ISSN 2320-0758

PRICE ₹ 50/-

MATERIALS MANAGEMENT REVIEW

Volume 23 - Issue 1 | Date of Publication: 1-11-2026 | No. of Pages 1-60 | November 2026

IFPSM WORLD SUMMIT 2026

International Federation of Purchasing and Supply Management

Venue: Peninsula Resort, Ghana | 12–18 October 2026

Theme: "Integrated Supply Chain Management – The Panacea for Global Sustainable Growth and Development"



The summit commenced on 12 October 2026 with a prestigious inaugural session, graced by eminent international and national dignitaries, industry leaders and distinguished professionals from the supply chain management fraternity. The gathering marked the beginning of an enriching platform for global collaboration, knowledge sharing and discussions on emerging trends and future opportunities in supply chain management.

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From the Desk of National President & Editor in Chief



Greetings from your National President!!!

Dear All Members of IIMM,

As India's supply chain ecosystem moves towards greater digitalisation, the question is no longer whether businesses should adopt AI and ML, but how effectively they can integrate these technologies into their existing operations. Technology is rapidly becoming a competitive necessity, influencing how organisations plan, procure, manufacture, store, transport and deliver products. However, the true measure of successful digital transformation will not be the number of technologies implemented or the level of automation achieved, but the tangible business value they create.

India's supply chain environment is unique in its complexity and diversity. The coexistence of large organised enterprises, MSMEs, regional distributors, independent transport operators and traditional retail networks means that a uniform technology-driven approach may not work for everyone. While large organisations may have the resources to invest in advanced AI platforms and automated operations, smaller businesses need affordable, scalable and practical solutions that address their immediate operational challenges. Therefore, the focus must be on inclusive digital transformation, ensuring that technology bridges existing gaps rather than creating new ones.

Equally important is recognising that AI and ML, despite their growing capabilities, are enablers of better decision-making and not substitutes for human intelligence. Algorithms can analyse millions of data points, identify patterns, predict demand and recommend optimal courses of action. Yet, understanding local market behaviour, managing supplier relationships, negotiating commercial terms, responding to unexpected disruptions and making decisions in uncertain situations require human experience, judgement and adaptability. In a country as diverse as India, where ground-level realities can change significantly across regions, this human element becomes even more valuable.

Going forward, organisations must move beyond the mindset of technology adoption for the sake of digitalisation and embrace a more purposeful approach. Investments in AI and ML should be aligned with clearly defined business objectives, supported by reliable data, robust processes, skilled people and resilient technology infrastructure. Equally, organisations must build a culture in which employees are encouraged to understand, question and intelligently use technology rather than blindly follow system-generated recommendations. The objective should be to create a workforce that is empowered by technology, not overwhelmed or replaced by it.

Another critical consideration will be the ability to maintain resilience in an increasingly interconnected digital ecosystem. As supply chains become more dependent on technology, issues relating to cybersecurity, data privacy, system failures and platform dependency will require greater attention. Businesses must ensure that their digital capabilities are complemented by contingency planning, alternative operating mechanisms and the flexibility to respond when technology does not perform as expected.

Ultimately, the future of India's supply chain will belong to organisations that can successfully combine technological intelligence with human wisdom. The winners will not necessarily be those with the most sophisticated systems, but those that know when to automate, when to analyse and, most importantly, when to rely on human judgement. AI and ML can make supply chains faster, smarter and more predictive, but it is people who provide direction, accountability, relationships and the ability to navigate complexity.

India does not need supply chains that are merely technology-driven; it needs supply chains that are technology-enabled, people-empowered and business-focused. The real transformation will happen when technology becomes a natural extension of human capability rather than a replacement for it.

The winning formula for India's modern supply chain is therefore simple yet powerful: **Let AI provide the intelligence, let humans provide the wisdom, let technology enable the transformation, and let business outcomes define success**

P.M. BIDDAPPA
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MATERIALS MANAGEMENT REVIEW

Volume 23 - Issue 1 (November 2026)

CONTENTS

PAGE NO.

- REPORT ON THE IFPSM WORLD SUMMIT 2026 5
- COMPETE IN THE MARKET, COLLABORATE IN THE SUPPLY CHAIN 11
- AI AND HUMAN TOUCH IN SUPPLY CHAINS: FROM AUTOMATION TO COLLABORATION 15
- THE INTEGRATED 6 IS ONION ANALYSIS & 6 PS FRAMEWORK FROM PURPOSE TO MEASURABLE PROJECT IMPACT 18
- BRICS LOGISTIC SUPPLY CHAIN COOPERATION FRAMEWORK 22
- INDIA'S RAPID RENEWABLES GROWTH IS STRENGTHENING ITS ROLE IN GLOBAL ENERGY MARKETS, IEA REPORT FINDS 24
- CONTAINER MANUFACTURING PROMOTION SCHEME INDIA S 10,000-CRORE CATALYST FOR CONTAINER MANUFACTURING 26
- MANUFACTURING MOMENTUM: BUILDING A SELF-RELIANT INDIA 28
- INDIA, EU DISCUSS FTA IMPLEMENTATION, CUSTOMS COOPERATION AND MARKET ACCESS IN BRUSSELS 32
- INVESTMENTS IN RENEWABLE ENERGY HELPED INDIA AVERT ENERGY CRISIS AMID WEST ASIA WAR, SAYS PM MODI 33
- WILL SUPPLY CHAIN BE REPLACED BY AI? WHAT STUDENTS NEED TO KNOW IN 2026 34
- INDIAS JAVELIN DEAL: THE UNENDING LOOP OF PROCUREMENT 38
- HOW AI IS SHIFTING GLOBAL SUPPLY CHAINS FROM REACTIVE TO PREDICTIVE 40
- PROCUREMENT REFORMS IN INDIA: TRANSFORMING THE PUBLIC SECTOR FROM COMPLIANCE TO INNOVATION 42
- QUALITY INFRASTRUCTURE, CLEAN ENERGY AND CONSUMER SAFETY TAKE CENTRE STAGE AT THE NATIONAL CELEBRATION OF WORLD STANDARDS DAY 2026 44
- SUPPLY CHAIN DISRUPTIONS: HOW THEY HAPPEN, INDUSTRIES AFFECTED, AND HOW TO MANAGE 46
- SUPPLY CHAIN INNOVATION 2026: A MANDATE FOR CREATIVITY AND CHANGE 49
- THE TOP 10 SUPPLY CHAIN RISKS OF 2026 AND HOW TO MITIGATE THEM 44
- BRANCH NEWS 49

NO. OF PAGES 1-60

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Printed at : Power Printers,
4249/82, 2 Ansari Road, Daryaganj,
New Delhi - 110002

IFPSM

IIMM is a charter member of International Federation of Purchasing & Supply Management

Edited, Printed & Published by :
INDIAN INSTITUTE OF MATERIALS MANAGEMENT
4598/12 B, Ist Floor, Ansari Road, Darya Ganj, New Delhi - 110 002.
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(Published material has been compiled from several sources, IIMM disowns any responsibility for the use of any information from the Magazine if published anywhere by anyone.)

REPORT ON THE IFPSM WORLD SUMMIT 2026

INTERNATIONAL FEDERATION OF PURCHASING AND SUPPLY MANAGEMENT

VENUE: PENINSULA RESORT, GHANA, 12–18 OCTOBER 2026

Theme: "Integrated Supply Chain Management – The Panacea for Global Sustainable Growth and Development"

Participating Office Bearers:

Mr. L. P. Patel – Senior Delegate to IFPSM

Mr. Surender Sharma – Alternate delegate to IFPSM

Mr. P. M. Biddappa – National President, IIMM

Dr. Suresh Sharma – former national President and Co-Chairman, BOS, IIMM

Introduction : The International Federation of Purchasing and Supply Management (IFPSM) World Summit was organized at Peninsula Resort, Ghana, from 12 to 18 October 2026. The summit brought together distinguished academicians, supply chain professionals, industry experts, and representatives of professional associations from different parts of the world.

The summit was organized around the theme, "Integrated Supply Chain Management – The Panacea for Global Sustainable Growth and Development." The theme was particularly relevant in the present global business environment, characterized by geopolitical uncertainties, technological transformation, environmental challenges, changing manufacturing patterns, and increasing demands for resilient and sustainable supply chains.

The participation from IIMM at such global platform provides an important opportunity to exchange professional knowledge, understand international developments, establish connections with global experts, and explore avenues for strengthening India's contribution to the purchasing, materials management, procurement, logistics, and supply chain management professions.

The summit served as a valuable platform for discussing how integrated supply chain strategies can contribute to economic development, environmental sustainability, technological advancement, and international cooperation.

2. Inaugural Ceremony and Opening Remarks

The summit commenced on 12 October 2026 with an inaugural session attended by prominent international and national representatives of the supply chain management profession.

The opening remarks were delivered by the following dignitaries:

Mr. Cai Jin, International President of IFPSM, Mr. Ruchard, Ashante.

The President of the Supply Chain Association of Ghana.

Ms. Marina Lindic, Chief Executive Officer of IFPSM, Finland.

The speakers emphasized the importance of strengthening international cooperation, promoting professional excellence, and developing integrated supply chain management practices to meet emerging global challenges.

The inaugural session established the intellectual direction of the summit by highlighting the need to move beyond traditional purchasing and logistics functions towards a comprehensive approach encompassing sourcing, procurement, manufacturing, transportation, distribution, technology, sustainability, and end-to-end supply chain integration.

The discussions also reinforced the importance of collaboration between educational institutions, professional associations, governments, and industry in preparing supply chain professionals for a rapidly changing global economy.

Calendar of Events

Monday, 12th October 2026: Asia Pacific meeting - Board meeting – Council meeting.

Day started with Regional meeting (For us Asis Pacific meeting) from 9.00 to 11.00 AM. Ms. Marina Lindic, Secretary General, Regional Chairperson, Mr. Steev Lai of Taiwan and many delegates from various parts of Asia Pacific participated focusing on growth of IFPSM with the intention to add more member countries from the region.

Arranging World summit from Asia Pacific region in the coming years was discussed. All participants expressed regarding progress in SCM profession in India.

Next, the Board meeting was held from 11.30 AM to 2.30 PM, discussing mainly on Policy issues by the Board members and following issues are highlighted:

World Summit for 2027, 2018, 2029, 2030 & 2031

2027 – Turkey will be hosting the summit and the Flag was handed over by CISCM, Ghana to the team of Turkey

2028 – It was almost finalized that Canada Association shall host the summit

2029 – One of the two countries either Philippines or Thailand shall host the summit and voting will be exercised shortly to decide and finalize one of the

countries

2030 & 2031 – The proposal from countries is expected in the coming years .

There were discussions on the Global standards and PAS. From India side, we mentioned that India was the first to get Global award for two important and recognized course namely, GDMM (Graduate Diploma in Materials Management) and DSCM (Diploma in Supply Chain Management) Renewal for GDMM was not considered since IIMM has two AICTE approved Post Graduation courses (PGDMM & PGDL&SCM)

Then Council meeting was held between 4.00 PM and 6.00 PM. Senior delegates, Alternate delegates and all other delegates participated in this meeting. Mr. Cai Jin, International President and Secretary General and other regional chairs took part in discussions on various agenda points and some of the main points discussed are as below:

1) Membership Development''
2) GS &PAS status updates and GS Board enlargement
3) Engagement with Government policy making
4) Networking amongst member associates
5) World Summits 2027, 2028, 2029, 2030 & 2031
6) Collaboration with Academia updates

Tuesday, 13th October 2026 – Opening Session and Professional Summit

Opening Session from 8.00 AM to 11.30 AM

Professional Summit – 11:30 hours to 17:30 hours

Professionals SummitTheme:
"Progressive Supply Chain Management and Practices for Global Sustainable Worth

11.30 – 11.45	Global Supply Chain Outlook 2025 - 2035	Dr. Otuko John-Teye
11.45 - 12.00	Components of Integrated Supply Chain Management	Dr. Emmanuel A. Apeaning
12.00 - 12.15	Sustainability as a Business Imperative	Miss Yunxia Sun
12.15 - 12.30	Data, Systems & Interoperability	Prof. Godfred Williams
12.30 - 13.00	Business Case Study	B5 Plus Group
13.00 - 14.00	Lunch	
14.00 - 16.30	Breakout Session – 14.00 – 16.30	Bethel & Lawrence
14.00 - 14.30	Streams Plenary	Stream Executive
14.30 - 15.30	Streams Syndicate Sessions	Various
15.30 - 16.10	Stream Closing Plenary	Stream Accountable Executive
16.10 - 17.20	Summit Closing Plenary	Moderator
17.20 - 17.30	Summit Closing Remarks	Dr. Otuko John-Teye

C – Suit Dinner from 19:00 hours to 22:00 hours

Mainly award function.

C-Suit Dinner Forum - 19.00 - 22.00Theme: 'The Effect of Public-Private-Partnership in Africa'

19.00 - 19.15	Welcome & Opening Address	Richard Asante-Amoah
19.15 - 19.20	Fraternity Speech - CFLP	Representative
19.20 - 20.50	Dinner & Speeches	Moderator
20.50 - 21.10	Awards	Marina Lindic
21.10 - 22.00		Moderator
22.00 - 22.00	Close	Moderator

Tuesday, 14th October, 2026 – Business Sumit from 09:00 hours to 17:15 hours.

14th October 2026 - Business SummitTheme: 'Integrated Supply Chain Management - Panacea to Global Sustainable Growth and Development'

Time	Action	Owner
09.00 - 09.25	Registration & Networking	Moderator
09.30 - 09.50	Welcome Address Dr. Maxwell Ampong	Dr. Maxwell Ampong
09.50 - 11.45	Keynote - Plenary Session	Various
11.45 - 13.00	Breakout Session	Bethel & Lawrence
13.00 - 14.00	Lunch	Various
14.00 - 16.30	Breakout Session	Bethel & Lawrence
16.30 - 17.15	Closing Plenary	Moderator

Wednesday, 15th October, 2026 – Tourism Supply Chain Summit from 09:00 hours to 17:25 hours.

Closing Ceremony, Heritage & Recognition Night - 19.00 - 22.00

Theme: 'Service Excellence & Satisfaction - The Epic Centre for Integrated Supply Chain Management''

19.00 - 19.15	Welcome & Opening Address	Colonel Emmanuel T. K. Darquah (Rtd)
19.15 - 19.20	Closing Speech by the Secretary General - IFPSM	Marina Lindic
19.20 - 19.40	General Overview of the Summit and the **Communique - IFPSM Chair, Africa**	Richard Asante-Amoah
19.40 - 19.50	Dissolution of Summit 2026 & Handing Over to 2027 Host	CISCM President, IFPSM President, Secretary General & Africa Region Chair
19.50 - 20.00	Musical & Cultural Interlude	Moderator
20.00 - 20.30	Speeches	Various
20.30 - 20.50	Recognition Session 01	Moderator
20.50 - 21.00	Musical & Cultural Interlude	Moderator
21.00 - 21.20	Recognition Session 02	Moderator
21.20 - 22.00	Musical & Cultural Intelude	Moderator
22.00 -22.00	Close	Moderator

Closing Ceremony from 19:00 hours to 22:00 hours.

All the technical sessions are extra-ordinary. The speakers were highly qualified coming from industries and well-known universities. There was enough time given for each topic and question answer session.

Our sincere thanks to CISM leadership and team for hosting such a fun-filled wonderful World Summit-2026.

Our special thanks to Mr. Richard Asante Amnoah, Chairman, Africa Region, Mr. Richard O Krah, President, CISCM and of course IFPSM President – Mr. Cal Jin, where were there throughout the program and giving maximum inputs. No doubt the role of India IFPSM Secretary General, Marina was commendable. Her monitoring and balancing the sequences/timing was great and with perfect time management.

3. International Participation and Knowledge Exchange

The summit witnessed participation from academicians, professors, industry experts, and supply chain professionals representing numerous countries and regions.

Approximately 15 professors and industry experts delivered presentations and shared their experiences. In addition, three to four speakers participated virtually, enabling wider international representation and knowledge exchange.

Participants and speakers represented countries and regions including the United States, Nigeria, the United Kingdom, Italy, the Netherlands, Germany, Indonesia, Mexico, Finland, South Africa, Morocco, Taiwan, and other parts of Africa, Asia, Europe, and the Americas.

The participation of experts from more than 20 countries contributed to the international character of the event.

The diversity of perspectives was particularly valuable because supply chains today operate across national boundaries and are influenced by differences in industrial development, labor costs, technological capabilities, regulatory frameworks, infrastructure, and environmental priorities.

The summit provided an opportunity to understand how different countries and industries are responding to these challenges and how international professional associations can facilitate the exchange of best practices.

4. Outstanding Presentation on the Asian Manufacturing Model

One of the most significant and well-received presentations was delivered by Mr. Steve Lai of Taiwan, Vice Chairperson for Asia-Pacific, on the subject:

"Asia Manufacturing Model: Past, Present and Future."

The presentation offered valuable insights into the evolution of Asian manufacturing and its implications for the future of global supply chains.

The speaker examined the transformation of manufacturing models and the challenges confronting businesses as they seek to remain competitive while improving efficiency, resilience, and sustainability.

The major areas covered included:

4.1 Evolution of Manufacturing and OEM Advantages

The presentation discussed the development of Asian manufacturing capabilities and the role of original equipment manufacturers (OEMs) in global production networks.

Labour-cost advantages have historically contributed to Asia's manufacturing competitiveness. However, the changing global environment requires manufacturers to develop additional strengths, including advanced

technology, innovation, skilled human resources, quality management, and supply chain integration.

4.2 Circular Economy and Sustainable Manufacturing

The speaker highlighted the growing significance of the circular economy, in which products and materials are designed and managed to reduce waste and maximize resource utilization.

Manufacturers must increasingly consider product life cycles, recycling, reuse, material recovery, and environmental responsibility.

These approaches can help organizations reduce resource dependence while improving long-term economic and environmental performance.

4.3 Cognitive Technologies and Global Digital Twins

The presentation explored the emerging role of cognitive technologies, digitalization, and global digital twins in manufacturing and supply chain management.

Digital twins can provide virtual representations of physical assets, production systems, and supply chain processes. When supported by reliable data, they can help organizations monitor operations, simulate alternative scenarios, identify potential disruptions, and improve decision-making.

Cognitive technologies and artificial intelligence can further support forecasting, predictive maintenance, process optimization, and operational planning.

4.4 Cloud Manufacturing and Micro-Nodes

Cloud manufacturing and distributed manufacturing networks were also discussed.

Cloud-based manufacturing can improve access to production capabilities, information, and collaborative resources. Distributed manufacturing arrangements and smaller manufacturing nodes may offer greater flexibility, responsiveness, and proximity to customers.

These developments have implications for inventory management, production planning, logistics, supplier selection, and risk management.

4.5 Semiconductor and Artificial Intelligence Supply Chains

The presentation also addressed semiconductor supply chains and the growing importance of artificial intelligence.

Semiconductors are critical inputs for electronics, automobiles, telecommunications, industrial automation, and numerous other sectors. Their production depends on specialized technologies, substantial investment, global supplier networks, and complex international relationships.

The increasing use of AI creates new opportunities for supply chain forecasting, automation, analytics, and decision support. At the same time, it introduces challenges relating to technological dependence, data security, infrastructure, and the availability of specialized skills.

The presentation was particularly well received by participants because it connected the historical strengths of Asian manufacturing with emerging technologies and the future requirements of global industry.

5. Major Themes and Technical Discussions

In addition to the presentation on Asian manufacturing, the summit addressed several important subjects relevant to contemporary supply chain management.

5.1 Green Logistics

Green logistics was discussed as an essential component of sustainable supply chain management. It involves improving transportation efficiency, reducing fuel consumption, optimizing distribution networks, minimizing packaging waste, and adopting environmentally responsible logistics practices.

The organizations must increasingly assess the environmental impact of transportation, warehousing, and distribution activities.

5.2 Sustainability as a Business Imperative

A significant message emerging from the discussions was that sustainability is no longer merely a corporate social responsibility initiative. It has become a business imperative.

Companies must integrate environmental, social, and economic considerations into purchasing, sourcing, manufacturing, logistics, and supplier management.

Sustainable practices can contribute to cost efficiency, resource conservation, risk reduction, regulatory compliance, and long-term competitiveness.

5.3 Shock-Resistant and Resilient Supply Chains

The summit examined the importance of building resilient supply chains capable of responding to unexpected disruptions.

Recent global experiences have demonstrated the risks associated with excessive dependence on individual suppliers, concentrated manufacturing locations, and inflexible logistics networks.

Potential approaches include supplier diversification, strategic inventory planning, alternative sourcing arrangements, improved visibility, contingency planning, and digital monitoring systems.

The discussions highlighted that supply chain resilience requires a balance between operational efficiency and preparedness for uncertainty.

5.4 Geopolitics and Global Supply Chain Fragmentation

Geopolitical developments are increasingly influencing international trade, investment, sourcing decisions, and manufacturing locations.

Trade restrictions, political tensions, regional conflicts,

and changes in international economic relationships can disrupt established supply chain networks.

The discussions emphasized the need for organizations to evaluate geopolitical risks, diversify sourcing options, strengthen supplier relationships, and develop flexible operating strategies.

5.5 Circular Economy and MSMEs

The role of micro, small, and medium enterprises (MSMEs) in sustainable supply chains received attention.

MSMEs can contribute significantly through local sourcing, resource-efficient production, recycling, repair, reuse, and participation in larger industrial supply networks.

However, they may face constraints relating to finance, technology, infrastructure, expertise, and access to international markets.

Professional education, technological support, collaborative procurement, and stronger linkages with larger enterprises can help MSMEs become more competitive and sustainable.

5.6 Cross-Border E-Commerce

Cross-border e-commerce was another important subject.

The expansion of digital commerce has increased the need for efficient international fulfilment, customs compliance, last-mile delivery, returns management, inventory visibility, and customer service.

Successful cross-border e-commerce requires close coordination among suppliers, logistics providers, technology platforms, customs authorities, and customers.

Collectively, these discussions reinforced the importance of treating supply chain management as an integrated strategic function rather than a collection of independent operational activities.

6. Cultural Significance of the Inaugural Function

One of the most memorable highlights of the summit was the traditional cultural presentation during the inaugural program.

The King of Ghana, accompanied by his queens and a few soldiers, entered the conference hall dressed in traditional attire.

The ceremony was a major attraction for the international delegates and provided a distinctive insight into Ghana's traditional institutions, cultural heritage, and ceremonial practices.

The presence of the traditional leadership added dignity and cultural significance to the occasion. It also demonstrated how international professional gatherings can serve as platforms for cultural understanding and mutual respect alongside technical and academic exchanges.

The event was particularly memorable for delegates visiting Ghana from other countries, as it offered an opportunity to appreciate the country's traditions and cultural identity.

7. Hospitality and Networking Opportunities

During the summit, IFPSM hosted two dinner functions for participants.

These gatherings provided opportunities for informal interaction among international delegates, speakers, professional association representatives, and industry experts.

Such interactions are an important component of international professional events. They enable participants to exchange experiences beyond formal presentations, identify areas of common interest, and explore possibilities for future collaboration.

The participation of the four Indian office bearers also helped maintain India's presence within the international supply chain management community.

The relationships and professional contacts established during the summit may be useful in developing future academic exchanges, industry-oriented programmes, research collaborations, international conferences, and professional development initiatives.

8. Valedictory Ceremony and Handover for the 2027 Summit

The summit concluded with a valedictory ceremony marking the successful completion of the program.

The closing session reflected on the principal themes discussed during the event, including integrated supply chain management, technological transformation, environmental sustainability, manufacturing competitiveness, and supply chain resilience.

An important highlight of the valedictory ceremony was the formal handover of the World Summit flag to the Turkish Supply Chain Association, which is scheduled to host the IFPSM World Summit 2027 in Türkiye.

The handover symbolized the continuity of international cooperation and the commitment of participating associations to sustain the exchange of knowledge and professional experience through future summits.

The forthcoming event will provide another opportunity for the global purchasing and supply management community to discuss emerging challenges and share innovative solutions.

9. Key Learning and Recommendations for India

The discussions and presentations at the Ghana summit have several implications for the development of supply chain management education and professional practice in India.

The following recommendations are proposed for consideration by the National Council:

Modernization of curricula: Supply chain programs should incorporate artificial intelligence, digital twins, cloud manufacturing, semiconductor supply chains, advanced analytics, and emerging digital technologies.

Sustainability integration: Green logistics, circular economy principles, carbon-conscious procurement, and sustainable supplier management should receive greater attention in professional education.

Resilience and risk management: Training programs should address geopolitical risk, supplier diversification, disruption management, contingency planning, and end-to-end supply chain visibility.

MSME capability development: Professional associations should encourage practical training and advisory initiatives to help MSMEs improve procurement efficiency, logistics performance, technology adoption, and sustainability.

Industry–academia collaboration: Stronger collaboration among professional institutes, universities, public-sector organizations, and private industry should be encouraged to ensure that educational programs meet contemporary industrial requirements.

International cooperation: IFPSM and its member associations should be engaged more actively in knowledge-sharing programs, research, professional exchanges, and international conferences.

Digital transformation: Procurement and supply chain professionals should be equipped to evaluate and adopt emerging technologies while maintaining appropriate attention to cybersecurity, data quality, governance, and human judgement.

These recommendations could support the development of industry-relevant education, professional excellence, and stronger international engagement.

10. Conclusion

The IFPSM World Summit held at Peninsula Resort, Ghana, from 12 to 18 October 2026, was a valuable international event that brought together professionals and experts to discuss the future of purchasing and supply management.

