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Daily News Analysis

The Hindu Important News Articles & Editorial For UPSC CSE

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In a significant policy posturing, Prime Minister Narendra Modi has asserted that India is now negotiating Free Trade Agreements (FTAs) from a "position of strength." This shift marks a transition from defensive protectionism to proactive global integration. Anchored by the Union Budget 2026-27, the government's strategy intertwines economic resilience (via MSMEs and private investment) with strategic autonomy (heightened defence preparedness following Operation Sindoor).

Trade deals made from position of strength: PM

- Modi urges the private sector to step up and take advantage of new policy framework
- Slew of trade agreements will expand global market access for MSMEs in key sectors
- The govt.'s 'political stability' has restored investors' confidence in the country, says PM

The Hindu Bureau
NEW DELHI

India recently entered into a slew of trade agreements, including with the European Union and the United States, "from a position of strength", Prime Minister Narendra Modi said on Sunday, adding that these deals were designed to expand global market access for Indian manufacturing and services.

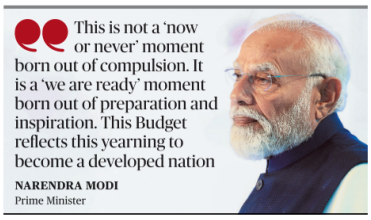
In a written interview to the Press Trust of India, Mr. Modi said that the 2026 Budget gave private sector the opportunity to step up and take advantage of government's investment in infrastructure and capital expenditure.

"This is not a 'now or never' moment born out of compulsion. It is a 'we are ready' moment born out of preparation and inspiration. This Budget reflects this yearning to become a developed nation," he said. explaining the Budget's boost for capital expenditure.

He added that it was now time for the private sector to step up and take advantage of the government's investment in infrastructure and capital expenditure.

The Prime Minister's remarks comes as Parliament remains in recess after the first part of the Budget Session where the government faced an attack by the Opposition on the terms of the trade deals.

Mr. Modi defended the agreements, noting that while long negotiations by the previous Congress-led UPA government had not yielded any results, his government's "political stability and political predictability" had restored investors' confidence in India.



His government's top three reform priorities for the next decade, Mr. Modi said, would be continued structural reforms, deepening innovation, and further simplification of governance.

"I am proud to say that we have moved from incremental adjustments to systemic transformation," the Prime Minister said.

Looking beyond tariffs

The Prime Minister spoke at length about his own government's efforts to enable the environment to strike these deals as well as his expectations from the private sector in taking advantage of these agreements.

"Trade competitiveness is not only about tariffs. It is about liquidity, certification, technology adoption and compliance with global standards. Our Free Trade Agreements (FTAs) are designed to reduce non-tariff barriers and expand market access for Micro Small and Medium Enterprises (MSMEs) in sectors such as textiles, leather, processed food, engineering goods, chemicals, handicrafts and gems and jewellery," Mr. Modi said.

"Indian MSMEs are more export-ready than before, and India's trade policy now deliberately places MSMEs at the centre of global integration. These FTAs are tools to ensure that our youth are not just suppliers to the domestic market, but active participants in global trade and growth," he said.

But, he added, "policy can only create the enabling framework. The next phase of transformation requires a decisive response from the private sector."

"As a country that is part of various trade agreements, making Indian products and services globally competitive is crucial. Our stance on 'Zero Defect, Zero Effect' has resonated deeply with the youth, start-ups and small and medium businesses," the Prime Minister said.

"MSMEs must move beyond being peripheral suppliers. They must become technologically upgraded, globally integrated and export-oriented enterprises that form the backbone of India's participation in global value chains," he added.

Defence focus

On defence expenditure and reforms, he noted that his government's focus on the issue had visibly paid off during the course of Operation Sindoor against Pakistan. "During the operation, one could see the benefits of the reforms we have undertaken in the last decade. Defence budgets, modernisation, etc., all these are parts of our continuous effort and need not be linked to any particular issue," he said.

Asked whether the higher budgetary allocation to the defence sector was part of the lesson learnt from Operation Sindoor, he answered in the affirmative. "Yes, the reality is that our country has to be strong and be prepared at all times, and that is what we are doing," Mr. Modi said.

"In this year's budget, a record ₹7.85 lakh crore have been allocated to the sector. This is 15% higher than the previous budget and is also the biggest chunk allotted to any ministry or department," he said.

Opposition slams PM's interview

NEW DELHI

The Congress dismissed Prime Minister Narendra Modi's interview with the Press Trust of India as a "carefully scripted" one and a "desperate PR exercise". » PAGE 4

Trade Deals: Moving Beyond "Compulsion"

The PM's emphasis on "political stability" as a catalyst for investor confidence highlights a shift in India's trade diplomacy.

