN SPACE SECTOR: PUBLIC-PRIVATE SYNERGY, CHALLENGES, AND ROAD AHEAD

MILESTONES & TRANSITION



PUBLIC (ISRO) & PRIVATE SYNERGY (NOT EITHER-OR)



MULTIDIMENSIONAL IMPACT & ROAD AHEAD



UPSC CSE SYLLABUS LINKS

- **GS 3** (Indigenization of S&T, Security)
- **GS 2** (Governance, Institutions)
- **Essay**
- **GS 4** (Ethics, Risk)

Launch-alone UNSUSTAINABLE for long-term commercial profit



Satellites, in-space services, Govt anchor contracts needed



Scaling with Thin Domestic Demand



Downstream supply vs. underdeveloped demand side (e.g., Pixxel constellation, GalaxEye failure, SBS project silence).

KEY CHALLENGES & LIMITATIONS

THE WAY FORWARD

- **Balanced Solution**
- **Filling sanctioned posts at DoS**
- **Repeatability** (Proving repeatable capability before carrying paying customers' satellites with confidence)

- **Logical and Philosophical Base**

- Analyzing the interaction between public space agencies and private enterprise involves several core economic and political concepts.

- **1. The Theory of the "Entrepreneurial State"**

- **Premise:** As economist Mariana Mazzucato argues, high-risk, capital-intensive technological breakthroughs are rarely initiated by private venture capital. Private capital typically enters after the state has absorbed early-stage technological and financial risks.

- **Application:** ISRO served as the primary risk-absorber for six decades, developing launch facilities, testing infrastructure, and technical expertise. Private space startups now build upon this state-funded foundation.

- **2. Public Goods vs. Market-Driven Commodities**

- **Premise:** Space infrastructure functions as a dual-use asset. Aspects like climate monitoring, disaster warning, and national defense are public goods characterized by non-excludability and non-rivalry.

- **Application:** Private entities operate on commercial profitability, while the state must maintain space capacity as a strategic public good regardless of market cycles or short-term profitability.

- **3. The Symbiotic Ecosystem Model**

- **Premise:** Public and private sectors in strategic technology domains do not exist in a zero-sum relationship.

- **Application:** The relationship resembles a co-dependent ecosystem. The state acts as the anchor buyer and technology creator, while private industry provides production scale, efficiency, and commercial flexibility.



- **Multidimensional Analysis**
- **1. Social Dimension**
- **Human Capital and Brain Drain:** A growing private space ecosystem offers career paths for aerospace engineers, helping retain talent within the domestic economy.
- **Socio-Economic Applications:** Downstream space data supports agricultural yield prediction, groundwater mapping, urban planning, and coastal management.
- **Educational Inspiration:** High-profile private space milestones can increase youth engagement in STEM (Science, Technology, Engineering, and Mathematics) fields.
- **2. Political and Governance Dimension**
- **State Capacity and Bureaucratic Health:** Persistent vacancies in critical scientific bodies like the Department of Space expose administrative bottlenecks that can slow major national missions.
- **Strategic Autonomy:** Reliance on foreign launch providers or non-sovereign satellite constellations introduces strategic vulnerabilities during geopolitical conflicts.
- **Policy Coordination:** Effective governance requires balancing IN-SPACe's dual role as a market facilitator and an independent safety and security regulator.
- **3. Legal and Regulatory Dimension**
- **International Treaty Obligations:** Under the Outer Space Treaty (1967) and the Liability Convention (1972), the Indian government remains strictly liable for all space objects launched from its territory, including those operated by private entities.
- **Legislative Framework:** While the Indian Space Policy 2023 provides direction, a formal, enacted Space Activities Act is needed to establish statutory clarity around liability caps, mandatory insurance, and intellectual property rights (IPR) transfer.
- **4. Ethical Dimension**
- **Space Debris and Environmental Sustainability:** The proliferation of small-satellite mega-constellations increases collision risks in Low Earth Orbit (Kessler Syndrome). Private entities must adhere to responsible de-orbiting practices.
- **Surveillance and Privacy Concerns:** High-resolution Earth observation imagery collected by private firms raises civil liberty and privacy issues that require clear regulatory oversight.
- **Equitable Access to Orbit:** Balancing commercial spectrum/orbital allocation so large capital ventures do not crowd out smaller research or educational payloads.
- **5. International and Geopolitical Dimension**
- **Global Launch Market Share:** India historically held less than 2% of the commercial space market despite its high launch success rate. Private small-satellite launchers aim to capture a larger share of the global small-sat market.
- **Geopolitical Alignments:** Space cooperation forms a core pillar of frameworks like the Quad and the US-India Initiative on Critical and Emerging Technology (iCET), balancing regional space dynamics.
- **Supply Chain Vulnerability:** Dependence on imported high-grade electronic components and specialty alloys leaves Indian space startups exposed to global supply chain disruptions.
- **6. Economic Dimension**
- **Capital Intensity and Gestation Periods:** Space hardware requires long R&D cycles and heavy capital expenditure (CapEx) with high initial failure risks, requiring specialized deep-tech venture financing.
- **The Downstream Value Chain:** Launch services represent only a fraction of the global space economy (~8-10%). Downstream satellite services, data analytics, and ground equipment account for over 70% of total economic value.