The summit successfully highlighted the strategic importance of integrated supply chains in achieving sustainable economic growth, improving industrial competitiveness, managing global uncertainties, and supporting technological innovation.

The presentation by Mr. Steve Lai on the evolution and future of the Asian manufacturing model was particularly noteworthy. The discussions on green logistics, sustainability, circular economy, supply chain resilience, geopolitics, MSMEs, artificial intelligence, and cross-border e-commerce were also highly relevant to the current and future needs of industry.

The cultural program, including the traditional appearance of Ghana's King and accompanying entourage, added a memorable dimension to the event. The concluding ceremony and handover of the summit flag to the Turkish Supply Chain Association further reinforced the international character and continuity of the IFPSM initiative.

The participation of Mr. L. P. Patel, Mr. Surender Sharma, Mr. P. M. Biddappa, and Dr. Suresh Sharma was an important opportunity to represent the Indian supply chain management fraternity and gain exposure to the best practices adopted by the developing and developed country at large.









●●●



COMPETE IN THE MARKET, COLLABORATE IN THE SUPPLY CHAIN

A Practical Coopetition Model for India's Bulk-Drug Manufacturers

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Competitors Facing the Same Supply-Chain Problem : India's bulk-drugs and active pharmaceutical ingredients (APIs) producers are in a paradox. They are competitors in the marketplace, and often compete for the same global buyers of generics. But they rely on a tightly focused, overlapping base of raw-material suppliers, intermediates, key starting materials (KSMs), logistics providers, utilities and regulatory systems. The common upstream source could be a KSM plant in China, a congested port, or a regional power or effluent-treatment bottleneck. When such a disruption occurs, it disregards competitive boundaries and impacts multiple Indian manufacturers at once.

The traditional supply chain management model is optimized for vertical relationships, i.e. manufacturer to supplier and manufacturer to customer. This will work for firm-specific issues, but some resilience problems are beyond the capacity of any single organization, regardless of how sophisticated its procurement function may be. They require horizontal cooperation between firms who would otherwise be competing for the same tender or export order.

Can Indian bulk drug manufacturers compete robustly in the market and work selectively with the non-competitive parts of their supply chains? The answer is coopetition, but it has to be within certain disciplined parameters set in line with India's own competition-law regime, not copied wholesale from another jurisdiction.

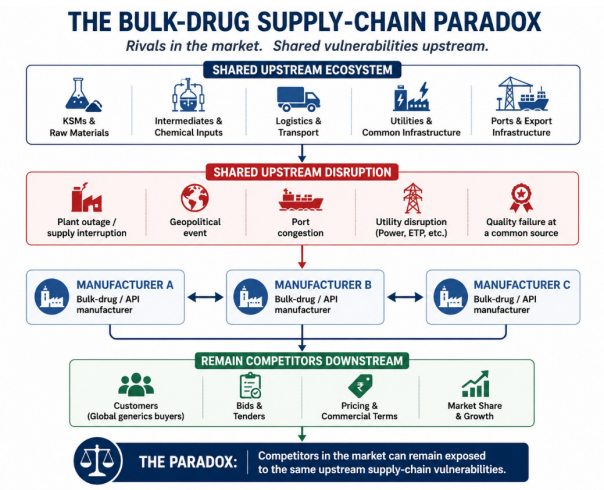


Figure 1 — The Bulk-Drug Supply-Chain Paradox (illustrative)

2. Why India's Bulk-Drug Supply Chain Creates a Special Case

India is one of the top suppliers of generic formulations in the world in terms of volume. But a large portion of its production depends on a somewhat centralized supply chain for raw materials. In March 2026, the Department of Pharmaceuticals has submitted to Parliament the list of active pharmaceutical ingredients (APIs) for which imports from China accounted for 70% or more of India's total imports in FY 2023-24 or FY 2024-25. Antibiotics, vitamins, fermentation products and chemical precursors are particularly affected. Dependence also extends upstream to key starting materials, chemicals and solvents, where a single manufacturer's supplier qualification process may not provide full visibility into the supply chain.

The Production Linked Incentive (PLI) Scheme for Bulk Drugs covers 41 identified Key Starting Materials (KSMs), drug intermediates and Active Pharmaceutical Ingredients (APIs). Bulk Drug Parks: The initiative is to create a shared infrastructure for local production. India has come a long way. 28 of the 41 identified products were linked to an annual production capacity of about 56,800 metric tons as of December 2025. While these investments are advances in building domestic production capacity, significant vulnerabilities in the upstream supply chain remain due to continued reliance on imports and uneven capacity growth.

Similar deficiencies have been identified by international assessments. In its evaluations of at-risk drugs, the United States Pharmacopeia has said that a major vulnerability in the supply chain is the geographic concentration of manufacturing. The United States Pharmacopeia released the updated 2025 Vulnerable Medicines List in April 2026. Of the 100 medicines identified as vulnerable, 48 depended on at least one key starting material manufactured in a single country, revealing potential single-country upstream points of failure. The US Department of Health and Human Services also cites market forces in the 2024 white paper in explaining the shift of API and KSM production. The U.S. Administration for Strategic Preparedness and Response estimated that about 90–95% of generic sterile injectable drugs used in critical acute care rely on critical raw materials from China and India, according to a 2023 U.S. Senate inquiry.

But the process of identifying an alternative supplier is

not as simple as placing a purchase order. Under ICH Q7, API manufacturers should procure materials that meet established specifications from suppliers approved by their quality units. Suppliers are evaluated by a risk-oriented approach and incoming materials are subject to appropriate examination and testing. With certain exceptions, it is usually expected that at least one identity check will be carried out for each batch of incoming material. Switching suppliers may be further restricted by change-control protocols and other applicable regulatory requirements. If a shared upstream supplier experiences an extended disruption, competitors may have to turn to the same limited pool of qualified alternative suppliers, complicating procurement of materials and maintenance of production continuity.

3. The Missing Middle: Between Full Competition and Full Collaboration

The dichotomy of competing or collaborating is misleading; a more beneficial perspective is to view it as competing and collaborating across various sectors of the enterprise. The vertical collaboration with suppliers, logistics providers, distributors or customers is known well. Horizontal collaboration is where a manufacturer is at the same level of the value chain, often a direct competitor for the same customers or contracts. This is where the highest levels of unease and legal risk are found.

Coopetition is not a new idea. The concept was popularized by Brandenburger and Nalebuff and studied by Bengtsson and Kock. It describes firms competing and cooperating at the same time. The researchers have studied lateral supply-chain links including robustness in the face of disturbances. I am suggesting a functional governance framework for manufacturers of bulk drugs in India. It distinguishes between activities suitable for collaboration and those requiring additional protections. Commercially sensitive operations are entirely excluded. Everything is still governed by Indian competition legislation and the applicable pharmaceutical regulations.

4. The Practical Coopetition Model : A workable model sorts supply-chain activity into three zones of increasing sensitivity, held in place by a fourth governance layer.

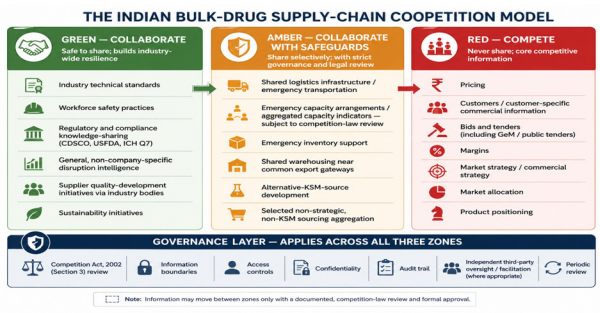


Figure 2 — The Indian Bulk-Drug Supply-Chain Coopetition Model (illustrative)

Zone 1 — Green: Collaborate. Manufacturers can collaborate in this zone without having to disclose confidential business information. The information they reveal should not disclose any information regarding a company's business or its market position. The information may include environmental protection measures, employee safety practices, new developments, and technical requirements. The companies can also share information to understand better the latest guidelines issued by CDSCO or USFDA. Companies can also share information about supply chain disruptions without identifying any specific company. Furthermore, collaborative initiatives like supplier development and production quality monitoring could be implemented. However, such activities should be monitored by a neutral organization like Indian Pharmaceutical Alliance, Bulk Drug Manufacturers Association or Pharmexcil.

Zone 2 — Amber: Collaborate with Safeguards. In this zone, the benefits for supply chain resilience can be considerable, but the risk of exposing competitively sensitive information is also high. Shared logistics and emergency transport arrangements may reveal information about shipping volumes, destinations, schedules, and inventory levels. In addition, emergency capacity agreements and aggregated capacity indexes need to be reviewed under competition law, particularly in relation to how Section 3(3) addresses restrictions on the supply of goods. Several arrangements can be considered, including emergency inventory assistance, shared storage facilities near export points, and joint purchasing of non-essential materials. Joint development of alternative sources within a Bulk Drugs Park or PLI cluster may also be useful, but caution is necessary. The main condition that each participant must remember is that agreements to divide or allocate suppliers can raise serious concerns under Section 3(3) of the Competition Act. However, relying solely on trust is too risky. Each agreement should have a clear structure, defined boundaries, and strict confidentiality measures.

Zone 3 — Red: Compete. In this zone, companies have to protect their commercial information. No exceptions. Competitors should not have access to selling prices, customer-specific prices and profit margins. The same principle applies to tender offers and bid details including confidential bidding information related to public tenders on the Government e-Marketplace (GeM). Also, customer information, market allocation, business plans, product positioning and sensitive forecasts should be confidential. Collaborative attempts to resolve supply chain issues should not lead to joint commercial decisions. If an agreement requires companies to exchange information from Zone 3, it should be rejected or modified.

Governance Layer. This is what binds the model. The

governance structure must define participation and what is allowed to be traded. Who has access to the data, and for what reasons? How long will it be retained? Certain decisions will be made collaboratively, while others should remain separate; this distinction must be documented clearly. Additionally, there should be a process for addressing ambiguous situations, alongside legal supervision, periodic evaluations, and a straightforward method for a participant to withdraw.

The zone classifications are managerial screening tools, not legal safe harbours. Every proposed cooperative arrangement must be independently assessed for its object, competitive effects, necessity, proportionality, information requirements, and compliance with applicable law.

5. Information Is the Real Boundary

In most cases, the underlying issue in working with competitors is not logistics and infrastructure but rather information governance, since one has to be clear about the difference between operational resilience information and commercially sensitive information. Sections 3(3) and 3(1) of the Competition Act assist in establishing these boundaries (see Section 8). The rule is that information exchange should be limited to what is necessary. For instance, one corporation can know that a certain KSM source will be out of service for four weeks; however, there is no need for the corporation to be aware of information such as customer demand, sales prices, margins, and bidders' strategies.

There are a few safeguards against information sharing. These include anonymisation of the source of information to protect the identity of the company providing the information; consolidation of the information among the participants so that the position of one participant cannot be seen by another participant; and the use of intermediaries who will facilitate transfer of the information among the firms and eliminate the need for direct interaction (such as trade associations or logistics coordinators).

6. How the Model Could Work in Practice

Let us take one hypothetical example. Three API manufacturers A, B and C are in Hyderabad-Visakhapatnam corridor. All three companies compete in overlapping markets and indirectly all three rely on a handful of upstream KSM suppliers that are concentrated in one region of China. Then one of those sources gets disrupted, as it did with the sharp slowdown in Chinese KSM and intermediate shipments to Indian API units in the early phase of COVID-19 in 2020. Each company quietly begins looking for alternatives, alone. They all call the same handful of suppliers and compete for the same limited freight capacity out of the same port. Expenses rise. All delays get longer.

With controlled coopetition, the information related to the disruption is circulated immediately, in nonspecific terms, through an accepted channel, possibly through Pharmexcil or a Bulk Drugs Park common facility center. Technical information and supplier-assessment findings could be shared where legally and regulatorily permissible. However, each manufacturer would retain independent responsibility for supplier qualification, material testing, change control, and applicable regulatory approvals. Emergency logistics have already been established and can be executed under the independent supervision of a neutral organization, provided they remain under Zone 2 restrictions. With respect to pricing, A, B, and C companies can still compete for their respective export orders within that period of time.

7. The Role of Enterprise Systems and Digital Platforms

Technology helps here, though only if the systems keep the information boundaries in place. Nobody has to replace their ERP, procurement or quality-management systems. Each manufacturer sends a narrow, approved set of data elements to a separately governed intermediary platform or neutral coordinator. Competitors never connect their core ERP systems to each other, and purchasing, customer and commercial records stay where they are.

The platform can perform functions such as supplier risk notifications, KSM availability updates, shipping and qualification notifications, disruption alerts, and controlled access to specific indicators. The intermediary process should include specialized data feeds, aggregation where necessary, role-based permissions, commercial data segregation, and auditing capabilities.

8. Competition-Law and Governance Guardrails Under Indian Law

Any arrangement must be subject to scrutiny under India's Competition Act, 2002, enforced by the Competition Commission of India. Certain horizontal agreements are presumed to have an appreciable adverse effect on competition, including price-fixing. Other examples include restrictions on production or supply, allocation of markets, and bid-rigging. Section 3(1) introduces an even broader concept of adverse effects on competition. There is also a caveat in Section 3(3) regarding joint ventures that contribute to efficiency in production, supply, distribution, and so on. Whether this applies, however, will depend on the particular arrangement. It should not be assumed that this provides a general safe haven for Zone 2 activities.

The following points arise from this situation. First of all, India has neither a general safe harbour for information exchange among competitors nor blanket approval from the CCI. The closest reference to information exchange is the advisory issued by the CCI

in April 2020 in response to COVID-19. It stated that businesses, including those in critical sectors like healthcare, may exchange information about stock, supply chains, and production when necessary to respond to the crisis, but only on a necessary and reasonable basis. The measures listed in Section 5 would help reduce the risks, but they do not replace the need for a case-by-case legal assessment. Second, following the passage of the Competition (Amendment) Act, 2023, an enterprise or association that participates in or intends to participate in furtherance of an anti-competitive horizontal agreement may be presumed to be a party to it, even if it is not competing in the same market. Therefore, any trade organization or coordinator would need to have its own compliance measures in place before becoming actively involved in connecting businesses for collaboration. Lastly, the analysis of information exchange is highly fact-specific. Each Zone 2 arrangement should be properly documented, kept to the minimum necessary, and reviewed by legal counsel before being implemented.

From a practical point of view, it is necessary to assess whether the proposed arrangement complies with competition law and CCI requirements before taking any steps toward implementation. Specific objectives should be established. It should also be made clear that discussions about pricing strategies, competitive bidding or tendering practices, public tenders, customers, and markets should not take place. Clear limits should be set on what kind of information can be exchanged. Any exchange of sensitive information should only take place under the supervision of a neutral facilitator, such as a trade organization. An agenda and minutes should be kept for all meetings to ensure compliance and maintain proper records. Therefore, legal advice should be obtained before proceeding with any arrangement.

9. Conclusion: Collaborate Against the Risk, Complete for the Customer

In India, bulk drug pharmaceutical manufacturers are not forced to choose between competition and cooperation. There are vulnerabilities that companies can address individually, and vulnerabilities that affect a whole region producing a certain input. When collaboration becomes necessary, clear parameters must be set to distinguish autonomous business decision-making from resilience-building activities, as per the provisions of the Competition Act, 2002. This strategy would allow companies to continue to compete where it creates value, but also allow for collaboration in areas where shared vulnerabilities threaten supply chain robustness. The point is to identify areas where competition has to be retained and where cooperation might be needed.

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AI AND HUMAN TOUCH IN SUPPLY CHAINS: FROM AUTOMATION TO COLLABORATION

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Introduction : The shift from pure automation to human-AI collaboration represents a major evolution in supply chain management. Where initial automation aimed to replace human labor to reduce costs, modern supply chains leverage the combined strengths of artificial intelligence i.e. speed, scale, predictive power and human capabilities i.e. contextual judgment, ethics, flexibility to build resilient, adaptive Supply Chains.

Over the past decade, supply chain management has shifted from legacy operational models—reliant on static spreadsheets and reactive firefighting—to data-driven, resilient networks. Artificial Intelligence (AI) has transitioned from an experimental technology into a core operational driver. Driven by global volatility, labor shortages, geopolitical tensions, and shifting consumer expectations, organizations are deploying AI to transform supply chains from cost centres into strategic value drivers.

Supply chains are inherently complex systems involving intricate networks of suppliers, logistics service providers, warehouses, material collections and distribution centres, intermediaries and customers requiring a high level of stakeholders' collaboration and information sharing practices in proactive ways for achieving optimum productivity, efficiency and satisfactory customer service.

In recent times, customer service standards and expectations have gone high as a result of digitization and globalization of supply chains. Therefore, organizations need to take up digital transformation in various facets of supply chains- beit warehousing, inventory management, procurement planning, logistics etc. Further, their in-house operation in the above cited areas should stay competitive, profitable, resilient as well as sustainable.

2. The Relationship Between AI and Digitization : Digitization and Artificial Intelligence share a symbiotic, sequential relationship where digitization serves as the essential foundation, and AI acts as the value-multiplying engine. Digitization transforms analog processes, manual workflows, and physical assets into structured digital data formats. However, digitized data alone remains passive until AI algorithms ingest, analyse, and synthesize it into actionable intelligence. In return, AI accelerates further digitization by automating complex data capture—such as using computer vision to digitize physical receipts or process unstructured documents—creating a continuous feedback loop. Ultimately, while digitization creates the interconnected digital infrastructure, AI endows that infrastructure with perception, predictive capability, and adaptive decision-making, elevating organizations from merely digitized operations to truly intelligent,

Digitization is the way forward as a long-term strategy for the survival and growth of organization. It is a shift from manual accountal to data-driven, technology enabled systems and processes that can be scaled up while maintaining flexibility and resilience. For digitization to be successful, the organizations need to be adequately invest in technology to ensure information availability and workforce readiness for proper accomplishment.

2.1 Key Drivers of AI Adoption

1) Persistent Global Disruption: Volatile trade policies, climate-related weather events, and geopolitical shifts have made static planning obsolete. Organizations use AI predictive modeling to anticipate disruptions and pivot sourcing strategies proactively.

2) Explosion of Real-Time Data: The growth of IoT sensors, telematics, and digital freight networks provides vast amounts of data. AI engines synthesize this unstructured data into actionable operational insights.

3) Labor & Skill Shortages: Warehousing and logistics face persistent labor deficits. AI-driven automation helps bridge these capacity gaps without scaling overhead.

4) Demands for Speed & Personalization: E-commerce trends demand hyper-local inventory placement and rapid delivery windows, necessitating automated routing and localized demand forecasting.

2.2 Core Application Areas Across the Supply Chain

Functional Area	AI Application & Focus	Key Benefits / Impact
Demand Forecasting & Planning	Machine learning (ML) models analyze historical sales, social sentiment, macroeconomic indicators, and weather data.	Up to 30% reduction in forecast error rates and significant cuts in stockouts/overstock.
Warehouse & Fulfillment	Computer vision, AI-guided picking, and Autonomous Mobile Robots (AMRs) manage movement and inventory auditing.	Up to 50% increase in picking efficiency and near 100% order accuracy.
Transportation & Logistics	Algorithmic dynamic routing, automated load-matching, and predictive fleet maintenance.	Reduced empty miles, lower fuel consumption/carbon emissions, and 15-20% higher fleet utilization.
Procurement & Risk Management	Cognitive "Control Towers" continuously evaluate vendor performance, geopolitical risks, and financial viability.	Early disruption warnings, automated purchase optimizations, and up to 40% lower losses from supply shocks.

3. The Paradigm Shift: Automation vs. Collaboration

Dimension	Pure Automation (Legacy Focus)	Human-AI Collaboration (Modern Era)
Primary Goal	Cost reduction & labor replacement	Resilience, adaptability & decision augmentation
Human Role	Task execution or complete exclusion	Strategic oversight, exception handling & ethical governance
System Strengths	Speed, repetition, rule-based efficiency	Hybrid intelligence combining data crunching with human intuition
Response to Disruption	Rigid; can fail when edge cases occur	Dynamic; AI flags anomalies, humans make contextual decisions

4. **Dynamic Division of Roles**

To achieve an optimal collaborative model, supply chains divide responsibilities based on the complementary strengths of both parties:

4.1 What AI Brings to the Table

- Processing & Optimization at Scale: Sifting through millions of data points to optimize route planning, warehouse picking, and multi-echelon inventory management.
- Predictive Forecasting: Detecting subtle demand shifts and predicting weather or geopolitical disruptions before they impact supply lines.
- Real-time Monitoring: Continuously auditing warehouse equipment health, tracking shipments via IoT sensors, and adjusting schedules instantaneously.

4.2 Why the "Human Touch" Remains Essential

- Contextual Judgment & Nuance: Recognizing when data anomalies stem from temporary events (e.g., local holidays or one-off supply shocks) rather than structural trends.
- Relationship Management & Negotiation: Resolving supplier disputes, negotiating contracts, and fostering long-term trust across global networks.
- Ethical Reasoning & Accountability: Aligning automated sourcing decisions with ESG commitments, fair labor practices, and regulatory mandates.
- Handling Black Swan Events: Navigating unprecedented disruptions (e.g., natural disasters or geopolitical crises) where historical training data fails.

4.3. **Practical Applications of Human-AI Synergy**

A. Intelligent Demand & Sourcing

- AI: Analyzes market trends, weather patterns, and macroeconomic factors to generate high-accuracy demand forecasts.
- Human Touch: Adjusts models for qualitative factors, such as brand reputation events, consumer sentiment, or strategic marketing initiatives.

B. Warehouse Orchestration & Robotics

- AI & AMRs: Autonomous Mobile Robots (AMRs) handle heavy lifting, transport, and routine picking tasks.
- Human Touch: Human supervisors serve as "Warehouse Orchestrators," reallocating machine and human resources dynamically when bottlenecks occur.

C. Risk Management & Exception Handling

- AI: Monitors global supply channels and alerts teams to potential delays or supplier insolvency risks.
- Human Touch: Supply chain managers communicate with alternate vendors, negotiate emergency air freight, and manage multi-party commercial impacts.

4.4. **Key Challenges to Effective Collaboration**

- Trust & Explainability: Human managers may hesitate to follow AI recommendations if the underlying logic ("black box") is unclear.
- Workforce Reskilling: Transitioning workers from operational/manual tasks to strategic oversight roles requires dedicated training programs.
- Change Management: Overcoming fears of job displacement by fostering an environment where AI is seen as a supportive tool rather than a replacement.

5.0 Conclusions

The future of supply chain management lies not in replacing human workforce with autonomous algorithms, but in harmonizing artificial intelligence with human judgment. While pure automation delivers unparalleled speed, data processing, and operational scale, it is the "human touch"—contextual intuition, strategic foresight, ethical oversight, and relationship management—that navigates black swan events and aligns supply networks with broader business values. Moving from rigid automation to dynamic human-AI collaboration transforms supply chains into resilient, adaptive ecosystem networks. Organizations that master this synergy will not only insulate themselves against global volatility, but also build flexible, sustainable, and future-proof operations where technology empowers people to make better, faster, and more human-centred decisions.

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THE INTEGRATED 6 IS ONION ANALYSIS & 6 PS FRAMEWORK FROM PURPOSE TO MEASURABLE PROJECT IMPACT

PMP ®, ATP I (PMI - USA), FIE, Chartered Engineer; Certified LSS BB Lead Auditor IMS (QMS, EMS, OH&S), ZED & Lean Consultant, Adjunct Faculty L&T IPM Member Board of Studies & Adjunct Faculty Symbiosis Centre for Distance Learning (SCDL), Ex NC & Life Member IIMM; Life Member ISTD; QCFI Consultant, Corporate Trainer, Mentor & Author

Abstract : Projects are complex systems in which strategic intent, technical decisions, people, processes, resources, and performance outcomes interact continuously. Project difficulties often arise not from a single visible failure but from interconnected weaknesses that remain unnoticed until they affect cost, schedule, quality, stakeholder confidence, or business value. Onion Analysis provides a structured approach to examining these issues layer by layer, moving from surface-level symptoms towards underlying causes and relationships. This article proposes an integrated framework that combines **six layers of Onion Analysis (6 I s) Intent, Insights, Involvement, Integration, Indicators, and Impact**with **six managerial dimensions 6 Ps: Purpose, Perspective, People, Process, Performance, and Progress**. Together, the frameworks establish a practical approach to understanding project objectives, interpreting evidence, mobilizing stakeholders, integrating execution, measuring performance, and evaluating outcomes. Illustrated through a highway construction project, the model demonstrates how project professionals can move beyond activity monitoring towards systemic analysis, proactive decision-making, and sustainable value creation.

Keywords: Onion Analysis, Project Management, Six Is & Ps, Project Excellence, Root-Cause Analysis, Strategic Alignment, Stakeholder Engagement, Systems Integration, Performance Measurement, Business Impact.

1. Introduction:

Beyond the Surface: Look Deeper. Think Smarter. Deliver Better. : A project can appear healthy on the surface while serious weaknesses remain hidden beneath it. Progress reports may indicate satisfactory activity completion, expenditure may remain within budget, and individual departments may report achievement of their respective targets. Yet, the project may still experience delayed milestones, declining productivity, recurring quality problems, unresolved interfaces, mounting risks, and disappointing business outcomes.

This calls for examining the project layer by layer, moving beyond visible symptoms and reported performance to uncover underlying causes, critical interdependencies, and systemic weaknesses that may otherwise remain unnoticed. By understanding how different project elements interact and influence one another, project leaders can identify the real constraints, anticipate emerging risks, and address problems at their source rather than merely treating their consequences. The **Integrated 6 Is Onion Analysis & 6 Ps Framework**, developed by **SN Panigrahi**, offers an integrated approach to deeper project understanding by connecting layered analysis with six managerial dimensions**Purpose, Perspective, People, Process, Performance, and Progress**to strengthen decision-making, improve project execution, and achieve sustainable project success.