- **Strategic Shift:** Unlike the protracted and often stalled negotiations of the past, the recent conclusion of the India-EU FTA (January 2026) and progress with the US and UK demonstrate a "ready" India.
- **MSME-Centric Integration:** Trade deals are no longer just for large conglomerates. The focus has shifted to Non-Tariff Barriers (NTBs), certification, and global standards to benefit labor-intensive sectors like textiles, leather, and gems.
- **The "Strength" Factor:** India's leverage comes from its massive domestic market (1.45 billion people) and its rising status as the world's 4th largest economy (GDP ~$4.13 trillion in 2025).

Budget 2026: The Economic & Defence Pivot

The 2026 Budget serves as the fiscal backbone for this "position of strength."

Feature	Key Highlight	UPSC Significance

Feature	Key Highlight	UPSC Significance
Defence Outlay	Record **₹7.85 lakh crore** (15% hike).	Prioritizes modernization and "Aatmanirbharta" after Operation Sindoor.
CapEx Focus	₹12.2 lakh crore (4.4% of GDP).	Infrastructure as a multiplier for private sector growth.
MSME Support	₹10,000 crore SME Growth Fund.	Shifts MSMEs from peripheral suppliers to global value chain players.
Fiscal Deficit	Targeted at 4.3%.	Signals fiscal discipline to global rating agencies and investors.

Security Perspective: The "Operation Sindoor" Catalyst

Operation Sindoor (May 2025) has redefined India's tactical and budgetary priorities.

- **Validation of Indigenization:** The success of indigenous platforms (Pinaka, Akash, and iDEX-funded drones) during the operation has boosted confidence in domestic R&D.
- **Gap Addressing:** The 21.8% jump in defence capital outlay (₹2.19 lakh crore) specifically targets gaps exposed during the operation, such as the need for advanced aero-engines and maritime surveillance (P-8I aircraft).
- **Doctrine of Preparedness:** The PM's affirmation that higher spending is a "lesson learnt" indicates a shift toward a constant state of readiness rather than reactive procurement.

Challenges and Way Forward

While the narrative is one of strength, several challenges remain:

- **Private Sector Hesitancy:** Despite high public CapEx, the "decisive response" from the private sector is still awaited to fully utilize the new trade frameworks.
- **Structural Imbalance in Defence:** Nearly half of the defence budget is consumed by salaries and pensions (₹1.71 lakh crore for pensions alone), limiting the actual "modernization" component to ~30%.
- **Global Headwinds:** Protectionist trends in the West and "China+1" competition require India to maintain high "Zero Defect, Zero Effect" standards to remain competitive.

Conclusion

India's current trajectory reflects a holistic "Grand Strategy" where trade policy, fiscal planning, and national security are no longer siloed. By leveraging political stability and a massive consumer base, India is effectively repositioning itself from a rule-taker to a rule-shaper in the global order. For the vision of Viksit Bharat @2047 to materialize, the private sector must now transition from a domestic-centric approach to a "globally integrated" mindset, matching the government's "preparedness with inspiration."

UPSC Prelims Exam Practice Question

Ques: The term "Zero Defect, Zero Effect" refers to:

(a) India's fiscal consolidation policy

(b) Quality manufacturing with minimal environmental impact

(c) Defence indigenisation framework

(d) Export subsidy regime

Ans : b)

UPSC Mains Exam Practice Question

Ques: Discuss how India-EU and India-US trade negotiations reflect India's evolving trade diplomacy in a multipolar world order. **(250 words)**

Page 06 : GS III : Indian Economy / Prelims Exam

Recently, NLC India Ltd. (NLCIL) signed a Memorandum of Understanding (MoU) with National Aluminium Company Limited (NALCO) to collaborate on the development of thermal and renewable energy projects. The agreement includes a proposed 1,200 MW Thermal Captive Power Project and renewable energy initiatives. This development is significant in the context of India's energy transition, industrial growth, and public sector synergy.

NLCIL signs MoU on thermal, renewable energy projects

NLC India Ltd. (NLCIL) has inked a memorandum of understanding with National Aluminium Company (NALCO), a Navaratna Central Public Enterprise (CPSE) under the Ministry of Mines, to strengthen collaboration in the development of thermal and renewable energy projects. The MoU was signed in the presence of NLCIL Chairman and Managing Director Prasanna Kumar Motupalli, and Director (Projects and Technical), NALCO, Jagdish Arora. According to the NLCIL, the MoU provides a structured framework for cooperation in the proposed 1,200 MW Thermal Captive Power Project and renewable energy development.

