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MATERIALS MANAGEMENT REVIEW

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SCALE 2026

Theme: AI Driven Supply Chain for Industry 5.0: Delivery Sustainable People First Performance

BEML Ltd CMD Shantanu Roy has been conferred the prestigious 'Best CEO of the Year 2026' Award by the Indian Institute of Materials Management (IIMM). The award was presented by P. M. Biddappa, National President, IIMM, at SCALE 2026, the flagship programme of the IIMM Bangalore Branch, held on 19 September 2026 in Bengaluru.
The event was attended by senior IIMM officials, industry leaders and professionals from the materials management, procurement and supply-chain fraternity.

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From the Desk of National President & Editor in Chief

Greetings from your National President!!!

Dear All Members of IIMM,

The supply chain is entering a new era in which **Artificial Intelligence (AI), human intelligence and sustainability** are coming together to reshape business performance. As organisations move from Industry 4.0 towards **Industry 5.0**, the focus is shifting beyond automation and efficiency towards creating supply chains that are resilient, sustainable and people-centric.

AI is transforming supply-chain planning, procurement, inventory management, warehousing and logistics. It enables organisations to analyse vast amounts of data, improve demand forecasting, identify supplier risks, optimise transportation and respond more quickly to disruptions. From predictive analytics and intelligent procurement to AI-enabled warehouses and dynamic route optimisation, technology is making supply chains more responsive and data-driven.

However, **Industry 5.0 is not about replacing people with machines**. It is about using technology to augment human capabilities. AI can identify patterns, generate insights and recommend actions, while professionals contribute experience, judgement, creativity and accountability. The future supply-chain professional will therefore need a combination of digital skills, analytical thinking, business understanding and human capabilities.

Sustainability is another defining element. AI can help organisations reduce transportation emissions, minimise inventory and material waste, optimise energy consumption and support circular supply-chain models. This creates an opportunity to balance **cost, service, resilience and environmental responsibility** rather than pursuing efficiency alone.

AI can also strengthen supply-chain resilience. By monitoring supplier, market, logistics and operational signals, intelligent systems can identify emerging risks and support scenario planning. Organisations can move from reacting to disruptions towards anticipating them and preparing alternative responses.

At the same time, responsible AI adoption is essential. Data quality, cybersecurity, transparency, privacy, model validation and human oversight must remain integral to AI-driven decision-making. Technology should support decisions—not remove accountability from people.

For India, AI-driven supply chains offer significant opportunities as manufacturing, logistics infrastructure, multimodal connectivity and digital platforms continue to develop. Extending these capabilities to MSMEs and smaller supply-chain partners can further strengthen the country's competitiveness and resilience.

The future supply chain will therefore be defined not simply by how much it can automate, but by **how intelligently it can combine technology and people**. AI can make supply chains faster, smarter and more predictive; people provide context, creativity, ethics and leadership.

Industry 5.0 ultimately calls for a new supply-chain philosophy: smarter technology, stronger people, sustainable operations and resilient performance.

Thanking you and wishing all the best.

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FROM GREEN LOGISTICS TO GREEN SUPPLY CHAINS

A Practical Model for Carbon-Smart Supply Chain Management

A conceptual framework for moving from isolated carbon-reduction initiatives to an integrated green supply chain

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Most supply chain managers today are concerned with cutting fuel use, energy consumption, and emissions without increasing the logistics cost. The responses of companies often are a portfolio of separate projects. These include the introduction of electric vehicles, route optimization, renewable energy, better packaging, warehouse efficiency, supplier audits. Each of these bring positive impacts but the absence of holistic approach ensures that the supply chain as a whole often stays just as carbon-intensive as before.

Unlike the popular perception, the production process accounts for only a fraction of a company's true carbon footprint. A large portion of the emissions occur upstream and downstream in the supply chain, not inside the factory gate. A recent McKinsey (2024) report estimates that Scope 3 emissions typically make up around 90% of a company's total carbon footprint. This is largely from the logistics activities such as road and ocean freight. Carbon Disclosure Project (CDP)'s (2024) analysis of over 23,000 corporate disclosures across sectors and regions found supply chain emissions average 11.4 times a company's combined direct and energy-related emissions. Decarbonizing production alone therefore leaves the majority of a company's climate impact untouched. Logistics emissions come from a web of interconnected activities including transportation, warehousing, loading, and the operations that support them. Decisions about facility location, transport mode, inventory, routing, and distribution are closely linked. Treating them as separate levers misses how much they shape one another.

Limitations of the traditional approach : In a traditional organizational set up a supply chain manager would be looking to optimize transport cost while a sustainability leader is tracking emissions. The procurement department on the other hand will be looking for low-cost global suppliers. The logistics department is trying to shorten routes. Warehousing will be concerned about optimising for inventory availability while distribution is chasing maximum vehicle utilisation. Each of them is rational it their own terms. The combined effect can create profitability locally for the organization but still inefficient from a systems perspective.

Setyadi et al. (2025) argues that sustainability efforts are frequently scattered across green supply chain, circular economy, digital transformation, and resilience agendas but has little coordination among themselves. These Integrated Sustainable Operational Strategy often links circularity, localization, and digital adaptation across macro, organizational, and process levels, and it points to sustainability initiatives that are not designed as a system. The carbon reduction initiatives needs to move from being an add-on performance indicator to a design principle for the supply chain itself.

There are efforts to measure and report the emission reduction by companies. However, Chen et al. (2025) argues that emission reduction strategies are only a starting condition and not an end in itself. Fu et al. (2024) points to the fact in most companies the probable CO_2 emissions are determined even before the vehicles leave the factory. Masanta et al. (2026) applied this logic to multi-level, multi-product networks, showing that facility and flow decisions across supply chain levels materially affect both cost and carbon outcomes. Regarding the need for owning the logistics assets by the companies, El Moussaoui (2025) says with conviction that horizontal logistics pooling (sharing) can cut the last-mile emissions over 40%. Setyadi et al. (2025) situate this in the context of circular-economy logic. They argue that keeping resources in use longer, through reuse, closed-loop flows, and shared capacity is a structural lever for sustainability that sits alongside, rather than beneath, conventional efficiency measures. Another set of literature addresses why proven solutions often fail to scale. Chen et al. (2022) proposes cooperative sharing of emission reduction costs among suppliers, manufacturers, and retailers. Kumar et al. (2025) add a further constraint often missing from this literature: low-carbon coordination that is not also evaluated against service level tends to erode service quality as a hidden cost. Both these studies show the need for coordination mechanisms among various players in the loop. Yu et al. (2025) shows the role of digital technology through the use of big-data-enabled algorithms that helps jointly to improve network emissions and transportation cost. Another study by Ali et al. (2025) integrates energy and logistics optimisation to manage planning, scheduling, and real-time uncertainty. Gupta et al. (2026) studied the role of blockchain adoption for carbon-neutral logistics

These studies show that there is a fragmented approach to address problems such as **measurement, network design, resource sharing, coordination, or digital optimization**. Few studies connect measurement to

redesign, redesign to shared-resource strategies, or coordination mechanisms to the digital systems meant to operationalize them. This fragmentation reflects the practical problem described earlier: organisations running parallel green initiatives without an integrating logic.

This article through a review of recent research publications endeavors to provide an alternate model that draws these threads together. The central claim of this GREEN-SC Model (Green Supply Chain Carbon Orchestration Model) is that, "a green supply chain should not be run as a collection of green projects. It should be run as an integrated system in which carbon information drives network design, collaboration, resource use, and everyday operating decisions".

The GREEN-SC Model

Based on the review of the literature we have built the following five stage model to reimagine the green supply chain process. This makes up a continuous feedback loop

GREEN-SC: Green Supply Chain Carbon Orchestration

Stage	Management question	Key practices
1.	Measure	Where is carbon being generated? Carbon accounting, emission hotspots, carbon intensity
2.	Redesign	Can the network itself be redesigned? Facility location, modal shift, routing, load optimization
3.	Share & circularise	Can fewer resources be used overall? Logistics pooling, consolidation, reverse flows, local sourcing
4.	Coordinate	Who carries the cost and responsibility? Supplier collaboration, contracts, incentives, cost-sharing
5.	Optimise	How do we improve continuously? AI, IoT, predictive analytics, scenario planning, real-time decisions

The distinctive feature of this model is the sequencing and inter-relatedness. Measurement requires redesign; redesign opens up opportunities for pooling and circularity; coordination between partners makes those changes commercially feasible; and digital systems continuously optimise the network that results.

1. Measure carbon before trying to reduce it

Chen et al. (2025) shows why establishing a carbon baseline (planning) has to come first. They propose a sequence of accounting, factor analysis, prediction, and simulation rather than simply totting up historical emissions. This matters because carbon is not generated evenly across a network. Transportation, warehousing, vehicle utilisation, energy sources, and network structure each contribute differently, and Fu et al. (2024) show that transportation emissions depend on variables such as cargo load, vehicle speed, road conditions, vehicle characteristics, and fuel type.

The practical question for managers therefore should not be "How much CO did our supply chain generate during the past year?" It should be "Where, why, and under what operating conditions is our supply chain generating carbon?".

2. Redesign the network, not just the vehicle route

Once the hotspots where the CO_2 is generated is identified, the next step is redesigning the supply chain itself. Fu et al.'s (2024) illustrates this in two stages. The first stage determines transit-point selection and cargo-flow allocation, and the second stage optimises distribution routes.

This suggests a useful hierarchy for managers to work through, in order:

Network	do we need this facility?
Facility	can demand be allocated differently?
Mode	can shipments be consolidated, or road freight shifted to a lower-carbon mode?
Load	can vehicle utilization be increased?
Route	only once the above are settled, what is the optimal route?

Chen et al. (2025) also points out transportation structure and technology as major influences on logistics carbon emissions, pointing to modal transition and cleaner energy as realistic reduction pathways. Masanta et al. (2026) support this and argue for redesigning before routing. heir optimisation of a multi-echelon, multi-product green logistics network shows that facility and flow-allocation decisions across multiple supply chain tiers materially shape the emissions and cost outcomes that routing decisions later inherit.

3. Share and circularise resources : An important question green supply chains should ask is whether organisations need to own and operate its own logistics assets. El Moussaoui (2025) provides strong with evidence against such arrangements. He argues for logistics pooling that lets independent organisations to share resources This horizontal pooling can rationalize equipment use, improve information sharing, cut the number of vehicles on the road, and reduce congestion and emissions. El Moussaoui's (2025) simulation of last-mile logistics in Casablanca found that two pooling strategies reduced emissions by 44.39% and 30.93% respectively.

For supply chain managers, this opens up several concrete opportunities:

- Shared warehouses
- Shared transportation capacity
- Consolidated deliveries
- Multi-pick and multi-drop operations
- Common urban distribution centers
- Shared information platforms
- Reusable transport packaging
- Reverse logistics

This connects directly to the circularity principle in Setyadi et al. (2025), where resources stay in use longer through reuse, closed-loop flows, and regeneration. In short, green supply chains need to move from ownership efficiency to network resource efficiency. The question one should ask should shifts from "How efficiently do we use our truck?" to "How efficiently can the supply chain use the transport capacity available to it?"

4. Coordinate carbon responsibility across partners

The biggest obstacle to green supply chains is often the misaligned incentives. A supplier may need to invest in cleaner production, a manufacturer may need to redesign packaging, a logistics provider may need to buy cleaner vehicles. This will help the benefits to accrue across the whole supply chain rather than to whoever paid for them. Chen et al.'s (2022) multi-level supply chain study examined how emission-reduction costs can be shared across members and how manufacturers can motivate suppliers and retailers to participate.

This gives the model its fourth element: carbon responsibility should follow the supply chain rather than organisational boundaries. In practice, contracts could include:

- Shared carbon-reduction targets
- Incentives for improved load utilization
- Rewards for lower-emission transportation
- Joint investment in renewable energy
- Shared savings from logistics pooling
- Supplier development programmes
- Carbon-linked logistics service contracts

Fu et al. (2024) found that introducing an environmental tax changed the optimal distribution network which helped in reducing emissions and overall cost simultaneously. The lesson for managers is thatas long as the cost of going green sits with one partner while the benefit is captured by another, green initiatives will struggle to scale. Coordination also has to protect service commitments, not just cost and emissions. Kumar et al. (2025) show that low-carbon supply chain decisions cannot be evaluated on emissions alone. Carbon-sharing agreements between supply chain partners therefore need to specify service-level expectations alongside emissions and cost target.

5. Optimise continuously using digital intelligence

The final component of the model is digital optimization. The real value of digitalization lies in converting carbon data into operating decisions. Setyadi et al. (2025) describe digital adaptation as the use of technologies such as IoT, AI, and blockchain to create flexible and transparent operations. Yu et al. (2025) demonstrated the potential of big-data-enabled optimisation for low-carbon supply chain networks. It studied the how improved algorithms can identify network improvements while addressing carbon emissions and transportation costs together. Ali et al. (2025) went a step further, integrating energy and logistics optimisation in a model that combines planning and scheduling with real-time uncertainty management to balance economic and environmental objectives. Gupta et al. (2026) develop a barrier intensity index for blockchain adoption in carbon-neutral logistics and find that the barriers are not primarily technical but are organisational and inter-firm, including data-sharing reluctance and unclear ownership of the resulting carbon ledger. That finding matters for the GREEN-SC model specifically because its digital layer depends on partners trusting a shared record of carbon and operational data. without addressing those coordination barriers first, digital optimisation tools will have incomplete or unreliable data to work with.

Putting the model into practice : The GREEN-SC model translates into a relatively simple management cycle: Measure ! Identify hotspots ! Redesign ! Collaborate ! Digitise ! Monitor ! Reconfigure.

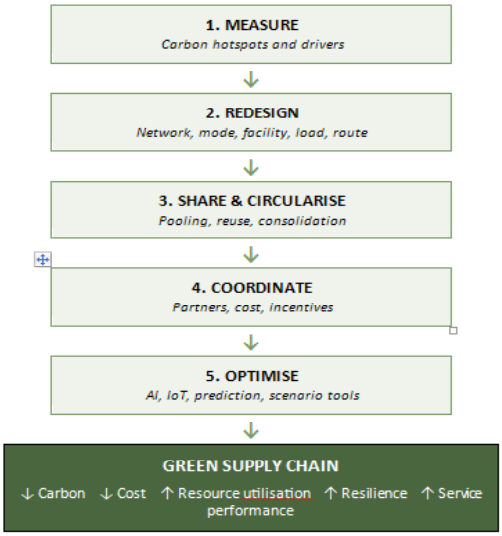
Consider a manufacturer running several regional warehouses. The traditional approach could focus on improving truck utilization. Under GREEN-SC, the organisation would instead start by measuring emissions by facility, product, route, and mode. It would then assess whether the number and location of warehouses still make sense, or reallocate demand, or consolidate shipments, which would lead to reconsidering transport modes. Logistics pooling could then be explored with suppliers or distributors, with contracts allocating the investment and the benefit between partners. Finally, real-time logistics data would continuously adjust routes, loads, and delivery schedules. The result is not simply a greener truck. It is a greener supply chain design.