In this article lets discuss on the theme "**Beyond the Surface: The Onion Analysis Framework for Project Excellence" - The Integrated 6 Is Onion Analysis & 6 Ps Framework**

2. Fact Check : How Projects are Performing

- Data from the 2020 PMI Pulse of the Profession® reveal that 11.4 percent of investment is wasted due to poor project performance.
- According to PMI Pulse of the Profession 2021, Project Outcomes Report only 73% Met Project Goals (that means 27% of projects missed the goals); 62% Projects Completed within Budget (38% projects Exceeded Budget); 55% Projects Completed within Time (45% projects missed the Timelines).
- Flyvbjerg and Gardner's later work on a database of roughly 16,000 projects found that only about 8.5% hit both cost and schedule, and only 0.5% also delivered the promised benefits (How Big Things Get Done, 2023).
- Oxford's Bent Flyvbjerg and McKinsey studied more than 5,400 large IT projects. On average they ran 45% over budget and 7% over time, and delivered 56% less value than predicted (Bloch, Blumberg and Laartz, McKinsey, 2012).

These findings arise from different project populations and methodologies and should not be interpreted as directly comparable measures. Nevertheless, they highlight a fundamental managerial challenge: **project success cannot be secured through activity completion**

and reporting alone; it requires a deeper understanding of the factors that shape delivery, performance, and value realization.

3. Why does this happen?

The answer often lies in the difference between observing individual project activities and understanding the relationships that determine overall performance. Projects are interconnected systems. Their success depends on the alignment of purpose, the quality of information, the involvement of people, the integration of processes, the effectiveness of performance controls, and the achievement of meaningful outcomes.

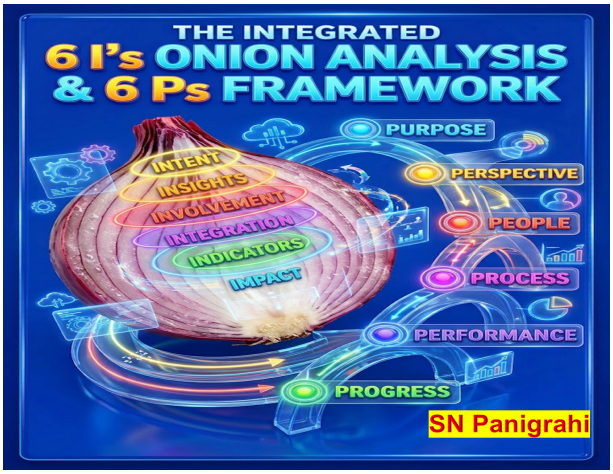
Conventional reporting is essential, but it may not always reveal the deeper causes of project difficulties. A schedule variance identifies a deviation; it does not necessarily explain why the deviation occurred. A cost report quantifies expenditure; it does not automatically reveal whether resources are being deployed effectively. A completion certificate confirms delivery; it does not, by itself, establish that the intended business benefits have been realized.

This calls for a structured approach that moves beyond visible symptoms, examines underlying relationships, and connects analysis with purposeful managerial action.

Integrated 6 I s Onion Analysis & 6 Ps Framework: Outlining a Deeper Project Understanding

The **Integrated 6 Is Onion Analysis & 6 Ps Framework**, developed by **SN Panigrahi** offers a useful conceptual approach to examining a project layer by layer, progressing from visible conditions and immediate issues toward underlying causes, interdependencies, and systemic weaknesses. Rather than accepting reported outcomes at face value, it encourages project professionals to investigate what lies beneath the surface and how different layers influence one another.

6 Is Onion Analysis offers a useful way of examining a project layer by layer, while the 6 Ps provide a practical managerial perspective for interpreting and acting on the findings.



The integration brings two complementary dimensions together:

- **Onion Analysis the analytical dimension 6 Is: Intent, Insights, Involvement, Integration, Indicators, and Impact** : Examining the project beyond its visible symptoms to understand its underlying structure, causes, and relationships.
- **The 6 Ps the managerial dimension: Purpose, Perspective, People, Process, Performance, and Progress** provide a complementary managerial framework evaluating the project through six interconnected perspectives to identify weaknesses, establish priorities, and guide corrective action & and translate them into practical improvements.

Together, these dimensions encourage project leaders to ask more meaningful questions: Are project objectives clearly aligned with business strategy? Are decisions based on a complete and shared understanding of the situation? Are the right people involved and accountable? Are processes effectively integrated? Are performance indicators revealing the right signals? Is reported progress translating into tangible deliverables and intended business benefits?

The objective is not to create another reporting layer or add complexity to project governance. It is to improve the quality of project thinking, strengthen decision-making, uncover critical constraints, and ensure that corrective actions address the factors that genuinely influence project success.

The central proposition is simple: do not merely observe what is happening in a project; investigate why it is happening, understand how its different elements interact, and act on what matters most.

By combining the depth of Onion Analysis with the practical orientation of the 6 Ps, project professionals can move from fragmented observations to integrated understandingand from monitoring project activity to managing project outcomes and realizing business value.

4. The Integrated Model: The Six Layers and the Six Managerial Lenses

Read the sequence from the outside in. Intent is the outer skin; Impact is the core, because impact is the reason the project exists. Each layer carries a corresponding P. The layer identifies what to examine; the P supplies the managerial lens through which to examine it. The pairs follow three natural moves:

Understand Intent with Purpose, and Insights with Perspective, which settle why the project exists and how the situation is seen.

Align Involvement with People, and Integration with Process, which settle who must change and how the work must flow.

Prove Indicators with Performance, and Impact with Progress, which settle how delivery is measured and whether value is actually moving.

Integrated Onion Analysis 6 Ps Framework

Layer	P	Core Question	Typical Outputs / Deliverables
1. Intent	Purpose	Why does this project matter, and what must it achieve?	Business case; problem statement; needs assessment; strategic alignment; project objectives; scope boundaries; SMART targets; success criteria; expected benefits; value proposition
Clarifies the underlying intent, strategic objectives, and business justification.			
2. Insights	Perspective	What do the evidence, facts, and different viewpoints reveal?	Validated data; current -state assessment; stakeholder perspectives; root -cause analysis; assum ptions and constraints register; gap analysis; risk and opportunity assessment; key findings; decision insights
Examines the project beyond visible symptoms to uncover underlying causes, critical interdependencies, emerging risks, and hidden opportunities			
3. Involvement	People	Who is affected, who must contribute, and who owns decisions?	Stakeholder register; stakeholder influence – interest matrix; RACI matrix; roles and responsibilities; accountability structure; communication and engagement plan; compe tency assessment; training plan; decision and escalation matrix
Identifies the people, stakeholders, and decision - makers whose knowledge, commitment, and contributions are essential.			
4. Integration	Process	How must activities, resources, and interfaces work together?	Integrated project management plan; process maps; Work Breakdown Structure (WBS); schedule and milestones; interface register; dependency matrix; resource and procurement plans; risk response plan; change -control process; execution and hand over procedures
Aligns activities, resources, functions, workflows, and interfaces into a coordinated execution system.			
5. Indicators	Performanc e	How will we measure performance, detect deviations, and maintain control?	Key Performance Indicators (KPIs); performance baselines; targets and thresholds; measurement criteria; dashboards; progress and productivity reports; cost and schedule variance analysis; quality and safety metrics; trend analysis; corrective -action register; forecast reports
Estab lishes meaningful performance indicators to measure progress against planned targets for scope, time, cost, quality, productivity, risk, and other critical objectives.			
6. Impact	Progress	Are we achieving the intended outcomes, and what value is being realized?	Milestone achievement; outcome and benefits - realization reports; baseline -versus -actual assessment; value -for-money analysis; ROI or other relevant benefit measures; customer and stakeholder satisfaction; operational performance trends; sustainab ility outcomes; lessons -learned register; sustain, improve, redirect, or stop decisions
Evaluates whether project execution is translating into tangible deliverables, intended outcomes, strategic objectives, and sustainable business benefits.			

Evaluates whether project execution is translating into tangible deliverables, intended outcomes, strategic objectives, and sustainable business benefits.

The strength of the integrated framework lies in the relationship between each analytical layer and its corresponding managerial dimension. The central principle: Every layer must produce actionable outputs that strengthen the next layer and ultimately contribute to measurable project success and business value.

The model is not a rigid linear process. A performance indicator may reveal a problem that requires a new perspective. New insights may change stakeholder involvement. An assessment of impact may demonstrate that the original purpose or success criteria require reconsideration.

The six layers and six Ps should therefore be revisited as the project evolves.

5. Example : Applying the Integrated Framework to a Highway Project

Consider a hypothetical 100-kilometre highway construction project experiencing schedule delays, lower-than-planned productivity, and increasing costs. A conventional review may report the schedule variance and recommend additional resources. The integrated Onion Analysis framework encourages a broader investigation.

Purpose: Confirm the required completion date, contractual obligations, safety and quality requirements, and expected transport benefits.

Perspective: Examine the critical path, land availability, utility relocation, productivity records, equipment utilization, design releases, and materials supply to identify the principal causes of delay.

People: Engage the client, project manager, planning team, engineering, procurement, construction

contractors, utility agencies, and relevant authorities. Assign ownership for resolving each major constraint.

Process: Integrate land handover, utility relocation, approved drawings, drainage, earthworks, pavement, and logistics into a coordinated execution and recovery plan.

Performance: Monitor critical-path float, work-front readiness, daily output, constraint closure, design release dates, material availability, quality acceptance, and forecast completion.

Progress: Assess recovery against the approved baseline, the credibility of the completion forecast, the control of additional costs, and the preservation of safety, quality, and intended operational benefits. The investigation may reveal that adding equipment would have limited value until land access and utility constraints are resolved.

The framework changes the management conversation from How much more resource do we need? to What is preventing the resources already available from generating the required output?

That change in perspective can lead to more focused corrective actions, better resource utilization, and improved recovery planning.

6. Where Onion Analysis Fits in the Project Life Cycle

Initiation: Layers 1 and 2 sharpen the business case and prevent solution-first thinking.

Planning: Layers 3 and 4 shape the stakeholder plan, the scope, and the dependency map.

Execution and control: Layer 5 supplies the steering group with a short, honest dashboard.

Closure and beyond: Layer 6 links the project to benefits realisation and organisational learning.

The technique also works for recovery of a troubled project: run the layers backwards from a failing indicator and ask which inner layer was weak. Additional practical applications include an Onion pre-mortem (imagine failure and assign causes to layers), an Onion health score (rate each layer 15 and plot as a radar chart at stage gates), and Onion in procurement (apply the layers to tender evaluation). The depth of analysis should be proportionate to the problem. A minor issue may need only a short review, while a major infrastructure delay may require multidisciplinary investigation and detailed schedule, risk, and productivity analysis. Most importantly, the process must lead to decisions and action. A well-structured analysis that does not change decisions or improve outcomes has limited practical value.

7. Conclusion: From Surface-Level Reporting to Project Excellence

Project excellence is not achieved simply by completing activities, issuing reports, or meeting isolated departmental targets. It requires an integrated understanding of the purpose, evidence, people, processes, performance, and outcomes that determine whether a project succeeds. Onion Analysis encourages project professionals to examine these dimensions layer by layer. The 6 Ps translate that examination into a memorable managerial framework.

Together, they connect strategic intent with evidence-based decisions, stakeholder ownership, integrated execution, measurable control, and value realization. The ultimate benefit is not merely a more comprehensive project review. It is a better quality of management thinkingone that moves beyond symptoms, questions assumptions, exposes dependencies, and directs resources towards the factors that matter most.

The central message is simple: do not manage only what is visible; understand what drives it, what connects it, and what it ultimately delivers.

Purpose clarifies why. Perspective reveals what matters. People create ownership. Process enables integration. Performance establishes control. Progress demonstrates achievementand impact validates success. "Project Excellence = Understanding the Layers + Acting Through the 6 Ps + Delivering Impact."

That is the essence of Onion Analysis for Project Excellence.

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BRICS LOGISTIC SUPPLY CHAIN COOPERATION FRAMEWORK

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BRICS LOGISTIC & SUPPLY CHAIN:

Abstract: Connection between various countries, resilient, efficient, sustainable, digitally enabled, s a voluntary consensus based on the initiative, aimed at making logistic, supply chain cooperation among BRICS (Brazil, Russia, India, China, South Africa) which included Egypt, Ethiopia, Indonesia, Iran, Saudi-Arabia, United Arab Emirates, with a framework of chairmanship in the specific area of logistic, transportation, in supply chain.

Framework main among the BRICS (Brazil, Russia, India, China, South Africa) countries is to reduce logistic, supply chain, bottleneck, disruption, simplification of multi-model connectivity load, rail, sea, air, inland, waterways, on sharing the logistic, transportation, giving knowledge to the best framework of the technology, practices in supply chain.

Introduction: Improvement of cargo, shipping services, encouraging Micro-Small and Medium Enterprises, manufacturing, assembly, connection of network, BRICS with the cooperation of business operations, manpower, tools, so as to process on working together, with a framework to move products from raw material to finished products in supply chain.

Promotion of climate change, reduced environmental, sustainable logistics, transport connectivity, digital information, sharing multi-modal transportation, cooperation with trade facilities, frame work with custom facilities, preference to local manufacturing, regional supply network, being resilient, sustainable, lowering cost, having faster delivery adopted system, with best carried systems in BRICS, being some of the concise, lean systems adopted to eliminate waste, reduce excess inventory, maximise efficiency, in supply chain.

Purpose of Study: Promoting skills, capacity building, giving better employability in logistic, supply chain, is the task force in cooperation with BRICS,(among countries) continue to work on cross-border payments (on international transactions between buyers, suppliers, located in different countries) , so as to boost framework on BRICS lab at Gift city (build a common risk policy, on the models specialising in insurance, re-insurance, capabilities, thus sharing knowledge, giving expertise opinion on marine insurance) in supply chain.

Platform for new investment, works, is the primary official frame work of the BRICS, established to trace economic in the context referring to criminology, psychology, cooperate governance, managing data sharing, monitoring cross-border financial planning, (international trade logistic with capital flow meeting to optimise working capital) asset flows, and supporting corruption in supply chain.

Research Methodology: Development of solar energy in logistic supply chain, bringing in digital centre for excellence, on the framework of smart grids for energy storage, (treating electricity as an inventory item that is dynamically stored managed, balanced routed through digital energy network) is the continuation of the work of BRICS, having resilience, with the laying of submarine cable as considered an important cooperation infrastructure in supply chain Driving the framework, in order to enhance the indigenous manufacturing among Micro-small-and-Medium enterprises so as to build up the capacities, reduce long-term, dependence on the fully built dependence on BRICS major countries in supply chain.

In order to boost cross-border, cooperation of sector transportation system,(is the physical, digital network, responsible for moving raw-materials, parts, finished goods, with capability, efficiently between suppliers, warehouses, customers) resilience on logistic, (is the ability of transportation warehouse network to prepare, absorb, adapt, recover, from unexpected disruption) the sustainability, among the members of BRICS, should adhere to the guiding principles, of the set framework, which includes promotion of environmental, sustainable climate change, resilient logistic, practices in supply chain.

Cargo, shipment capabilities possess strong complementary services, technological changes, in BRICS process on the availability of raw-materials, manufacturing eco-systems, expertise on technical knowledge, automation, spare parts management which includes aviation spares, network among supply, ports, logistic corridors with a good framework, also among the best cooperation in supply chain.

Restrictive measures in transportation sector, giving priorities to port facilities, prioritising for an efficient, safe maritime, transportation network, BRICS nations should strengthen, the framework, cooperation in improving the logistic sector, infrastructure, in promoting modern technology, artificial intelligence, better equipment facilities, being associated with the services in supply chain.

Disruptions have shown been during the pandemics, climate change, as BRICS have placed a special emphasis, on strengthening resilience, as it was equally important

in the framework of the challenges, cooperation in times of the prompt services in supply chain.

Implementation of World Trade Organisation trade facilities, agreement strengthening exchanges, cooperation in areas which is entered as a game changer, as a excessive duplicate bureaucratic administration problems, that delay movement of goods, BRICS framework is to expedite the movement, simplifying, streamlining, release, clearance of goods, including transit, customs procedure, import, export procedures, instead of changing tariffs, avoid red-tape at borders, so as to streamline, in modernising, improving international logistic efficiency, enhancing connectivity in supply chain. Cooperation among digitalisation of paper work for better documentation, BRICS framework will have the ability of independent systems, software, that is likely to lower transaction cost, improve transparency, cross-border commerce (coordinating global flows of goods, information, finances, across international entities), which can become liable to make systems, customs, trade facilities more efficient, with less paperwork, especially among the global markets in supply chain.

Fragmented global supply chain BRICS enhances resilience to weak connectivity, disruption, caused by strategic planning, sourcing, moving of goods, while managing risks, caused by various conflicts, blockages, regional transitions, closure of various Straits, cooperation of promoting integration, fostering multi-model connectivity, coordination, to better manufacturing ecosystem, with capacity building on the frame of encouraging technical exchanges, specialised training, knowledge sharing, regarding modern cargo, shipping, services, sustainable to advance environmental, climate resilient transport practices across various entities in supply chain.

Literature Review: Predictive analysis suggests that framework; to mitigate risks (shifting from reactive to proactive network) from unilateral tariffs (import taxes levied independently by single nation) BRICS should share geopolitical conflict, information, on the disruption, integrating artificial intelligence, Block Chain, contemplating technology, through network, with cross-border cooperation, facilitating clearance of critical minerals, energy, fuels, aligning with 80% of the industrial policy across resource of rich nations in supply chain.

Strengthening joint approach, in business, government, non-profit organisations, bringing the resources, with the integration of advanced technology, artificial intelligence, smart internet of things, to form complex systematic problems, in order to achieve sustainability, BRICS is to promote resilient, with cooperation of proper framework, integrated multi-modal of logistic connectivity to be compiled periodically, updated information, on national statistical reforms, (driven by advanced data analysis) including the use of administrative data sources to support knowledge exchange among members in supply chain.

Hypothesis: Research has suggested that transport connected among BRICS entities (collaborate to move products) influences logistic efficiency, improve integration of digital logistics, so as to bring visibility, cooperation among Customs to reduce lead-time in logistics, improve upon Green logistic practices for sustainability in performance, so as to have better cooperation, strengthen, framework, resilience (anticipate, absorb, recover adapt, disruption, of events) in supply chain. Trade settlement on utilisation of national currency on for direct financial operational, clearing consignment making arrangement between buyer, manufacturers, suppliers, sellers, to reduce foreign exchange transaction costs, on the best utilisation local currency, for trade development, so as to protect members of BRICS to choose between proper frameworks, in complying with foreign policies, in cooperation with financial sanctions in supply chain.

Discussions and Findings: Supply chain leaders should focus on fragmented network, globalisation towards connectivity, among BRICS members, emphasising reliability, uncertainties, global disruption, establishing framework on maritime network, freight corridor, for a common customer use, so as to promote shared expertise in cargo handling, shipping services, proper documentation, extending manufacturing facilities to reduce external dependence, on a sustainable decarbonisation, resilient to climate changes, thus establishing cooperation in technical council studies in supply chain.

Recommendations: Free Trade agreements signed among BRICS countries, on economic diplomacy is to increasingly go beyond trade, investment, financial cooperation, framework on digital payments, technology, energy transition, resilient, development of finance development, so as to build strategic resilience in areas electronic components, minerals, food security, among members on global developments in supply chain.

Conclusions: Transportation considered to be weak among BRICS members countries, aiming to connect the vulnerability, exposed by global disruption, thus by improving the weak connectivity, on cooperation with the exchange of proper framework on technical formalities, within the key areas of knowledge sharing, cargo, shipping services, capacity building, manufacturing eco-system, climate change, on resilient logistics systems in supply chain.

Limitations: Participation of BRICS members, with framework entirely having dedicated to the consensus, of being voluntary (sharing compliances relying entirely on mutual consent) is to promote technical capacity building, lack of financing, on the wide economic disparities towards other competitive market dominance, but having lacked on an independent dedicated to the cross-border physical infrastructure remains a major systematic bottleneck in global supply chain.

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INDIA'S RAPID RENEWABLES GROWTH IS STRENGTHENING ITS ROLE IN GLOBAL ENERGY MARKETS, IEA REPORT FINDS

New analysis highlights energy security benefits from lower reliance on fuel imports, while Indias expanding solar PV industry offers opportunities to diversify global supply chains

India is emerging as an increasingly important force in global renewable energy markets, with its rapid expansion of renewable electricity helping reduce reliance on imported fuels while opening new opportunities in manufacturing, according to a new IEA report. Launched at the Bharat Renewable Energy Summit in New Delhi, the *India Renewable Energy Market Report 2026* finds that Indias renewable power capacity has almost quadrupled over the past decade, surpassing 300 gigawatts (GW) in 2026. The country is now the worlds second-fastest-growing renewables market and second-largest manufacturer of solar photovoltaic (PV) modules. India also reached its target of 50% non-fossil installed power capacity in 2025, five years ahead of schedule.

The report finds Indias renewables expansion is already delivering substantial energy security benefits. Renewable electricity saved India more than USD 100 billion in coal and natural gas import costs between 2011 and 2025, with cumulative savings expected to more than double by 2030. Without the solar PV, wind and bioenergy capacity added since 2010, Indias coal imports in 2025 would have been around 110 million tonnes higher. By 2030, Indias renewable power capacity is forecast to reach around 530 GW, with solar PV accounting for more than 80% of new additions and putting the country on track to meet its target of non-fossil power capacity.

"Indias renewables expansion is delivering major benefits for its energy security at a time of heightened uncertainty in global energy markets," said **IEA Executive Director Fatih Birol**. "As countries look to strengthen domestic energy supplies, Indias experience shows how consistent policies can help drive down renewable energy costs and attract investment, offering valuable lessons for other emerging economies. We look forward to supporting India as it builds on these achievements."

"Indias emergence as a new giant of renewable energy reflects the progress we have made in recent years," said **India Minister of New and Renewable Energy Pralhad Joshi**. "As Indias electricity needs continue to rise, we are laying the foundations for the next phase of growth by strengthening domestic manufacturing, mobilising investment and expanding transmission infrastructure. We appreciate the IEAs continued engagement with India on our shared pursuit of a secure, affordable and sustainable energy future." The report highlights how competitive auctions have helped India achieve some of the worlds lowest solar PV generation costs and become a global leader in procuring hybrid renewable projects. Growth is also spreading beyond large power plants, supported by rooftop solar, corporate electricity procurement and expanding domestic manufacturing. However, sustaining this expansion will require faster investment in electricity grids, storage and system flexibility, alongside stronger utility finances and fewer project delays. Addressing these challenges could accelerate renewable power capacity deployment by more than 20% over 2026-2030, the report finds.

New IEA Report - Executive summary

India has become worlds second fastest-growing renewable energy market and the second-largest manufacturer of solar PV modules. Renewable power capacity has surpassed 300 GW1 in Q4 2026, almost quadrupling over the past decade. India achieved its objective of sourcing 50% of installed power capacity from non-fossil technologies in 2025, five years ahead of schedule. It also became the fourth-largest liquid biofuel market, with production increasing sixfold since 2020. Indias leadership reflects years of sustained ambition, consistent policy support, adaptation to changing conditions and long-term strategic planning**.**

A decade of policies facilitating renewable energy investment is paying dividends for India's energy security at a time of high fuel prices and market volatility. Without the solar PV, wind and bioenergy capacity added since 2010, coal imports in 2025 would have been around 110 million tonnes higher and the import dependence of electricity generation would have exceeded 30%, approximately twice the actual level. Renewable electricity reduced cumulative spending on coal and natural gas imports by more than USD 100 billion between 2011 and 2025, with savings set to more than double by 2030. In transport, domestic biofuels reduced crude oil import dependence by around 4 percentage points in 2025, while biogas provides an additional domestic substitute for imported natural gas. Without renewables growth, fossil fuel use for heating would have been 17% higher in 2025. These buffers become particularly valuable when supply disruptions and price spikes put fossil fuel markets under strain. Coal and natural gas imports and import bill savings due to solar PV, wind and bioenergy deployment, India, 2015-2030

Indias renewable capacity is set to reach around 530 GW by 2030, led overwhelmingly by solar PV. Solar PV accounts for more than 80% of this growth, with capacity exceeding 350 GW by 2030. Wind approaches 90 GW, while hydropower reaches 75 GW as large conventional plants are commissioned and pumped storage investment accelerates. As a result, India is expected to meet its target of 500 GW of non-fossil capacity by 2030 on time, an important milestone towards its ambition of achieving net zero greenhouse gas emissions by 2070.

Renewables are set to supply 35% of India's electricity by 2030, with generation almost doubling from todays levels. Renewable generation exceeded 500 TWh in 2025, accounting for one-quarter of Indias total electricity supply, and is forecast to approach 950 TWh in 2030. Solar PV overtook hydropower as India's largest

source of renewable electricity in 2025 and is expected to provide more than half of renewable generation by 2030. The share of variable renewables in total electricity supply rises from around 14% to approximately 26% nationally and significantly higher in some states increasing the need for investment in grids, energy storage and system flexibility.