Background

NLCIL operates under the Ministry of Coal and is engaged in lignite mining and power generation.

NALCO, under the Ministry of Mines, is a major aluminium producer.

Both are Navratna CPSEs, enjoying operational and financial autonomy.

Aluminium production is highly energy-intensive, requiring stable and affordable power supply.

Key Features of the MoU

Thermal Captive Power Project (1,200 MW)

Dedicated power supply to NALCO's aluminium smelters.

Ensures energy security and cost optimization.

Renewable Energy Development

Exploration of solar, wind, and hybrid energy projects.

Supports India's commitment to green energy transition.

Structured Framework of Cooperation

Technical collaboration.

Project planning, financing, and implementation mechanisms.

Significance for India

Energy Security for Strategic Industries: Aluminium is a core sector for infrastructure, defence, and electric mobility. Reliable power supply ensures competitiveness in global markets.

Boost to Atmanirbhar Bharat: Collaboration between CPSEs strengthens domestic industrial capacity and reduces dependence on energy imports.

Alignment with Climate Commitments: While thermal energy ensures base-load stability, renewable integration supports India's Nationally Determined Contributions (NDCs) under the Paris Agreement.

CPSE Synergy Model: Demonstrates horizontal integration among public enterprises, improving efficiency and asset utilization.

Challenges

Environmental concerns associated with thermal power.

Land acquisition and regulatory clearances.

Financing large-scale infrastructure projects.

Balancing coal-based power with decarbonisation goals.

Way Forward

Adoption of supercritical/ultra-supercritical technology to reduce emissions.

Integration of renewable energy with storage solutions.

Gradual transition towards green hydrogen in aluminium production.

Transparent environmental compliance mechanisms.

Conclusion

The MoU between NLCIL and NALCO represents more than an industrial agreement; it reflects India's strategic approach to ensuring energy security while navigating the clean energy transition. By combining thermal stability with renewable expansion, the collaboration could strengthen core industries, enhance CPSE efficiency, and contribute to sustainable economic growth.

UPSC Prelims Exam Practice Question

Ques: Which of the following industries is most energy-intensive in India?

(a) Textile

(b) Aluminium

(c) Pharmaceuticals

(d) IT Services

Ans: (b)

UPSC Mains Exam Practice Question

Ques: Examine the significance of collaboration among Central Public Sector Enterprises (CPSEs) in strengthening India's industrial and energy ecosystem. **(250 words)**

Page 06 : Prelims Exam

Debris bearing the ISRO logo and the National Emblem was reportedly found on an uninhabited island near L. Kunahandhoo in the Maldives. It is suspected to be part of the payload fairing (PLF) of the LVM3-M6 mission launched in December 2025. ISRO has not officially confirmed the origin of the debris. The event highlights issues related to launch vehicle stages, space debris, and international maritime concerns.

Launch vehicle debris with ISRO logo, National Emblem found on Maldives island

The Hindu Bureau
BENGALURU

The debris from a launch vehicle bearing the Indian Space Research Organisation (ISRO) logo and the National Emblem has reportedly been found recently on an uninhabited island in the Maldives.

The debris of the payload fairing, believed to be from the ISRO's Launch Vehicle Mark-3 (LVM-3), washed up on an island near L. Kunahandhoo in the Maldives and was found on February 12.

A website which tracks Indian spaceflight and aerospace developments said on X that the debris was likely from the LVM3-M6 mission.

"A PLF [payload fairing] has washed up on an uninhabited island near L. Kunahandhoo, #maldives (found February 12, 2026). The @isro logo's position below the national emblem suggests it is likely from the LVM3-M6 launch. This follows a similar recovery on December 28, 2025, in Sri Lanka (Trincomalee), which also appeared to be from the same mission," the website indianspaceflight.in posted on X.

The debris could be from the LVM3-M6 mission, says website that tracks Indian spaceflight.

On December 19, 2025, the ISRO launched the LVM3-M6/BlueBird Block-2 Mission, a dedicated commercial mission aboard the LVM3 launch vehicle.

During the mission, it successfully launched the BlueBird Block-2 satellite of AST SpaceMobile, U.S., and on November 2 the space agency used the LVM-3 to launch the CMS-03 communication satellite.

The LVM3 is the heaviest rocket developed by the ISRO and is a three-stage launch vehicle comprising two solid strap-on motors, a liquid core stage, and a cryogenic upper stage. The ISRO is yet to confirm whether the debris is from an Indian launch vehicle.