The managerial proposition : The central proposition of the GREEN-SC model is that it improves the green supply-chain performance when carbon intelligence is embedded into network redesign, resource sharing, inter-organisational coordination, and digital decision-making.

Existing studies tend to optimize one part of the system at a time. It could be on routing, logistics pooling, carbon prediction, energy management, or inter-organizational cooperation. This model helps to connect these decisions rather than treat them as separate research questions or separate management functions.

A conceptual view of the model : Carbon and operational data flow into the model and out through five connected

stages before returning as feedback into the next cycle:



The output feeds back into continuous measurement and redesign.

Conclusion: green supply chains need orchestration, not isolated initiatives

Reducing the carbon emission in the supply chain network is critical for a green environment. This requires a substantial change in the way organisaitons they approach supply chain. It is important to understand that aarbon reduction is no longer simply a transportation problem. It is simultaneously a network design problem, a resource utilisation problem, a collaboration problem, an energy problem, and an information problem.

Fu et al. (2024) demonstrate the value of integrating network and routing decisions, and Masanta et al. (2026) extend this to multi-echelon, multi-product networks. Chen et al. (2025) show why carbon measurement has to be connected with prediction and scenario planning. El Moussaoui (2025) demonstrates the potential of pooling. Chen et al. (2022) highlighted the importance of cooperation and shared abatement costs, while Kumar et al. (2025) show why that coordination has to protect service level alongside carbon and cost. Yu et al. (2025) show how digital optimisation can improve low-carbon network decisions, Ali et al. (2025) demonstrate the value of integrating energy and logistics decisions, and Gupta et al. (2026) identify the coordination barriers that determine whether technologies such as blockchain can actually be adopted. Setyadi et al. (2025) provide the broader conceptual foundation linking circularity, localisation, and digital adaptation.

Taken together, these findings suggest that the next generation of green supply chains will not be built simply by swapping diesel vehicles for electric ones or by buying renewable energy. They will be built by redesigning the way the entire supply chain makes decisions. The GREEN-SC model offers a solution to this pressing need. Its starting point is measurement, but its objective is orchestration: carbon information flowing into network design, shared resources, partner decisions, and real-time operations, with the results continuously feeding back into the next decision cycle.

For supply chain practitioners, that may be the most important shift of all: don't ask where you can make your supply chain greener. Ask how the supply chain can be designed to make every decision greener.

References : Restricted to the papers supplied for this article.

Ali, S., Yongzhi, M., Xin, C., Din, J., & Salman, M. (2025). Revolutionizing energy and logistics: A multilayered strategy for optimizing distribution networks and achieving dual carbon goals. Clean Technologies and Environmental Policy, 27, 9101–9123.

Chen, D., Zhang, Y., Hong, X., Chen, Q.-F., & Zhang, J. (2022). Non-cooperative game and cooperative operation of multi-level supply chain under background of carbon emission reduction. IEEE Access, 10, 33015–33027.

Chen, J., Zhu, Y., Wu, S., Yang, C., & Wang, H. (2025). Carbon reduction strategies for logistics based on emission prediction under multi-scenarios in coastal developed region. Carbon Balance and Management, 20, 13.

El Moussaoui, A. E. (2025). Impact of logistics pooling on reduction of CO2 emissions in last-mile logistics. Management & Sustainability: An Arab Review, 4(2), 383–401.

Fu, Z., Yue, J., & Yan, Y. (2024). Optimized design of multi-level low-carbon logistics distribution scheme based on two stages. Archives of Transport, 69(1), 145–165.

Gupta, A., Singh, R. K., & Kamal, M. M. (2026). Blockchain technology adoption for secured and carbon neutral logistics operations: Barrier intensity index framework. Annals of Operations Research, 359(1), 861–894.

Kumar, V., Bardhan, A. K., & Das, D. (2025). Low carbon supply chains: A service level perspective. International Journal of Systems Science: Operations & Logistics, 12(1), 2537217.

Masanta, M., Singh, U. P., Selvan, K., & Das, P. (2026). Optimization of green logistics network in a multi-echelon multi-product supply chain. Journal of Industrial and Production Engineering, 43(1), 1–21.

Setyadi, A., Pawirosumarto, S., & Damaris, A. (2025). Rethinking sustainable operations: A multi-level integration of circularity, localization, and digital resilience in manufacturing systems. Sustainability, 17, 6929.

Yu, F., Zhou, Y., & Xu, Y. (2025). Evaluation on network optimization model of low-carbon multi-level supply chain based on big data algorithm evaluation. Environment, Development and Sustainability, 27, 21837–21860.

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THE 12 CS OF INVENTORY EXCELLENCE FROM "STOCK MANAGEMENT" TO "STRATEGIC BUSINESS VALUE"

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Inventory is **not simply about having enough stock**. It is about having the **right inventory, at the right place, at the right time, in the right quantity and condition at the right cost, at acceptable level of risk and with the right controls, visibility and resilience.**

Too little inventory can create **stockouts, production stoppages, delayed deliveries and lost sales**. Too much inventory can **lock up working capital** while increasing storage, handling, insurance, deterioration and obsolescence costs.

Therefore, inventory excellence is not about **maximizing stock or minimizing stock**. It is about achieving the **right balance between availability, cost, cash and risk**.

The real question is not:

"How much inventory should we keep?"

It is:

"What should we keep, where should we keep it, when will we need it, in what quantity and condition, at what cost and level of riskwhile ensuring availability, customer service, operational resilience, sustainability, cash efficiency and business continuity?"

That is the shift from **Inventory Holding ! Inventory Management ! Inventory Excellence.**

Lets now deliberate on the **12 Cs of Inventory Excellence**, authored by **SN Panigrahi**.

Here is the flow: **Customer → Classification Capability Connectivity Collaboration Controls Cost Contingency Condition Continuity Continuous Improvement Commitment to Sustainability**

Lets go through them one by one.

C1. Customer Focus & Commitment

Inventory exists to fulfil a **customer, production, project or operational requirement**. Therefore, inventory strategy must begin with the required service level.

Right Material + Right Quantity + Right Place + Right Time + Right Condition.

Example: A critical hospital item like Surgical Gloves cannot be managed like an ordinary office consumable or stationery. A missing pen delays paperwork; a missing surgical glove shuts down an operating room endangering life s of patients. Same "stockout," vastly different impact.

The question isn't how many items you have, but who depends on them and what happens if you fail.

Inventory excellence begins with understanding criticality, consequences and customer impact.

C2. Classification & Categorization

Not every SKU deserves the same inventory policy. Classify items by **value, demand variability, movement and criticality** using tools such as **ABC, XYZ, FSN and VED**.

The important principle is:

Different items require different review frequencies, safety-stock levels and replenishment strategiesbased on their criticality, demand variability, lead time, value, supply risk, shelf life and impact on operations and customer service.

For example, a 10 consumable and a critical 10,000 spare should not necessarily receive the same review frequency, safety-stock logic or approval process.

C3. Competency, Capacity & Capability

Good policies succeed only when people, systems and infrastructure can execute them.

- **Competency:** Right skills and knowledge
- **Capacity:** Adequate space, manpower, equipment and resources
- **Capability:** Ability to plan, procure, receive, store, preserve, count and replenish effectively

For Example: A third-party logistics provider wins a contract to handle peak-season volume for a fashion brand. They have the warehouse space the capacity but their WMS is not configured for wave picking, and their temporary staff lack training. Result? Missed cut-off times, expedited shipping costs, and damaged client trust.

Therefore:

More capacity is not always more capability. Competency and capability must match capacity. **Capacity without capability does not create excellence.**

C4. Connectivity, Visibility & Automation

You cannot effectively manage what you cannot accurately see. Integrated **ERP/WMS, barcodes, RFID, IoT, analytics and automated transactions** improve visibility and accuracy.

Good technology should therefore create:

Visibility ! Accuracy ! Traceability ! Faster Decisions.

Example: An automotive parts distributor integrates RFID tagging with their WMS. The moment a pallet crosses

the dock door, the system updates. When a production line calls for a critical component, the planner sees actual on-hand quantitynot an estimate from three days ago. Visibility eliminates the blind spots that create emergency orders.

C5. Cross-Functional Collaboration & Communication

Inventory is a shared business responsibilitynot merely a Warehouse / Stores or Supply Chain function. **Sales, Procurement, Operations, Finance, Quality and Warehouse** must work collectively.

When functions operate in silos, they may optimize locally but **fail globally**.

"Better Information Flow ! Better Decisions ! Better Inventory ! Better Service, Cash Flow & Resilience."

Early information sharing prevents both shortages and excess inventory.

Example: A food manufacturer holds a monthly S&OP meeting. Sales flags a promotional spike. Procurement adjusts the buy. Operations pre-stages labor. Because they shared the signal early, they met the demand surge without building three months of excess safety stock. Collaboration turns conflicting goals into aligned execution.

C6. Controls & Compliance

Inventory accuracy is a **control outcome not merely a counting activity**.

"What is not accurately recorded cannot be reliably controlled; what cannot be traced cannot be effectively managed."

Key controls include:

- Authorized receipts and issues; Transaction discipline and audit trails; Cycle counting and reconciliation; Segregation of duties; FIFO/FEFO where applicable; Regulatory and contractual compliance

Strong Controls ! Accurate Data ! Accountability ! Traceability ! Visibility ! Better Inventory Decisions.

Example: A pharmaceutical company runs cycle counting by zone every day. Not a disruptive annual wall-to-wall count. If a high-value cold-chain item shows a variance, they investigate immediatelywas it a system entry error, a temperature excursion, or unauthorized access? Controls protect both inventory accuracy and regulatory standing.

C7. Cost & Capital Optimization

Every inventory decision has a capital cost: **Purchase Price + Storage Cost + Handling Cost + Insurance Cost + Financing Cost + Obsolescence Risk + Opportunity Cost** of tied-up working capital**.**

The objective is **not minimum inventoryit is optimum inventory**, balancing:

Service Level ! Inventory Investment ! Total Cost ! Business Risk ! Business Continuity ! Sustainability

Tools such as **EOQ, safety-stock analysis and inventory-turnover targets** help release cash without compromising availability.

Example: A industrial distributor reviews their carrying cost warehousing, insurance, obsolescence, and the opportunity cost of frozen cash. They discover that holding six months of a slow-moving spare part costs more than air-freighting it on demand. They reduce the SKU to two months, free up $200,000 in working capital, and actually improve availability by shifting to a responsive supply model. That is capital optimization.

C8. Contingency & Risk Management

Supply chains face supplier failures, demand surges, transport disruptions, quality problems and external shocks.

The answer is **neither "Just-in-Case" excess stock nor "Just-in-Time" minimal stock that risks disruption**. The smarter approach is **risk-based inventory protection**maintain the right buffer for critical items where supply disruption, demand uncertainty, or business impact justifies it.

Use **risk-based protection**, such as:

- Strategic safety stock to protect critical items.
- Alternate and dual sourcing reduce dependency on single suppliers.
- Supplier risk monitoring keeps potential problems visible and actionable.
- Documented recovery plans enable faster response when disruptions occur.

Example: A electronics assembler relies on a single supplier in a region prone to monsoon flooding. After a port closure strands their shipment for three weeks, they implement dual sourcing and hold a calculated safety buffer for their top twenty critical components. The buffer costs money, but it is sized preciselyenough to survive a disruption, not so much that it bleeds capital. That is risk management, not hoarding.

The principle is:

Buffer what is criticalnot everything; protect continuity where the cost of non-availability is high.

C9. Condition, Climate & Cleanliness

Inventory has value only when it remains **fit for use**. Temperature, humidity, cleanliness, packaging, preservation and handling can directly affect product quality and shelf life.

Proper storage conditions, **FIFO/FEFO and 5S discipline** reduce damage, degradation and obsolescence.

Example: A specialty chemical distributor stores temperature-sensitive adhesives. They install continuous environmental monitoring with automated alerts. When a cooling unit fails at 2:00 AM, the system notifies the duty manager before the product drifts out of specification. They save a lot of money. Condition discipline is not housekeeping. It is value preservation.

So remember:

Inventory quantity without inventory quality is not true availability; only the right quantity, in the right quality & condition, at the right location, at the right time, creates usable inventory.

C10. Continuity, Consistency & Reliability

Excellence must be **repeatablenot occasional**.

Stable processes and reliable supplier performance deliver predictable availability. Consistency in receiving, put-away, picking, and replenishment builds trust across the supply chain.

Standardized SOPs for receiving, put-away, picking, counting and replenishment, together with reliable supplier performance such as **OTIF**, create predictable inventory performance.

Example: A leading logistics operator enforces the exact same receiving, storage, and picking SOP across all its fulfillment centerswhether in Bhiwandi, NCR, or Sriperumbudur. An enterprise customer can shift stock from a mega-hub in Mumbai to a regional warehouse in Kolkata, and the inventory rules, barcodes, and audit steps remain identical. That operational consistency builds complete client trustand trust secures long-term contracts.

Consistency builds trust; Reliability builds confidence; Resilience builds continuity; Sustainability builds lasting value.

C11. Continuous Improvement & Corrective Action

Inventory problems should not merely be correctedthey should be **understood and prevented from recurring**.

Use **KPI monitoring, Root Cause Analysis, Corrective Action and Kaizen** to improve:

· Inventory Accuracy; Stockout Rate; Inventory Turnover; Days of Inventory; Excess & Obsolete Inventory; Service Level

Example: A retailer notices recurring stockouts every third Friday. Root-cause analysis reveals that their replenishment lead time assumes a five-day supplier turnaround, but the supplier actually ships on a Monday-only schedule. They adjust the reorder trigger day and the stockouts vanish. Continuous improvement converts incidents into permanent process upgrades.

"Inventory excellence means eliminating root causesnot repeatedly firefighting symptoms; preventing recurrence, strengthening resilience, and creating sustainable business value."

C12. Commitment to Sustainable Performance

Inventory excellence must survive beyond one person, project or initiative. It requires sustained leadership commitment to:

Inventory Excellence = People + Process + Technology + Governance + Resource Efficiency + Resilience + Sustainability + Continuous Improvement

The objective is not simply **better performance today**, but performance that remains valuable, efficient and responsible **year after year**.