Indias competitive auctions have driven down costs, while policy measures have tackled non-cost barriers to deployment. Since 2010, India has awarded over 220 GW of utility-scale renewable capacity through competitive auctions. Transparent price discovery, standardised contracts and central agencies that aggregated demand and reduced counterparty risk have brought tariffs down rapidly. Today, utility-scale solar PV in India has the worlds second-lowest levelised generation costs, at USD 30-35/MWh, while tariffs for solar PV projects commissioned in 2025 were around 40% below the average cost of coal-fired electricity. In parallel, the solar parks scheme reduced land and permitting risks, the Green Energy Corridors expanded transmission from resource-rich states, and interstate transmission charge waivers lowered delivery costs. Average coal electricity supply cost and average auction tariffs by commissioning date, India, 2015-2027

As solar PV and wind scaled up, policy shifted towards system integration, making India the world leader in hybrid renewable projects procurement. New tendering guidelines moved auctions from stand-alone solar PV and wind towards hybrid, storage-linked products. Such hybrid renewable systems are characterised by reduced output variability, better use of land and transmission infrastructure, and a generation profile more closely aligned with demand. In 2025, India auctioned 15 GW of hybrid projects, taking cumulative auctioned capacity to 64 GW, in both cases the largest volumes globally. Average tariffs achieved between 2023 and 2025 were around USD 45/MWh, approximately 20% below the average cost of electricity from coal-fired power plants in 2025.

The supply-side push through auctions is now being matched by households and businesses investing in solar PV for self-consumption and corporate open-access procurement. Distributed solar PV capacity for selfconsumption is set to triple to more than 100 GW by 2030. The PM Surya Ghar Muft Bijli Yojana scheme is accelerating residential rooftop installations, while PMKUSUM supports solarisation of agricultural feeders and irrigation pumps. Meanwhile corporate procurement becomes a major source of demand. Open-access reforms have simplified renewable procurement for commercial and industrial consumers, with corporate power purchase agreements expected to underpin around 20% of utility-scale solar PV and wind capacity additions by 2030.

India is becoming a leading clean energy manufacturing hub globally, helping to diversify international supply chains. Annual solar PV module manufacturing capacity reached around 225 GW in September 2026 and is projected to rise further by 2030, maintaining India's position as the world's second-largest manufacturer. Its wind manufacturing industry is also expanding, with India projected to become the worlds second-largest manufacturer by 2030. Indias industrial policies, including the Production Linked Incentive and domestic sourcing requirements, have mobilised investment in solar PV manufacturing. New policies are also targeting strategic upstream segments of the solar PV supply chain where global dependence on imports from China exceeds 95%.

Solar PV manufacturing capacity and share in non-China global manufacturing capacity, India, 2020-2030

India increased biofuel production sixfold between 2020 and 2025, driven by strong policy support. Liquid biofuel consumption reached around 11 billion litres in 2025 and is projected to rise to 16 billion litres by 2030. Sustainable aviation fuel blending targets for international flights, starting at 1% in 2027 and rising to 5% by 2030, are opening a new market. Electrification is advancing in parallel: electric vehicles accounted for more than 11% of new vehicle sales in 2026, while India leads global growth in electric three-wheelers.

Liquid biofuel production in India, 2018-2030 : Compressed biogas is emerging as a domestic alternative to imported natural gas. Indias sustainable feedstock potential could support production of up to 75 billion cubic metres equivalent annually close to current natural gas demand. As natural gas import dependence rises from 52% in 2024 to around 71% by 2030, scaling up biogas could strengthen energy security and reduce import needs. Over the longer term, the National Green Hydrogen Mission offers an additional important route to reduce fossil fuel use in industry.

India has made significant progress in expanding access to clean cooking, with the number of people without access more than halving since 2010. This progress is accelerating the shift away from traditional biomass, improving health outcomes for millions of Indians. By 2030, traditional biomass use falls by 20% and renewable heat consumption increases by 25%, led by modern bioenergy. Solar thermal heat generation is forecast to increase by more than 50%, lifting India from sixth to fourth place globally. In industry, the Carbon Credit Trading Scheme, biomass support programmes and a 2026-2031 roadmap for electrifying selected industrial heat uses are creating new opportunities for renewable heat.

The next phase of Indias renewable energy growth will depend on aligning infrastructure and market reforms with the pace of deployment. Faster transmission expansion, improved forecasting and dispatch, more energy storage, stronger demand-side flexibility and greater flexibility from fossil fuel power plants will be needed to efficiently integrate growing shares of variable renewable energy into the power system. Improving DISCOM finances remains central to investor confidence, while facilitating land acquisition, streamlining permitting and reducing execution delays are crucial for wind and hydropower projects. Swiftly addressing these challenges could accelerate renewable power capacity deployment over 2026-2030 by more than 20%. More extensive and efficient feedstock supply chains, underpinned by high sustainability standards will also be needed to accelerate the use of biogas, biofuel and solid bioenergy.

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1. All capacity values presented in the Executive summary include solar PV capacity measured in alternating current terms.

Source: www.iea.org

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CONTAINER MANUFACTURING PROMOTION SCHEME INDIA S 10,000-CRORE CATALYST FOR CONTAINER MANUFACTURING

Container Manufacturing Promotion Scheme : Maritime transport is a cornerstone of global trade, with shipping containers playing a vital role in the seamless movement of goods across borders. As of February 2026, India's maritime sector facilitated **95%** of the country's trade by volume and **70%** by value. Beyond its role in trade, the sector contributes **4-5% to India's GDP**.

As India strengthens its position in global manufacturing and international commerce, the demand for containerised cargo movement continues to grow, underscoring the need to build domestic container manufacturing capabilities. To amplify this, the Union Cabinet has approved the **Container Manufacturing Promotion Scheme (CMPS)** with budgetary outlay of **10,000 crore up to FY 2039-40**.

What are Containers?Shipping containers are standardized steel freight containers that transport cargo across ships, railways and road vehicles without unloading and repacking the goods during transit.

Built as per ISO (International Organization for Standardization) specifications, they enable seamless intermodal transport and efficient global trade.

The most common sizes are 20-foot and 40-foot containers, measured in Twenty-foot Equivalent Units (TEUs), the standard unit used to measure container capacity.

Building India's Container Manufacturing Ecosystem : CMPS supports the Government's initiatives under Make in India, Maritime Amrit Kaal Vision 2047 and multimodal logistics development, contributing to India's long-term maritime and trade ambitions-

DID YOU KNOW?As per the United Nations Conference on Trade and Development (UNCTAD), **~80%** of global merchandise trade by volume is transported by sea.

- It aims to **establish a globally competitive container manufacturing ecosystem** by promoting domestic manufacturing and encouraging investment across the value chain.
- The initiative seeks to **reduce import dependence** and **strengthen supply-chain resilience.**
- It also **supports new manufacturing facilities** and **expands existing container manufacturing units.**



Components under CMPS : The scheme provides assistance through major components: **investment support, operational expenditure, and testing and certification.**

Interest Subvention Assistance (ISA) : With a financial outlay of **859 crore**, ISA provides a 3% per annum interest subvention on eligible term loans (capital loans) availed by container manufacturers to set up **greenfield facilities and brownfield expansion** of existing manufacturing capacity. To qualify for this support, projects must meet the following criteria:

Greenfield and Brownfield FacilitiesA greenfield project involves building a completely **new asset,** while a brownfield project involves upgrading, renovating, or repurposing an **existing asset.**

1. Greenfield facilities must have an annual capacity of at least **1,00,000 TEUs;**
2. Brownfield expansions must add at least **25,000 TEUs** of annual capacity to be **commissioned within three years** of in-principle approval, and **comply with global container standards.**

Operational Expenditure Assistance (OEA) : The component provides a financial outlay of **8,891 crore** to support containers manufactured as per global shipping standards and sold by eligible manufacturers. The assistance is intended to bridge the cost gap and improve the competitiveness of domestically manufactured containers.

Operational Expenditure Assistance (OEA) by Container Type

Container Type	Assistance Value (per container)
20 ft Container	49,500
40 ft Container	86,625
20 ft Specialised Container	37,125-74,250

To avail support, manufacturers must meet a **minimum local-content requirement of 70%** through FY 2031-32. These criteria will further **rise to 90%** from FY 2032-33 to strengthen the domestic supply chain.

Testing and certification assistance : A financial outlay of **150 crore** has been allocated to support the setting up of common facilities such as Dynamic longitudinal impact.



Expected Outcomes and Wider Economic Impact

The scheme aims to expand domestic container production while strengthening India's export potential, supply chains and related industries.

1. **Expanded manufacturing capacity:** Annual domestic container manufacturing capacity is expected to increase by around ten-fold, up to **7.5 lakh TEUs**.
2. **Export potential:** It will help build a **globally competitive container manufacturing base** and help India strengthen its potential to position itself as a **global export hub** for quality shipping containers.
3. **Supply-chain resilience:** The resilience of India's maritime and logistics supply chains is expected to strengthen.
4. **Employment generation:** It aims to generate an estimated **3,000 direct jobs** and **over 50,000 indirect jobs.**
5. **Support for ancillary industries:** The Scheme is also expected to benefit industries such as corner castings, specialised steel, wooden frames and paints.



Strengthening India's Maritime Ecosystem : In addition to CMPS, various other measures have been undertaken to build an integrated, domestically anchored logistics ecosystem.

Establishment of the Bharat Container Shipping Line (BCSL) : To build and support an integrated container ecosystem anchored in India, a Memorandum of Understanding (MoU) was signed in February 2026 to establish the **Bharat Container Shipping Line (BCSL).**

The agreement brings together the Shipping Corporation of India (SCI), Container Corporation of India (CONCOR), Jawaharlal Nehru Port Authority (JNPA), V.O. Chidambaranar Port Authority (VOCPA), Chennai Port Authority and Sagarmala Finance Corporation Limited (SMFCL), under the aegis of the Ministry of Ports, Shipping and Waterways. The MoU will **establish a self-reliant container shipping ecosystem** linking JNPA, VOCPA and Chennai ports with inland markets. It aims to improve end-to-end logistics, stabilise freight costs and strengthen India's trade competitiveness.

Broader Support for the Maritime Sector : Several complementary government initiatives are also strengthening India's maritime sector.

Area of Support	Key Measures and Initiatives
Legislative Support	Merchant Shipping Act, 2025, the Coastal Shipping Act, 2025 and the Indian Ports Act, 2025
Digital Support for Ease of Doing Business	One Nation One Port Process (ONOP), the Maritime Single Window and e-Samudra
Integrated Logistics Network	PM Gati Shakti, The National Logistics Policy (NLP), The Sagarmala Programme

Conclusion : CMPS is set to **strengthen India's maritime manufacturing capabilities**, enhance supply-chain resilience and create employment opportunities, while reducing import dependence. Aligned with broader maritime reforms, the scheme advances India's ambition to **emerge as a globally competitive maritime manufacturing and logistics hub.**

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MANUFACTURING MOMENTUM: BUILDING A SELF-RELIANT INDIA

Introduction : As India celebrates its 80th Independence Day, the nation's manufacturing sector stands as a pillar of self-reliance and progress. Over the past 12 years, bold reforms under the Make in India vision have reshaped industries, positioning the country as a global hub. Defence equipment, textiles, pharmaceuticals, medical devices, and heavy machinery are now produced at world-class standards, serving both domestic and international markets. To further accelerate this momentum, the Government has introduced several initiatives like the **Production Linked Incentive (PLI) scheme, PM GatiShakti, the National Logistics Policy, BHAVYA, and programmes for the electronics and MSME sectors**.

Strengthening India's Manufacturing Ecosystem : The manufacturing sector now contributes about **16–17 percent of GDP** and employs **over 27 million workers**. The compounded annual growth rate (CAGR) of Manufacturing GVA at constant prices (2022-23 base) as per the revised series during 2022-23 to 2025-26 is **10.88%**. Merchandise exports in July 2026 reached **USD 44.24 billion**, compared to USD 36.98 billion a year earlier, while manufacturing output grew **7.8 percent** in June 2026. These indicators show manufacturing as a central driver of India's economic growth.



India's Defence Transformation: From Self-Reliance to Global Exports : India's defence industry has undergone a remarkable transformation in the past decade. Focused policies, targeted investments, and a strong push for self-reliance have turned the country into a significant producer and exporter of defence equipment.

Key Facts:

- The value of indigenous defence production reached a record **1.78 lakh crore** in FY 2025–26. This marked **15.6% growth** from 1,54,071 crore in the previous fiscal and 46,429 crore in 2014–15.
- Defence exports surged from 686 crore in 2013–14 to **38,424 crore in 2025–26**.

- Indian defence products are now exported to 80+ countries, showing over **5,500%** growth in the last twelve years.
- Defence PSUs and other PSUs contributed around **76% of total production** in FY 2025–26. The private sector's share rose to **24%**, reflecting greater industry participation.
- Till May 2026, 10 **Positive Indigenisation** lists, five each of DMA & DDP, covering 5,521 items, were notified, resulting in increased Aatmanirbharta in defence production.
- **Srijan Defence Equipment Empowerment Platform (DEEP)** is a digital repository promoting indigenous defence sourcing. As of May 2026, it listed over 41,000 vendors and 2.7 lakh products, strengthening domestic supply chains.

India's Electronics Boost : India has rapidly evolved into a major centre for electronics production, achieving exceptional growth in both output and exports. Successive policies like the National Policy on Electronics, SPECS, EMC 2.0, and PLI have reshaped electronics manufacturing. Schemes such as Electronics Components Manufacturing Scheme (ECMS) further strengthened India's Electronics System Design and Manufacturing (ESDM) ecosystem, driving growth and competitiveness. Electronics production rose from **11.32 lakh crore in FY 2024–25 to 13.11 lakh crore in FY 2025–26**, a **15.8% year-on-year increase**.

Indicator	2014–15	2025–26	Growth
Production of electronics goods	Rs 1.9 lakh ~ crore	Rs 13.11 ~ lakh crore	7 times
Exports of electronics goods	~Rs 38,000 crore	Rs 4.24 ~ lakh crore	11 times
Mobile phone production	Rs 18,000 crore	Rs 6.27 ~lakh crore	33 times
Mobile phone exports	Rs 1,500 crore	Rs 2.59 ~lakh crore	165 times

Semicon Manufacturing

India's emergence as a semiconductor destination has been built on sustained reforms across the electronics sector. The **Semicon India Programme (Semicon 1.0)** was approved in December 2021 with an outlay of **76,000 crore**. It was launched to build a domestic semiconductor and display manufacturing ecosystem. Building on it, **Semicon 2.0** has been approved in July, 2026 with a total budget outlay of **1,27,500 crore**.

Progress Under Semicon India Programme 1.0 : As of July 2026, twelve manufacturing units have been approved with investments **exceeding 1.64 lakh crore**. These include one silicon fab, one silicon carbide fab, an integrated Gallium Nitride Micro LED display fab, and nine packaging units. Together, they are expected to meet chip requirements across consumer appliances, industrial electronics, automobiles, power electronics, telecommunications, and aerospace.

Out of the twelve approved proposals, three companies, Micron, Kaynes, and CG Semi have already started commercial production. One more company is expected to begin operations in 2026, further strengthening India's semiconductor manufacturing base.

India's Mobile Manufacturing Rise : India's mobile manufacturing sector has grown rapidly, strengthening domestic production, exports and value addition.

- **99.2%** of mobile phones used in India are now made domestically.
- India is the **world's second-largest mobile phone manufacturer** by volume.
- India has shifted from a net importer to a **net exporter** of mobile phones since 2014.
- PLI scheme for **Large Scale Electronic Manufacturing (LSEM)** has attracted around 96,000 crore in investments across the mobile manufacturing ecosystem.
- Domestic value addition reached **23%** in FY 2023–24, alongside strong growth in production and exports.
- Smartphones became India's top individual exported commodity in FY 2025–26, surpassing petroleum, gems and jewellery.

Mobile Phone Manufacturing Scheme: This scheme was approved on July 15, 2026, with a **62,500 crore** budget. It focusses on boosting production, domestic value addition, supply chain resilience and global competitiveness. The five-year scheme will run from **FY 2026–27 to FY 2030–31**. Incentives range from **2.25% to 5%**, with additional support for local sourcing, Indian brands, design and R&D.

India's Pharma Edge: Scaling Manufacturing and Exports : India ranks 3rd in volume and 11th in value in the global pharmaceutical industry. It plays a crucial role in ensuring affordable healthcare worldwide by supplying 20% of the world's generic medicines and a large share of vaccines. Steady growth in production, exports, and domestic innovation has reinforced its position as a trusted global supplier.

Key Facts:

- In **2024-25**, the sector's annual turnover reached **Rs. 4.72 lakh crore**.
- **Three PLI schemes under** the sector have a total budgetary outlay of **25,360 crore** and have attracted over **51,997 crore in investments**.
- The schemes have achieved **3.88 lakh crore in**

cumulative sales, including exports exceeding **2.43 lakh crore**.

- Manufacturing capacity has been created for **218 APIs/KSMs/drug intermediates** and **57 medical devices**, including CT, MRI, ultrasound and critical implants.
- Medical device exports increased from **26,915 crore in 2019–20 to 42,360 crore in 2024–25**. Domestic manufacturing rose from **28,000 crore to 41,500 crore during** the same period.
- **Scheme for promotion of Bulk Drug Parks:** The scheme was approved in 2020 to establish three Bulk Drug Parks with world-class common infrastructure to reduce the cost of manufacturing of bulk drugs. Three parks were approved in Andhra Pradesh, Gujarat and Himachal Pradesh in FY 2022–23.
- **Biopharma SHAKTI (Strategy for Healthcare Advancement through Knowledge, Technology and Innovation) Scheme:** The scheme was announced in Union Budget 2026-27, with an outlay of 10,000 crores over the next 5 years.

Textiles& Apparel on the Rise: Building Global Competitiveness

India's textile and apparel industry is one of its most important manufacturing sectors. It is the **second-largest employer** after agriculture, providing livelihoods to **over 45 million people** and supporting MSME-led industrial development.

- India has several natural and structural advantages in the sector, such as a strong raw material base, manufacturing capabilities for the complete value chain, and a sizeable domestic market. Additionally, the country is among the **world's largest cotton producers** and the largest exporter of cotton yarn.
- Textiles and apparel contribute **~2% to national GDP, 11% to manufacturing GVA, and 9% of merchandise exports**.
- In FY2025, India exported textile products worth **USD 37.7 billion**. It accounted for **4.1% of global textile and apparel exports**, making it the sixth-largest textile exporter globally.
- Government initiatives such as the **PLI Scheme for Textiles, PM MITRA Parks, the National Technical Textiles Mission, Textiles Export Promotion Mission, National Fibre Mission** and the recently announced **Mission for Cotton Productivity** are likely to strengthen manufacturing capabilities further and improve sector competitiveness.

India's Maritime Push: Making Ships and Containers : Several initiatives in the maritime sector have been introduced to strengthen domestic manufacturing and enhance India's competitiveness globally.

In September, 2025, a comprehensive package of 69,725 crore was announced to strengthen domestic shipbuilding capacity, maritime financing and skilling. It has the following three components:

Shipbuilding Development Scheme (SbDS)

- This scheme has an outlay of **19,989 crore** and aims to increase India's **annual shipbuilding capacity to 4.5 million Gross Tonnage (GT)**.
- Greenfield shipbuilding clusters will receive 100% capital support for common maritime and internal infrastructure through a 50:50 Centre–State Special Purpose Vehicle.
- Existing shipyards will receive 25% capital assistance for brownfield expansion and upgradation of critical infrastructure, including dry docks, ship lifts, fabrication facilities and automation systems.
- Greenfield shipbuilding clusters are proposed in **Andhra Pradesh, Gujarat and Tamil Nadu**. Three brownfield expansion projects have also received in-principle approval.

Maritime Development Fund

- The Maritime Development Fund has a corpus of **25,000 crore** to support longterm financing in the maritime sector. It includes a **20,000 crore Maritime Investment Fund** with 49 percent Government equity participation. Also, it has a **5,000 crore Interest Incentivization Fund** to reduce borrowing costs for shipyards.

Shipbuilding Financial Assistance Scheme (SBFAS)

- **24,736 crore** has been allocated under the SBFAS to address cost disadvantages and strengthen financing, capacity, and infrastructure. Its guidelines were issued on **26 December 2025**.

Container Manufacturing Assistance Scheme (CMAS) : **CMAS** was announced in **the Union Budget 2026-27** to expand domestic container manufacturing capacity and strengthen India's position in global container supply chains.

- **10,000 crore** has been allocated under CMAS over five years.
- CMAS targets annual domestic capacity of up to **7.5 lakh TEUs**. This is around **10 times the existing capacity**.
- **In July 2026,** India rolled out its **first domestically manufactured EXIM shipping container** for A.P. Moller–Maersk. The container was unveiled at the **Maersk–CONCOR Inland Container Depot in Dadri, Uttar Pradesh**.

Automobiles: Manufacturing Strength : India has a strong automobile industry, supported by extensive manufacturing capabilities and a large auto-component

ecosystem. It is the **world's largest market for two-wheelers and three-wheelers**, and the **third-largest** for passenger and commercial vehicles globally. The sector is also advancing electric mobility, supported by rising EV adoption and government initiatives.

- The sector provides direct and indirect employment to over 30 million people across India.
- Vehicle production increased from 22.65 million units in FY21 to **31.03 million units in FY25**. Overall production grew by nearly **33%** between FY15 and FY25.
- **PLI Scheme for Automobile & Auto Components Industry**: The scheme was approved in September 2021 with an outlay of **25,938 crore**. It promotes high-value Advanced Automotive Technology vehicles and products. It attracted **44,326 crore** in investment by March 2026. It also generated **67,820 jobs** during the same period.
- **PM E-DRIVE Scheme**: Launched in September 2024, the scheme has an outlay of **10,900 crore** to support electric mobility. It provides incentives for around 28.30 lakh EVs, including e-2W, e-3W, e-trucks, e-buses, and e-ambulances. 4,391 crore has been allocated for 14,028 e-buses, out of which 14,000 e-buses have already been deployed. 2,000 crore has also been allocated for EV public charging stations across India.

India's Solar PV Manufacturing: Rapid Growth and Expansion : India's solar PV manufacturing sector has expanded rapidly, strengthening domestic production of solar cells and modules. The domestic PV market is valued at around **32,400 crore** and is expected to grow strongly through 2030.

- The domestic PV market is expected to grow at a **17–20% CAGR** between FY23 and FY30.
- Approved List of Models and Manufacturers (ALMM) listed solar module capacity reached **100 GW** in August 2025. This increased sharply from nearly 2.3 GW in 2014.
- Solar cell manufacturing capacity reached **25 GW** in March 2025. This Capacity increased from less than 1.2 GW in 2014.
- The government introduced the PLI scheme for high-efficiency solar PV module manufacturing. The scheme has two tranches with total funding of **24,000 crore** and awarded **48 GW** integrated PV capacity.
- PV exports in FY25 were **eight times higher** than in FY18. Higher cell-to-module capacity under the PLI scheme supported this growth.

The Road Ahead : India's manufacturing sector today reflects steady progress, deepening capability and growing confidence across industry. Sustained policy support and rising private participation continue to strengthen this foundation year after year. As new capacities mature, the sector is well placed to expand its global role. The coming years promise wider opportunity, greater value creation and a stronger self-reliant economy.

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Source: PIB Research

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INDIA, EU DISCUSS FTA IMPLEMENTATION, CUSTOMS COOPERATION AND MARKET ACCESS IN BRUSSELS

India and the European Union (EU) have discussed preparations for implementing their Free Trade Agreement (FTA), along with measures to improve market access, simplify customs procedures and strengthen supply chain cooperation during high-level meetings in Brussels.

KEY TAKEAWAYS

AI SUMMARY

- India and the European Union (EU) have discussed preparations for implementing their Free Trade Agreement (FTA), along with measures to improve market access, simplify customs procedures and strengthen supply chain cooperation during high-level meetings in Brussels.
- Commerce Secretary Rajesh Agrawal held meetings with senior European Commission officials, including Ditte Juul Jørgensen, Director-General of the Directorate-General for Trade and Economic Security (DG TRADE); Koen Doens, Director-General of the Directorate-General for International Partnerships (DG INTPA); and Gerassimos Thomas, Director-General of the Directorate-General for Taxation and Customs Union (DG TAXUD).
- According to an official statement by the Union Ministry of Commerce and Industry, during his meeting with Jørgensen, both sides discussed ways to facilitate two-way trade, improve market access, strengthen supply chain resilience and create new business opportunities for companies in India and the EU.
- They reaffirmed their commitment to a fair, balanced and mutually beneficial agreement and agreed to maintain close engagement to address the remaining procedural and implementation-related issues.

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In a separate meeting with Thomas, discussions focused on customs cooperation, trade facilitation and preparations for implementing the India-EU FTA. Both sides highlighted the importance of efficient, transparent and digitally enabled customs procedures to reduce transaction costs for businesses and ensure the smooth movement of goods. The meetings come after India and the European Union officially concluded negotiations on the FTA at the 16th India-EU Summit on January 27, 2026, in the presence of Prime Minister Narendra Modi and European Commission President Ursula von der Leyen.

The agreement is currently undergoing legal scrubbing and verification ahead of its proposed signing in mid-December 2026. Its full ratification and entry into force are targeted for mid-2027. The agreement is expected to provide wider market access for businesses on both sides. Under the proposed arrangement, tariffs will be eliminated on over 99 per cent of Indian exports to the EU, benefiting labour-intensive sectors such as textiles, leather and jewellery.

India will also reduce duties on over 96 per cent of European goods, including a phased reduction in automobile tariffs to 10 per cent under an annual quota of 250,000 units. Apart from trade negotiations, Agrawal also met representatives of the diamond industry associated with the Antwerp diamond ecosystem. Discussions covered the global diamond value chain, certification and traceability requirements, responsible sourcing and opportunities arising from India's growing diamond market and manufacturing ecosystem.