Key Facts for Prelims

About LVM3 (Launch Vehicle Mark-3)

Formerly called GSLV Mk-III.

Heaviest rocket developed by ISRO.

Three-stage vehicle:

Two solid strap-on boosters (S200)

Liquid core stage (L110)

Cryogenic upper stage (C25)

Used for:

Heavy communication satellites

Commercial launches

Gaganyaan mission

Payload Fairing (PLF)

Protects satellite during atmospheric flight.

Jettisoned after exiting dense atmosphere.

Falls into designated ocean drop zones.

LVM3-M6 Mission (December 2025)

Commercial mission.

Launched BlueBird Block-2 satellite of AST SpaceMobile (USA).

Previous debris from same mission reportedly found in Sri Lanka (Dec 2025).

Important Concepts for UPSC

Space Debris vs Rocket Debris: Rocket stages and fairings are planned re-entries; space debris refers mainly to non-functional satellites/fragments in orbit.

Liability Convention (1972): Under international space law, launching states are liable for damage caused by space objects.

India's Space Policy 2023: Promotes commercial launches and private participation.

Strategic Importance of Maldives: Located in the Indian Ocean Region (IOR), important for India's maritime diplomacy and SAGAR doctrine.

Conclusion

The discovery of suspected LVM3 debris in the Maldives underscores India's growing space launch footprint and raises awareness about post-launch stage recovery and international liability norms. For UPSC Prelims, the issue is significant from the perspective of space technology, international space law, and India's strategic presence in the Indian Ocean Region.

UPSC Prelims Exam Practice Question

Ques: The term "Payload Fairing" in a launch vehicle refers to:

(a) The propulsion system of the upper stage

(b) The protective covering around the satellite during atmospheric flight

(c) The navigation control unit of the rocket

(d) The heat shield used during re-entry

Ans: b)

Page 07 : Prelims Exam

In February 2026, astronomers using the European Space Agency's (ESA) Cheops (CHaracterising ExOPlanet Satellite) telescope announced the discovery of a unique planetary system around the star LHS 1903. Located 117 light-years away, this system challenges the "Standard Model" of planet formation by featuring a rocky planet orbiting beyond its gaseous neighbors—a configuration often referred to as an "inside-out" system.

The LHS 1903 System: Key Components

The Host Star: A Red Dwarf (M-dwarf), which is smaller (50% Sun's mass), cooler, and dimmer (5% Sun's luminosity) than our Sun. Red dwarfs are the most common type of stars in the Milky Way.

The Planetary Architecture: The system consists of four planets arranged in a sequence that breaks the typical "rocky-inner, gaseous-outer" rule:

Planet 1 (Innermost): Rocky (Super-Earth).

Planets 2 & 3: Gaseous (Mini-Neptunes).

Planet 4 (Outermost): Rocky (Super-Earth)—the "anomaly."

Why This Challenges Current Theories

The Standard Theory: Usually, intense stellar radiation near a star strips away gases, leaving rocky cores (like Mercury or Earth). Further out, beyond the "Snow Line," cooler temperatures allow planets to accumulate massive gas envelopes (like Jupiter or Neptune).

WHAT IS IT?

LHS 1903: a strange system

Reuters

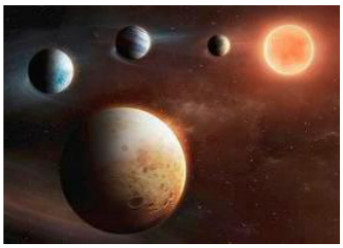
Astronomers have observed a planetary system that challenges current planet formation theories, with a rocky planet that formed beyond the orbits of its gaseous neighbors, possibly after much of the planet-forming material had been used up.

The system, observed using the European Space Agency's Cheops space telescope, consists of four planets, two rocky and two gaseous, orbiting a relatively small and dim star called a red dwarf about 117 light-years from the earth. The star, named LHS 1903, is about 50% as massive and 5% as luminous as our sun. The innermost planet is rocky, the next two are gaseous and the fourth, which current planetary formation theory suggests should be gaseous, is rocky.

The two rocky planets are superearths, meaning rocky like the earth but two to ten times more massive. The two gas planets are categorised as mini-Neptunes: gaseous and smaller than Neptune but larger than the earth.

The researchers suspect that rather than forming all at once in a large disk of gas and dust swirling around their host star, the system's planets formed in series, with gas that otherwise would have made up the atmosphere of the fourth planet being used up by its sibling planets before it coalesced. Another possibility is that the planet was born with a gaseous atmosphere that later was lost in a calamity, leaving behind just the rocky planetary core.