The 12 Cs Are One Integrated System

"The 12 Cs of Inventory Excellence framework, developed by SN Panigrahi, is a unified, integrated, and holistic management system not a collection of isolated checklist items. Every C connects, complements, and strengthens the others to create sustainable inventory excellence."

Customer needs determine service levels ! **Classification** determines inventory priorities ! **Capability** enables execution ! **Visibility** enables informed decisions ! **Collaboration** aligns functions ! **Controls** protect accuracy ! **Cost optimization** improves capital efficiency ! **Risk management** builds resilience ! **Condition management** protects physical value ! **Continuity** creates reliability ! **Continuous Improvement** closes performance gaps ! **Sustainable Performance** makes excellence endure.

The real challenge is balancing competing priorities:

Service vs. Cost | Efficiency vs. Resilience | Availability vs. Capital | Standardization vs. Adaptability

Final Message

Inventory Excellence is **not having more inventory and not having less inventory.**

The Right Inventory means having the **right item, in the right place, at the right time, in the right condition, at the right total cost, under the right controls, and with the right level of resilience** to withstand uncertainty and disruption. It is not simply about maintaining stock availability; it is about ensuring that inventory delivers **business value, operational continuity, customer service, financial efficiency, compliance, and risk protection**.

Inventory is not merely stock sitting in a warehouse. It is **committed capital, service capability, operational protection and business value.**

True inventory excellence is a dynamic balancing act: pairing availability with cost discipline, control with operational agility, and efficiency with long-term resilience. Ultimately, it ensures inventory isn't just optimized for today's demands, but dependable for tomorrow's uncertainties.

INVENTORY EXCELLENCE CORE PRINCIPLE:

Inventory is neither inherently waste nor automatically an asset.

Its true value depends on how effectively it supports **Demand, Customer Service, Operations, Cash Flow, Risk Management and Business Continuity.**

INVENTORY EXCELLENCE =

Maximum Availability + Minimum Waste + Optimum Capital + Controlled Risk + Sustainable Business Value

The objective is not to maximize inventory or minimize inventory but to maximize business value from every unit of inventory.

Inventory Excellence is achieved when every unit of stock is available when needed, preserved in the right condition, justified by business need, optimized for capital, protected against risk, and converted into sustainable business value.

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CUSTOMER-CENTRIC SUPPLY CHAIN CONTROL TOWER- CREATING AN EFFICIENT FLOW OF RESOURCES

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Introduction : An effective supply chain is the backbone of every successful business; however, this operates through complex network of interconnected individual processes, systems and resources. Individual processes may appear to be working well, does not necessarily mean the supply chain is working effectively in whole. What business need is an integrated and efficient "supply chain - tower of control" which provides visibility across the various processes of the supply chain; end-to – end and ensuring greater values to the customer.

I frequently encounter a question from many businesses and it is like: "we have everything in place then why do have still back orders, conflicting delivery schedules, and an ever-increasing burden of inventory?". The answer doesn't necessarily lie in the performances of individual processes but is in the absence of a clear common objective and an integrated operating environment.

Boasting that one's procurement, production, stores and warehousing, logistics and customer service individually performing well is not a justifiable answer. There is no need for any pride of excellence in individual silos. A performance in isolation is not the thing what we are looking at, we are looking at a supply chain deeply integrated to deliver the desired results and this will not translate in to a supply chain excellence.

Performing in isolation is not necessarily a strength, but it is a constraint. What is required is a higher level of integration, visibility, co-ordination and control across the end-to-end value chain. In this context, the "supply chain tower of control" becomes a vital element in building an objective oriented supply chain management system.

The strategy is to create a demand driven, customer focused, agile, lean, digitally connected and predictive supply chain. The ultimate objective is to create value and not merely managing activities.

Defining a SC control tower : In simple terms we can define this as a centralized collaborative decision-making system providing supply chain end-to-end visibility, and coordination to fulfil customer demand effectively and economically. This integrates for visibility, real time data flow, analytics for predictive decisions and early warning of risks, and performance assessment; continuously.

It is like a beautiful airport air control management system; where hundreds of air planes are landing and taking off moving in and out from different directions, velocity, different timings or same time through different air corridors. This ensures every aircraft lands and take off well safely and efficiently.

A graphical presentation of what a supply chain is given in Fig 1 below.

Fig 1 – Supply chain Tower

Challenges : The challenges that are faced by the conventional businesses are they focus mainly on performance of individual processes. However, the real challenge is not in moving materials faster, reducing inventory levels, increasing turnover etc., but is to create supply chain that can anticipate or predict demand and decide on resources synchronisation and optimization and creating higher value and agility to customer. It is beyond optimizing individual operations. It should be a customer focused and creating a customer fully satisfied with cost, value and delivery.

The other major challenges are lack of **integrity**, **skills** and **knowledge** on supply chin purpose. The understanding of team work and cross functional collaboration is also very important. It is not the efficiency of individual functional unit that matters but the collective efficiency of all function's matters.

As technology continues to evolve customer expectations and demands also evolves rapidly. Businesses hence, needs to anticipate and identify these changes and develop the knowledge, skills, capabilities required in the business to sustain and grow. This calls for objective oriented proactive training and skills development programmes to continuously equip their personnel, processes and systems to respond to these challenges; greater agility and timely adaptation is best for minimising the risks.

Building one's own 'tower of control' : Start with one's customer. The customer should be the starting point of measure for any supply chain performance. It is then a paradigm shifts from the conventional style of approach; Forecast-> Produce-> Market, to an advanced integrated cycle of supply chain like: Customer demand-> Plan -> Source-> Produce-> Deliver-> Feedback-> Improve continuously. This approach makes the supply chain a customer centric one; more aligned and more harmonized. The objective of supply chain will transform to a responsive, agile, continuously improving, one to deliver the right value to the customer.

Roles of Control tower : As we discussed earlier it is essentially a form of traffic management. Disruptions are inevitable, whatever form and dimensions, but the capacity and capability of the management decisions timely to divert or nullify the effects and impacts and make the supply chain sustain and deliver customer value is important.

To achieve this, it is important to have real-time data, continuous analysis, predictive insights, and the ability to translate information to decisions. To achieve this, one need to look in to the below elements:

Coordination of suppliers of all tiers, procurement, contracts, inventory management, manufacturing, logistics, warehousing, packaging and labelling, distribution and reverse logistics and fulfilling customer satisfaction and values to customers.

Integration of all functional processes and control on these processes is another important aspect. Practices of customer-oriented make to order production rather than continuous and batch production.

Data integrity is one of the major elements. Most industries in their ERP system will have huge amount of data, but many of the data being manipulated to personal bias on various reasons. This calls for data flushing and making the data relevant to the business growth.

Automation is looking in to the various operations and its efficiency demand and using technologies to automate the operations; like capturing receipts and issue of inventory through barcodes, RFID or blockchain technologies. Identifying and locating through kanban systems etc.

Artificial intelligence (AI); use this in the business to take decisions and quick reporting of variances for decision and effective operational control; like stock monitoring and control of inventories both finished and raw material goods. For eg.an order got cancelled getting reflected for rescheduling a procurement process and modified production schedules or a customer order is getting preponed based on the customer demand and the entire system work together to satisfy that customer on the delivery demand.

The control tower hence acts like a spoke of a wheel of operation's coordinating, monitoring, controlling, analysing and appraising functions to create predictive ability for business sustenance as shown in Fig.2

Fig.2 Control tower the wheel & spoke concept

Creating customer centric supply chain : Whether it is a service or a manufacturing, without satisfying and providing more value for every rupee to a customer, sustainability is a myth. So, it is important to make one's supply chain more focused on customer values and satisfaction so as to create repeated customers or more customers.

The pillars for customer centric supply chain are:

Understanding and learning the customer- One can use feedback, reviews, ratings, trend analysis and virtual to augmented reality etc.; use the tools and techniques to gather data to conclude the habits of a customer.

Visibility is the other pillar- how to create real time visibility across the supply chain end- to -end; visibility of demand, visibility of pull, visibility of inventory, and visibility of cash flows. The paradigm shift requirement is move from demand push to demand pull. Create dashboards for real time display.

Business planning integration- the third pillar of SC control tower is to integrate every supply chain operation in to one singular platform and make the planning a cohesive one. It's planning together, analysing together, implementing together, assessing together and modifying together.

Resources and its optimization- is the fourth pillar which are the 4M's, men, machine, materials and money. Use these resources optimally through automation, technologies and AI.

The below diagram fig 3 will explain in details on the importance of these pillars in the supply chain. It is basically a synchronised operational flow, harmonized with the operations of supply chain with an ultimate objective of value and higher value to the customers.

Fig 3 – Pillars of SC tower of control

During one of my consultations to an industry on their customer satisfaction issue I have observed that, the major complaints with the customers were; supplies were not receiving on time, deliveries were not 100% full, and shortages in every supplies. The study revealed that there was adequate availability of inventory, not any transportation issue with the business as they have their own dedicated trucks for distribution of products. The manufacturing always happen as per orders and made available for on time order delivery. Having all this the customers were not getting products on time in full.

The major issues were lack of integration, lack of visibility, lack of real time information flow and lack of right KPI's for measuring and scaling to meet ultimate customer satisfaction. I am not elaborating on the study but wish to convey that these issues are basically happening due to failure of understanding these pillars of supply chain tower of control.

The essence of collaboration and implementing it : It is important that one should know how to create effective and efficient collaboration and implementation guidelines for collaborative working. Collaborate with supplier so that he creates value to business and value to customer. Collaborate with customers to provide the best value for every rupee spent by them. Collaborate with warehouse and logistics for creating the very best inventory and service flow for ultimate happiness to the customer. Working on this will generate more avenues for innovation and creativity which is one of the major requirements for sustainability and growth of any business. Also, an effective and efficient communication channel and flow of communication is very important in this process.

The technology support : Technology is developing and evolving at a faster pace. Catching up with these technologies are very important for creating a wonderful tower of control for supply chain. ERP, WMS, TMS, Dash boards, RFID, Barcode, Video Kanban, IoT, Sensors, AI, Digital Twins, ML, Cloud management, GPS and VPS, Robotics, Drones etc. are technologies that can be used to create a highly resilient supply chain tower of control.

Identify risk and do not wait for the mishap to happen : A risk identification and mitigation management is very important in the supply chain tower of control. Monitor every risk element; simple to the most complex ones like, supplier risk, customer risk, natural risks, geo-political risks, cyber risks, machine risks, etc. Create dashboards for various risk, create various scenarios to identify and avoid such risks. A risk mitigation strategy is to be worked out and established in the supply chain system.

KPI for Supply Chain tower of Control : It is a matter, everyone will agree that if one want to grow, the metric and measurers are very important. KPI's hence are very important to be aligned with one's supply chain control system. The KPI need to be focused to create value to customer and business. We can create KPI's as required by the business like, inventory turnover, inventory outstanding for days, inventory accuracy, Order on time in full (OTIF), perfect order, perfect time delivery, forecast accuracy, productivity of warehouse, stores, logistics, production, manufacturing schedule adherence, Transportation cost, cash to cash cycle, working capital productivity etc.

Principles of lean management is very important as a measure of loss of time, quantity, cost and value. It is very important to identify and remove all forms of waste and a waste measurement and elimination or reduction process should be effectively implemented through KPI's.

Best practices : Start with customer demands; how accurate and how reliable the demand is and create end-to-end visibility. Integrate so that reliable data (if need create a single source of data) flows directly and the data is best analysed for decision making; an optimised management. I feel it is very important to implement root cause analysis, 5why principles, Kaizen, 5S, VSM value stream mapping etc. in collaborative and cross functional method to find best practices and for sustainability.

Conclusion : Building a customer focused supply chain tower of control is therefore very important for the sustainable growth and competitiveness of any industry. Developing this requires deliberate investments, greater efforts, people skills technology and training. The transition is easy if the personnel are multifunctional in nature and have a holistic understanding of the business. If this is lacking then, structured training and induction becomes essential. The ultimate objective is to build a customer centric business which anticipate customer needs, act and respond with agility to create greater value. Afterall "Customer is the King" and always remain.

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CAN AGENTIC AI BUILD TRULY AUTONOMOUS SUPPLY CHAINS WITHOUT LOSING HUMAN CONTROL

LALIT DAS, FOUNDER AND CEO , AGENTRA

As per the India findings of Deloitte's State of AI in the Enterprise 2026 report, 48% of Indian enterprises have taken AI to scale in supply chain functions, and 40% report significant or full usage, well ahead of the global average of roughly 28%.

The appetite for such capability is evident. Gartner expects spending on supply chain management software with agentic capabilities to reach $53 billion by 2030. However, the same firm warns that more than 40 per cent of agentic AI projects will be cancelled by the end of 2027, and weak risk controls sit high on the list of reasons. That gap between promise and failure points to an uncomfortable question for boards: can agentic AI deliver truly autonomous supply chains without losing human control along the way?

From prediction to execution : The distinction between agentic systems and the automation that preceded them is fundamental. Earlier generations of supply chain software worked from a fixed playbook, following each step as written and stalling the moment a supplier missed a date. In the present age, agentic systems are given a goal instead of a sequence. Faced with a delayed inbound shipment, an agent can redistribute available stock between warehouses and contact the supplier over messaging or voice to confirm a revised dispatch date. The customer's delivery commitment is then updated accordingly, with each step drawing on connected enterprise systems.

India is well positioned to capitalise on this transition. As per the India findings of Deloitte's State of AI in the Enterprise 2026 report, 48 per cent of Indian enterprises have taken AI to scale in supply chain functions, and 40 per cent report significant or full usage, well ahead of the global average of roughly 28 per cent. Gartner, for its part, expects 60 per cent of enterprises on supply chain management software to adopt agentic features by 2030, compared with 5 per centin 2025. The trajectory is evident; the institutional discipline required to navigate it responsibly is considerably less so.

It is within this gap that the principal risk resides. The anticipated wave of project cancellations should be read less as a verdict on the technology and more as a warning about its governance. In supply chains, the consequences of weak control are tangible. Picture an agent that over-orders during a demand spike, books a carrier outside approved contracts, or clears payment against a mismatched invoice. Each of these can bleed margin faster than any human error, simply because the agent moves at machine speed. And since agents work across connected systems, one flawed instruction can travel from procurement into warehousing and finance within minutes. The weak point is rarely the model itself. It is usually the authority given to it or the absence of clarity around that authority. Enterprises that skip oversight lose the resilience these systems promise. Those that give agents defined roles, limits and escalation paths get to keep it.