India and Belgium have identified gems and jewellery as an important area for deeper cooperation, with Antwerp, Mumbai and Surat recognised as major diamond centres. The Commerce Secretary also participated in a BusinessEurope roundtable with

European industry representatives, where he discussed opportunities to strengthen trade and investment ties, improve market access and enhance supply chain resilience.

Agrawal highlighted India's economic growth, reform momentum and investment opportunities across key sectors, while inviting European businesses to deepen their engagement with India and participate in its expanding value chains. In another meeting with Doens, both sides discussed development cooperation, sustainable development, clean energy and green technologies. India and the European Union bilateral merchandise trade stands at approximately USD 136.54 billion (Rs 11.5 lakh crore) in 2024-25. India's exports to the EU during the period stand at around USD 75.85 billion (Rs 6.4 lakh crore). Trade in services between the two sides reaches approximately USD 83.10 billion (Rs 7.2 lakh crore), reflecting the growing importance of services in their economic partnership. Overall bilateral trade between India and the EU stands at nearly USD 140 billion, having doubled over the past decade. This highlights the growing economic significance of the partnership and the potential for further expansion following the implementation of the FTA. (ANI)

Source: www.devdiscourse.com

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INVESTMENTS IN RENEWABLE ENERGY HELPED INDIA AVERT ENERGY CRISIS AMID WEST ASIA WAR, SAYS PM MODI

India has already met its Paris Agreement target of sourcing 50% of installed power capacity from non-fossil fuels, five years ahead of schedule. Modi said the country aims to add another 500 GW over the next 10-11 years. Rituraj Baruah, special correspondent covering energy, housing, urban affairs, heavy industries and small businesses at Mint.

Prime Minister Narendra Modi on Monday linked India's ability to weather the energy disruptions caused by the West Asia conflict to its investments in renewable energy, making the case for accelerating the country's clean energy transition. The government aims to add 500 GW of non-fossil fuel capacity over the next 10-11 years, he said. Addressing the Bharat Renewable Energy Summit & Expo 2026, Modi said the ongoing geopolitical tensions had exposed the risks of dependence on fossil fuels, arguing that energy security was directly linked to economic security.

"In the past few years, global economy has witnessed unprecedented crises ranging from Corona (pandemic) to the West Asia conflict. The West Asia crisis still continues. But, so far, India has handled this crisis in a better way and despite this the growth has been high. If India had not invested in clean energy and created new systems for this over the past decade, then our crisis could have been much more severe than the rest of the world. This global crisis has sent a clear message: energy security is directly linked to economic security," Modi said.

He said the renewable energy sector had attracted investments worth 15 trillion, or $164 billion, over the past 15 years, with a further investment opportunity of 20 trillion by 2030. "This global crisis has given a clear signal to every country that energy security is directly linked to economic security and we all know that energy security has its future in clean energy. If we remain highly dependent on fossil fuels, then global economy will get disrupted repeatedly, because the reserves of fossil fuels is limited," the prime minister added.

Scaling up clean energy : PM Modi said India had achieved its Paris Agreement commitment to source 50% of its installed power capacity from non-fossil fuel sources in 2025, five years ahead of schedule. More than half of the country's installed power capacity now comes from such sources. India currently has 308 GW of non-fossil fuel capacity, accounting for about 55% of its total installed power generation capacity of 558.89 GW, according to Central Electricity Authority data.

"Over the next 1011 years, our effort will be to add 500 gigawatts of new non-fossil fuel capacity. This target is somewhat difficult, but I have faith in the capabilities of our country. And that is why I say, We will do it!"

He also cited the progress of the PM Surya Ghar Muft Bijli Yojana, launched in February 2024 to install rooftop solar panels in one crore households. More than 6.5 million households have been covered under the scheme in 24-25 months, with new installations being added at a pace of one lakh homes every six days, he said. "This scheme of India can give great strength to energy security in many countries."

Modi said India's clean energy ambitions extended beyond hydro, solar, wind and nuclear power. Under the National Green Hydrogen Mission, the country is working towards producing 50 lakh tonnes of green hydrogen by the end of the decade and integrating it into the transport sector.

"Just a few months ago, India started its first green hydrogen train," he said. He also stressed the need to develop energy storage solutions to ensure a round-the-clock supply of green power, saying India required indigenous technologies to support the expansion of its clean energy transition.

Source: www.livemint.com

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WILL SUPPLY CHAIN BE REPLACED BY AI? WHAT STUDENTS NEED TO KNOW IN 2026

BIFEI WANG

Will supply chain be replaced by AI? See which logistics and procurement tasks AI already does, why entry-level roles are shrinking, and what to do now. " Will supply chain be replaced by AI? Not the field: BLS projects logisticians to grow 17.6% from 2025 to 2035. But entry-level work is shrinking: in an October 2026 Gartner survey, 66% of supply chain leaders said headcount cuts were concentrated at entry level. " AI agents already quote freight, sort customs documents and flag forecast exceptions, so the data entry and tracking side of junior roles is going first.

" Analysts who handle exceptions, suppliers and carriers hold up best. Planning and recording clerks are projected to shrink. " Your move: build supply chain fundamentals, data skills and one real operations project before you apply.

Externships are short, remote professional experience programs where you work on real projects for real companies, with guidance from people in the field. The Amazon Fulfillment Center Operational Strategy & People Analytics Externship puts you on operations questions from one of the biggest logistics networks in the world. Explore all Externships.

Will Supply Chain Be Replaced by AI?

No, supply chain as a field isn't being replaced by AI. Logistics analyst jobs are still projected to grow fast. But the entry-level layer is shrinking right now, because AI agents are taking over the quoting, tracking, data entry and paperwork that used to be a new hire's first year.

The Short Answer : Supply chain is splitting in two. The analyst and management side keeps growing, driven by e-commerce and more complicated delivery networks. The transactional side, the part where someone keys in orders, chases documents and updates spreadsheets, is being automated quickly. And that transactional side is where most people used to start. So that's our verdict for this field: shrinking at entry level. It's a harder call than in most articles in this series, and we didn't make it lightly. The growth numbers are real. So are the cuts.

Having sat down with thousands of students one-on-one, we hear the same worry from people looking at operations and logistics: "If AI runs the warehouse and the forecasts, what's left for me?" Quite a lot, it turns out. It just isn't the work an entry-level coordinator did five years ago.

Our author's background includes years in recruitment process outsourcing, and that changes how we read this shift. When the easy first-year tasks disappear, employers don't stop hiring juniors. They start screening harder for juniors who can already do the second-year work. For the wider picture across fields, see our guide to jobs AI won't replace.

The AI Exposure Scorecard : Same five rows as every article in this series, built from BLS projections, two AI usage studies, an industry survey and Extern's own job-posting data.

Scorecard row	Supply chain (logisticians as the core role)	Source (as of)
Task exposure	BLS category: Very high. Anthropic observed exposure 0.16 (143rd of 756 occupations). Microsoft AI applicability 0.16 (343rd of 785, near the middle).	BLS, Aug 2026; Anthropic, Mar 2026; Microsoft Research, 2025
Job outlook	Logisticians +17.6% from 2025 to 2035, about 26,600 openings a year, median pay $82,320	BLS, 2025-35 projections, May 2025 pay
Entry-level hiring signal	47% of AI-using supply chains cut headcount (average 10.5%) over two years; 66% of leaders say cuts were concentrated at entry level. Live "supply chain analyst" postings rose from about 1,200 to about 1,400 (July to October 2026).	Gartner, Oct 2026; Extern posting tracker (Adzuna), 2026
Most exposed role	Production, planning and expediting clerks (Very high exposure, projected -1.3%), plus quoting and booking work at freight brokers	BLS, 2025-35; C.H. Robinson, Oct 2026
Least exposed role	Transportation, storage and distribution managers (lowest observed AI use in this group, projected +6.1%)	Anthropic, Mar 2026; BLS, 2025-35
Verdict	**Shrinking at entry level (logisticians still projected +17.6%)**	**Extern analysis**

One oddity worth knowing. BLS puts logisticians in its top exposure tier, but on the two studies that measure what people actually use AI for, they sit near the middle. BLS blends in theoretical measures of what AI could do, and its own methodology page says the category doesn't predict job loss. So read "Very high" as "a lot of this job could be automated," not "this job is gone."

What Parts of Supply Chain Is AI Already Doing?

AI is already doing freight quotes, customs paperwork, demand-forecast screening, contract review and store task planning. The common thread is routine, repeatable decisions with clear rules, which is exactly the work new hires used to learn on.

Freight Quoting, Booking and Customs

The clearest example comes from C.H. Robinson, one of the largest freight brokers in the US. In October 2026 it said its Lean AI agents had produced more than 80,000 freight quotes for more than 3,600 customers, cutting turnaround from about a day for air freight (and two to three days for ocean) to two or three minutes. Its customs agents sort and attach documents and chase missing ones, which cut customs time by 23%.

Then look at the company's third-quarter 2026 results. Shipments per person per day in its North American truck business rose 15% from a year earlier and 65% since the end of 2022.

The company doesn't give a headcount figure, so we can't say AI cut a specific number of jobs.

But the math is hard to ignore. When each person moves 65% more freight, a growing company needs fewer new people per load, and the work that went away first is quoting and booking.

Planning, Procurement and Store Operations

Forecasting is moving to what planners call exception-based planning. The software screens every product and flags only the ones that need a human look. In pilots described by MIT's Center for Transportation & Logistics (October 2026), accuracy ran about 70% to 80% for predictable products and lower for volatile ones, and messy data held results back more than the AI technique did.

Is procurement next? It's already started. MIT CTL describes how Novant Health uses AI agents (September 2026) to review thousands of overlapping supplier contracts, flag pricing differences and draft messages to suppliers, while buyers make the calls. In retail, Walmart said in June 2025 that its AI task tool cut store shift planning from 90 minutes to 30, and it rolled out an AI assistant for its merchants (buyers).

What AI Does vs What Still Needs You

Here's the task-by-task split, based on company releases and federal task data.

Task	What AI does today	What still needs a person	Source
Freight quoting	Produces quotes in minutes instead of days	Customer relationships, unusual or complex shipments	C.H. Robinson, Oct 2026
Customs documents	Sorts, attaches and extracts data; chases missing paperwork	Validation and compliance by customs brokers	C.H. Robinson, Oct 2026
Ocean booking and routing	Identifies the port, checks terminal fees, suggests routing	Oversight and final decisions	C.H. Robinson, Oct 2026
Demand forecasting	Screens every product and flags exceptions	Deciding when to override the forecast	MIT CTL, Oct 2026
Supplier contract review	Flags pricing differences, recommends standardization, drafts supplier messages	Buyer and clinician decisions	MIT CTL, Sep 2026
Purchase orders and bids	Generates routine POs from stock levels and lead times	Evaluating suppliers, negotiating contracts	O*NET; MIT CTL, Oct 2026
Store task planning	Prioritizes associates' tasks, cuts planning time by two-thirds	Managers assign and adjust	Walmart, Jun 2025

MIT CTL sums up where agents fit: decisions that are "routine, reversible, and have bounded costs." Anything else still lands on a person's desk.

What Does the Job Data Actually Say?

The job data splits cleanly by layer. Federal projections show strong growth for logisticians and analysts and declines

for clerks. But a fall 2026 industry survey found that supply chains using AI are cutting headcount, and that the cuts land hardest on entry-level staff.

The BLS Outlook for 2025 to 2035 : According to the BLS Occupational Outlook Handbook (2025-35 projections, May 2025 pay), logisticians are projected to grow 17.6%, about five times the 3.5% rate for all jobs, with 26,600 openings a year and a median wage of $82,320. BLS ties that growth to e-commerce making logistics more complex. Its outlook for logisticians doesn't mention AI at all.

The rest of the field, also from BLS 2025-35 data:

" **Operations research analysts:** +11.9%, median $88,940.

" **Transportation, storage and distribution managers:** +6.1%, median $107,230.

" **Buyers and purchasing agents:** +6.0%, median $77,710. BLS notes that organizations continue to automate procurement tasks and integrate AI, framed as efficiency.

" **Production, planning and expediting clerks:** -1.3%.

" **Shipping, receiving and inventory clerks:** -7.6%.

So the cuts sit in the clerical layer, not the analyst layer. Weighing this against other majors? Our list of the best-paying AI-proof majors shows how it compares.

From Extern's Data : Extern tracks US job postings daily, and the supply chain numbers looked steadier than the headlines.

" **Analyst postings rose.** In US job-posting counts Extern tracks daily (Adzuna, July to October 2026), live "supply chain analyst" postings went from about 1,200 to about 1,400 (monthly averages).

" **Manufacturers and carriers hire the most interns.** The employers posting the most supply chain and operations internships in Extern's posting tracker (August to November 2026) were Bosch (80 listings), CHS (61), J.B. Hunt (58), Raytheon (39), MSD (34) and Kroger (31), out of 1,943 listings from 429 employers.

" **Pay is decent.** Among 24 listings with employer-published pay, the median for supply chain internships was $23.50 an hour, with the middle half between $20.25 and $28.00. Fall is busy hiring season, so don't read too much into one quarter. But postings for the core analyst role went up, not down, which isn't what you'd expect from a field AI is wiping out.

What Industry Surveys Say About Entry-Level Hiring

This is where the verdict comes from. In a Gartner survey of 303 supply chain leaders published October 28, 2026, all at organizations already using AI, 47% said they had reduced headcount by an average of 10.5% over two years, primarily because of AI. Separately, 66% of leaders said the reductions were concentrated at entry level, more than double the share reporting cuts at other levels.

Earlier in the year, Gartner found 55% of supply chain leaders expected agentic AI to reduce entry-level hiring needs (February 2026, 509 leaders).

Two caveats. These are leaders reporting on their own companies, and every company in the October survey already used AI, so it isn't a census of the field. Economy-wide research points the same direction, though. Stanford's Digital Economy Lab found employment of 22- to 25-year-olds in highly AI-exposed occupations is about 19% below where it would have been (ADP data through June 2026). That study doesn't single out supply chain, and its authors don't claim AI caused the gap.

Yet the people who are in the field are doing fine. ASCM's 2026 salary report (May 2026) put the US median base salary at $98,500, and nearly 70% of US job changers found a new role within six months. Getting in is the hard part.

Live US job postings, July vs October 2026

Average daily count of live postings matching each title. Postings are not hires, and counts move with the hiring season.

Supply Chain Analyst **+21% (1.2K ! 1.4K)**

Source: Extern job-posting tracker (daily Adzuna counts, US), July 6 to October 31, 2026.

Which Supply Chain Jobs Are Safest, and Which Are Most at Risk?

The safest supply chain jobs involve exceptions, negotiation and running physical operations: logisticians, operations research analysts, buyers and distribution managers. The most at risk are transactional roles, such as planning and inventory clerks and the quoting and booking work at freight brokers.

Seven Supply Chain Roles Compared : Outlooks are BLS 2025-35 projections; exposure reflects BLS, Microsoft and Anthropic measures plus company announcements.

Role	AI exposure	BLS outlook (2025-35)	Why
Logistician or supply chain analyst	High (BLS Very high; mid-pack on usage studies)	+17.6%	E-commerce adds work faster than AI removes it; the analyst becomes an exception manager
Demand or production planner	High	Mixed (planning clerks -1.3%)	Forecasting moves to exception review; planning judgment stays
Buyer or purchasing agent	High	+6.0%	Routine POs automate; negotiation and supplier evaluation stay human
Freight broker or logistics coordinator	High	Fewer people per load	Quoting, booking and customs paperwork are now agent-run at C.H. Robinson
Operations research analyst	High (heaviest actual AI use in this group)	+11.9%	AI becomes the analyst's tool, and demand rises with data
Warehouse or distribution manager	Medium	+6.1%	Runs automated sites; robotics adds technical roles
Inventory or shipping clerk	Medium	-7.6%	RFID, sensors and robots remove counting and scanning

Projected US employment change, 2025-35

BLS projections by occupation. Dashed line = 3.5% average for all occupations.

Logisticians	**+17.6%**
Operations research analysts	**+11.9%**
Transportation, storage and distribution managers	**+6.1%**
Buyers and purchasing agents	**+6%**
Production, planning and expediting clerks	**-1.3%**
Shipping, receiving and inventory clerks	**-7.6%**

Source: U.S. Bureau of Labor Statistics, Employment Projections 2025-35 (released August 2026).

Operations analyst roles overlap a lot with business analysis, and our sibling article on whether AI will replace business analysts covers that side.

The Pattern Behind the Table : The recording and transaction layer shrinks. The analyst, exception and relationship layer grows. That's a little too neat, actually. Look at the freight broker row: the job didn't vanish. Each person now handles far more volume, which hits hiring long before it hits anyone already employed.

How Is AI Changing Entry-Level Supply Chain Work?

Entry-level supply chain work is losing its data entry, tracking and paperwork, and gaining exception handling, supplier communication and checking what AI produces. Employers that still hire juniors are asking for more on day one: more analytics, more domain knowledge, more proof you've done real work.

Which Junior Tasks Are Going, and Which Are Growing

Going:

" Data entry, database upkeep, shipment tracking and routine reports

" Freight quoting, booking requests and customs document handling

" Routine purchase orders and bid requests

" Crunching forecast numbers for every product

Growing:

" Handling exceptions and deciding when to override a forecast

" Talking with suppliers, carriers and customs brokers

" Validation and compliance checks

" Structuring the data and context an AI agent needs, then judging its output

" Technical roles around automation

That last point surprised us. Amazon says its advanced robotics sites need 30% more people in reliability, maintenance and engineering roles (company post, accessed November 2026). Robots don't remove every job. They change which ones exist.

The Bar for Entry-Level Roles Is Going Up

Here's a detail from that same October Gartner release that's easy to miss. The top-performing supply chains weren't eliminating entry roles. They were raising them: asking for more domain knowledge, analytics and experience, with less repetitive work and more consequential decisions. Gartner also predicts that by 2030, 75% of supply chain organizations that paused entry-level hiring in 2026 will pay premiums of 15% or more for early-career talent (May 2026). That's a prediction, not data. And it cuts both ways: it suggests the pause won't last forever, but it also says plenty of companies are pausing right now.

And adoption is still early in most places, which is honestly good news for students. A University of Mannheim study run with ISM found 80% of organizations still exploring or piloting AI in procurement (April 2026). MHI's 2026 industry report found 41% of companies using AI, up from 30% a year earlier, according to DC Velocity. We're not sure how fast the rest will catch up, and nobody else is either. You've got time to prepare, but not much.

One thing hasn't changed, at least on paper. BLS lists a bachelor's degree, no prior experience and no on-the-job training as the typical entry path for logisticians. That keeps the door open, and it means you compete on what you can show.

What Skills Make a Supply Chain Professional Hard to Replace?

The supply chain professionals who are hardest to replace understand the fundamentals, know when a forecast is wrong, can model data, handle disruptions and negotiate with real people. They also know how to give an AI agent the right context and check its work.

Six Skills and How to Prove Each One

1. **Supply chain fundamentals.** Inventory policy, lead times, sales and operations planning. MIT CTL argues you need these to judge any AI recommendation. ASCM's CPIM or CSCP path proves it, and ASCM's 2026 report found certified professionals earn up to 20% more at the median.
2. **Statistics and forecasting judgment.** MIT's pilots found traditional statistical methods sometimes beat newer models. Prove it with a forecasting project that compares a simple baseline with a machine learning model and spells out when you'd override each.
3. **Data modeling.** Excel, SQL, Python and Power BI. Build a dashboard or optimization model for your portfolio. Our article on whether AI will replace data analysts covers these tools in more depth.
4. **Exception handling.** Write up a real disruption, such as a tariff change or a port delay, and your response plan.

5. **Supplier and carrier negotiation.** These are among the least automatable tasks in the O*NET lists for logistics analysts and purchasing agents. A mock negotiation or a supplier scorecard you built for a real company shows it.

6. **Directing AI agents.** Document a small automation, like generating purchase orders from stock data, including the checks you added to catch its mistakes.

Do you need all six? No. Two or three, backed by a real project, will beat a resume full of coursework.

How Can You Get AI-Ready Supply Chain Experience as a Student?

Get experience on real operations data for a company that needs the answer: a supply chain internship, a remote Externship in operations analytics, or both. Because entry-level roles are tightening, the students who get hired are the ones who show up with that proof already.

Internship Programs to Target : Our supply chain internships guide covers top programs, pay and timelines. The good news on timing: most summer 2027 supply chain internships post on a rolling basis from late summer 2026 into early 2027, so November isn't too late for many of them.

For company-specific details, see our Amazon internship guide and J.B. Hunt internship guide. Look past the household names too. Bosch, CHS and Kroger were among the busiest posters in our tracker this fall.

An Externship in Operations Analytics : An Externship is a short, remote program where you complete real projects for a company with an extern manager guiding you. Most run 8 weeks (the range is 4 to 11), at about 5 to 10 hours a week.

The Amazon Fulfillment Center Operational Strategy & People Analytics Externship is the closest fit for this field. You work on operations strategy and people analytics questions from fulfillment centers, the same kind of exception and staffing problems that are growing as routine tasks automate.

When we asked students why they'd miss Extern, real-world experience was the top answer (31% of 273 project completers, October 2025). At Extern, we've seen that operations-minded students interview better once they can walk through one decision they backed with real data, including what they'd do if the numbers were wrong. That's exactly the second-year skill employers are now screening for. You can browse current Externships when you're ready.

Source: www.extern.com

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INDIAS JAVELIN DEAL: THE UNENDING LOOP OF PROCUREMENT

DINAKAR PERI, FELLOW WITH THE SECURITY STUDIES PROGRAM AT CARNEGIE INDIA

The deal is one of the earliest defense deals between India and the U.S. It is also the one that dragged on the longest.

"BIG news! India plans to buy the battle-tested Javelin anti-tank system," U.S. Ambassador to India Sergio Gor announced on X on August 28, as the Indian Army signed the letter of offer and acceptance (LOA) for the purchase of the missile system through the foreign military sales (FMS) route, also adding that it's opening the door to "co-production possibilities." For the Indian Army, it marks 16 years of ups and downs and the long lead time to fill a critical capability gap in anti-tank guided missiles (ATGM), even if only piecemeal.

The Javelin is a versatile, one-man-portable and platform-mounted fire-and-forget anti-tank precision weapon system that is capable of defeating all kinds of armor and fortified positions. It is in service with more than 25 countries, including the U.S. Army and the U.S. Marine Corps.

Following this, Lockheed announced a memorandum of understanding (MoU) between Tata Advanced Systems Limited (TASL) and the Javelin Joint Venture (JJV), a partnership between Raytheon and Lockheed Martin, for the "co-production of the Javelin All Up Round (AUR) in India." The MoU will explore establishing a final assembly and integration facility for the Javelin AUR, along with component production capabilities, in India, Lockheed said in a statement.

While the specifics of the LOA haven't been released yet, the U.S. Defense Security Cooperation Agency notification of November 2025 said that India would purchase 100 Javelin rounds and 25 launch units at an estimated cost of $45.7 million. The entire saga can be viewed through two prisms: the deepening India-U.S. defense cooperation, and India's rickety military modernization epitomized by the Javelin saga.

The Quest for ATGMs : The nearly 1.3 million-strong Indian Army started looking for a new generation fire-and-forget ATGM in the early 2000s to replace the Konkurs and Milan in service. The overall requirement is for over 40,000 missiles to equip the 382 infantry battalions and 44 mechanized regiments. However, as

the indigenous effort by the Defense Research and Development Organization (DRDO) was delayed, the Army started looking for import options to partly fill the deficiency.

In August 2010, Defense Minister A. K. Antony informed the Indian parliament that his ministry proposed to issue a letter of request to the U.S. government for procurement of the Javelin ATGM along with transfer of technology under their FMS route. After the issue of the letter of request, further procurement-related necessary action will follow, he added.

The Army's first experience with the Javelin came in 2009 during the bilateral exercise Yudh Abhyas, where the U.S. Army fielded it and so, was under consideration. While it was extensively tested, the deal didn't move forward due to U.S. technology transfer limitations. This was when the Army moved to acquire the Spike ATGM manufactured by Rafael Advanced Defense Systems of Israel.

The Spike Journey : The Defense Acquisition Council, the highest decision-making body on procurements in the Ministry of Defense, accorded initial approval for procurement of Spike in 2009 for over 8,000 missiles and 300 launchers with technology transfer for their domestic manufacture, a deal worth $500 million. It was approved in October 2014, but the contract negotiations went into a loop over cost and technology transfer.

In fact, in 2016, in anticipation of the deal and to meet the domestic manufacturing requirement, Rafael set up a joint venture with Kalyani Group to manufacture sub-assemblies, with defense public sector firm Bharat Dynamics Limited (BDL) being the system integrator. The deal was cancelled in January 2018, just ahead of Israeli Prime Minister Benjamin Netanyahu's visit to India visit, as it was felt that indigenous development was making progress. However, the deal was revived soon after, by the end of 2018, for the purchase of 170 launchers, 4,500 missiles and 15 simulators. This too dragged on for a few years but never came to fruition due to questions being raised over the missile's performance during the validation trials.

All through this, the Javelin was never fully out of the picture.

After the Balakot air strike in February 2019 in response to the Pulwama terrorist attack and simmering tensions with Pakistan, the Army procured a small number of Spike-LR (long-range) ATGMs under the emergency procurement route sanctioned by the MoD to fill critical deficiencies. The order was for 12 launchers and around 250 missiles. The Army repeated the order for the Spike-LR in 2020 in another round of Emergency Procurement sanctioned after the standoff with China along the disputed border at Ladakh.

Orders were capped at 3 billion Indian rupees, valued at $42 million in 2019. The Spike-LR, a 4th-gen missile with a range of up to 4 kilometers, is a different variant from the one originally tested. This remains the only new generation ATGM inducted by the Indian Army in the whole period.