This fourth planet also is interesting because its surface temperature is 60° C, which means it could be habitable.



An artist's impression of the LHS 1903 planetary system. REUTERS

For feedback and suggestions for 'Science', please write to **science@thehindu.co.in** with the subject 'Daily page'

The LHS 1903 Deviation: The fourth planet is rocky despite being in a zone where gas giants should form.

Proposed Explanations:

Sequential Formation: Unlike our solar system where planets likely formed simultaneously, these may have formed one after another. By the time the fourth planet coalesced, the protoplanetary disk was already gas-depleted.

Atmospheric Loss: A catastrophic event (like a massive collision) might have stripped the fourth planet of an original gaseous atmosphere.

Potential Habitability

The fourth rocky planet (LHS 1903e) is of particular interest because its estimated surface temperature is 60°C. In the context of M-dwarf systems, this places it near the "habitable zone" where liquid water could potentially exist, making it a prime candidate for future atmospheric studies by the James Webb Space Telescope (JWST).

Associated Space Missions

CHEOPS (ESA): Launched in 2019, its primary mission is to measure the sizes of known exoplanets with high precision to determine their density and composition.

TESS (NASA): The Transiting Exoplanet Survey Satellite, which initially flagged the LHS 1903 system for follow-up study.

Quick Facts for UPSC Prelims

Term	Definition/Detail
Super-Earth	A planet with a mass higher than Earth's but substantially below those of the local ice giants, Uranus and Neptune.
Mini-Neptune	A planet smaller than Neptune but larger than Earth, possessing a thick hydrogen-helium atmosphere.
Snow Line	The particular distance in a solar nebula from the central protostar where it is cold enough for volatile compounds to condense into solid ice grains.

Conclusion

The LHS 1903 system serves as a "cosmic laboratory" that proves planetary formation is far more diverse than the template provided by our own Solar System. For UPSC aspirants, this highlights the importance of Red Dwarf systems in the search for habitable worlds and the role of international collaboration (ESA-NASA) in advancing space situational awareness.

UPSC Prelims Exam Practice Question

Ques: With reference to the 'LVM3' (Launch Vehicle Mark-3), consider the following statements:

1. It is a three-stage launch vehicle consisting of solid, liquid, and cryogenic stages.

2. It is primarily designed to launch heavy satellites into Geostationary Transfer Orbit (GTO).

3. The LVM3-M6 mission was a dedicated commercial mission for NewSpace India Limited (NSIL).

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

Ans: d)

Page 10 : GS III: Environment

In August 2024, the Union Cabinet approved the BioE3 Policy (Biotechnology for Economy, Environment, and Employment), identifying bio-based chemicals and enzymes as a strategic thematic area. As India targets a $300 billion bioeconomy by 2030 and $1.2 trillion by 2047, transitioning from petroleum-based industrial inputs to biological alternatives has become a national priority for achieving Net Zero goals and Atmanirbhar Bharat.

What are bio-based chemicals and enzymes?

How is India positioned with respect to scaling bio-based chemicals and enzymes?

Shambhavi Naik

The story so far:

Bio-based chemicals are industrial chemicals produced using biological feedstocks like sugarcane, corn, starch, or biomass residues, often through fermentation or enzymatic processes. Examples include organic acids (such as lactic acid), bio-alcohols, solvents, surfactants, and intermediates used in plastics, cosmetics, and pharmaceuticals. Enzymes are biological catalysts widely used in detergents, food processing, pharmaceuticals, textiles, pulp and paper, and increasingly in biomanufacturing. Enzymes often work at lower temperatures and pressures, reducing energy use and emissions.

Why does India need such chemicals?

India has strong fundamentals for scaling bio-based chemicals and enzymes: a large agricultural base, deep expertise in fermentation from pharmaceuticals and vaccines, and a growing manufacturing sector. Expanding this space could reduce import dependence on petrochemicals, create new markets for agricultural produce, and position India as a competitive supplier of sustainable industrial inputs. For example, India imported roughly $479.8 million worth of acetic acid in 2023.

Where does India stand today?

India has prioritised bio-based chemicals and enzymes as a priority area under the Department of Biotechnology's BioE3 policy. In the bio-based chemicals segment, companies such as Praj Industries and Godrej Industries are leading. Other firms such as Godavari Biorefineries are pioneering ethanol-based, bio-derived chemicals in India, while Jubilant Ingrevia produces "acetyls" intermediates (for example, acetic anhydride/ethyl acetate). Emerging companies such as StringBio are using novel microbial strategies to develop such chemicals. The India enzymes market is consolidated in nature with top players accounting for more than 75% of the market share. Companies such as Novozymes India, DuPont, DSM, Advance Enzyme Technologies, BASF SE, and Ultreze Enzymes Private Limited are key players in the Indian market.