Linkages with NCERT Textbooks

NCERT Book & Class	Chapter Title	Conceptual Connection
Class 11 Economics <i>(Indian Economic Development)</i>	<i>Chapter 3: Liberalisation, Privatisation and Globalisation: An Appraisal</i>	Explores public sector reforms, the transition from state monopolies to market competition, and the evolving role of public-private partnerships (PPPs) in infrastructure development.
Class 12 Political Science <i>(Politics in India Since Independence)</i>	<i>Chapter 3: Politics of Planned Development</i>	Details the post-independence state-led science and technology strategy, the creation of public institutions like ISRO, and public investment in heavy infrastructure.
Class 11 Physics <i>(Part 1)</i>	<i>Chapter 5: Laws of Motion</i> <i>& Chapter 8: Gravitation</i>	Explains the physical principles of rocket propulsion (conservation of momentum, Newton’s third law), orbital velocities, satellite insertion, and geostationary dynamics.
Class 11 Fundamentals of Physical Geography	<i>Chapter 15: Life on the Earth</i> & Practical Work in Geography	Connects space assets with practical applications in remote sensing, Geographic Information Systems (GIS), weather forecasting, and resource mapping.

- **Linkages with UPSC CSE Syllabus**
- **GS Paper 2: Governance, Polity, and Public Policy**
- **Role of Civil Services and Bureaucratic Capacity:** Managing human resource shortages within scientific institutions (such as high vacancy rates in the Department of Space) and maintaining administrative efficiency.
- **Statutory and Regulatory Bodies:** Structure, mandate, and performance of regulatory mechanisms like IN-SPACe in overseeing Non-Government Entities.
- **GS Paper 3: Science & Technology, Economy, and Security**
- **Indigenization of Technology:** Transitioning from public-led tech development (SLV-3, PSLV) to indigenous private launch capability (Vikram-1, Agnibaan).
- **Awareness in the Field of Space:** Technical mechanics of launch systems, semi-cryogenic engines, reusable rockets, and satellite constellations.
- **Infrastructure and Economic Growth:** Public-Private Partnerships (PPP) in high-risk sectors, mobilization of private capital, and expanding India's share of the global space market.
- **GS Paper 4: Ethics and Human Interface**
- **Public Safety vs. Commercial Enterprise:** Ethical responsibility of regulatory agencies to maintain strict safety protocols for private launches without stifling innovation.
- **Resource Allocation:** Moral and ethical considerations in balancing state expenditure on high-technology space exploration with basic social welfare needs.
- **Optional Subject Linkages**
- **Public Administration:** Institutional design, administrative reforms, human resource management in scientific departments, and the shift from state production to regulatory governance.
- **Political Science & International Relations (PSIR):** Space as a domain of strategic autonomy, soft power projection, and state capacity in international geopolitics.
- **Economics:** Industrial policy, market failure in deep-tech sectors, public investment as a catalyst for private investment (crowding-in effect), and state-led economic modernization.