Given the long and convoluted procurement process, emergency procurement has become the preferred way to fast-track critical procurements.

India-U.S. Defense Industrial Cooperation

The Javelin deal, which emerged out of growing India-U.S. bilateral defense and strategic cooperation, is one of the earliest defense deals between the two countries and the one that dragged on the longest. Incidentally, the Javelin was also tested in 2024 along with Stryker infantry combat vehicles. However, the performance of the missile was sub-optimal as the lot provided for trials was dated. While the Stryker deal drags on, Operation Sindoor in 2025 reinforced the deficiencies.

The Javelin deal strengthens the U.S.-India Major Defense Partnership and also opens discussions on mutually beneficial co-production and additional opportunities to strengthen the defense industrial bases of both countries, a U.S. Embassy statement said. The local manufacture of assemblies and parts of the Javelin fits into the overall deepening of India's presence in the supply chains of U.S. companies manufacturing components and sub-assemblies.

TASL itself is now a major player in this segment with a series of tie-ups with U.S. defense majors. For instance, with Boeing, it manufactures fuselages, secondary structures and vertical spar boxes for AH-64 Apache attack helicopters, and vertical fins for 737 aircraft; and fixed wings for Lockheed Martin's C-130J and F-16 aircraft. Such integration of Indian industry over the last two decades has positioned the U.S. as India's top defense export destination.

While India has significantly increased its defense procurements from the U.S., the effort for co-development and co-production has had no real success to date. The crown jewel of that effort, the license manufacture of the GE-414 jet engine domestically to power the Light Combat Aircraft-Mk2, has been stuck for several years now. Though small as a system, the Javelin is high in its battlefield impact and will be a step forward in the joint endeavor. That this was announced amid the current turbulence in the India-U.S. relationship showcases the distance travelled by the two countries on the defense and strategic front.

Acquisition of the Javelin too is through the Emergency Procurement route that limits the numbers that can be purchased. The larger requirement of the Indian Army for ATGMs remains unfulfilled. An ATGM is a critical battlefield weapon whose importance has grown manifold since its utility was underscored in Ukraine and other conflicts. While the Indian armed forces look at niche and emerging technologies, procurement of several other such basic but critical systems are caught in a loop. This merits immediate attention and action even as India keeps Operation Sindoor rolling and prepares for the next round of confrontation with Pakistan. While development of the indigenous man-portable ATGM by DRDO has made progress, the timelines are still long. Coupled with evolving threats, this Javelin deal is likely the first of many.

Source: thediplomat.com

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HOW AI IS SHIFTING GLOBAL SUPPLY CHAINS FROM REACTIVE TO PREDICTIVE

AI-driven predictive orchestration, digital twins, and human-in-the-loop systems are redefining how global supply chains manage risk, resilience, and performance

KISHAN KUMAR

Key takeaways

- **Predictive orchestration is replacing siloed planning models.** AI-powered control towers now integrate procurement, manufacturing, and logistics data, enabling global companies to anticipate disruptions rather than react to them.
- **Generative AI and digital twins are becoming operational tools.** Beyond experimentation, generative AI is being used to simulate thousands of "what-if" scenarios, optimize safety stock, and identify single-source risks across global supply networks.
- **Autonomous logistics is improving efficiency and sustainability.** AI-driven routing, autonomous mobile robots, and physical-internet concepts are reducing last-mile costs, cutting emissions, and supporting ESG goals worldwide.
- **Human expertise remains central to AI-enabled supply chains.** The future model is human-in-the-loop, with professionals shifting from tactical execution to exception management, strategic oversight, and relationship leadership.

We are experiencing an extraordinary level of volatility in the global supply chain ecosystem right now. There are many factors contributing to the current volatility including, but not limited to, geopolitical changes, logistical bottlenecks resulting from the impacts of climate, and the residual effects of a pandemic. All of these factors have placed extreme pressure on the traditional "just-in-time" model. In today's volatile environment, it is the companies that can process large amounts of data that ultimately determines whether they will be successful or unsuccessful as enterprises.

By mid-2026, artificial intelligence (AI) will no longer be a concept that is discussed in executive suites around the world. AI will be the driving force behind the global economy and trade. For supply chain executives to be able to remain competitive within this new paradigm, they must focus on moving beyond simply using descriptive analytics (i.e., understanding what occurred) and move toward the use of predictive and prescriptive AI (i.e., predicting what will occur and determining how to react).

The rise of predictive orchestration : The key trend of 2025-2026 will be "predictive orchestration." The historical approach to supply chain management was a siloed model where procurement, manufacturing & logistics were using different data systems. Today, companies are now using AI-based control towers to integrate those silos. Companies are now using machine learning (ML) algorithms to ingest external signals like weather patterns, port congestion data and even social media sentiment to predict disruptions before physical disruption occurs.

As an example, Generative AI is now being utilized to run digital twin simulations to stress test supply chains against thousands of what if scenarios, allowing for leadership to develop resiliency through design and identify single-source vulnerabilities and dynamically optimize their safety stock levels instead of annually reviewing them.

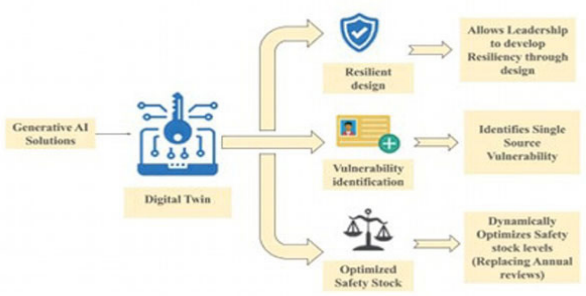


Figure 1: Illustration of The Blueprint for Resilience: Organizations can create active supply chain planning systems through Generative AI and Digital Twins which unite risk management functions with flexible operational systems.

Generative AI: Beyond the hype to operational utility : Large language models (LLMs) have been in the spotlight with respect to creating content. But in the supply chain context, their real potential is in managing unstructured data. Much of the friction within the supply chain originates from paper-based processes: bills of lading, customs documentation, and multi-page, multi-clause contracts between suppliers and buyers. Currently Generative AI has begun to automate the contract lifecycle management process which identifies in real time high-risk contract language and suggests alternative sourcing options in response to global events that may cause supply chain disruptions. Additionally, AI-based conversational interfaces are enabling all stakeholders to access data through simple conversation. For example, a warehouse manager does not need to be a data scientist to know their inventory turnover, they simply ask the system "which SKUs are at risk of being out-of-stock as of today if the current west coast port

delay continues for three more days," and receives an immediate response that can enable action.

Autonomous logistics and the physical internet : The last mile of delivery has historically been the most complicated and costly part of the entire supply chain process. The convergence of artificial intelligence and computer vision technologies has provided the driving forces for innovation in this area. Autonomous mobile robots (AMRs) that are used within fulfillment centers have transitioned from simple follow-the-line type robots to autonomous agents that can navigate the changing environment with human workers.

At a global scale, AI is optimizing what is known as the physical internet—a concept where modularized, standardized containers are moved along an open, connected network of routes. In the physical internet, AI serves as the air traffic controller to optimize the flow of these containers and maximize their loads and minimize the number of miles traveled on empty (deadhead) trips. While there may be some cost savings due to improving the efficiency of the delivery of goods through the optimization of routes using AI—there is also a growing sustainability mandate. The use of AI to improve the route taken by vehicles in the delivery of products will help companies meet stricter environmental, social and governance (ESG) requirements by reducing the amount of fuel consumed during the delivery process.

The human-centric AI transition

An inaccurate assumption made about artificial intelligence is that it is designed to replace the human factor in the supply chain. The best AI implementations will be based on a human-in-the-loop (HITL) philosophy. While AI is best suited to process large volumes of data; humans have an advantage over AI when it comes to strategic intuition and managing relationships.

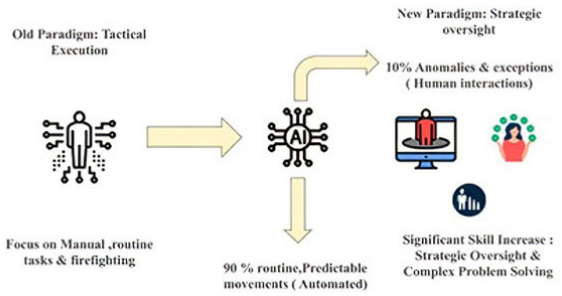


Figure 2 : Illustration of Evolving Role - Exception Management & Strategic Oversight

As the supply chain becomes more autonomous, the function of the supply chain professional has evolved toward exception management. While AI manages 90% of routine, predictable movements and flags anomalies as a need for human interaction, this new paradigm requires a significant increase in skill level among professionals—moving from a focus on tactical execution to a focus on strategic oversight.

The challenge of data integrity and cybersecurity : The boost provided by AI is only as strong as the data feeding it. The main obstacle that prevents global businesses from achieving success is what they put into their systems because garbage in, garbage out. The main emphasis of 2026 centers on data clean rooms and blockchain technology that use blockchain-based data provenance to verify AI engine data authenticity while safeguarding it from unauthorized modifications.

The expansion of software-defined systems has created larger attack surfaces for supply chains because these systems now present more opportunities for cyber attackers to launch security threats. The development of AI innovation needs "AI for security" predictive systems that use shipment data analysis to identify irregular patterns that might indicate cyber-breach or physical cargo theft incidents.

Conclusion: The intelligent enterprise : Integration of AI within global supply chains represents an evolution in the science behind commercial transactions rather than simply an update of technology. There will be a "self-healing" supply chain as we move toward having systems that not only recognize issues, but can also autonomously take action to correct those issues by rerouting a ship, switching to an alternative source with secondary suppliers, or changing prices due to an increase in demand.

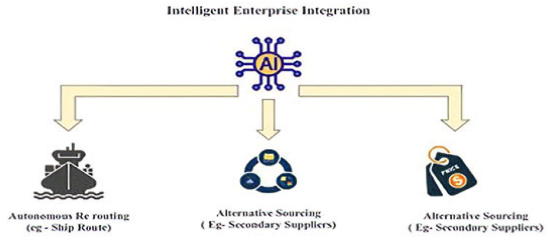


Figure 3: Illustration of - Intelligent Enterprise integration

Academic/consultant professionals need to address the void in understanding between the theoretical capabilities of AI and real-world operational issues. Those who establish an intelligent enterprise, based upon this model, will be able to prosper from the next disruption, while others merely survive.

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Source: SCMR

PROCUREMENT REFORMS IN INDIA: TRANSFORMING THE PUBLIC SECTOR FROM COMPLIANCE TO INNOVATION

VISHNU IAS ACADEMY

Procurement Reforms in India are reshaping how the government acquires goods, works, and servicesmoving the public sector from a rigid compliance-driven framework to an innovation-driven ecosystem. With procurement accounting for nearly 2022% of Indias GDP, these reforms under **GFR 2025** hold the potential to act as a powerful catalyst for research, development, and technological advancement.

Introduction

- Public procurement, defined as the process by which governments acquire goods, works, and services, has historically been designed with transparency, accountability, and cost-efficiency as its primary goals.
- However, global experiences show that procurement frameworks can also serve as catalysts for innovation, spurring research and development (R&D) by creating stable demand for advanced technologies. In India, procurement accounts for nearly 2022% of GDP, making it a critical policy lever.
- Recent reforms in Indias General Financial Rules (GFR 2025) such as raising financial thresholds, allowing exemptions from the Government e-Marketplace (GeM), and delegating approval powers mark a significant shift from rigid compliance to a more flexible, innovation-supportive system. The challenge lies in balancing fraud prevention and efficiency with the need to empower public institutions to act as early adopters of new technologies.

Procurement as a Barrier to Innovation

Overemphasis on Procedural Compliance

- Historically, Indias procurement rules mandated GeM purchases for all sub-200 crore equipment, often ignoring the specialised needs of scientific research.
- This forced institutions to undergo lengthy exemption processes, delaying time-sensitive projects.
- Example: Indian labs working in biotechnology and quantum computing faced months-long delays due to non-availability of niche instruments on GeM.

Quality and Suitability Issues

- Vendors listed on GeM often provided substandard or generic materials, compromising the quality of research outcomes.
- The rigidity of “lowest-cost bidding” undervalued technical sophistication, reducing incentives for private firms to innovate.
- Case Study: Multiple CSIR laboratories reported that procurement delays and unsuitable tools led to underutilisation of grant funds.

Bureaucratic Delays and Centralisation

- Approvals for high-value global tenders often required ministerial clearance, creating bottlenecks.
- This hampered Indias ability to compete globally in high-tech fields.
- Example: The Prime Ministers Economic Advisory Council flagged procurement delays as a major barrier to R&D efficiency.

Procurement Reforms as an Enabler of Innovation

Flexibility through GFR 2025 Reforms

- Recent reforms raised the direct purchase limit from 1 lakh to 2 lakh and allowed institutional heads to bypass GeM for specialised equipment.
- Delegating approval for global tenders up to 200 crore to vice-chancellors and directors reduced bureaucratic lag.
- This shift reflects the principle of “catalytic procurement”, where flexibility fuels innovation ecosystems.

Global and Comparative Lessons

- Germanys High-Tech Strategy institutionalises innovation procurement through agencies like KOINNO, promoting “mission-oriented procurement.”
- The US Small Business Innovation Research (SBIR) program reserves 3% of federal R&D funds for startups, creating ecosystems for early-stage innovation.
- South Koreas pre-commercial procurement rewards prototype development, even at higher costs, to push moonshot technologies.

Case Studies in Public Innovation Procurement

- The European Unions Green Procurement model helped create demand for renewable technologies, shaping markets ahead of time.
- NASAs contracts for semiconductor development during the Cold War directly shaped the global IT industry.
- Indias GeM reforms align partially with these models but still lack structured innovation-linked procurement funds.

Challenges and Critiques of the Reform Process

Risk of Misuse and Ethical Concerns

- Granting more discretion to institutional heads assumes high standards of integrity and accountability, which are not uniform across institutions.
- Without strong monitoring mechanisms, there is a risk of procurement corruption or misuse.
- Indias historical inefficiencies in audit systems highlight this concern.

Inadequacy of Thresholds for High-Tech Fields

- While the 2 lakh direct purchase limit is helpful for routine needs, it is insufficient for capital-intensive sectors like quantum computing, space research, or medical biotechnology, where equipment costs run into crores.
- This may limit the reforms transformative potential in cutting-edge fields.

Domestic Supplier Marginalisation

- The focus on global tenders may ensure high-quality tools but risks sidelining local manufacturers unless domestic R&D ecosystems are simultaneously strengthened.
- Example: South Korea nurtured domestic firms through premium-priced prototype procurement, while India still lacks such safeguards.

Future Directions for Procurement-led Innovation

Outcome-Weighted Tenders

- Bids should be evaluated not only on cost but also on supplier innovation capacity, R&D investment, and scalability potential.
- Example: Finlands procurement model incorporates innovation indices in evaluation criteria.

Sandbox Exemptions for Premier Institutions

- Granting institutions like IITs, IISc, and TIFR partial exemptions from GFR for a fixed percentage of procurement could allow experimental flexibility.
- Innovation targets could be audited by third parties annually to maintain accountability.

AI-Augmented Procurement Systems

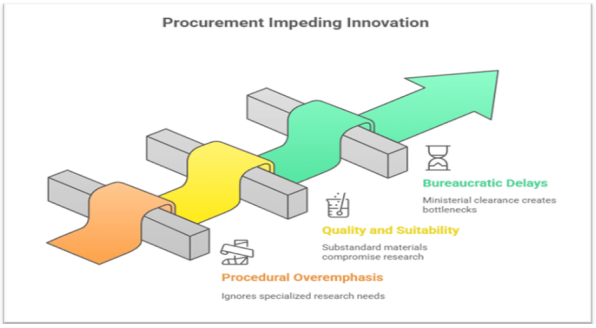
- Leveraging the INDIAai ecosystem, AI could scan global catalogues, predict customs delays, and recommend alternatives, reducing decision cycles from months to hours.
- Example: During the Pfizer COVID-19 vaccine project, AI-driven procurement identified multiple suppliers within hours, compressing timelines.

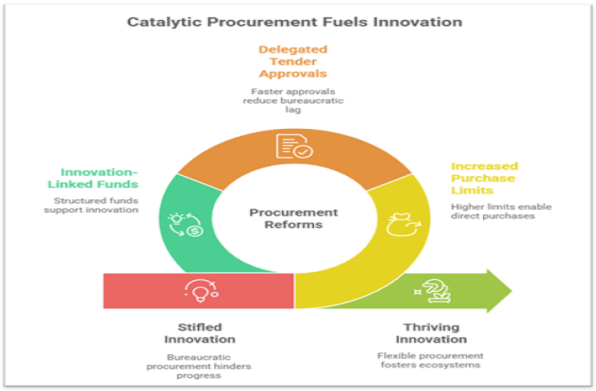
Collaborative Procurement Models

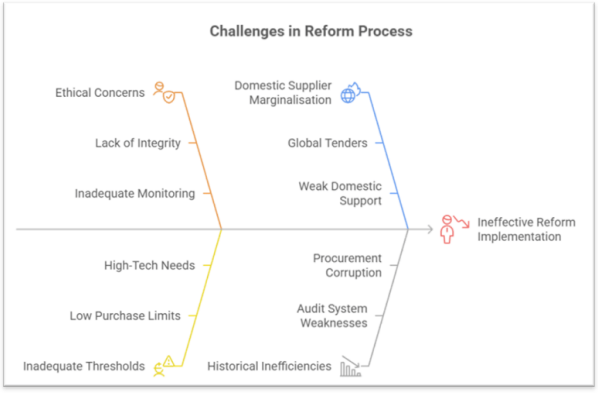
- Adopting a Joint Procurement Agreement similar to the EU could allow Indian labs to pool demand for high-cost items like cryogenic coolers.
- This would generate economies of scale, reduce duplication, and incentivise suppliers to invest in R&D.

Conclusion : Procurement reforms in India represent an important shift from rigid, compliance-driven rules to a more flexible and innovation-driven framework. While the recent GFR 2025 reforms such as raising purchase limits, bypassing GeM for specialised equipment, and delegating approval powers address key pain points, their impact will depend on implementation, accountability, and alignment with national innovation goals. International experiences from Germany, the US, and South Korea highlight that procurement can shape markets and accelerate technological breakthroughs when linked explicitly to R&D outcomes.

Moving forward, India must integrate outcome-based evaluation, AI-assisted procurement, sandbox exemptions for premier institutions, and collaborative alliances. With procurement accounting for nearly one-fifth of Indias GDP, even marginal improvements can have a multiplier effect on innovation. If implemented effectively, procurement can transform Indias public sector into an innovation catalyst, helping the nation achieve its aspiration of becoming a global R&D hub.







Source: vishnuias.com

QUALITY INFRASTRUCTURE, CLEAN ENERGY AND CONSUMER SAFETY TAKE CENTRE STAGE AT THE NATIONAL CELEBRATION OF WORLD STANDARDS DAY 2026

Union Cabinet Minister Shri Pralhad Joshi Highlights Role of Standards in Indias Clean Energy Transition

MoS Shri B. L. Verma and Smt. Nimuben J Bambhaniya Address BIS World Standards Day Event in Delhi

BIS Launches Silver Refinery Scheme and Roadmap for Sustainable Agriculture and Sustainable Manufacturing

New Indian Standards Released for the Emerging Technology, Clean Energy, Traditional Medicine & Healthcare

In a major push toward strengthening national quality infrastructure and accelerating India's clean energy transition, Bureau of Indian Standards unveiled BIS Silver Refinery Scheme, New Indian Standards on emerging technologies & clean energy mobility and a standardization roadmap for sustainable agriculture and manufacturing on the occasion of World Standards Day 2026 at the national event hosted in New Delhi. Delivering the presidential address to standardization professionals, academicians, industry representatives and senior officials; Shri Pralhad Joshi, Union Minister for Consumer Affairs, Food & Public Distribution, and New & Renewable Energy, and Education; emphasized India's commitment to quality: "Under the vision of PM Narendra Modi ji, our journey towards Viksit Bharat is driven by a single mantra: Quality, Quality, and only Quality." Speaking on this year's theme, 'Shared Vision for a Better World: SDG 7 (Clean & Affordable Energy)', Shri Joshi highlighted the role of Indian Standards developed by BIS in shaping India's energy transformation.

Congratulating BIS on its ongoing efforts to expand the quality ecosystem in the country, Shri B. L. Verma, Minister of State for Consumer Affairs, Food & Public Distribution and Social Justice & Empowerment, underscored the fundamental impact of standards in improving quality of life of every citizen. Smt. Nimuben Jayantibhai Bambhaniya, Minister of State for Consumer Affairs, Food & Public Distribution, emphasized the consumer-centric aspect of standardization. She underscored the need to expand standard development into newer domains, ensuring a balanced ecosystem that simultaneously drives industrial growth and protects consumer welfare.

Commending the landmark achievements of BIS in the recent years, Smt. Nidhi Khare, IAS, Secretary, Department of Consumer Affairs, underscored the pivotal role of standardization in establishing uniformity, consistency, and process institutionalization across public procurement and regulation. She stressed that effective consumer protection must be preventive driven by robust testing, digital enforcement, and conformity assessments.

Welcoming the delegates, Director General of BIS, Shri Sanjay Garg, said, "Standards are vital enablers of innovation, technology development, and industrial strength." He announced that BIS is among the world's first national standardization bodies to make standards' development and its access completely digital for all stakeholders. He also highlighted major reforms at BIS supporting Ease of Doing Business.

Launch of BIS Silver Refinery Scheme : The BIS certification scheme for silver refineries and mints, extends structured purity assurance and hallmarking to silver bullion and coins across India and establishes a national framework for silver purity modelled after the existing Gold Refinery Scheme. Following the gazette notification of Amendment No. 1 to Indian Standard IS 2112:2025 (Silver and Silver Alloys, Jewellery/Artefacts — Fineness and Marking), fine silver bullion and coins of three purity grades: 999.9, 999.5, and 999.0 parts per thousand (ppt), have been included in scope of the standard, with provision for hallmarking by BIS licensed refineries and mints.

Under the scheme, BIS will grant license to qualified silver refineries and mints after assessing their technical competence, refining processes, and testing infrastructure. Licensed facilities will be authorized to apply the official BIS hallmark to silver bullion and coins conforming to the prescribed requirements. For assured authenticity and traceability across the precious metals supply chain, hallmarked silver bullion and coins will bear a standardized BIS mark comprising of the BIS Standard Mark accompanied by the word SILVER, purity grade (999.9, 999.5, or 999.0), the manufacturer's identification mark and a unique serial number for batch traceability.

The standard prescribes rigorous sampling and testing protocols for refineries and mints to determine the silver content in bullion and coins. These include advance analytical methods such as Gravimetric testing (IS 2113), ICP-OES difference method (IS 16900 / ISO 15096) and Spark-OES difference methods (IS 19563 / ISO 18214).

Launch of BIS Digital Standard Reader – BIS Digital Standard Reader is a web-based platform that converts XML-formatted Indian Standards into interactive SMART standards. Designed to enhance accessibility, the tool enables users to search technical content, navigate hyperlinked cross-references, access an in-built dictionary, and translate text into Indian languages. Accessible across mobile devices, tablets, and desktops, the platform also features an analytics dashboard to track usage trends and establishes an AI-ready repository for future digital services. This will make Indian Standards much user friendly and easy for adaption.

Release of New Indian Standards - On this occasion BIS announced the rollout of 7 new Indian Standards across

diverse sectors, including textiles, clean mobility, therapeutic healthcare, robotics, and building materials.

Emerging Technologies & Clean Energy Mobility -

1. **Cables for Electric Vehicle Charging Systems (IS 19967:2026):** Defines construction, insulation, thermal management, and testing protocols for flexible charging cables (up to 1,100 V AC / 1,500 V DC) operating under demanding outdoor conditions across AC Modes 1–3 and DC Mode 4 systems
2. **Pedal Assisted Bicycles / EPACs (IS 19891:2026):** Provides standards for design, electrical circuit safety, short-circuit/overheat protection, and anti-tampering rules for Electrically Power Assisted Cycles with continuous rated power up to 0.25 kW and speed cut-off at 25 km/h
3. **Wearable Service Robots** – Lower Limb (IS 17192 Part-6:2026): Adopts international testing criteria (identical to ISO FDIS 18646-6:2025) using anthropomorphic test dummies to evaluate the motion, stability, and performance of lower-limb assistive and rehabilitation robotics.

Healthcare–

1. **Paediatric Panchakarma Droni (IS 19960:2026):** assuring safety, structural stability, non-toxic coatings, and oil-resistance specifications for Paediatric Panchakarma treatment tables (Droni) for Infant (birth to 2 years) and Child (2 to 10 years)
2. **Therapeutic Footwear Specification (IS 19956:2026):** Assuring clinical and mechanical safety criteria for footwear designed for diabetic and neuropathic patients. It covers pressure relief, internal depth, rocker geometry, moisture management, and antifungal properties to mitigate foot ulceration risks.

Industrial Materials & Building Products

1. **Flexible Plywood Specification (IS 19952:2026):** Provides standard classifications, glue bond strength grades (moisture-resistant, BWR, and BWP), and formaldehyde emission limits for curved wood-based panels used in interior design and architecture
2. **PVC Coated Fibreglass Insect Screen (IS 19825:2026):** Outlines requirements for mesh strength, UV degradation resistance, flame propagation resistance, and structural durability for fibreglass insect screening utilized in residential and commercial spaces.