What are other countries doing?

The EU Bioeconomy Strategy and Action Plan provides coordinated support for bio-based chemicals as part of circular bioeconomy goals. It links industrial transformation to climate goals, waste reduction, and sustainable growth. In the U.S., the USDA BioPreferred Program mandates federal procurement preference for certified bio-based products, including chemicals and enzymes, creating early markets for producers. China's bioeconomy development plans explicitly prioritise high-value bio-based chemicals and enzyme technologies as strategic sectors. In Japan, priority projects funded through METI/NARO integrate bio-based chemical research with manufacturing readiness.

What are the risks?

A key risk in developing the bio-based chemicals sector is the comparative cost of bio-based products relative to petrochemical alternatives. While this cost disadvantage may be temporary and limited to early stages of scale-up, it nonetheless creates a significant entry barrier for private investment. A second risk relates to the availability of reliable feedstocks and supporting infrastructure required to produce different categories of bio-based chemicals at scale. A third challenge lies in market adoption – specifically, whether bio-based chemicals can seamlessly substitute existing inputs in manufacturing pipelines and whether downstream manufacturers are willing to switch, even when costs are comparable.

Scaling shared biomanufacturing infrastructure – such as biofoundries, pilot plants, and demonstration facilities under BioE3 – can reduce capital risk for firms. Clear standards, certification, and procurement policies can help create build investor confidence.

The author is chairperson, Takshashila Institution's Health & Life Sciences Policy.

THE GIST

- India has prioritised bio-based chemicals and enzymes as a priority area under the Department of Biotechnology's BioE3 policy.
- The India enzymes market is consolidated in nature with top players accounting for more than 75% of the market share.
- A key risk in developing the bio-based chemicals sector is the comparative cost of bio-based products relative to petrochemical alternatives.

Core Definitions: Bio-based Chemicals and Enzymes

Bio-based Chemicals: These are industrial substances derived from renewable biological feedstocks (biomass, agricultural residues, corn, or sugarcane) instead of fossil fuels.

Enzymes: These are biological catalysts (mostly proteins) that speed up chemical reactions. In industry, they allow processes to happen at lower temperatures and pressures, significantly reducing energy consumption.

India's Strategic Positioning and Strengths

India is uniquely positioned to lead this sector due to several fundamental advantages:

Raw Material Abundance: India is one of the world's largest producers of sugarcane, rice, and wheat, providing a massive base of **agricultural residues and biomass**.

Existing Expertise: Decades of leadership in the **pharmaceutical and vaccine sectors** have created a deep pool of expertise in **fermentation technology**, which is the backbone of producing bio-chemicals.

Policy Support: The **BioE3 Policy** and the **Bio-RIDE scheme** (with an outlay of ₹9,197 crore) provide the institutional framework for R&D and biomanufacturing hubs.

Economic Drivers: India imports nearly **$480 million worth of acetic acid** annually. Scaling domestic bio-based production can save significant foreign exchange and reduce "import addiction."

Key Challenges to Scaling

Challenge	Impact on Industry
Cost Disadvantage	Bio-based products currently cost more than mass-produced petrochemical alternatives.
The "Valley of Death"	A gap in late-stage funding (Series B/C) makes it difficult for startups to move from the lab to commercial-scale production.
Infrastructure Gap	A lack of shared "Biofoundries" and industrial-scale fermentation tanks forces firms to outsource manufacturing.
Feedstock Logistics	Ensuring a steady, year-round supply of biomass across different geographies remains a logistical hurdle.

Global Context: How Other Nations Compare

USA: Uses the **USDA BioPreferred Program** to mandate federal procurement of bio-based products, creating a guaranteed "early market."

European Union: Its **Bioeconomy Strategy** links climate goals directly to industrial transformation through circular economy mandates.

China: Focuses on high-value specialty chemicals and has a robust IPO pipeline for biotech firms, providing deep capital access.

Quick Facts for UPSC Prelims

BioE3 Policy: Stands for **Biotechnology for Economy, Environment, and Employment**.

Biofoundries: Multi-disciplinary facilities that integrate biology with engineering to automate the design and testing of biological systems.

Current Contribution: The bioeconomy contributes approximately **4.25% to India's GDP** (as of 2024-25).