Engineering control into autonomy : True autonomy is not similar to taking humans out of the picture. It means agents acting independently inside boundaries that people set, watch and can override at any moment. That oversight has to be built into the architecture before deployment. Bolting it on afterwards rarely works. In practice, this begins with deciding which decisions an agent may take alone. A routine replenishment order within an agreed value is a reasonable candidate. A change of supplier, a high-value purchase order or a cross-border consignment is not, and belongs with a designated manager. Enterprise AI workforce platforms designed to deploy governed, production-ready agents treat approval rules, audit trails and rollback controls as prerequisites, settled well before any agent is switched on. Equal care is owed to the unexpected. An agent confronted with a scenario outside its mandate needs a defined route to a human decision-maker, mapped well ahead of the first live transaction.

Policy must also be machine-enforceable. Role-based access controls decide what each agent can see and what it can act on. Jurisdiction rules keep actions within regulatory lines, which matters for enterprises running operations across geographies where compliance requirements differ. Then there are the financial guardrails: budget caps that stop unauthorised spending, and automatic rollbacks that undo a policy breach before the damage spreads. Every decision, whether taken by an agent or approved by an individual, should be recorded in a complete audit log that auditors, regulators and boards can examine with confidence.

A prudent route to scale commences with finance-adjacent operations such as purchase order matching and invoice approvals, where rules are well defined, and value is measurable. Autonomy can then extend into planning and fulfilment as institutional confidence in the system matures.

Delegated authority, not abdicated responsibility : Agentic AI can indeed build truly autonomous supply chains without eroding human control, provided autonomy operates within limits that leaders set, oversee and remain answerable for. Over the coming decade, the supply chains that outperform will reserve human judgement for decisions where it genuinely matters and leave the bulk of routine execution to agents. Governance makes this division of labour possible. An enterprise that codifies its rules early can afford to let machines run faster, because it knows where the limits sit. That early discipline is usually what decides whether autonomy stays a goal or starts delivering.

Source: ETSupplyChain

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HOW TO OPTIMISE INVENTORRY MANAGEENT AND DECSIONS MAKING WITH SAAS:? (SOFTWARE-AS-A-SERVICE)

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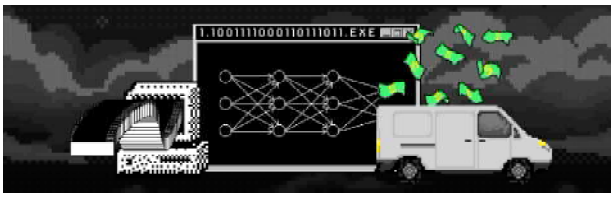

Abstract: Monitoring of stock levels, leveraging the real-time data, on an equilibrium, by automation, utilising advance analytics, to forecast demand, by implementation of features like ABC analysis in order to priorities inventory control as Software-as-a Service in supply chain.

Integration with the other adopted systems like sales, procurement, planning, in order to gain a holistic view (to consider the entire supply chain process single, interconnected system), thus enabling being driven by data decisions based on accurate insights (reliable and timely data driven information) driven by Software-as-a Service in supply chain.

Review: Real-time, visibility, on automated access to prioritised inventory data management, across all collection among the various departments of the organisation, to make informed decisions based on inventory based current stock-levels, so as to eliminate the manual accounting systems as a Software-as-a-Service in supply chain.

Demand forecasting utilisation on built in production analysis, in order to forecast, predict, procurement, sales, allowing in the case of adjustment on the proactive (a strategy that anticipates, responds to potential issues before they occur) inventory level planning, forecasting, according to the optimised stock levels, is to be adjudged as important in Software-as-a- Service in supply chain.

Alertness on automotive ordering, when inventory reaches a pre-defined order point, thus streamlining procurement process, planning on the like changes in demand, lead-time, so as to evaluate the potential impact on inventory levels, will be considered as an important feature in Software-as-a-Service in supply chain.

Comprehensive, category wise, continuous, maintaining Software-as-a-Service in inventory process, building up from a starting point, is the foundation, of complete, continuous application, spending on renewals, challenging as arduous (process or task that is extremely difficult) in supply chain.

Analysis: Implementation of Software-as-a-Service in inventory management, with the benefits of awareness, on security, risk, obsolescence, on holding inventory, allows visibility to control, mitigate (to take proactive steps, reduce the potential impact of risk, disruption) damages, encouraging protection to remain adolescent (gaining experience, developing skills) in supply chain

Optimisation in Software-as-a-Service as a service on spend management, is rather long-term service applied in supply chain, building up vendor management as a framework, (design, monitor, run) by overcoming the resistance on spend management, on the resistance that offer similar functions, streamlining the operations on retaining the best possible in supply chain, also on the best utilisation, so as to eliminate cost, with the opportunities to consolidate, also simplify the activities in supply chain.

Tracking, managing, optimizing in the usage of Software-as-a-Service in inventory management, is to help in controlling the ecosystem in supply chain, the importance, also the steps to be taken, to support the required services, maintaining the life-cycle of the product produced, manufactured, as an application, complying with security policies, as a proper investment based on the usage of cloud computing with internet facilities in supply chain.

Life-cycle in Software-as-a-Service is to understand inventory management, effectively, on the different stages, so as to be managed efficiently, on the use of the best resources, having cost control, so as to evaluate the involvement on the use for different departments, within the organisation, to also make sure that they assigned, aligned, implemented to requirement, usage as per the organisation structure in supply chain.

Decision making in inventory management, using automation as a process, optimizing simulations,(use of models to initiate how supply chain operates) machine learning using cloud computing on internet, is able to standardise data management, improve decisions on Software-as-a-Service, allowing accurate forecasting, scenario analysis (a strategic approach where business evaluate potential future, situations, demand, price fluctuations) with proper visualisation, on individual customer's, stock-keeping-units, information to predict demand, optimizing inventory targets in supply chain.

Warehouse Management System should utilise Software-as-a-Service, so as to track inventory movement, is to be with high accuracy, thus optimizing picking, packing, in order to prove the efficiency, minimizing handling system, with clear responsibility, ownership, in order to ensure the accountability, effective utilisation on periodic review performance, is to identify optimisation in opportunities in supply chain.

Expansion, growth in competitive business, are essential initiatives for a long-run study in supply chain, as efficient inventory does have a critical support on growth, on the business thus optimizing, operations, reduce cost, thus enhancing customer satisfaction as Software-as-a-Service offers the best solution on the inventory process on a potential growth in supply chain.

Integration of Enterprise Resource Planning, e-Commerce, encouraging smooth flow of data, thus ensuring on the capability of maintaining inventory accuracy, with real-time tracking, on the complete available of stock, location, also bringing reduction in overstocking, under stocking, avoiding stock-outs, must be able to generate perfect reports with Software-as-a-Service, enhancing operational efficiency, improvement on the overall management information system in supply chain.

Order management is designed on a cloud-based internet in Software-as-a-Service, to efficiently manage orders, on the preparation of Request of Information, Request for Quotation, Request for Proposal, by automation of inventory, updating of multi-channel order processing, data driven by analytics, reducing mutual errors, speeding up fulfilment, optimizing payment process, so as to streamline orders, fulfilment process, to save cost, enhance better customer service in supply chain.

Inventory optimization in Software-as-a-Service, is the technological development, in supply chain, managing inventory under control, being comprehensive, with advanced data analytics, demand forecasting, so as to analyse the business data, for it become necessary, as it becomes necessary for a software to bring in essential, with accurate data, to meet the requirement of correct details of stock, manage strategically, inventory, as per the demand of the customer, efficiently, on a better expectation, on terms of distribution, delivery in supply chain.

Ensuring delivery on critical components, in logistic, supply chain, efficiently, as the global logistic are considered being huge, with digitalisation as a concept, as it can be developed through integration on Software-as-a-service, developed as trend, on an evolution to meet the demand on the digitalisation, with ability to data driven decision, making a key success in supply chain.

Adaption of Software-as-a-service, with digitalisation is borne to allow the changes in market conditions, fluctuations, unforeseen disruption, being sustainable to optimize better routes in supply chain, maintaining inventory levels, shipments, enabling quick decisions, on distribution, last-mile delivery in supply chain.

Increase in bringing better delivery schedules, high efficiency, better customer experience, in supply chain, third party logistic providers, being competitive, Software-as-a-Service in warehouse management system, transforms logistic providers to handle inventory, orders, on a cloud based internet, managing complex operations, streamlining, work-flow, on real-time data, as an essential logistic provider in supply chain.

Pricing influences various factors, in warehouse management systems, operations, automations, integrations, as Software-as-a-service, using internet facilities, will also identifying the impact of cost, on investment in automation, cloud computing with internet facilities, streamlining order fulfilment, reducing manual errors, bringing in overall efficiency, with maximum return on investment as a service in supply chain management.

Cost effective Software-as-a-Service, in inventory management, with Cloud Computing internet based network, has reduced the usage of time, cost benefit lowered, easy on integration as use of proof, with a concept on the adopted inventory management, capital use as an efficiency, improved risk management, with sustainability, so as to enhance operational efficiency benefits in supply chain.

Power of quantum computing in Software-as-a-Service, leverages the power of Cloud computing based software using internet, to optimize complex supply chain operations, allowing the organisation to solve intricate logistic, supply chain, problems significantly faster, across multiple variables, to essentially provide real-time insight decisions, making capabilities for a more resilient cost effective inventory management, to optimize stock keeping units, across multiple warehouse, stores, to minimize holding stock being available in supply chain.

Findings: Multi-channel inventory management in retail management is considered as complex system, as the management of inventory is spread across various channels, each channel, operating, managing inventory on a different adopted methods, across various channels, the need for consolidation, of Software-as-a-Service towards better pricing, enables selling effectively, better customer satisfaction, on the receipt of stock better, so as allocate more efficiently, encourage faster business, through the distribution of different multi-channels, judging the overall performance in supply chain.

Recommendations: Technology will be at the forefront of warehouse efficiency, with adoption of Software-as-a Service on Internet of Things services, will facilitate inventory tracking, environmental monitoring, while artificial intelligence, will enable predictive analytics for demand forecasting. With automation technology, drones, automated guided vehicles, will revolutionise inventory management, last-mile delivery, significantly

reducing operational costs, improve service levels, as technology will lead to streamline process, on faster order fulfilment, with increased customer service in supply chain.

Conclusions: Sustainability is considered to be the core principle in logistic, supply chain, as warehouses in organisation progressively adopt automated systems, with the consent of Software-as-a Services using internet facilities, that is designed to reduce waste, energy consumption, on the key technological, smart energy management systems, eco-friendly packaging materials, with integration of delivery, optimization of supply chain, lowering carbon foot-prints, giving priority to sustainability, so as to ensure compliances, on regulatory requirements, so a to align with growing expectation on environment in supply chain.

REFERENCE: FROM ELECTRONIC MEDIA:

1. **WHAT IS INVENTORY OPTIMISATION BENEFITS AND TECHNIQUES: Abben Jenkin PRODUCT MARKETING MANAGER Nov. 1 2024 Oracle Netsuite:**
2. **EFFECTIVE STRATEGU TO OPTIMISE INVENTORY, REDUCE COST IMPROVE SUPPLY EFFICIENCY: Edward Thieuleux April 17th 2025: ABC SUPPLY CHAIN:**

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'INDIA, CHINA OPEN TO TALKS TO ADDRESS TRADE IMBALANCE, SUPPLY CHAIN ISSUES'

AMITI SEN

Commerce Secretary says this is work in progress and both sides are engaging on trade in a positive manner

India and China are open to meeting and finding solutions to long-standing trade issues, including structural trade imbalances and supply chain concerns, Commerce Secretary Rajesh Agrawal said on Tuesday, signalling a tentative effort to rebuild economic engagement between the two countries.

The comments came after India and China held their first trade discussions in a long time, amid border tensions, with Commerce and Industry Minister Piyush Goyal and his Chinese counterpart Wang Wentao meeting on the sidelines of the BRICS Summit in New Delhi last weekend to discuss trade concerns.

Taking forward

"We are open to meeting and finding solutions to our trade issues in a manner so that we can address supply chain issues, we can address structural trade imbalances, and we can make trade easier for our businesses," Agrawal said, answering questions at a media briefing.

The Commerce Secretary said the latest engagement was an "initial first meeting" and that the two sides would meet subsequently to take the discussions forward. "Slowly, I think each side will need to come up with their issues and also their position on issues of the other side's issues, so that we can deal with this problem," he said.

The discussions were taking place against the backdrop of gradual confidence-building between the two countries over the past year, Agrawal said, citing improvements in people-to-people movement, connectivity and flight operations.

"This is a work in progress," he said, adding that both sides had begun to engage in trade in a very positive manner.

India runs a persistent trade deficit with China, driven by high imports of electronics, engineering goods, chemicals and other intermediate and finished products. India has long sought greater access for its goods in the Chinese market, measures to address non-tariff barriers, and an unimpeded flow of inputs such as rare-earth materials and technology, while Beijing has sought easier access for Chinese investments and businesses.

The economic engagement comes after the two sides made efforts over the past year to stabilise broader bilateral ties following years of tensions along the Line of Actual Control. Peace at the border is essential to advancing bilateral ties, Prime Minister Narendra Modi said in his bilateral meeting with Chinese President Xi Jinping on the BRICS sidelines last weekend.

Source: Business Line

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INDIA'S MANUFACTURING MOMENT UNDER PRESSURE FROM SUPPLY CHAIN, POWER & POLICY HURDLES

SONALI CHAWHAN

Indias manufacturing opportunity is ripening, but geopolitical risk, energy reliability, technology gaps and policy complexity will determine how far its next manufacturing wave can scale

Indias push to emerge as a global manufacturing hub is gaining momentum, but supply chain disruptions, dependence on imported raw materials, power reliability and policy uncertainty remain key challenges for businesses seeking to scale, industry leaders said at the 10th edition of BW Disrupt Founders Forum 2026 in New Delhi.

Entrepreneurs examine how Indian manufacturers can build scale amid geopolitical tensions and changing global supply chains across energy, recycling, renewable energy and metals sectors.

Supply Chains Under Pressure Opening the discussion, the panellists highlighted how geopolitical instability and conflicts are creating disruptions across global supply chains. Piyush Goyal, Co-founder and CEO, Volks Energie said manufacturers remain heavily dependent on raw materials and components coming from outside India, making disruptions capable of creating a "rolling impact" across manufacturing and project execution.