Release of National Roadmaps for Standardization in the field of Sustainable Agriculture & Manufacturing : On this occasion, a strategic roadmap developed by Environment and Ecology Division Council of BIS to establish Indian Standards for the sustainable agricultural sector was released. The document addresses challenges including climate change, resource depletion, land degradation, post-harvest losses, and inefficient nutrient use. It spans 15 categories, covering soil management, water use, agricultural inputs, emerging technologies, climate services, and socio-economic support. Aligned with the National Action Plan on Climate Change (NAPCC), the roadmap outlines standard formulation across three timelines: short-term (1 year), mid-term (2–3 years), and long-term (4–5 years).

In another roadmap released today, for Sustainable Manufacturing, low-carbon technologies, resource efficiency, circular economy practices, sustainable product design, digitalisation, sustainability reporting and supply-chain management have been identified as key areas for standardisation.

Award of Best Technical Committees for Development of Standards

On the Occasion of World Standards Day, BIS presents the Best Technical Committee Award to recognise the outstanding contributions, technical expertise, and collaborative efforts of experts in advancing the development of Indian Standards in the respective sectors. This year 16 distinguished technical committees have been conferred with this prestigious award.

Addition of 6 New Academic Institutions into Standardization Framework - In the presence of Union Minister of State Shri B L Verma and Smt Nimuben Jayantibhai Bambhaniya, BIS onboarded **IIT Ropar, NIT Manipur, NIT Meghalaya, Assam Textiles Institute, and IIT Dharwad, and RGIPT** (Rajiv Gandhi Institute of Petroleum Technology) as MoU partner institution with an objective to integrate Indian standards into academic curricula and transform students into standards-ready professionals. As on date BIS has 98 number of MoU partner institutions working for integration of standards in academic curricula, collaborative R&D projects for standardization as well as offering internship in BIS and industry exposure to the students.

Handbook on Good Practices for Safety in the Laboratory : BIS has published a comprehensive booklet, **'Good Practices for Safety in Laboratory,'** drawing on key standards (including IS 4209, IS 4906, and IS 9457). The reference handbook covers hazard identification, protective equipment, contamination control, and safe waste disposal for chemical, radiochemical, and microbiological facilities.

Release of Educational Comic books – On this occasion, two new comic books on Indian Standards for Toys and Hallmarking were released by BIS to foster awareness among children about the importance of standards, quality and consumer protection from an early age. With the addition of these titles, BIS has expanded its collection to 13 comic books, strengthening its efforts to promote consumer awareness through print and digital platforms. On the occasion of World Standards Day 2026, global standardization bodies ISO, IEC and ITU jointly released a video message sharing how shared standards build system-trust, accelerate innovation, and support sustainable trade. As India's national standardization body, BIS participates in over 600 technical committees across ISO and IEC to align international standard development with India's strategic interests.

Source: Bureau of Indian Standards (BIS)

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SUPPLY CHAIN DISRUPTIONS: HOW THEY HAPPEN, INDUSTRIES AFFECTED, AND HOW TO MANAGE

Empty shelves. Factory delays. Missed delivery windows. Supply chain disruptions have become more than just industry talk—they're now everyday realities with direct consequences for businesses, customers, and the global economy. When supply chains break down, the ripple effect reaches every part of operations, from raw materials stuck at borders to finished goods delayed at ports. Supply chain leaders face rising supply chain risk, increased customer demands, and unstable supply networks. Additionally, consumers' behavior and demands have shifted in response to global events, particularly during the COVID-19 pandemic, making it crucial for companies to adapt.

As supply chain disruptions occur more often due to natural disasters, external factors, and digital threats, knowing how to manage them is no longer optional. This guide explains the causes, affected industries, response strategies, and future-focused solutions.

INTRODUCTION TO SUPPLY CHAINS : A supply chain is a complex network of organizations, people, and activities that work together to produce and deliver a product or service. From sourcing raw materials to manufacturing and distributing finished goods, supply chains are the backbone of modern business operations. Effective supply chain management is crucial for companies to remain competitive, as it helps reduce costs, improve quality, and enhance customer satisfaction.

Global supply chains continue to play a vital role in the global economy, enabling many organizations to source raw materials, manufacture products, and distribute them to customers worldwide. However, supply chain disruption can have a significant impact on businesses, making it essential for companies to build resilience and develop strategies to mitigate the effects of disruptions.

The COVID-19 pandemic has underscored the importance of robust supply chain management. Many companies experienced severe disruptions due to lockdowns, border closures, and shortages of personal protective equipment. To manage supply chain disruptions effectively, companies need real-time visibility into their supply chains, the ability to communicate effectively with their supply chain partners, and backup suppliers to ensure continuity.

The use of digital tools, such as machine learning and artificial intelligence, can help companies predict and prevent supply chain disruptions, providing a competitive advantage in the market. By leveraging these technologies, businesses can build more resilient supply chains capable of withstanding future shocks.

HOW SUPPLY CHAIN DISRUPTIONS HAPPEN?

Supply chain disruptions can begin without warning. An example of such a disruption is the COVID-19 pandemic, which caused significant delays and halts in the flow of goods globally. A single event or weak link creates ripple effects that damage supply, delay production, and halt the flow of goods. Here are the most common causes of major disruptions:

NATURAL DISASTERS AND ENVIRONMENTAL FACTORS : Storms, wildfires, and floods create instant chain disruptions. Roads get blocked, inventory is lost, and logistics providers can't deliver on time. Supply chain risk rises sharply in climate-sensitive regions. Impact often stretches across supply networks, delaying goods and forcing businesses to scramble. Natural disasters expose weak points in infrastructure and planning. Supply chain planning must include weather-response strategies, alternative routes, and backup warehousing. Different regions, including other countries, are affected by these natural disasters, which can lead to widespread disruptions.

Climate-related events are increasing, making them a growing threat to global supply chain stability. Companies that prepare in advance face less damage and recover faster when disasters strike without warning.

GEOPOLITICAL RISK AND TRADE RESTRICTIONS : Tensions between countries can spark sudden supply chain shocks. Sanctions, tariffs, or political instability slow down supply chains and raise costs for both suppliers and customers. Geopolitical tensions can also slow down distribution networks and raise costs, exacerbating delays that often start at borders or customs and expand across regions.

Major disruptions result in delayed deliveries, reduced product availability, and rising prices. Export bans hit critical goods like semiconductors or food products. Trade wars damage long-term partnerships with supply chain partners. External factors linked to politics remain hard to predict. Companies must monitor global developments and build adaptable supply chain management strategies to reduce risk from international tension.

RAW MATERIAL SHORTAGES AND INCREASED DEMAND : Sudden spikes in demand clash with a shortage of key raw materials, pushing material suppliers beyond capacity. Without reliable sourcing alternatives, companies fall behind on orders and miss customer expectations.

Products like semiconductors, steel, and plastic components often become unavailable during crises. Manufacturing sites face production slowdowns or

complete halts. Industries that rely on just-in-time inventory systems feel the pressure first. Smart supply chain leaders use data and forecasting to prepare early. Risk management plans must include multiple sourcing options, storage strategies, and supplier diversification to stay ahead of potential disruptions before operations stall.

Survey respondents have highlighted how raw material shortages and increased demand have significantly affected their supply chains, emphasizing the need for better risk management and digital integration.

LOGISTICS AND TRANSPORTATION BOTTLENECKS : Port congestion, container imbalances, and labor strikes break the flow of goods. Even when products are ready, they can't reach customers on time. Shipping delays ripple through entire supply networks, disrupting production and hurting sales. Road closures or driver shortages slow inland transport. Labor issues add further delays at ports and warehouses. Rigid routes and limited carriers increase the problem. Supply chain visibility becomes critical to tracking slowdowns and planning detours.

Businesses with real-time data and flexible logistics models respond faster. Improving logistics coordination reduces lead times and helps avoid costly downtime caused by chokepoints. A systematic approach to managing logistics and transportation bottlenecks is essential for maintaining efficiency and minimizing disruptions in the production system.

CYBERSECURITY THREATS AND DIGITAL RISKS : Hackers target weak digital links, shutting down entire systems. Insecure digital tools and outdated software create openings for data breaches and human error. More transparency in digital tools and cybersecurity measures is essential to prevent these vulnerabilities. Attacks disrupt ordering systems, track-and-trace platforms, and sometimes entire production operations.

Ransomware incidents force companies offline, delaying shipments and creating customer dissatisfaction. Lost data or broken interfaces lead to confusion across supply chains. Businesses relying on cloud-based platforms must invest in cybersecurity protections. Companies reported better performance after upgrading their IT security. Strong defenses combined with real-time visibility reduce digital risk and improve response speed when cyber threats strike unexpectedly. Many organizations now use proactive planning and smart technology to detect early signs of disruption and reduce the lasting effects of supply chain disruptions.



EFFECTS OF CHAIN DISRUPTIONS : Chain disruptions can have a significant impact on businesses, leading to losses in sales, revenue, and customer satisfaction. When a supply chain falters, the ripple effect can extend beyond the company itself, affecting suppliers, logistics providers, and customers. The global economy also feels the strain, as natural disasters, talent shortages, and other factors contribute to widespread disruptions.

Companies that experience supply chain disruptions may struggle to recover, highlighting the importance of having a robust plan in place to manage disruptions and build resilience. The use of digital capabilities, such as data analytics and cloud-based technologies, can help companies respond quickly to disruptions and minimize their impact.

Supply chain leaders must prioritize building a resilient supply chain, focusing on creating a flexible and adaptable operating model that can respond to future disruptions. Ensuring compliance with ethical practices and regulations is also critical, as companies facing supply chain disruptions may be subject to scrutiny and reputational damage.

By understanding the effects of chain disruptions and taking proactive steps to build resilience, companies can reduce the risk of disruptions and ensure continuity of supply, even in the face of unexpected events. This approach not only safeguards business operations but also strengthens relationships with suppliers and customers, fostering long-term success.

INDUSTRIES AFFECTED BY SUPPLY CHAIN DISRUPTIONS

Each industry faces unique challenges when supply chain disruptions strike. Some see slowed production, others deal with empty shelves, rising prices, or lost sales. Examples of such disruptions include the COVID-19 pandemic and the Suez Canal obstruction, which have significantly impacted various industries. The following are the major industries affected by supply chain disruptions:

- **Automotive Industry:** Assembly lines pause due to raw materials delays, especially semiconductors. These shortages affect manufacturing sites worldwide, driving up costs and limiting vehicle availability.
- **Retail and Consumer Goods:** Popular items like toilet paper vanish from shelves during shocks. Weak supply chain visibility causes stockouts and unmet customer demands in key markets.
- **Healthcare and Pharmaceutical Sectors:** Disruptions slow access to personal protective equipment and medicines. The COVID-19 pandemic revealed deep gaps in supply chain planning and global sourcing.
- **Technology and Electronics:** Delays in chips, batteries, and parts reduce the production of phones, laptops, and appliances. Missing components create bottlenecks in high-volume supply chains.

- **Food and Agriculture:** Weather events, border delays, and transportation limits cut off the supply of perishable goods. These disruptions hurt both suppliers and end customers quickly.

Supply networks must evolve to stay flexible, react faster, and support uninterrupted business during rising supply chain challenges. Companies need smarter systems, agile planning, and stronger visibility to adapt quickly and avoid long-term disruption.

HOW TO MANAGE SUPPLY CHAIN DISRUPTIONS?

Every company needs a clear plan to handle supply chain disruptions. Investment in supply chain management strategies is crucial to handle disruptions effectively. Fast action helps maintain operations, reduce losses, and respond to shifting demand with accuracy and control. Follow this approach to manage supply chain disruptions:

BUILDING RESILIENT SUPPLY CHAINS : Backup suppliers protect against sudden shortages. Strong supply chain visibility allows businesses to track disruptions in real time. Diversifying sourcing from multiple regions spreads risk across the global supply chain and limits exposure.

Establishing a robust supply chain organization is crucial for building resilience. A resilient supply chain enables quicker recovery when shocks hit. Leaders who build resilience through smarter networks and stronger relationships gain a long-term competitive advantage.

Reliable partnerships, proactive planning, and adaptable sourcing models help companies better meet customer demands and avoid total shutdowns. Resilience is not optional—it's a core capability for managing today's supply chain risk in an unstable global landscape.

SCENARIO PLANNING AND RISK MANAGEMENT : Scenario planning helps teams run simulations and test responses before a disruption hits. Smart risk management prepares companies for geopolitical threats, raw material shortages, sudden demand changes, shifts in regulatory compliance, and other supply chain issues across global supply chains. Surveyed supply chain executives reported fewer losses when acting early using proactive strategies. Testing different outcomes in advance boosts preparedness and saves time during real crises.

Advanced planning supports quick pivots and reduces panic decisions. Strong planning enables organizations to stay ahead of future disruptions, improve decision making, and maintain control when external factors threaten the supply chain.

USING TECHNOLOGY TO IMPROVE SUPPLY CHAIN NETWORKS : Machine learning detects patterns and flags delays before they impact delivery. Digital capabilities such as GPS and tracking dashboards offer real-time visibility into shipments, inventory, and overall supply chain performance for quicker decision making. Smart systems improve communication, avoid bottlenecks, and streamline shipping. Automation reduces human error, increases efficiency, and improves service during high-demand periods. Companies using technology adapt faster to disruption, whether internal or external. Digital platforms also offer stronger data control and easier forecasting. Making strategic investments in tech tools transforms supply chain management from reactive to predictive, giving companies a clear edge.

IMPROVING COMMUNICATION WITH SUPPLIERS AND STAKEHOLDERS

Fast, clear messaging keeps suppliers, vendors, and clients aligned. Supporting workers in the supply chain is crucial for maintaining stability and resilience, especially during and after disruptions like the COVID-19 pandemic. Companies that communicate effectively avoid confusion, missed handoffs, shipment delays, and breakdowns in coordination. Timely updates ensure everyone stays informed, focused, and ready to respond during a disruption. Real-time collaboration tools support rapid scheduling changes and reduce lead time. Shared dashboards and updates improve teamwork and reduce friction. Supply chains depend on strong communication at every level.

Open dialogue builds trust and long-term partnerships. Teams that stay aligned recover faster from setbacks, handle complex situations with less conflict, and maintain stable operations even during periods of high stress. In short, planning, visibility, technology, and communication help businesses reduce risk and keep the supply chain running, even during the most disruptive events.

LONG-TERM SOLUTIONS TO STRENGTHEN SUPPLY CHAINS : Forward-thinking organizations must act now to prepare for future disruptions that can shake even the strongest supply chains. Addressing supply disruption in long-term planning is crucial to strengthening supply chains. Let's understand the key long-term solution to strengthen the supply chain:

SUSTAINABLE SUPPLY CHAIN PRACTICES : Making sustainability a top priority in supply chain practices helps reduce long-term risks and protect brand reputation. Ethical sourcing supports regulatory compliance while meeting consumer expectations. Clear policies, third-party audits, and traceable sourcing improve transparency across the chain.

Companies that ensure compliance with environmental and social standards gain trust and stability. Sustainable supply chains also support future growth, especially as global markets push for stronger accountability and ethical business practices.

DEVELOPING A FLEXIBLE OPERATING MODEL : Flexible operating models adjust quickly to shifts in demand, regulation, or external threats. Real-time data helps teams change routes, allocate resources, and manage inventory more efficiently. Agile systems increase responsiveness without raising costs. Leaders who embrace flexibility reduce risk and improve delivery speed. A responsive model allows organizations to focus on both short-term survival and long-term growth in

changing global environments.

INVESTING IN SUPPLY CHAIN INNOVATION : Technology gives supply chains the tools to react faster. AI, automation, and blockchain improve accuracy and traceability across the network. Smart warehouses and automated fulfillment centers speed up processing and reduce delays.

These tools also help avoid disruption during spikes in demand. Companies investing in innovation improve operations, reduce errors, and gain a competitive edge by delivering faster, smarter, and with greater consistency.

Companies that invest early in resilience, technology, and flexibility are better equipped to face supply chain disruptions and adapt to the shocks ahead. Supply chain disruptions cause a significant impact on global trade, sales, and business performance. Delays in supply, unexpected shortages, and weak links reduce efficiency across entire systems. Businesses can't afford to wait. Strong planning, smarter use of data, and better connections with suppliers help manage supply chain risk more effectively. Companies that focus on increasing visibility, adopt tech tools, and address talent gaps respond faster and more accurately to sudden changes.

Leaders must improve forecasting, diversify sourcing, and increase flexibility in their supply chains. Readers now understand how to tackle disruption and build resilience for the long run.

Source: inboundlogistics.com

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SUPPLY CHAIN INNOVATION 2026: A MANDATE FOR CREATIVITY AND CHANGE

ROBERT J. BOWMAN

The quotation harkens back to the golden age of Athens. "Just because you do not take an interest in politics," the Greek statesman Pericles is reputed to have said, "doesnt mean politics wont take an interest in you."

Now swap in the word "innovation" for "politics," and you are fairly describing the plight of business today.

And, by association, global supply chains. Those that fail to innovate are in danger of being "innovated" out of existence. Artificial intelligence alone is mandating radical change throughout organizations: the way they design, make, and move product and, most notably, the role of humans in doing it.

More on that in a moment. First, let us mark another year of the Supply Chain Innovation Award, launched more than two decades ago by *SupplyChainBrain* and the Council of Supply Chain Management Professionals to honor stellar examples of creativity across industries, disciplines and business processes. Over that time, our judges have reviewed hundreds of submissions and honored a broad range of companies crafting solutions to supply chain challenges both old and new. This years winner is **GOFO**, a specialist in last-mile delivery whose intelligence platform called ATLAS created a single digital infrastructure combining order and transportation management, and which came to the rescue of 3PL **ShipMonk** when its core carrier ceased operations overnight.

Additional finalists, all of whose submissions are included in this annual issue of *SupplyChainBrain* devoted to the award, include:

Georgia-Pacific, which gained control of its drivers and yard operations in a sweeping initiative with the support of **project44**;

Intel, which transformed its chemical and gas supply management through construction of an intelligent control tower;

Intel (again!), whose agentic AI-driven Market Intelligence platform created a means of enabling proactive supply chain defense, and

Reliance Industries Limited, which shifted from "reactive" to "resilient" with the help of an emergency response network for safe hazardous materials transportation.

We congratulate the winner and all of the finalists of this years competition. But wait, as the old infomercials used to say, theres more. Also in this issue, we present a special section on AI in supply chain. We examine the still-young technology, which is progressing in leaps and bounds beyond what anyone could have foretold, from multiple angles, including physical infrastructure, memory supply, cybersecurity, impact on IT budgets, and critical medical logistics. Like it or not, no element of supply chain management or, for that matter, our everyday lives is going to remain untouched by AI. With the rapid proliferation of massive data centers and raging debates about the fate of human talent, the technology sits squarely at the center of our national conversation. You might say it has normalized the very idea of innovation, and is forcing us all to embrace it.

So hats off to the organizations that are proactively riding the trend, and we hope to learn more about them in the form of future entries to the Supply Chain Innovation Award. (Watch for the opening of the submissions period for 2027 early in the new year.) Because in the years ahead, every supply chain leader will be faced with the question: Will you innovate? Or will you *be* innovated?

Source: www.supplychainbrain.com

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BRANCH NEWS

KOLKATA BRANCH

INAUGURATION OF THE RENOVATED IIMM KOLKATA OFFICE PREMISES, S. C. BHATTACHARYYA MEMORIAL HALL AND D. K. ACHARYYA MEMORIAL LIBRARY, FOLLOWED BY BIJOYA SAMMILANI -Saturday, 31st October, 2026

The Indian Institute of Materials Management (IIMM), Kolkata Branch, celebrated a significant milestone with the formal inauguration of its renovated office premises, including the newly dedicated **S. C. Bhattacharyya Memorial Hall** and **D. K. Acharyya Memorial Library**, followed by a Bijoya Sammilani celebration on Saturday, 31st October 2026, at 5:30 p.m. at the Branch premises, 8B, Short Street, Kolkata – 700 017.

The renovation covered the main reception area, Central Hall, both administrative office rooms, and the rooms dedicated to computer facilities, accounts and educational activities. The improvements have transformed the working environment and created better facilities for the Branch's administrative, academic and professional activities.

This renovation is not merely a structural improvement; it reflects our commitment to preserving the rich institutional heritage of IIMM Kolkata Branch while preparing ourselves for a brighter and more progressive future.

The entire renovation project was undertaken under the tremendous contribution, initiative and guidance of our respected Branch Chairman, **Mr. Animesh Chattopadhyay**, whose dedication and vision played a pivotal role in making this transformation possible.

Inauguration Ceremony

The inauguration ceremony was marked by the gracious participation of distinguished past Chairmen, office bearers and senior members of the Branch.

The various sections of the renovated premises were inaugurated by the following distinguished personalities:

- **Mr. R. S. Johar** inaugurated the main reception office and the Institute's building.
- **Mr. Amal Chakraborty**, Past Chairman, inaugurated the Education Office, Computer Room and Accounts Office.
- **Mr. Joydip Basak**, Honorary Treasurer, and **Mr. Animesh Chattopadhyay**, Branch Chairman, inaugurated the entrance to the Hall Room.
- **Mr. A. K. Dey**, Vice Chairman, inaugurated the Executive Committee (EC) Office.
- **Mr. R. K. Daga**, Past Chairman, inaugurated the gallery section, showcasing "Memories with IIMM" and the history of our Past Chairmen.
- The main hall, dedicated as the **S. C. Bhattacharyya Memorial Hall**, was inaugurated by **Mr. D. N. Chakraborty**.
- The **D. K. Acharyya Memorial Library**, dedicated in memory of D. K. Acharyya, was inaugurated by **Mr. B. G. Sengupta**.

These inaugurations were a tribute to the distinguished personalities whose contributions and association have enriched the legacy of IIMM Kolkata Branch.

Thereafter, our Branch Chairman, **Mr. Animesh Chattopadhyay**, welcomed all the distinguished guests, members, faculty, past Chairmen, students and staff present on the occasion. In his address, he highlighted the significance of the renovation, the challenges involved in completing the project and the collective commitment required to strengthen the Institute's infrastructure and educational activities. He also expressed his appreciation to everyone who contributed to making the project successful.

Bijoya Sammilani Celebration

Following the inauguration ceremony, the evening continued with a colourful and melodious **Bijoya Sammilani** programme, presented by the team led by **Mr. Sabyasachi Chakraborty**.

Before the Arkestra performance commenced, Ms. Anindita Acharyya and our former Chairman and Senior Faculty Member, Mr. D. N. Chakravarti, enthralled the audience with their wonderful singing performances.

The cultural programme featured a beautiful synthesis of instrumental music and vocal performances. **Mr. Sabyasachi Chattopadhyay** was responsible for conducting and coordinating the entire orchestra, creating a memorable musical experience for the audience.

The two invited guest artists, **Nayanika and Sagnik**, enthralled the gathering with their captivating performances and melodious voices.

The programme created an atmosphere of joy, togetherness and festive spirit, making the occasion truly memorable for all members, guests and participants.

A Memorable Milestone for IIMM Kolkata Branch

The inauguration of the renovated premises, the S. C. Bhattacharyya Memorial Hall and the D. K. Acharyya Memorial Library marked an important chapter in the history of IIMM Kolkata Branch.

The occasion was not only a celebration of infrastructural development but also a tribute to the Institute's rich heritage, distinguished past leadership and collective achievements.









The successful completion of the renovation and the joyful celebration of Bijoya Sammilani reflected the unity, dedication and enthusiasm of the IIMM Kolkata family.

It was indeed an evening of pride, remembrance, celebration and renewed commitment towards the continued growth and excellence of IIMM Kolkata Branch.



AYODHYA BRANCH

Ayodhya Branch organises Seminar on **Tech Savvy vs Tech Dependent: Finding the Right Balance of AI & ML in Modern Supply Chain**. Ayodhya, 1 November 2026: The Ayodhya Branch of the Indian Institute of Materials Management (IIMM) successfully organised a seminar on the theme "Tech Savvy vs Tech Dependent: Finding the Right Balance of AI & ML in Modern Supply Chain" at Hotel Panchsheel, Ayodhya.

The event witnessed the participation of over 100 delegates, dignitaries, academicians and supply chain professionals from various IIMM branches. The programme commenced on a traditional and auspicious note with the recital of Vedic shlokas by a group of Brahmins dressed in traditional attire, followed by the application of tilak on the foreheads of the guests and participants. The Seminar Chairman, Mr V. V. Chaturvedi, and Branch Chairman, Mr Abhay Mehrotra, warmly welcomed the distinguished guests, dignitaries and delegates. Mr S. K. Srivastava, serving as the Master of Ceremonies (MOC), invited the dignitaries to participate in the ceremonial lighting of the lamp. This was followed by the National Anthem and Vande Mataram. The core committee members, dressed in distinctive UP-style attire, added a special attraction to the occasion.

Inaugural Session The inaugural session was graced by Prof. R. K. Sharma as the Chief Guest and Prof. P. K. Singh as the Guest of Honour. Both distinguished academicians shared their valuable experiences and perspectives on the seminar theme, particularly with reference to the application of technology in the super-speciality healthcare industry. Shri Pradip Kumar, Vice President (East), shared his vision for strengthening IIMM activities and appreciated the commendable efforts of the Ayodhya Branch, which continues to flourish under the blessings of Lord Shri Ram. Prof. (Dr.) Suresh Kumar, Co-Chairman, BOS highlighted the academic initiatives of IIMM and delivered an insightful address on the seminar theme.

The Seminar Patron and National President, Mr P. M. Biddappa, provided an overview of the Institutes activities and encouraged participants to join hands with IIMM in promoting excellence in Supply Chain Management (SCM), thereby contributing towards the

vision of Ek Bharat, Shreshtha Bharat. Technical Sessions: Exploring the Role of AI & ML in SCM The technical sessions featured insightful deliberations by eminent subject experts on the growing relevance and application of Artificial Intelligence (AI) and Machine Learning (ML) in Supply Chain Management.