Bio-RIDE Scheme: Merges existing R&D and entrepreneurship programs of the Department of Biotechnology (DBT).

Conclusion

India's transition toward bio-based chemicals is not merely an environmental choice but a strategic economic imperative. To move from being the "Pharmacy of the World" to the "Biomanufacturing Hub of the World," India must bridge the infrastructure

gap through Biofoundries and implement procurement policies (similar to the US) that favor sustainable products. Success in this sector will directly contribute to India's LiFE (Lifestyle for Environment) mission and its 2070 Net Zero commitment.

UPSC Mains Exam Practice Question

Ques: The BioE3 Policy marks a strategic shift in India's bioeconomy from research-led biotechnology to industrial-scale biomanufacturing. Examine India's preparedness to scale bio-based chemicals and enzymes, highlighting opportunities and challenges. **(250 words)**

The UAE-India corridor is sparking a growth story

Badr Jafar

is Special Envoy of the United Arab Emirates Foreign Minister for Business and Philanthropy

The UAE-India corridor is driving growth, technology and strategic global expansion

Something remarkable has happened in the economic relationship between India and the United Arab Emirates (UAE). When the Comprehensive Economic Partnership Agreement (CEPA) was signed in 2022, both sides had set a target of $100 billion in bilateral trade by 2030. That milestone was reached five years ahead of schedule. In January this year, leaders set a new target of $200 billion by 2032. Few economic corridors in the world today are moving with the speed and ambition of this one.

The scale and direction

The numbers tell part of the story. Non-oil trade between the two countries grew nearly 20% last year to reach $65 billion, demonstrating that this partnership has moved well beyond its energy origins. UAE entities have invested over $22 billion into India since 2000, while Indian companies have invested more than $16 billion into the UAE. Nearly five million Indian nationals live and work in the Emirates, forming its largest diaspora community and the human backbone of a corridor that now supports over 1,200 flights a week between the two countries – one of the busiest air routes on earth.

But what excites the most is not just the scale. It is the direction. This corridor is being reshaped by advanced manufacturing, financial services, technology, and logistics. Reliance Industries has partnered with TA'ZIZ on a $2 billion-plus investment in low-carbon chemicals manufacturing in Abu Dhabi. Ashok Leyland has relocated its electric bus production from the United Kingdom to the UAE. Larsen & Toubro has been selected as preferred contractor for one of the world's most ambitious solar-plus-storage projects in Abu Dhabi. Indian banks, technology firms, and health-care companies are building real operational presence across the Emirates. These are not tentative first steps. They are confident long-term industrial commitments.

Investment is flowing with equal conviction in the other direction. DP World has committed an additional $5 billion to Indian infrastructure, expanding its already extensive network of ports and logistics parks across the country. Emirates NBD's acquisition of a majority stake in RBL Bank represents the largest single foreign direct investment in Indian banking history. ADNOC has signed long-term LNG supply agreements with Indian Oil Corporation Ltd and Hindustan Petroleum Corporation Limited worth billions of dollars. Mubadala has deployed over $4 billion across Indian health care, renewables, and technology platforms. Abu Dhabi Investment Authority became the first sovereign wealth fund to establish a base in India's GIFT City.

It is for the long term

What underpins all of this is trust built over decades, reinforced by human connections, and supported by a policy architecture – the CEPA, which eliminated tariffs on roughly 90% of tariff lines, the 2024 Bilateral Investment Treaty, and now a strategic defence partnership - that gives businesses the certainty to make long-term bets.

The ambition is now extending into third markets. Bharat Mart, currently under construction in the UAE, will serve as a wholesale hub for Indian goods targeting Africa, West Asia and Eurasia, aiming to help double India's exports to these regions. India and the UAE are also exploring joint digital infrastructure and capacity-building initiatives across Africa. The corridor is becoming a platform not just for bilateral exchange but also for global reach.

Artificial intelligence (AI) is emerging as the next major frontier for this corridor. India this week hosts the AI Impact Summit in New Delhi (February 16-20, 2026) – the first global AI summit held in the Global South. It is a powerful statement of India's growing role in shaping how this technology develops and is governed. The UAE, which appointed the world's first Minister of State for AI back in 2017 and has invested heavily in AI infrastructure and research ever since, is a natural partner in this space. The UAE and India are already exploring cooperation on advanced computing capacity, data centres, and AI-driven innovation. In a technology that will reshape every sector of every economy, the countries that lead will not be those that build fastest alone, but those that build the smartest partnerships.