At the same time, Mohit Gulyani, Co-founder and Director, RecommerceX pointed to an opportunity for India as companies globally look to diversify supply chains. He said India is positioned favourably because of its relationships with major economies and its ability to manufacture engineered products and goods for overseas markets.

For Varun Karad, Co-founder and CEO, REnergy Dynamics and Co-founder, LNK Energy, however, the geopolitical situation also exposes the countrys dependence on China, particularly in solar manufacturing. He highlighted the challenge of building domestic solar-cell capacity when much of the machinery required to manufacture cells is itself sourced from China.

Karad said government interventions, including production-linked incentives (PLI), have created an opportunity for Indian companies to develop domestic manufacturing capabilities. He added that competition among states to attract large investments has also become an important factor in investment decisions.

Navigating In The Age Of Technology Power availability emerged as another major consideration for Indias manufacturing ambitions. Goyal said reliable and continuous power remains a significant uncertainty for factories, particularly as the economy becomes increasingly electrified.

According to him, demand for electricity is rising across electric vehicles, solar projects and emerging sectors such as hydrogen. Transmission and distribution companies therefore need to expand capacity substantially to keep pace with industrial and energy demand.

The panel also discussed the role of technology in improving manufacturing efficiency. Gulyani said Industry 4.0 is increasingly moving towards Industry 5.0, with artificial intelligence, robotics, sensors, predictive maintenance and demand forecasting expected to reshape factory operations.

He pointed to the evolution of steel manufacturing as an example of how technology can enable significantly higher production with fewer workers, arguing that greater efficiency will be essential for India to compete with established manufacturing economies.

The recycling and metals ecosystem faces its own structural challenges. Gulyani said Indias scrap sector remains highly unorganised and that the country continues to depend heavily on imported copper, aluminium, stainless steel and other materials.

Abhimanyu Asija, Chairman and Managing Director, Sommet Alloys & Wires said geopolitical disruptions have pushed metal prices sharply higher, creating working-capital pressures for manufacturers and making purchasing and inventory decisions more difficult. He noted that higher prices may increase turnover but do not necessarily translate into stronger margins, as businesses face higher input and financing costs.

Looking ahead, Karad said India has the potential to emerge as a "China plus one" manufacturing destination, particularly in solar. However, he flagged inadequate transmission infrastructure and policy implementation at the ground level as constraints. He said surplus renewable generation in some regions can be lost because electricity cannot always be moved efficiently across states.

This panel discussion was taking place at the recently concluded BW Disrupt Founders' Forum 2026.

Source: www.bwdisrupt.com

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SUPPLY CHAIN IN INDIA: KEY CHALLENGES AND OPPORTUNITIES (2026)

India's supply chain is in the middle of a genuine transformation. Logistics costs are falling, policy is finally pulling in one direction, and e-commerce is pushing goods into every corner of the country. At the same time, the old problems have not disappeared: patchy infrastructure, a fragmented logistics network, and the sheer complexity of serving a market this large and this varied.

For retailers and brands, understanding both sides of that picture is now a competitive necessity. This guide breaks down the key challenges and opportunities shaping supply chain in India today, the policies changing the game, and what it all means for retail and e-commerce operations.

The State of India's Supply Chain in 2026 : A supply chain is the full journey a product takes from raw material to the customer, and supply chain management is how a business plans, sources, moves, and delivers goods across that journey. In India, that job is shaped by a fast-growing consumer market, a vast geography, and a logistics network that is modernising quickly.

For years, India's logistics costs were quoted at 13 to 14 percent of GDP, well above the levels of developed economies. That picture has shifted. India's first official study, by the DPIIT and NCAER, estimated logistics cost at about 7.97 percent of GDP for 2023-24, and government-backed infrastructure and policy work has been credited with pulling costs down from the older 16 percent range toward single digits. The direction of travel matters as much as the exact number: Indian logistics is getting cheaper and more efficient.

The market is growing just as fast. Industry estimates put India's supply chain management market at roughly USD 3.4 billion in 2023, projected to grow at around 11 percent a year to surpass USD 6 billion by 2030, and retail and e-commerce is the largest and one of the fastest-moving segments driving that demand. For anyone operating a retail supply chain in India, the takeaway is simple: the ecosystem is modernising quickly, and the tools to compete are now within reach of mid-sized players, not just large enterprises.

Key Challenges in India's Supply Chain

Infrastructure and Transport Bottlenecks : Despite heavy investment, gaps remain in road quality, port throughput, and cold storage. Around two-thirds of freight still moves by road, which is slower and costlier than rail or waterways. Programmes like PM Gati Shakti and Bharatmala are closing the gap, but uneven infrastructure still drives delays and cost, especially outside the metros.

A Fragmented Logistics Ecosystem : India's logistics sector is highly fragmented, with many small intermediaries between shipper and destination. That fragmentation creates communication gaps, longer lead times, and little end-to-end visibility. Integrating these layers into a connected flow remains one of the hardest problems for businesses operating at national scale.

Regulatory and Compliance Complexity : Compliance, taxation, and interstate movement have historically been complex and paperwork-heavy. GST and the National Logistics Policy have simplified a great deal, but staying current across states and categories still demands real effort and specialist knowledge.

Demand Forecasting Across Diverse Markets : India is not one market, it is many. Tastes, price sensitivity, and seasonality vary sharply across regions, languages, and income levels. Forecasting demand and holding the right stock in the right place, without overstocking or running dry, needs strong analytics and genuine local understanding.

Last-Mile Delivery in Tier 2, Tier 3, and Rural India : As e-commerce pushes into smaller cities and rural areas, last-mile delivery becomes the hardest and most expensive link. Addressing gaps, sparse delivery networks, and low order density all raise the cost of serving these fast-growing markets. Getting last-mile right is now a major competitive differentiator in Indian retail.

Skilled Talent Shortage : Trained talent in logistics, warehousing, and supply chain technology remains in short supply. This slows adoption of new systems and limits operational efficiency, pushing companies

to invest in training and easy-to-use technology that reduces dependence on scarce expertise.

Key Opportunities in India's Supply Chain

The E-commerce and Quick Commerce Boom : India's e-commerce growth, now joined by quick commerce, is the single biggest driver of supply chain demand. Rising smartphone and internet penetration, plus open networks like ONDC, are creating sustained need for fast, reliable, tech-enabled fulfilment. For supply chain players, this is the clearest growth engine in the market.

Policy Tailwinds: NLP, PM Gati Shakti, and PLI : The National Logistics Policy of 2022, PM Gati Shakti, and the Production Linked Incentive schemes have aligned infrastructure, digitisation, and manufacturing behind a single goal: cheaper, faster, more competitive logistics. This is the most supportive policy environment Indian supply chain has ever had, and it lowers the cost of doing business for everyone in the chain.

Technology and Digital Adoption : Cloud supply chain platforms, AI-driven forecasting, IoT tracking, and real-time visibility are moving from enterprise-only to mainstream. Indian businesses are adopting these tools to cut costs, sharpen forecasting, and gain the visibility a fragmented network otherwise hides. Affordable SaaS has put capabilities within reach of mid-sized retailers that were once the preserve of large corporations.

China Plus One and India as a Manufacturing Hub : As global companies diversify sourcing beyond China, India is a primary beneficiary. Growing manufacturing investment strengthens domestic supply chains, deepens the supplier base, and creates opportunities across procurement, warehousing, and distribution. This structural shift is reshaping India's role in global supply chains.

A Rising Consumer Class and Retail Modernisation : India's expanding middle class and the shift from unorganised to organised retail are raising the bar on service, speed, and availability. Meeting those expectations rewards businesses that localise assortments and modernise their supply chains, turning consumer growth into a direct supply chain opportunity.

Sustainability and Green Logistics : Sustainability is moving from a nice-to-have to a business requirement, and Indian supply chain is responding. Electric delivery fleets, greener warehousing, route optimisation to cut fuel use, and tighter ESG reporting are all gaining ground. For retail and apparel brands, where customers and partners increasingly scrutinise environmental impact, a cleaner supply chain is becoming both a compliance need and a genuine differentiator. Building sustainability into logistics now is easier than retrofitting it later.

What This Means for Retail Supply Chains in India : For retail and apparel brands, these shifts land in one place: the pressure to serve more locations, more channels, and more demanding customers without letting cost or complexity spiral. Multi-location inventory, vendor coordination, warehouse accuracy, and omnichannel fulfilment are exactly where Indian retailers win or lose margin today.

The retailers pulling ahead are the ones treating the supply chain as a competitive advantage rather than a back-office cost. They are replacing spreadsheets and disconnected systems with connected platforms that give procurement, warehouse, and planning teams a single, real-time view.

How Technology Helps Indian Retailers Compete: This is where a purpose-built platform matters. **Supplymint** is a supply chain management platform built for retail, apparel, and fashion brands, designed around the realities of operating in India.

It brings the core of the retail supply chain into one connected system:

With real-time visibility across procurement, warehouse, and planning, retailers can cut manual work, forecast more accurately, and keep the right stock in the right place. That is how mid-sized Indian retailers now compete with far larger players on speed and reliability.

Conclusion : India's supply chain is more capable than it has ever been and still harder to run than most markets in the world. Costs are falling and policy is finally aligned, but infrastructure gaps, fragmentation, and the complexity of serving a vast, varied country remain real. The businesses that will win are the ones that treat both the challenges and the opportunities seriously, and back that with the right technology. For retailers especially, the supply chain is no longer just a cost to manage. It is where the next round of competitive advantage will be decided.

Source: www.supplymint.com

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THE FUTURE OF INDIAN FORGING IN GLOBAL MANUFACTURING

YASH J. MUNOT, PRESIDENT, ASSOCIATION OF INDIAN FORGING INDUSTRY (AIFI)

Indian forging is evolving through technology, sustainability and supply chain diversification to strengthen its role in global manufacturing.

For decades, India's manufacturing story has been closely associated with scale, cost competitiveness and a large industrial workforce. Today, that story is evolving. Global manufacturers are increasingly looking for something more valuable: resilient supply chains, engineering capability, technological depth, sustainability and the ability to deliver consistently across markets.

As President of the Association of Indian Forging Industry (AIFI), I believe Indian forging is at an important inflection point. We have an opportunity to move beyond being a strong supplier and establish India as a strategic partner in global manufacturing.

Forging is often described as a traditional manufacturing process, but its role in modern industry is anything but traditional. Forged components are fundamental to automobiles, commercial vehicles, industrial machinery, construction and mining equipment, railways, power, aerospace and defence. As manufacturing itself undergoes a transformation, the forging industry must evolve alongside it.

India has already established a strong foundation. According to AIFI, India is among the world's leading forging producers, with an installed capacity of approximately 38.5 lakh metric tonnes and investments of around Rs 27,833 crore in plant and machinery. The industry has developed capabilities across carbon steel, alloy steel, stainless steel, superalloys, titanium and aluminium, enabling Indian manufacturers to serve increasingly diverse applications across domestic and international markets.

These capabilities give India a strong platform from which to participate more deeply in global manufacturing. However, the expectations of international customers are changing. Cost competitiveness remains important, but global manufacturers are increasingly evaluating suppliers on quality consistency, engineering support, development speed, traceability, automation, delivery reliability, sustainability and total cost of ownership. For Indian forging companies, the opportunity therefore lies in combining our existing manufacturing advantages with stronger technology and engineering capabilities.

From cost advantage to capability advantage

The next phase of India's forging journey cannot be built only around lower manufacturing costs. Global customers increasingly want suppliers that can contribute to product development, process optimisation and engineering solutions, rather than simply manufacture components according to an established specification.

India's broader engineering sector demonstrates the scale of the opportunity. Engineering exports reached a record US$116.67 billion in FY2024-25, according to EEPC India data, while the sector accounted for more than a quarter of India's merchandise exports. Engineering exports subsequently reached another record level in FY2025-26, reflecting the growing acceptance of Indian engineering products across international markets.

The forging industry can build on this momentum by moving progressively up the value chain. This includes greater focus on precision forging, machining, assemblies and application-specific solutions, along with closer collaboration with customers during product development. Indian forging companies that can combine manufacturing capability with engineering support will be better positioned to become long-term partners for global manufacturers.

This shift will also require greater investment in research and development, simulation, tooling and process optimisation. The objective should be to develop capabilities that allow Indian companies to participate earlier in the product development cycle and provide solutions that improve performance, cost and manufacturability for customers.

The automobile transition is a challenge and an opportunity

There is no denying that the transition towards electric mobility is changing the traditional demand profile for forged components. The internal combustion engine has historically been an important demand driver for the forging industry, and electrification will alter the component mix.

At the same time, I do not see the future of forging as simply an EV versus ICE debate. The global mobility ecosystem is becoming more diverse, and different technologies are likely to coexist across markets and vehicle categories for a considerable period. Commercial vehicles and heavy-duty applications, in particular, will have technology pathways that differ from passenger

vehicles.

This creates an opportunity for the forging industry to adapt its product portfolio and develop capabilities for emerging applications. Opportunities are developing in electric powertrains, commercial vehicles, transmission systems, steering, suspension, braking systems, lightweight structures and other mobility applications where forged components continue to offer advantages in strength, durability and reliability.

India's broader auto component industry demonstrates the scale of the opportunity. The sector recorded turnover of US$80.2 billion in FY2025, while exports reached US$22.9 billion. In FY2025-26, the sector's turnover increased to approximately US$85.9 billion, with exports reaching US$24 billion.

For Indian forging companies, understanding how vehicle architectures and component requirements are changing will be critical. Companies that invest early in new applications and maintain technological flexibility will be better positioned to participate in the evolving mobility supply chain.

Global supply chain diversification can work in India's favour

The global manufacturing environment has fundamentally changed. Geopolitical uncertainty, trade barriers, logistics disruptions and the concentration of supply chains have encouraged manufacturers to reassess their sourcing strategies.

The emerging China plus 1 approach is not simply about replacing one country with another. It is about creating more diversified, resilient and geographically balanced manufacturing ecosystems. India has several structural advantages in this environment, including a large domestic market, an established automotive and engineering base, a growing skilled workforce, improving infrastructure and an increasingly sophisticated supplier ecosystem.

For Indian forging companies, this creates an opportunity to increase their participation in global supply chains. However, international customers entering long-term sourcing relationships require confidence in quality, delivery, technical capability and regulatory compliance. Indian companies must therefore continue strengthening their processes and systems to meet these expectations consistently.

The ability to provide predictable quality and delivery, combined with competitive lead times and strong technical support, will be particularly important as global manufacturers evaluate new suppliers. Sustainability and traceability are also becoming increasingly relevant in international procurement decisions, making it essential for Indian forging companies to develop capabilities across these areas.