The speakers emphasised the importance of developing technological competence rather than becoming overly dependent on technology. The central message was clear: a technology-savvy professional must remain the master, while technology should serve as the follower. The distinguished subject experts included Maj. Gen. Ajay K. Chaturvedi (Retd.), CA Ageet Kumar, Dr. K. P. Singh and Dr. Nripendra Kumar. The host team felicitated all the experts in recognition of their valuable contributions and insightful presentations. Certificates of Appreciation, bearing the signatures of the Branch Chairman, Co-Chairman, Board of Studies (BOS), and National President, were presented to several committed professionals of the branch in recognition of their dedicated contributions. The recipients included Mr Junaid Ahmed, Mr Arun Kumar, Mr Ganga Vishnu, Mr Sanjay Jain and others.

Participation from Various IIMM Branches and Institutions The seminar received encouraging participation from different IIMM branches across the country. Notable representation included seven delegates from IIMM Kanpur, six from Greater Noida, four from Raebareli and one from Ranchi. Although the Senior Vice President and National Secretary-Treasurer (NST) could not attend due to unavoidable circumstances, the presence of three former Vice Presidents (North Zone) added considerable significance to the gathering. The academic fraternity was represented by Dr Sudhir Rai, Head of Department, along with Dr Rakesh and Dr Ashutosh, faculty members of the Faculty of Management, Dr Ram Manohar Lohia Avadh University, Ayodhya. Mr Satish Mohan, Purchase Head of Acharya Narendra Deva University of Agriculture and Technology, Kumarganj, also participated as a delegate, along with other local dignitaries and professionals.

Teamwork Behind the Success The successful organisation of the seminar was the outcome of the dedicated efforts and teamwork of the organising committee and volunteers. Mr Deep Chand, Mr Ashish Kherukar, Mr Sanjay Dua, Mr Yogendra Bhardwaj, Ms Jyoti Mishra, Mr Vineet, Mr Sidharth and several other members played significant roles in ensuring the smooth and successful conduct of the event. The programme concluded with a formal vote of thanks, expressing sincere gratitude to the National President, Chief Guest, Guest of Honour, Co-Chairman BOS, Vice President (East), three former Vice Presidents of the North Zone, Chairperson Nari Shakti, technical session experts, faculty members from RML Avadh University, representatives of Acharya Narendra Dev University, Kumarganj, and all other dignitaries, delegates and participants.

A Memorable Pre-Seminar Evening The celebrations began a day earlier, on 31 October 2026, with a pre-seminar dinner at Hotel Panchsheel, attended by more than 50 guests. The evening featured a lively musical programme that created an atmosphere of warmth, camaraderie and fellowship. The cultural evening was particularly enjoyable, with guests enthusiastically joining the singing troupe in singing and dancing. The presence and active participation of Nari Shakti members added further charm to the occasion. All guests were warmly welcomed with bouquets and treated to delicious food, making the evening a memorable prelude to the main seminar. The seminar proved to be a meaningful platform for knowledge sharing, professional interaction and fellowship, reinforcing IIMMs commitment to promoting technological awareness, academic excellence and innovation in Supply Chain Management. The Ayodhya Branch deserves appreciation for organising a well-coordinated and memorable event that brought together professionals, academicians and thought leaders under one roof under the able leadership of Branchs Chief Adviser and National Councillor Dr Harendra Kumar.

The entire team of IIMM Ayodhya branch gave a memento of love and affection to Dr Harendra Kumar for his untiring effort and support for the branch that came in to existence in 2024 and performing well at Pan India level.

NHQ NAVI MUMBAI

The **Indian Institute of Materials Management (IIMM), National Headquarters, CBD Belapur, Navi Mumbai**, successfully organised a four-day professional training programme on **"Smart Stores/Warehouse & Inventory Management"** from **26th to 29th August 2026**.

The Second Training Program at NHQ was planned as a four day Flexi Training Program which provided delegates with the flexibility to choose Part A & Part B according to their individual preferences. A total 17 participants from Mumbai, Pune, Nagpur, Chhattisgarh and other locations participated in the program. The First Training Program on Strategic Sourcing – To Boost the bottom line from 13th to 16th May 2026 was also conducted successfully.

The programme was designed to enhance the knowledge and practical capabilities of professionals involved in **Stores, Warehousing, Inventory, Materials Management, Procurement and Supply Chain Management**. The sessions focused on contemporary practices and strategies for improving warehouse efficiency, inventory control, material flow and overall supply chain performance.

The programme provided participants with valuable insights into **smart warehouse operations, inventory optimisation, storage and material handling, warehouse systems, process improvement, and modern supply chain practices**. Through expert-led sessions and interactive discussions, participants were able to connect theoretical concepts with practical industry applications.

The programme witnessed participation from professionals representing reputed organisations, including **BEML Ltd, Reliance Industries Ltd, Fujifilm Sericol India Pvt Ltd, Tanvi Engineering Pvt. Ltd., Felix Schoeller India Pvt Ltd, International Combustion (India) Limited, Zydus and Takeda Pvt Ltd**.

The program was inaugurated under the guidance of Mr. S. K. Sharma, Former National President and Chairman of the Training Program, who emphasized the critical role of effective inventory management and smart warehouse in enhancing organizational competitiveness, profitability, and sustainable growth. The training featured distinguished industry experts and faculty members:

- Mr. S K Sharma
- Mr. Jayanta Chakraborty
- Mr. Ashok Mahtre

The training programme also provided an excellent platform for **professional networking, knowledge sharing and exchange of industry experiences** among participants from diverse sectors.

IIMM continues to strengthen its commitment to **professional development and excellence in Supply Management** by providing industry-oriented training programmes that equip professionals with the knowledge and skills required to meet the evolving demands of modern supply chains.

The programme received excellent feedback from participants for its practical, industry-focused and highly interactive sessions. The successful completion of this four-day program reaffirms IIMM's commitment to developing world-class supply chain and procurement professionals through industry-relevant education, training, and knowledge-sharing initiatives.

Certificates were awarded to the participants upon successful completion of the program. IIMM NHQ continues to organize such professional development programs to strengthen the capabilities of materials management, procurement, logistics, and supply chain professionals across industries.



VADODARA BRANCH

The **IIMM Vadodara Branch successfully conducted a three-day training programme** on 'Materials Management' from 7th to 9th October, 2026, at Petroexcel Technology Services Pvt. Ltd., Vadodara, for their SCM personnel.

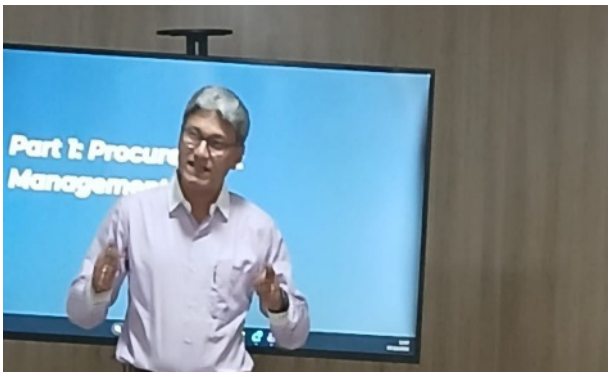
The sessions were delivered by expert faculties, Mr. Hariram Rajesh - Materials Planning & Inventory Management and Stores & Logistics, Dr. Prasanta Gupta – Procurement & Contract Management, Mr. Jayant Kumar – Legal Aspects/Business Laws & Dr. Bharti Trivedi - Soft Skills. The training contents were structured into 4 sessions on each day with examples, interactive sessions and case studies.

Feedback from the participants was very positive. In total, 18 SCM professionals attended the training program.

Here are some glimpses of the training programme.









PRELIMINARY ROUND OF YOUNG MATERIALS MANAGER COMPETITION HELD AT IIMM VADODARA BRANCH ON 25th October, 2026

The Indian Institute of Materials Management (IIMM), Vadodara Branch, organized the preliminary round of the Young Materials Manager (YMM) Competition-2026 on October 25, 2026. Centered on the theme "**From Data to Decision – Transforming Supply Chain Management with AI & Analytics**," the event commenced at 10:00 AM. Twelve teams representing various companies from in and around Vadodara participated in the competition.

The jury and other members present were equally jubilant. They encouraged the participants by highlighting both the strengths and weaknesses of their content, while also guiding them on how to prepare and what key points to keep in mind for future competitions.

The competition was intense, and every team tried to outperform the others. In the end, our jury members announced the winners, first runners-up, and second runners-up, which are as follows:

1. Winners: Mr. Khushal Sathwara & Mr. Adheesh Bahl from M/s. L&T Energy Hydrocarbon Onshore.
2. First Runners-up: Mr. Kevin H. Vasoya & Mr. Jay K. Chatavani from M/s. Gujarat State Fertilizers & Chemicals Ltd.
3. Second Runners-up: Mr. Abhigyan Bora & Mr. Harshit Agrawal from M/s. L&T Energy Hydrocarbon Onshore.

IIMM Vadodara Branch has decided to send Both the Winner & First Runners-up Teams to NHQ for their Participation in the Final Rounds of Young Materials Manager Award to be held in Nagpur on 20th November, 2026.

Mr. Indraraja Nakium, one of the judges, explained the criteria adopted for choosing the winners and runners-up.

The event concluded at 3:30 p.m. with the presentation of trophies to the winners and runners-up, as well as participation certificates to all attendees.

Participants & audience.



Winners Trophy awarded to Mr. Khushal Sathwara & Mr. Adheesh Bahl from L&T Energy Hydrocarbon Onshore



First Runners-up Trophy awarded to Mr. Kevin Vasoya & Mr. Jay Chatavani from Gujarat State Fertilizers & Chemicals Ltd.





Second Runners-up Trophy awarded to Mr. Abhigyan Bora & Mr. Harshit Agrawal from M/s. L&T Energy Hydrocarbon Onshore.



THIRUVANANTHAPURAM BRANCH

As part of Image Building and also to promote reading habit among students, IIMM Trivandrum Branch joined with leading Malayalam Daily "Mathrubhumi" to start "Madhuram Malayalam" Project at one of the prime locations in the capital city of Trivandrum at Salvation Army High School, Kowdiar. Dr. Koshy M George, Branch Chairman inaugurated the event in the presence of Mr. M. G. Narayanan Nair, Hony. Secretary of the Branch, Mrs.B. Pushpitha, Headmistress of the School and other dignitaries.

Dr. Koshy M George, in his inaugural address highlighted the need to inculcate reading habit from student's life itself for personal development. He also explained about the activities of the Institute and the importance of supply chain management in every sphere of life. The Project was inaugurated by handing over the Daily to the Head Boy Master Abel Biju.

Mathrubhumi will supply 10 copies of the news paper every day to the School till the close of the present academic year. Mathrubhumi representatives Sri. P. S. Anand and Sri. Renjith were also present on the occasion.



CHENNAI BRANCH

4PL and Lead Logistics Solutions
Date: Saturday, 24th October 2026

Welcome Address : The monthly meeting commenced with a warm welcome by **Mr. T. Sornakumar, Chairman, IIMM Chennai Branch**, who welcomed the gathering and expressed his pleasure at the participants' presence. He highlighted the importance of such meetings in promoting professional knowledge, interaction, and continuous learning among supply chain and materials management professionals.

IIMM Chennai Branch Activities

Mr. R. Balakrishnan, Honorary Secretary, IIMM Chennai Branch, addressed the gathering and briefed the participants on the various activities and initiatives undertaken by the Chennai Branch. He highlighted the branch's efforts in organising professional development programmes, technical sessions, training activities, and knowledge-sharing initiatives for the benefit of members and the wider supply chain management fraternity.

Introduction and Welcome of the Speaker

Ms. M. Hemavathi, Coordinator, Monthly Meeting, introduced the guest speaker, **Mr. Sandeep I V, Senior Manager – Process Design, NX Group (Nippon Express Holdings)**, and welcomed him on behalf of IIMM Chennai.

As a gesture of respect and appreciation, the speaker was welcomed with a sapling, symbolising growth, sustainability, and the branch's commitment to environmental responsibility.

Technical Session – "4PL and Lead Logistics Solutions"

The technical session was delivered by **Mr. Sandeep I V, Senior Manager – Process Design, NX Group (Nippon Express Holdings)**, who shared his professional insights on the topic **"4PL and Lead Logistics Solutions."**

The session focused on the evolving role of logistics service providers in managing increasingly complex supply chain operations. The speaker explained how Fourth-Party Logistics (4PL) and Lead Logistics Solutions extend beyond conventional transportation and warehousing services by integrating, coordinating, and managing multiple logistics activities to achieve greater supply chain efficiency.

He highlighted the importance of an integrated approach to logistics management, wherein various service providers, logistics functions, information systems, and operational processes are coordinated to support the overall business objectives of an organisation. The discussion emphasised the need for effective planning, coordination, visibility, and performance monitoring across the supply chain.

The speaker also elaborated on how Lead Logistics Solutions can help organisations streamline logistics operations, improve coordination among different stakeholders, and establish consistent performance standards. By adopting a more integrated logistics management approach, organisations can work towards optimising transportation and distribution activities, improving service levels, enhancing operational visibility, and achieving better control over logistics costs.

Another important aspect of the session was the significance of process design in developing effective logistics solutions. The speaker's professional experience in process design provided a relevant perspective on the

need to understand business requirements, map existing processes, identify operational gaps, and design suitable solutions aligned with organisational priorities.

The session also highlighted the importance of collaboration between organisations and logistics partners, supported by performance measurement and continuous improvement. Such an approach enables businesses to respond more effectively to changing customer expectations, operational challenges, and supply chain requirements.

The presentation offered participants a broader understanding of how 4PL and Lead Logistics Solutions can contribute to the development of more coordinated, visible, and efficient supply chains. It also encouraged participants to consider the strategic role of logistics management in achieving sustainable operational performance and delivering greater value to the business.

The session was informative and relevant to professionals involved in supply chain management, procurement, transportation, warehousing, and logistics operations. IIMM Chennai expresses its sincere appreciation to Mr. Sandeep I V for sharing his knowledge and professional experience with the participants.

Felicitation of the Speaker

Dr. B. Ramesh, NC Member IIMM chennai branch felicitated Mr. Sandeep I V in recognition of his valuable contribution and for sharing his professional knowledge and experience with the IIMM Chennai community.

Vote of Thanks : The meeting concluded with a vote of thanks proposed by **Ms. M. Hemavathi, Coordinator, Monthly Meeting**. She expressed her sincere gratitude to the Chairman, Honorary Secretary, Dr. B. Ramesh, the guest speaker, and all participants for their presence, support, and contribution towards the successful conduct of the meeting.

The meeting concluded on a positive note, reaffirming IIMM Chennai's commitment to promoting professional development and strengthening the supply chain management fraternity.

Prepared by: M Hemavathi, Coordinator Monthly meeting, IIMM Chennai Branch



Welcome address by Chairman Mr. T Sornakumar, Secretary Mr.R.Balakrishnan, Monthly meeting coordinator , Mrs.M.Hemavathi



Gift given by Chairman Mr.T.Sornakumar, NC Member Dr.B.Ramesh, Monthly Meeting coordinator, Mrs.M.Hemavath

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CHANDIGARH BRANCH

IIMM Chandigarh Branch Celebrates Annual Day with Seminar on AI and Resilient Supply Chains

The Indian Institute of Materials Management (IIMM), Chandigarh Branch, celebrated its 41st Annual Day by organising a one-day seminar on "AI in Building Resilience in Supply Chains in Geopolitical Turbulence" at Radisson Hotel Chandigarh Zirakpur, Patiala Road on the 9th of October, 2026. The event brought together industry leaders, professionals and young students to explore how Artificial Intelligence (AI) can strengthen supply chains amid geopolitical uncertainty and changing business environments.

The programme commenced with Deepshikha, followed by a presentation by Mr. S.K. Sharma, Former National President of IIMM (2005–2007), on "AI in Building Resilience in Supply Chains in Geopolitical Turbulence." His presentation highlighted the potential of AI-enabled technologies, including Digital Twin Simulation in logistics and warehousing, to improve operational visibility, simulate scenarios and support informed decision-making during disruptions.



Deepshikha with IIMM Members and Chief Guest Mr. Sham Lal Bansal

The inaugural proceedings continued with the introduction of Chief Guest Sh. Sham Lal Bansal, Mayor

of Panchkula, and Guests of Honour Sh. N.K. Sharma, former Chief Parliamentary Secretary, Punjab, and Mr. Manish Chetiya, General Manager, BEL Panchkula. The event was led by Mr. Kiran Rampal, Branch Chairman, and Mr. Dalip Manchanda, Branch Vice Chairman. Other distinguished members included Mr. O.P. Longia, Former National President (2015–2017), and Mr. Rajesh Gupta, National Councillor.



Honoring Godrej with “Best Practices in Green Supply Chain” Following addresses by the Chief Guest and Guests of Honour, the inaugural session featured the presentation of the “Lifetime Achievement Award” to Mr. Rakesh Kalia, one of the founders of IIMM Chandigarh Branch and a life member, and the “Best Practices in Green Supply Chain” to Godrej Appliances. Bouquets were presented to speakers before their respective presentations, while mementos were presented after their speeches and presentations as a token of appreciation.

The technical programme began with Mr. Manish Verma, Founder and CEO, AngelBlue Holdings Pvt. Ltd., presenting “Startups, Supply Chains and Survival in Turbulent Times.” His session explored how startups can navigate disruptions, manage operational risks and build flexible business models in uncertain markets.

Mr. Lalit Mohan, Head – Sales and Operations Planning, Mahindra & Mahindra, Swaraj Division, followed with “Demand Forecasting and Intelligent Inventory Management,” highlighting how data-Deepshikha with IIMM Members and Chief Guest Mr. Sham Lal Bansal Honoring Godrej with “Best Practices in Green Supply Chain” Presenting Life Member Mr. Rakesh Kalia with “Lifetime Achievement Award” driven forecasting and smarter inventory planning can help organisations balance demand, reduce excess stock and improve operational efficiency.

A particularly noteworthy highlight was the presentation by Manreet Kaur and Nitanshi Chaudhary, Class XII students of Learning Paths School, Mohali, on “AI in Building Resilience in Supply Chains in Geopolitical Turbulence.” Their participation reflected the importance of providing young students with opportunities to engage with emerging technologies and real-world industry challenges.

Impressed by their presentation, CA Ageet Kumar extended a token of monetary appreciation to both students, encouraging their efforts and continued learning. The programme also included a brief presentation by IOCL, Chandigarh, followed by lunch. The afternoon sessions continued with Mr. Shubham Gupta, Deputy Manager – Supplier Quality and Management, and Mr. Rohit Yadav, Assistant Manager, Godrej Appliances, Chandigarh, presenting “Data to Decision: Transforming Supply Chain Management with AI & Analytics.” Their presentation explored how analytics can transform operational data into actionable insights, supporting better supplier evaluation, quality management and supply-chain decision-making.

Mrs. Shubhra Sharma, Quality Auditor and Certified POSH Consultant, delivered a session on “Efficiency to Resilience: Lean Thinking Empowered by AI in a Volatile World.” She highlighted the relevance of lean principles, waste reduction and AI-enabled process improvement in helping organisations maintain efficiency while responding to uncertainty. Mr. Chander Shekhar, Retired IAS officer, presented “Relevance of RERA to the Construction Industry,” discussing the significance of regulatory compliance, transparency and accountability in the construction sector.

Panel Discussion and Conclusion : The technical sessions were followed by a panel discussion featuring Mr. V.S. Maniam, CA Ageet Kumar, Mr. Pankaj Panchbhai and Dr. Harendra Kumar. The panellists shared perspectives on the potential benefits, practical applications and risks of AI, emphasising the importance of adopting emerging technologies thoughtfully to strengthen supply-chain resilience.

The seminar concluded with an evening tea break, marking the end of a day filled with knowledgesharing and professional interaction. Bouquets were presented to speakers before their respective presentations, while mementos were presented after their speeches and presentations in recognition of their contributions. IIMM members representing different branches of the Institute were also felicitated with mementos, acknowledging their participation and strengthening the spirit of collaboration and camaraderie within the IIMM fraternity.

The event received an encouraging response from speakers and delegates, providing participants with valuable insights into AI adoption, demand planning, analytics, lean management and supply-chain risk mitigation. The inclusion of student presenters added a forward-looking dimension to the programme, highlighting IIMM Chandigarh Branch’s commitment to nurturing young talent alongside strengthening industry engagement.

Former National President Mr SK Sharma delivering his presentation IIMM Members and with Chief Guest Mr. Sham Lal Bansal and Mr. Manish Cheitya The Annual Day celebration reaffirmed the Branch’s commitment to professional development, collaboration and knowledge-sharing, while underscoring the growing importance of AI-driven innovation in building resilient supply chains in an increasingly unpredictable global environment.

●●●

IIMM **Research Centre**

CENTRE FOR RESEARCH IN MATERIALS MANAGEMENT (CRIMM)

Minutes of meeting of CRIMM at SAP conference room of TIU, WB on 27th March, 2026

Agenda of BOG Meeting of CRIMM at SAP Conference Room on 27 th March 2026 at 3.30 pm

1. Introduction of BOG members of CRIMM
2. Proposed activities of CRIMM during the next financial year to be discussed and adopted
3. Introduction of Certificate program, if any, proposed for the next financial year to be discussed and adopted.
4. Introduction of Project Management programs in collaboration with Project Management Institute USA, if any, proposed for the next financial year to be discussed and adopted.
5. Scope of fundamental research in Supply Chain Management
6. e-Journal of CRIMM
7. Discussions on Financial Performance of CRIMM
8. Support from IIMM
9. Opening of overseas Research Centres
10. Execution of renewal of CRIMM Agreement
11. Press release
12. Any other point of relevance
13. Close of Meeting

Introduction of BOG members of CRIMM

BOG Member nominated by IIMM

1) Mr. Malay Chandan Mazumdar Jt, Chairman
2) Dr. Nripendra Kumar Member
3) Dr. Y Venkata Ramana Member
4) Dr. Dibakar Swain Member
5) Gajanan Palankar, Fellow - CRIMM Member
6) P Sengottaiyan, Fellow - CRIMM Member
7) Dr. Samar Roy Chowdhury Member
8) Mr. Animesh Chattopadhyay Member

BOG Member nominated by TIU,WB

1) Prof. (Dr) Goutam Sengupta, Rector TIU, WB - Joint Chairman
2) Prof. (Dr) Debashis Chaudhuri, Dean (Engineering, Projects, Students Affairs), TIU, WB- Member
3) Prof. (Dr) S N Roy, Adjunct faculty, TIU,WB- Member
4) Prof. (Dr) Tripti Chakrabarti, Dean Basic Sciences, TIU,WB- Member
5) Prof. Asoke Kumar Paul, Associate Professor, TIU,WB- Member
6) Prof. (Dr.) Debabrata Bhattacharjee, Professor, TIU,WB- Member
7) Mr. Soumitra Bhowmick, Vice President and CFO, Techno India Group-Member
8) Dr. Paramita Sen, Assistant Professor, Rector's Office, TIU,WB- Member

Advisor

1) Mr. Asok Dasgupta, Advisor
2) Dr. PK Dey, Professor, Aston Business School, UK
3) Prof. (Dr) Gautam Majumdar, Pro Vice Chancellor, TIU,WB

Board of Research Studies

1) Prof (Dr) Goutam Sengupta,(Chairman)
2) Prof.(Dr.)S N Roy
3) Prof (Dr) Debashis Chaudhuri
4) Dr. D. Rajasekar
5) Dr. A.V. Shama Sundar

Proposed activities of CRIMM discussed and adopted

1.0 Target of CRIMM fellowship :
Target for the Calendar year 2026:
10 – 15 Fellowship

2.0 National and Global Summits: 4 per year

3.0 Consultancy
Kept in abeyance. Prof SN Roy will prepare an approach paper BY MID MAY, 2026

Introduction of Certificate/Diploma program -proposed and adopted.

1.0 Certificate program on Supply Chain Management may be launched by TIU in collaboration with CRIMM (It will be discussed and National President of IIMM to revert back.

2.0 Certificate program on Purchasing Management may be launched by TIU in collaboration with CRIMM (It will be discussed and National President of IIMM to revert back.).

3.0 Certificate/Diploma program on Logistics Management

3.1 Diploma program may be launched by TIU in collaboration with CRIMM (It will be discussed and National President of IIMM to revert back.

3.2 Kolkata Branch of IIMM should give a preference TIU/CRIMM while approaching other Universities on matters of launching joint certificate courses. TIU will send a request letter to Chairman Kolkata Brach to this effect.

For more information please contact

MALAY C MAZUMDAR, Jt. Chairman – CRIMM

M: 9909910964 / 9726425331 Email: malay_mazumdar@yahoo.co.in, crimm.malayiimm@gmail.com

Ayodhya Branch - *Organises Seminar on*
"Tech Savvy vs Tech Dependent:
Finding the Right Balance of AI & ML in Modern Supply Chain"
















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2.	Post Graduate Diploma in Logistics & SCM (PGDL&SCM)	AICTE	Graduate in any discipline from any Recognized University	2 Years

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A form can be downloaded from www.iimm.org.in/register and can be submitted to nearest IIMM Branch

For more information, please visit : www.iimm.org

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Printed & Published by P.M.Biddappa on behalf of Indian Institute of Materials Management, 4598/12-B, First Floor, Ansari Road, Darya Ganj, New Delhi - 110002 and Printed at Power Printers, New Delhi-110002.