The next chapter

India's global moment is here. As the world's fourth-largest economy, with GDP at around $4 trillion, it is powered by entrepreneurial energy, manufacturing ambition, and digital infrastructure that are genuinely world-class. In conversations with Indian business leaders, there is one theme that is coming through consistently: the appetite to scale internationally has never been stronger. The question is no longer whether Indian enterprise will go global, but how effectively the right corridors can accelerate that journey.

This is also part of a wider realignment. The recent Delhi Declaration between India and Arab Foreign Ministers outlined an ambitious programme of cooperation across politics, economy, energy, technology, and security through 2028. The India-UAE corridor is at the vanguard of that broader convergence.

The UAE and India are demonstrating what becomes possible when two countries align policy, capital, and execution around a shared vision. The first $100 billion came faster than anyone expected. The next chapter will be defined not by the numbers alone, but by how deeply their economies integrate – and how far that integration reaches.

GS Paper II : International Relations

UPSC Mains Practice Question: The India–UAE relationship has evolved from a transactional energy partnership into a comprehensive strategic corridor encompassing trade, technology, and security. Analyse the drivers of this transformation and examine its significance for India's foreign policy. **(250 Words)**

Context :

The India-UAE relationship has undergone a paradigm shift, evolving from a buyer-seller energy dynamic into a Comprehensive Strategic Partnership. With the early achievement of the $100 billion trade target (reached in FY 2024-25, five years ahead of the 2030 schedule), both nations have set a bold new target of $200 billion by 2032. This corridor is now characterized by deep institutional integration, high-technology collaboration, and a shared vision for the Global South.

1. Economic Pillars: CEPA and the BIT

Comprehensive Economic Partnership Agreement (CEPA - 2022): The bedrock of the current boom, CEPA eliminated or reduced tariffs on 90% of goods, significantly boosting non-oil trade (reaching $65 billion).

Bilateral Investment Treaty (BIT - 2024): Effective as of August 2024, this treaty replaced the older BIPPA.

Key Innovation: It includes portfolio investments (stocks/bonds) and uses an "enterprise-based" definition of investment, offering stronger protection for investors.

Dispute Settlement: It mandates a 3-year exhaustion of local remedies before moving to international arbitration, balancing investor protection with state sovereignty.

Bharat Mart: A massive 2.7 million sq. ft. distribution hub under construction in Jebel Ali, Dubai. It acts as a "gateway" for Indian MSMEs to export products efficiently to Africa, West Asia, and Eurasia.

2. The New Frontier: AI and Digital Infrastructure

The hosting of the **AI Impact Summit** in New Delhi (February 2026) marks a milestone for the Global South.

Supercomputing Cluster: India and the UAE (via G42 and C-DAC) are co-developing a supercomputing cluster in India to boost "sovereign AI" capabilities.

Digital Infrastructure: Cooperation includes data centers and "digital embassies," leveraging the UAE's capital and India's vast tech talent pool.

Human-Centric AI: Both nations are advocating for a global roadmap that emphasizes ethical governance, inclusivity, and the use of AI for social welfare (e.g., healthcare and agriculture).

3. Strategic and Energy Convergence

Strategic Defence Partnership (2026): A recent Letter of Intent (LoI) moves the relationship from joint exercises to **joint defense manufacturing** and technology transfer.

Energy Security: Transitioning from "transactional crude" to long-term stability. A landmark 10-year LNG pact was signed in 2026 (ADNOC-HPCL), while cooperation in civil nuclear energy (Small Modular Reactors) is expanding.

Delhi Declaration (2026): Reaffirmed after a 10-year hiatus, this declaration with the Arab League (co-chaired by India and UAE) aligns positions on maritime security in the Red Sea and the creation of a sovereign Palestinian state.

Quick Facts for UPSC Prelims

Feature	Details
New Trade Target	$200 Billion by 2032
Largest Diaspora	~3.5 to 4.3 million Indians in the UAE

Feature	Details
Key Port Project	DP World's $5 billion commitment to Indian infra
Financial Linkage	Integration of UPI (India) with AANI (UAE); RuPay with JAYWAN
Strategic Gateway	IMEC (India-Middle East-Europe Economic Corridor)

Conclusion

The India-UAE corridor is no longer just about "oil and labor." It has become a sophisticated platform for multimodal logistics (Bharat Mart), energy security (LNG and Nuclear), and frontier technology (AI). For India, the UAE serves as the primary gateway to the West and Africa; for the UAE, India represents a $4 trillion economy and a critical partner in its post-oil diversification strategy. This "smart partnership" is set to redefine economic norms for the Global South.