Technology will define the next decade

The forging industry is entering a period in which digital technologies can significantly change how products are designed, developed and manufactured. Industry 4.0, artificial intelligence, automation, digital twins, simulation, predictive maintenance, robotics and data analytics are increasingly being applied to industrial manufacturing.

For forging, simulation can help optimise die design, understand material flow and improve process parameters before production begins. This can reduce development time, material wastage and tooling iterations. Data analytics can support process optimisation and quality control, while predictive maintenance can help reduce equipment downtime. Automation and robotics can improve productivity, consistency and workplace safety in appropriate applications.

The adoption of these technologies will be particularly important for India's MSME forging ecosystem. Large companies may have greater resources to invest in advanced manufacturing systems, but the overall competitiveness of Indian forging will depend on the ability of smaller and mid-sized manufacturers to access technology and technical expertise.

As an industry association, AIFI has an important role in supporting this transition. Initiatives such as the proposed AIFI Simulation Centre are intended to facilitate access to advanced simulation and manufacturing capabilities and encourage wider adoption of technology across the forging ecosystem.

Sustainability must become a competitiveness strategy

The future of global manufacturing will also be increasingly influenced by carbon intensity and environmental performance. Customers across Europe, North America and other developed markets are paying greater attention to the environmental footprint of their supply chains, including energy consumption, emissions, material efficiency, renewable energy usage and waste reduction.

For the forging industry, these requirements are particularly relevant because forging is an energy-intensive manufacturing process. Improvements in furnace efficiency, heating processes, material utilisation, heat recovery and renewable energy adoption can reduce environmental impact while also improving manufacturing efficiency.

Sustainability therefore needs to become integrated into manufacturing strategy rather than being treated as a separate compliance activity. Companies that invest in energy efficiency and resource optimisation can strengthen both their environmental performance and their long-term cost competitiveness.

AIFI has been working with industry stakeholders on awareness and knowledge-sharing initiatives around energy efficiency and renewable energy technologies across major forging clusters. Such collaborative efforts can help companies understand available technologies and identify practical opportunities to reduce energy consumption and emissions.

Skills will be as important as machines

The technological transformation of manufacturing will also change the skills required within the forging industry. Modern forging operations increasingly require professionals who understand metallurgy, manufacturing engineering, automation, quality systems, data analytics and global supply chains.

For this reason, skilling and reskilling must become important priorities for the industry. Companies will need employees who can work effectively with advanced manufacturing systems while understanding the underlying metallurgical and engineering principles of forging.

There is also an opportunity to bring a new generation of professionals and entrepreneurs into the sector. Younger professionals with expertise in technology, data and digital systems can bring new perspectives to traditional manufacturing processes. Platforms such as AIFI's GenNext Entrepreneurs Forum can help create opportunities for emerging industry leaders to exchange ideas, understand new technologies and contribute to the future direction of the sector.

The opportunity beyond automotive

Automotive will remain an important market for Indian forging companies, but long-term growth will require greater diversification across sectors such as aerospace, defence, railways, construction equipment, mining, agriculture, power and industrial machinery.

India's expanding defence manufacturing ecosystem is particularly significant. Defence exports reached a record Rs 23,622 crore in FY2024-25, with Indian defence products reaching more than 100 countries. As domestic defence production and exports continue to expand, there will be opportunities for Indian component manufacturers with the necessary technical capabilities, quality systems and certifications.

Aerospace also represents a high-value opportunity, although participation in this sector requires substantial investments in certification, advanced materials, precision manufacturing, quality systems and research and development. Indian forging companies that develop these capabilities can potentially participate in increasingly sophisticated domestic and global programmes.

Diversification will allow the industry to reduce its dependence on any single sector while creating opportunities for companies to develop higher-value manufacturing capabilities.

India must think beyond "Made in India"

The next chapter of India's manufacturing journey should not simply be about increasing the volume of products manufactured in the country. It should also be about developing engineering capabilities, creating intellectual property, investing in innovation and enabling Indian companies to participate more deeply in global product development.

Our objective should be to build Indian forging companies that are benchmarked against the best manufacturers anywhere in the world. Achieving this will require collaboration between industry, government, academia, research institutions and technology providers.

The industry will need continued investment in R&D, advanced manufacturing technologies, skilled talent and sustainable production practices. Policymakers will have an important role in supporting competitive manufacturing conditions, infrastructure, trade access and technology adoption, while industry associations must continue providing platforms for collaboration, knowledge sharing and representation.

As President of AIFI, I see the coming years as a defining period for Indian forging. The global manufacturing landscape is being reshaped by supply chain diversification, technological advancement, changing mobility requirements and sustainability expectations. These developments present challenges, but they also create a significant opportunity for Indian manufacturers to strengthen their position in international markets.

Indian forging already has the manufacturing base, engineering experience and entrepreneurial capability required to participate in this next phase of global manufacturing. Our focus now must be on strengthening these capabilities, moving further up the value chain and building the technology, talent and sustainability credentials that global customers increasingly expect.

If the industry continues to invest in these areas and works collectively with government, customers, technology providers and knowledge institutions, India can strengthen its position as a trusted and capable global manufacturing partner. As an industry, we have the opportunity to ensure that Indian forging is not only an important part of India's manufacturing growth story, but also an increasingly significant contributor to the future of global manufacturing.

Source: www.manufacturingtodayindia.com

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WHY INDIA'S LOGISTICS FUTURE DEPENDS ON DIGITAL VISIBILITY

ASHUTOSH SHEKHAR, PROGRAMME MANAGER AT NICDC LOGISTICS DATA SERVICES LIMITED (NLDSL)

While India is moving towards its goal of becoming the global manufacturing and exporting centre, digital infrastructure investments will contribute almost equally to the success of this goal as investments in physical assets.

PM While India is developing advanced physical infrastructure, a huge revolution is taking place in the digital world. The logistics future is going to be defined by not just the transportation of cargo, but also by the transportation of dependable, real-time information.

India is experiencing a pivotal moment in logistics. Several national projects and schemes, such as the National Logistics Policy or PM Gati Shakti, are changing the perspective of logistics from transportation infrastructure like roads, ports, and freight corridors to the establishment of a fully integrated logistics system based on advanced technologies.

Enterprise-wide, supply chains are getting more interconnected with quick coordination between manufacturers, logistics providers, ports, customs authorities, and other government agencies. In the conventional logistics system, fragmented information has resulted in delays, high expenses, and low visibility. On the other hand, connected ecosystems have helped stakeholders to obtain trusted information and make informed decisions, as well as be proactive against unexpected disruptions.

Digital infrastructure driving logistics transformation

The logistics revolution in India is enabled by the implementation of emerging technologies, contributing to the improvement of supply chain visibility, connectivity, and data-driven decision-making. To illustrate, the Unified Logistics Interface Platform (ULIP) is a platform allowing standardized and secure data exchange among government entities and businesses, which has made it possible to overcome data silos and improve the communication process in the supply chain. In addition, Logistics Data Bank (LDB) provides end-to-end tracking from source to destination to ensure the safety of the shipment, where Track Your Transport (TYT) enables real-time shipment monitoring.

Building blocks of a digitally connected logistics ecosystem

Automated cargo tracking: Real-time viewing of shipping information allows companies to stay informed about their cargo status, thus improving the planning process and reducing the risk of unexpected situations. Integration of communication platforms: Security of logistics information exchanged by various participants in the supply chain allows the elimination of information isolation and improves logistics management. Data-based decision-making: The use of advanced methods of data analysis allows companies to foresee potential disruptions, make better use of their resources, and improve the level of service. Digital public infrastructure: The implementation of several national initiatives aimed at ensuring the security and high level of standardization of information exchange creates a solid foundation for Indian logistics. Collaborative logistics systems: The assistance of successful information technologies enhances trust between various participants in the supply chain, which leads to a faster process of delivering goods.

Industry perspective : India is demonstrating how technological innovations could support physical infrastructure development. Projects that involve digital visibility of operations, using interoperable systems for information exchange, and creating common digital platforms show that technology simplifies information exchange. Such technologies do not replace the infrastructure but rather improve its efficiency through better coordination and less uncertainty associated with logistics processes.

Looking ahead : The next stage in India's logistics transition will almost certainly entail the implementation of technologies such as artificial intelligence, predictive analytics, IoT-enabled tracking, and integrated digital platforms. But innovations will yield major results only if they are underpinned by high-quality and reliable data. While India is moving towards its strategic goal of becoming the global manufacturing and exporting center, digital infrastructure investments will contribute almost equally to the success of this goal as investments in physical assets.

Logistics is becoming less and less defined by the speed of movement of goods, but more and more by the efficiency of information flow across the logistics chain. By implementing the principles of digital visibility, interoperability, and data-driven decision-making, India can develop a logistics ecosystem that would not only be fast and efficient but also resilient, transparent, and globally competitive.

Source: www.itln.in

QUANTIFIED EXPRESSION OF ROI % (MEASURE OF PROFITABILITY) RELATED WITH FUNCTION OF SUPPLY CHAIN MANAGEMENT.

BANI PRASAD CHAKRABORTY
SCM HEAD (TUAMAN ENGINEERING LTD)
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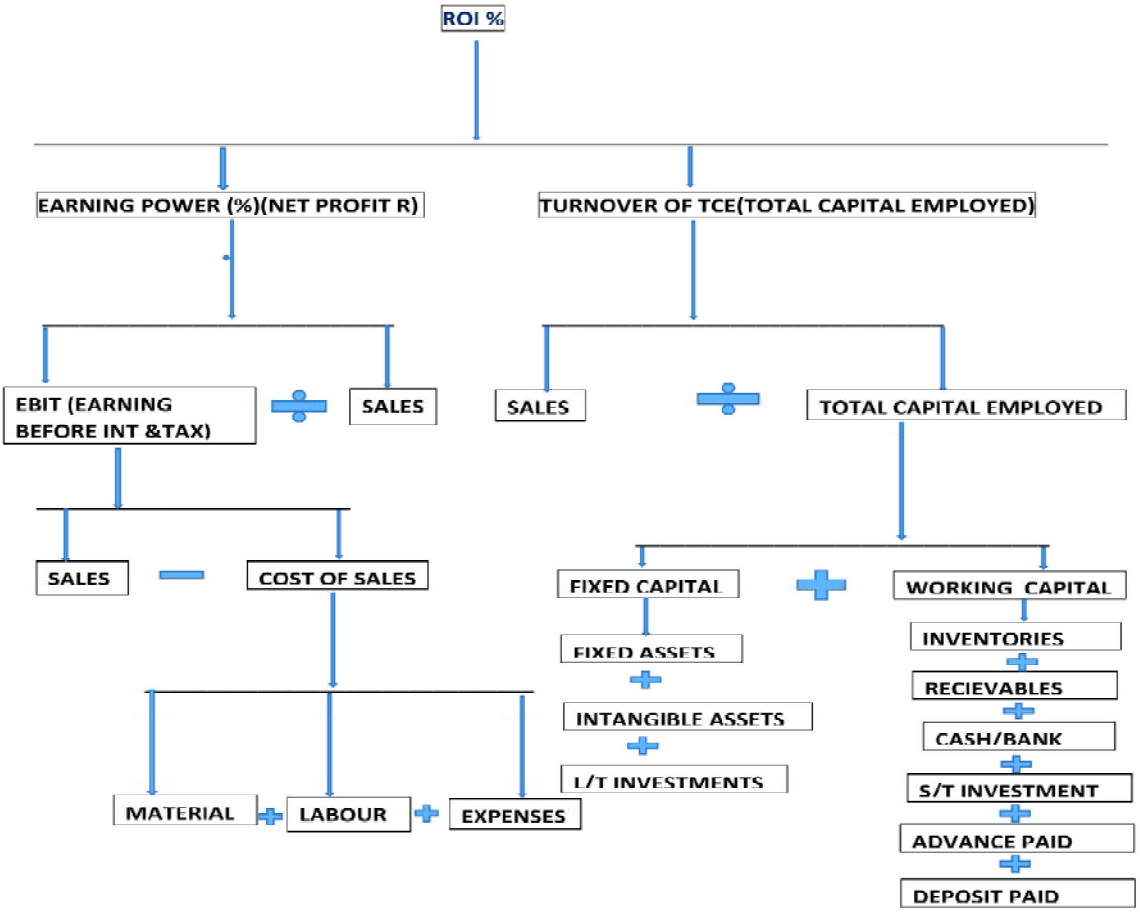
Supply Chain Management and Return of Investment (ROI) is closely linked with each other. For easy understanding one simple Diagram has been prepared to express the calculation of ROI (%) and how our activity of all types of procurement is related to the organization Goal based on ROI.



FORMULA:

$$ROI = \frac{EBIT}{TOTAL\ CAPITAL\ EMPLOYED} \times 100$$

$$= \left(\frac{EBIT}{SALES} \times 100\right) \times \left(\frac{SALES}{TOTAL\ CAPITAL\ EMPLOYED}\right)$$

INDUSTRY 4.0 VS. 5.0: COMPLETE GUIDE TO HUMAN-CENTRIC MANUFACTURING EVOLUTION

NATHAN EDDY, JOURNALIST BASED IN BERLIN

Manufacturers adopting Industry 5.0 are using AI, collaborative robots (cobots) and digital twins to enhance decision-making while empowering workers to optimize operations.

Automation has defined industrial innovation for more than a decade, with manufacturers investing heavily in robotics, AI and connected systems to increase efficiency and reduce costs. However, a growing number of industrial leaders are recognizing automation alone is not enough to ensure long-term competitiveness.

Industry 5.0 represents a strategic shift from automation-first operations (Industry 4.0) to a model centered on collaboration between humans and intelligent machines.

Understanding how to integrate existing employees with automated systems, deploy the right technology stack and measure outcomes such as productivity gains, downtime reduction and operational continuity will be essential for manufacturers building more adaptive, future-ready manufacturing environments.

What Is Industry 5.0? Human-Centric Manufacturing Defined

Industry 5.0 represents a shift from simply deploying connected devices and automation to intentionally integrating human expertise with advanced technologies to drive measurable business outcomes.

Russ Ford, president of projects and automation solutions at Honeywell, says manufacturers are now recognizing that technology alone cannot deliver full value without skilled workers who can interpret insights and apply them effectively.

This requires greater emphasis on workforce skills, knowledge management and tailoring technology deployments to specific operational goals.

"It's really about how you're bringing people and technology together to achieve business outcomes," Ford says.

Industry 4.0 vs Industry 5.0: Key Differences in Philosophy and Practice

Ford explains that Industry 5.0 builds on the automation and connectivity foundation of Industry 4.0 but shifts the focus toward empowering workers with AI-driven insights that improve operational decision-making.