- **Way Forward**
- **1. Structural Strengthening of ISRO**
- **Address Staff Vacancies:** Accelerate recruitment and capacity building in the Department of Space to address operational bottlenecks.
- **Refocus on Frontier Science:** Shift routine manufacturing and operational launch services to the private sector and NSIL, allowing ISRO to concentrate on deep-space exploration, advanced propulsion research, and human spaceflight (Gaganyaan).
- **2. Demand-Side Stimulation Through Sovereign Contracts**
- **Government as Anchor Customer:** Government departments (Agriculture, Defense, Urban Development, Environment) should issue multi-year anchor contracts to private satellite and data providers to create reliable revenue streams.
- **Public-Private Partnerships (PPP):** Revitalize stalled PPP initiatives in Earth observation and satellite surveillance, establishing clear risk-sharing models between the state and private enterprises.
- **3. Enacting a Statutory Space Activities Act**
- **Legislative Clarity:** Pass a comprehensive Space Activities Act to replace non-binding policy guidelines with statutory protections.
- **Liability and Risk Management:** Establish clear statutory caps on third-party liability for private launch providers, backed by accessible state-supported insurance frameworks to lower market entry barriers.
- **4. Financial Capital and Infrastructure Ecosystems**
- **Targeted Deep-Tech Funding:** Establish dedicated government-backed venture funds and extend Production Linked Incentive (PLI) schemes to space component manufacturing.
- **Shared Infrastructure Access:** Expand private startup access to ISRO's testing, launch, and tracking facilities with clear, standardized cost structures.



UPSC CSE Prelims Questions

1. UPSC Prelims 2023

Q. Consider the following statements in relation to India's space program:

- 1.Launchers like PSLV use a combination of solid and liquid propulsion stages.
- 2.The Indian National Space Promotion and Authorization Centre (IN-SPACe) was created to act as a single-window agency to promote and authorize private space activities.
- 3.Non-Government Entities (NGEs) are restricted from developing their own launch vehicles under the Indian Space Policy 2023.

Which of the statements given above are correct?

- (a) 1 and 2 only
- (b) 2 and 3 only
- (c) 1 and 3 only
- (d) 1, 2 and 3

Correct Answer: (a)

2. UPSC Prelims 2016

Q. With reference to 'India's Satellite Launch Vehicle', consider the following statements:

- 1.PSLVs launch the satellites useful for Earth resources monitoring whereas GSLVs are designed mainly to launch communication satellites.
- 2.Satellites launched by PSLV appear to remain permanently fixed in the same position in the sky, as viewed from a particular location on Earth.
- 3.GSLV Mk III is a four-stage launch vehicle with the first and third stages using solid rocket motors.

Which of the statements given above is/are correct?

- (a) 1 only
- (b) 2 and 3 only
- (c) 1 and 2 only
- (d) 1, 2 and 3

Correct Answer: (a)

UPSC CSE Mains Questions

1. General Studies Paper 3 (2023)

Q. What is the main objective of India's space policy of 2023? Discuss its key features and how it aims to promote private sector participation in the space industry. *(15 Marks, 250 Words)*

2. General Studies Paper 3 (2018)

Q. India has achieved remarkable successes in unmanned space missions including the Chandrayaan and Mars Orbiter Missions. Analyze how these achievements have contributed to socio-economic development and technological self-reliance. *(15 Marks, 250 Words)*

3. General Studies Paper 3 (2015)

Q. Discuss the utility of Space Technology in the field of disaster management and developmental planning in India. Highlight the key challenges faced by Indian space agencies in expanding commercial operations globally. *(10 Marks, 150 Words)*



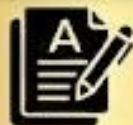
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