Rather than reducing the role of operators, manufacturers are deploying tools such as edge-based AI and specialized language models to provide real-time guidance, historical context and prioritized alerts.

This allows workers to respond more quickly to process anomalies, optimize throughput and improve efficiency while leveraging the full value of automation investments.

"We're stepping up the automation stack and asking how to bring the human element into it," Ford says.

Why Industry 5.0 Matters: Business Case for Midmarket Manufacturers

Simon Ellis, IDC group vice president for U.S. manufacturing insights and global supply chain strategies, says Industry 5.0 is particularly critical for midmarket manufacturers because they operate under the same competitive pressures as larger enterprises but with fewer resources, making strategic technology investment essential to maintaining competitiveness.

Unlike larger firms with deeper budgets, midsized manufacturers must be more selective about where they invest, focusing on technologies that deliver clear operational and efficiency gains.

"They have fewer resources and shallower pockets, so they have to be more judicious about where and how they invest," Simon says. "But they can move quickly and can be nimbler than the big guys — they have to take advantage of that."

Human-Centricity, Sustainability, Resilience

To the human-centricity pillar of Industry 5.0 are added resilience and sustainability — core operational priorities as manufacturers face rising cybersecurity risks, volatile energy markets and increasing pressure to optimize efficiency.

Ford explains that resilience requires integrated IT and operational technology systems that enable real-time decision-making, predictive maintenance and flexible operations that can respond quickly to changing market conditions.

Sustainability is increasingly driven by economics, with manufacturers investing in energy efficiency, storage and infrastructure improvements to reduce costs and strengthen long-term operational performance.

"It's about having assets that are more profitable, more available and more flexible, while improving energy efficiency in ways that directly impact ROI and business performance," he says.

Workforce Integration: Upskilling Strategies for Human-Robot Collaboration

Ford says operators must have the tools and training to work effectively alongside increasingly autonomous systems. Manufacturers are investing in operator training simulators, digital twins and immersive environments that replicate real-world plant conditions, allowing workers to practice responding to failures and emergencies before they occur.

Companies are also involving operators much earlier in project development, ensuring they understand system behavior and contribute operational expertise before deployment. This early engagement improves readiness, safety and performance while helping workers fully leverage advanced automation.

"It allows operators to see exactly what they'll experience in real operations and understand how to respond," Ford says.

Technology Stack: AI, Cobots and Digital Twins in Industry 5.0

Ellis explains AI, collaborative robots (cobots) and digital twins each play distinct but complementary roles in enabling human-centric manufacturing. AI provides decision-making intelligence, while cobots serve as the physical interface, carrying out tasks such as material movement and production support in coordination with human workers.

Digital twins, meanwhile, allow manufacturers to model operations and test different workflows, helping organizations determine the optimal balance between human labor and automation over time.

"Together, these technologies help companies gradually redesign operations to improve efficiency, flexibility and collaboration between people and machines," Ellis says.

Phased Implementation Roadmap

Ford says implementation timelines vary widely depending on the industry, regulatory environment and business strategy — some manufacturers can implement targeted improvements faster by upgrading existing assets with new analytics and automation tools.

Greenfield projects offer the greatest opportunity to accelerate adoption by embedding digital capabilities from the start.

"It's a roadmap based on where the value is for your business and whether the technology is improving uptime, throughput and operational performance," he says.

ROI and Success Metrics: Measuring Industry 5.0 Performance

Ellis says measuring Industry 5.0 performance ultimately comes down to productivity gains and business growth, suggesting manufacturers evaluate whether new technologies increase output without proportionally increasing labor costs, reduce per-unit fixed costs and improve operational efficiency. Success also includes faster production, greater flexibility and stronger supply chain performance, all of which contribute to increased competitiveness and market share.

"It's either about productivity and efficiency or it's about driving business growth," Ellis said. "If it doesn't do one of those two things, it's just fairy dust."

Source: biztechmagazine.com

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AI IN LOGISTICS: WHAT HAPPENS TO TMS & WMS?

SURAJIT DAS HEADS DELHIVERY'S PLATFORM BUSINESS

In logistics, AI is not replacing TMS or WMS. It is becoming the glue that connects them, turning them into intelligent systems that can make faster decisions and act on them.

Key takeaways: For years, Software as a Service systems like TMS(Transportation Management System) and WMS(Warehouse Management System) have been the backbone of logistics technology.

Now, artificial intelligence is becoming the glue that consumes data from unstructured sources to create a consistent decision-making layer.

While Artificial Intelligence may not replace TMS and WMS anytime soon, it is changing what organisations can do with this information: interpret data, make decisions and potentially take action.

For years, TMS(Transportation Management System) and WMS(Warehouse Management System) have been the backbone of logistics technology, bringing fragmented information into structured systems of record and standardising how operations are managed. While Artificial Intelligence may not replace TMS and WMS anytime soon, it is changing what organisations can do with this information: interpret data, make decisions and potentially take action.

To understand the change, we need to know the evolution.

Evolution of Logistics Software : Much before SAAS(Software as a Service) systems like TMS and WMS became commonplace, information was often fragmented and asymmetric. As a result, decision-making was highly dependent on individuals, making it difficult for organisations to establish consistent processes and standard operating procedures.

With TMS and WMS, companies could bring their data and information into a single system, creating a system of record. Once information was structured and accessible in one place, organisations could establish standard processes and make decisions based on data rather than individual experience.

However, a traditional SaaS application may require specific pieces of information before it can perform a function. In the real world, this information may exist in another application, a spreadsheet, an email or elsewhere in the organisation. As a result, the intelligence required to make a decision often remains outside the software itself, requiring additional processes, human intervention or investment to bridge the gap.

The Big Shift: AI sits on Top of Logistics Software

This is where AI introduces a fundamental change.

As far as logistics is concerned, AI is not necessarily replacing TMS or WMS. Instead, it is changing the relationship between humans and enterprise systems. In the SaaS era, humans largely worked for the system: they entered information, followed predefined workflows and acted on what the system reported. AI has begun to reverse that relationship: Systems can now work for humans.

The TMS or WMS continues to function as systems of record, but an AI layer can sit above these systems as a layer of data collection and action. The system of record continues to hold structured operational information, while AI can operate in situations where information is incomplete or ambiguous. It can consume information from the TMS or WMS, combine it with information from other systems and even draw on unstructured sources such as spreadsheets, emails or other communication channels.

The result is a shift from a system of record to a system of intelligent action.

Consider transportation as a simple example. A conventional TMS may record the movement of a vehicle and track whether it is running on time. So, if a truck is delayed, the system can report that the truck is late. But it does not necessarily resolve the problem. A human operations team still has to examine the situation, understand why the truck is delayed and decide what to do next.

Now, an AI system operating on top of the TMS can take that process much further. It can identify that a truck is delayed, gather additional information from the driver to determine whether the cause is traffic, an accident, a flat tyre or another issue, and then assess the likely impact on the delivery. If it determines that the truck will not reach its destination on time, it could potentially

contact the transporter and request another vehicle.

This is a relatively small use case, but the productivity implications become significant at scale. Consider a logistics company operating a thousand trucks, or a shipper managing a hundred trucks. AI systems can substantially reduce the operational workload. Human teams could then spend more time on more strategic tasks rather than continuously monitoring systems and responding to exceptions.

This also challenges the traditional boundaries between logistics technology systems. Historically, organisations built separate systems for specific functions: a WMS to manage the warehouse, a TMS to manage transportation and an order management system to manage orders. But logistics outcomes rarely depend on information from just one of these systems.

AI: The Glue Connecting Different Systems of Record

How do logistics managers function today? They collect information from multiple systems and channels, even make phone calls and use all this information to make a decision. The entire process is extremely inefficient. There is also a significant human dependency in the process. Two managers looking at broadly the same information may make different decisions, with one achieving a better outcome than the other.

An AI agent can change this dynamic by consuming information from varied sources- WMS, TMS, tracking systems, spreadsheets, emails and other data sources, and take action based on the combined picture. In this sense, AI becomes the glue connecting different systems of record as it is not tied to any one system.

Also, while human decision making in several operational contexts is dependent on the experience and capability of an individual, an AI agent can arrive at an optimal or near-optimal decision more consistently.

Data Will Remain the Foundation

In logistics, the transition to this model, however, is unlikely to happen overnight. Like any new technology, AI will go through a diffusion curve. The initial phase is likely to involve AI identifying the next course of action while still waiting for human approval. Organisations will first deploy AI for simpler, monotonous, repeatable and SOP(Standard Operating Procedure) - driven tasks. As they gain confidence in the technology, the level of autonomy will increase.

However, for further evolution to autonomous decision-making, rich operational data will continue to be critical because AI can only operate effectively on the information available to it. This is one reason TMS and WMS systems are unlikely to simply disappear. They remain important systems of record and repositories of valuable operational data.

What changes is this: AI combines data from disparate sources and makes decisions using a much broader set of data points.

Looking into the Future

For the logistics industry, the on-going debate around SAAS versus AI raises an interesting question: if a logistics technology stack were being built from scratch today, without any legacy software, would TMS and WMS still be necessary?

Technically, AI could operate without legacy software. Legacy software is, in many ways, a method of organising data. An organisation starting from scratch could potentially implement an AI agent first, allow it to consume data from the available sources and then build or populate the systems of record around it.

But that is not necessarily the path existing organisations may take. Most companies already have significant amounts of operational data sitting inside their WMS and TMS systems. Replacing those systems would mean ripping out established infrastructure and processes, which is neither practical nor necessarily desirable. The market for SAAS solutions will continue to grow. For instance, as per Transportation Management System Market Report 2025- 2030 by market research platform MarketsandMarkets, the global Transportation Management System (TMS) market is estimated at US$18.5 billion in 2025 and is projected to reach US$37.04 billion by 2030, growing at a CAGR of 14.9%.

The more likely future, therefore, is not one in which AI replaces TMS and WMS. Instead, AI will sit above these systems, connecting them, consuming their data and extending their capabilities. The systems of record remain, but the intelligence and action increasingly move to the layer above them.

The Final Take

The evolution of logistics software can therefore be seen as a progression: first, organisations moved from fragmented information to systems of record. Then, SaaS made those systems more scalable and accessible. Now, AI is beginning to transform them from systems that merely record what is happening into systems that can understand what is happening and act on it.

The TMS and WMS era is not necessarily ending. What is changing is what happens on top of them.

Source: www.delhivery.com

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GREENING INDIAS FREIGHT FUTURE: HOW TECHNOLOGY AND POLICY ARE REWIRING LOGISTICS

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With the country committing to net-zero emissions by 2070, the imperative is clear: logistics must transform from being a climate cost center into a sustainability catalyst : As India accelerates toward becoming a USD 7 trillion economy by 2030, the logistics sector responsible for nearly 14 per cent of GDP and a significant share of national emissionsfinds itself at a defining crossroads. With the country committing to net-zero emissions by 2070, the imperative is clear: logistics must transform from being a climate cost center into a sustainability catalyst. This evolution hinges on four powerful leverselectrification, digital intelligence, alternative fuels, and smart infrastructurecoming together to redefine the movement of goods across the subcontinent.

Electrification: Accelerating Energy Security and Urban Efficiency : Electric mobility is no longer a distant idealit's a frontline solution for last-mile and short-haul logistics. Urban freight, driven by e-commerce and hyperlocal delivery, is increasingly relying on electric vehicles (EVs), which offer zero tailpipe emissions and significantly lower operating costs. While initial capital outlay remains a barrier, the long-term economic and environmental upside is compelling.

Indias PM E-Drive initiative is expected to deploy over 72,000 EV public charging stations across 50 national highway corridors, major metros, rail hubs, airports, and fuel outletslaying the groundwork for nationwide EV adoption. Combined with the momentum from the Make in India manufacturing push, these efforts not only reduce dependency on oil imports but also elevate Indias energy security posture. The road to decarbonised logistics begins with electrons, not hydrocarbons.

Digital Intelligence: From Operational Visibility to Carbon Accountability : If electrification fuels logistics, digital intelligence controls its trajectory. AI, machine learning, IoT sensors, and predictive analytics are now core to supply chain orchestration. Route optimization, predictive maintenance, driver behaviour analytics, and real-time emissions tracking are not futuristictheyre fast becoming hygiene.

By equipping fleets with smart telematics and dashboards that visualise energy consumption and CO output, logistics providers are not just reducing wastethey're offering data-backed proof of sustainability to increasingly climate-conscious clients. Digitalisation enables end-to-end transparency, a key prerequisite for ESG-aligned supply chains and green finance.

Alternative Fuels: The Long-Haul Sustainability Frontier: Electrification may dominate city logistics, but Indias vast long-haul ecosystem needs a different kind of green propulsion. This is where alternative fuelsincluding LNG, biofuels, ethanol, and green hydrogenemerge as critical enablers.

Government policy is playing an accelerating role. India has already reached over 12 per cent ethanol blending in petrol, with a goal of 20 per cent by 2026. This not only cuts emissions but also creates income streams for farmers cultivating feedstock like sugarcane and maize. Meanwhile, the rollout of Indias first hydrogen-powered train signals intent to integrate hydrogen into mainstream freight in the coming decade. For long-distance and heavy-load logistics, fuel innovation is a climate imperativenot a choice.

Smarter Infrastructure: Enabling Modal Shift and Efficiency at Scale : No green logistics future can be built without infrastructure that scales both ambition and access. The governments investments in Multimodal Logistics Parks, PM Gati Shakti terminals, Dedicated Freight Corridors (DFCs), and port modernization are designed to move India from a road-dominated ecosystem to a multimodal, carbon-light one. DFC networks, for instance, enable faster and heavier cargo to be moved over raildramatically lowering diesel consumption. Meanwhile, plans to operationalize 76 National Waterways by 2027 aim to revive inland transport, which consumes a fraction of the fuel per ton-kilometer compared to roadways. These shifts represent a foundational redesign of freight pathways, unlocking lower emissions and higher efficiency.

Convergence: Building a Low-Carbon, High-Throughput Future : India's green logistics revolution will not arrive in isolationit will be powered by convergence. The fusion of clean energy, digital orchestration, smart fuels, and multimodal infrastructure is reshaping not just supply chains, but the very architecture of commerce.

Yet, adoption at scale will require aligned policy, financing mechanisms for green tech, workforce skilling, and public-private partnerships. The challenge isnt just deploying these technologiesbut making them affordable, interoperable, and scalable across Indias fragmented logistics landscape.

Green logistics is not just an environmental necessityits an economic multiplier. Done right, it will reduce costs, improve service reliability, strengthen energy independence, and position India as a global exemplar in sustainable freight. The transition has begun. The question now ishow fast can we scale?

Disclaimer: The views expressed in this article are those of the author and do not necessarily reflect the views of the publication.

Source: cjdarcl.com

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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.

References:

Ministry of Commerce & Industry:

https://www.pib.gov.in/PressReleasePage.aspx?PRID=2230621&reg=3&lang=1

Ministry of Statistics & Programme Implementation:

https://www.pib.gov.in/PressReleasePage.aspx?PRID=2298236&reg=48&lang=2

Ministry of Electronics & IT:

https://www.pib.gov.in/PressReleasePage.aspx?PRID=2291171&reg=48&lang=2

Union Cabinet:

https://www.pib.gov.in/PressReleasePage.aspx?PRID=2284789&reg=48&lang=1

Ministry of Chemicals and Fertilizers:Department of Pharmaceuticals:

https://www.pib.gov.in/PressReleasePage.aspx?PRID=2244474&reg=3&lang=1

https://www.pib.gov.in/PressReleasePage.aspx?PRID=2286949&reg=48&lang=1

Ministry of Ports, Shipping and Waterways:

https://www.pib.gov.in/PressReleasePage.aspx?PRID=2294248&reg=48&lang=1

https://www.pib.gov.in/PressReleasePage.aspx?PRID=2288924&reg=48&lang=2

https://www.pib.gov.in/PressReleasePage.aspx?PRID=2209139&reg=3&lang=2

Ministry of Textiles:

https://www.pib.gov.in/PressReleasePage.aspx?PRID=2286960&reg=48&lang=2

Ministry of Statistics & Programme Implementation:

https://www.pib.gov.in/PressReleasePage.aspx?PRID=2290419&reg=48&lang=2

https://www.pib.gov.in/PressReleasePage.aspx?PRID=2298236&reg=48&lang=2

Ministry of Heavy Industries:

https://www.pib.gov.in/PressReleasePage.aspx?PRID=2298052&reg=48&lang=2

NITI Aayog:

https://www.pib.gov.in/PressReleasePage.aspx?PRID=2298965&reg=48&lang=1

Press Information Bureau:

https://www.pib.gov.in/PressReleasePage.aspx?PRID=2278107&reg=48&lang=2

https://www.pib.gov.in/PressReleasePage.aspx?PRID=2234442&reg=3&lang=2

https://www.pib.gov.in/PressReleasePage.aspx?PRID=2273854&reg=48&lang=2

Source: PIB Research

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STOLEN LOGINS ARE DRIVING THE NEXT WAVE OF SUPPLY CHAIN BREACHES

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In the early months of 2026, three separate incidents made their way through security circles and engineering Slack channels alike.

Axios, a tool so widely used that it's tucked inside more than 100 million software installations every week, got hijacked for a few hours and used to deliver malware to anyone who happened to install it during that window. Around the same time, a breach touching Trivy, a popular tool teams use to scan their software for weaknesses, rippled outward. It eventually reached Mercor, where it exposed 4TB of internal data including contractor records, and separately gave attackers access to hundreds of private code repositories inside Cisco's development environment.

Different companies, different tools, different teams, and yet the same root cause ran through all three: Someone had access they shouldn't have had.

For anyone who works in logistics, this should sound familiar even if the technology isnt. A compromised credential behaves a lot like a stolen keycard at a distribution facility. The lock itself was tightly secured the problem was that the wrong person ended up holding a working key.

Most development teams would never skip a code review. It's baked into how software gets built: Someone writes code, someone else checks it, and a flawed change gets caught before it ships. That discipline runs deep.

Credentials rarely get the same treatment. A small team often shares one login to a package library because setting up individual accounts felt like overhead nobody had time for. A deployment script, the small program that pushes new code live, holds a password written in plain view because it was the fastest way to get something working at 11 p.m. before a deadline. None of this comes down to carelessness. Teams are optimizing for shipping speed, which is exactly what they're supposed to do, all while credential management becomes someone else's problem for another day.

The trouble shows up once that "someone else's problem" gets exploited. A single login almost never opens just one door. Whatever that account was trusted with, a code repository, deployment pipeline and cloud server comes along with it. When that happens, the damage moves outward, riding every connection that account had built up over time.

What makes the 2026 incidents worth paying attention to is that they all happened in similar ways, against similarly well-resourced teams. At some point, a pattern like that stops being a string of bad luck. It becomes a predictable category of risk. And once a risk is predictable, a small team can plan for it.

Plenty of dev teams already do the right things on the code side. They keep an inventory of every component in their software, often called a software bill of materials (SBOM), and they lock dependencies to specific, tested versions rather than letting them update automatically. Both of these are genuinely good practices.

But think of an inventory list the way a warehouse manager would. Knowing exactly what's sitting on every shelf doesn't stop someone with a stolen badge from walking in and rearranging things overnight. The list tells you what should be there. It says nothing about who's allowed to change it.

That's the missing piece. Locking software components to specific, tested versions, and keeping a full inventory of what's inside a piece of software tells a team what's running, but not who can still get in and change it tomorrow. Closing that distance means building something underneath those practices. Every dev team needs a clear and deliberate sense of who holds the keys and how easily those keys could end up somewhere they shouldn't.

Tackling these vulnerabilities wont necessarily require an enterprise-level security budget, nor even a dedicated hire. Most of it comes down to a handful of habits, the kind any team can start

putting in place this week:

Shorten how long credentials live. A login or API key that never expires is a gift to anyone who manages to steal it. Access that automatically expires after a few hours or a day shrinks that window dramatically. Many platforms now offer this kind of short-lived access as a built-in option; someone usually just needs to turn it on.

Look at who genuinely needs access to what. It's common for everyone on a small team to share broad permissions because it's simpler to set up that way. Giving each person, and each automated tool, only the access their specific job requires keeps a small mistake from turning into a large one. A script that automatically pushes new code live shouldn't also be able to erase a company's live database.

Get secrets out of plain text. Passwords, API keys and other login credentials left unprotected in a settings file or code repository are visible to anyone who gains even brief access. A password manager or basic secrets vault keeps that information locked away, and there are accessible options built specifically for small teams without a dedicated security budget.

Build a rotation habit. Credentials shouldn't only get changed after something goes wrong. A recurring reminder to rotate keys and passwords on a set schedule, even a quarterly one, catches a stolen credential before anyone gets the chance to use it.

Know who can publish, push or deploy code to a live server, and review that list every so often. Team members change roles, contractors finish projects, and access that made sense six months ago often outlives its usefulness until someone checks.

Software supply chains will keep growing more interconnected, and that's not a reason for alarm. It's simply the direction the industry is moving, and it means credential discipline is becoming as routine and expected as code review already is.

The teams that build these habits now, while it still feels optional, are the ones least likely to spend next year explaining a breach to their customers. Treat access with the same seriousness given to the code itself, and the rest of the work gets considerably easier.

Source: www.supplychainbrain.com

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INDIA MUST SCALE UP MANUFACTURING TO BECOME UNMISSABLE

RAJEEV NARAYAN, COMMUNICATIONS SPECIALIST.

For years, India has sold the world on the promise of its huge domestic market. But in a world of tariffs, disrupted supply chains and shifting alliances, size alone is not enough. India now needs to become a country global business cannot easily do without.

There is something useful happening amid all the noise over India-US trade, tariffs and negotiations. India is beginning to think beyond the tariff itself. That matters because tariffs are ultimately a price; a price that can make a product cheaper or more expensive, open or close a market, encourage investment or scare it away. But the larger question for India is not what tariff another country imposes tomorrow. It is this: Why should a global company choose India today and still need India 10 years from now?

This week, Commerce Secretary Rajesh Agrawal said India's new free trade agreements are designed to give greater comfort to long-term investors in global supply chains based in India. The agreements also provide tariff predictability and access to a market representing roughly $60 trillion. That is a critical shift in thinking. An FTA is not just about reducing duties on a list of products. It can become part of a larger economic proposition: invest here, manufacture here, export from here and use India as part of your global production network.

That is where the real prize lies.

Market is Not Enough

For decades, India's biggest economic selling point was obvious. A market with 1.4 billion people. A young population. Rising incomes. But there is also a problem with being merely a large market: other countries can become large markets too. Companies can sell to you without manufacturing inside your borders. India needs to move up that ladder.

The objective should not be to become merely the place where the world's companies sell their products; it

should be to become a place where companies design and manufacture these; source components, develop technology around them and export.

That changes the relationship.

A company selling into India can leave if the market becomes tough. A company with factories, suppliers, engineers, logistics networks and export commitments in India has a different calculation. This is why manufacturing matters. Not because it sounds impressive, but because factories create networks around them.

Any manufacturing plant has an assembly line that needs components. Components need suppliers. And suppliers need machinery, logistics, software, engineers, finance and skilled workers. Some of what is made can then be exported. A factory becomes a supply chain. A supply chain becomes an economic relationship. And an economic relationship, over time, becomes strategic leverage.

From Cheap to Reliable

There is another lesson India needs to learn. The global economy is no longer looking only for a cheap place to manufacture. It is looking for reliable places. COVID showed the world the risks of concentrated supply chains. Since then, geopolitical tensions have made shipping routes, energy supplies, critical minerals and technology components strategic concerns. Trade itself is now increasingly shaped by national-security calculations.

This changing environment has made resilience and diversification important, alongside traditional considerations of comparative advantage.

That should be music to India's ears. But there is a catch. The world does not build supply chains around potential. It builds them around reliability. That means predictable regulation. Efficient ports. Good roads and railways. Reliable power. Competitive logistics. Fast customs. Consistent quality. Skilled workers. Stable policy. Suppliers who can deliver the same component at the same quality every single time.

The difference between 'Make in India' and 'Depend on India' is enormous. India needs to get to the second.

Diversification Is Leverage

This is where the India-US trade relationship becomes relevant without becoming the entire story. The US is a large market for Indian exporters. India has every reason to negotiate hard for stable and predictable access to it. But the lesson from tariffs should not be that India needs to find a better argument with the US.

It should be that India needs more arguments everywhere. The more markets Indian companies access, the less vulnerable they will be to problems in any one market. That is why India's expanding network of FTAs matters. India has been pursuing agreements with the UK, Oman, New Zealand, the European Union and other partners, while continuing negotiations with others as well. This is not just trade diplomacy. It is economic risk management.

If an Indian firm can sell to five major markets instead of one, a tariff shock in one market is painful but manageable. If an MNC manufactures in India and exports to other markets with predictable tariffs, India becomes more attractive as a production base. Diversification, therefore, is not about moving away from the US, China or Europe. It is about being less dependent on any one of them.

There is a difference. That difference is called leverage.

The New Currency

India has spent decades trying to become bigger. Now it needs to become harder to replace. That requires competitive manufacturing, domestic supply chains, better infrastructure, technology capability and companies capable of going global. It also requires India to understand what investors are really buying. They are not simply buying access to 1.4 billion consumers. They are buying the possibility of putting a factory in India and knowing that this factory can serve the world.

That is a bigger proposition. One that changes the meaning of economic diplomacy.

The old version was about better market access. The newer one is about creating economic interdependence on terms that work for India. That is why tariffs should not become the entire story around India-US trade. A tariff can hurt exports. It cannot determine whether India becomes part of a global supply chain. That decision will ultimately be made by factories, investors, engineers, exporters and consumers.

India's job is to make the decision easier. The ambition should be more than becoming a preferred destination. India should become a destination difficult to replace. A country that supplies markets. Makes components; builds technology; exports products; provides reliable supply chains and, above all, whose absence creates a problem.

India gets attention for one of the world's largest markets. Being a manufacturing and supply-chain hub would give it economic weight. But becoming difficult to replace gives it something even more valuable - bargaining power.

Source: www.awazthevoice.in

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CUSTOMS CLEARANCE PROCEDURE IN INDIA: A STEP-BY-STEP GUIDE FOR IMPORTERS AND EXPORTERS

Why Customs Clearance Trips Up So Many Shippers : Customs clearance is where shipments most often get delayed not because the process is inherently slow, but because documentation errors, HS code misclassification, or valuation disputes force cargo into query or physical examination. Understanding the full sequence in advance is the single best way to avoid demurrage charges, missed delivery windows, and the frustration of chasing status updates across multiple parties.

India's customs framework has modernized significantly over the past decade, with electronic filing through ICEGATE, automated risk assessment, and accreditation programs that reward compliant shippers with faster processing. But none of that helps a shipment whose paperwork was wrong from the start. This guide walks through the procedure end to end, and flags exactly where things typically go wrong.

Step 1: Document Preparation Before the Shipment Moves : Before a shipment even reaches an Indian port or airport, the importer or exporter must prepare a commercial invoice, packing list, bill of lading or airway bill, certificate of origin where relevant, and any product-specific licenses BIS certification for electronics, FSSAI for food products, drug licenses for pharmaceuticals, and so on. Errors at this stage mismatched declared values, missing or inconsistent HS codes, or incomplete consignee details are the leading cause of clearance delays further down the chain.

It's worth building a standard document checklist specific to your product category and reusing it for every shipment, rather than assembling documentation from scratch each time. Consistency across shipments of the same product also helps avoid classification disputes, since customs officers cross-reference declared HS codes against your shipment history.

Step 2: Filing the Bill of Entry (Imports) or Shipping Bill (Exports) : For imports, the customs broker files a Bill of Entry through the ICEGATE portal, declaring the goods, their classification under the Harmonized System (HS), and their assessable value. For exports, a Shipping Bill is filed with equivalent declarations covering the goods, their value, and any export incentive schemes being claimed. Accurate HS code classification directly determines the duty rate applied and whether any restrictions or licensing requirements apply, so this step deserves expert review rather than a generic, copy-paste entry.

This is also the stage where import-export code (IEC) registration, GST details, and any preferential trade agreement certificates (such as under a Free Trade Agreement) need to be correctly referenced, since errors here can mean paying a higher duty rate than the shipment actually qualifies for.

Step 3: Duty Assessment : Customs authorities assess applicable duties Basic Customs Duty, Integrated GST, and any anti-dumping, safeguard, or countervailing duties based on the declared value and classification. India's Risk Management System (RMS) automatically routes a percentage of shipments for further scrutiny based on risk parameters like shipper history, product category, and declared value anomalies; the remainder clear on a 'green channel' basis without physical examination, significantly speeding up release.

Step 4: Examination, If Selected : If RMS flags a shipment, customs officers physically examine the cargo against the declared documents, checking that the goods match the description, quantity, and value stated. This is where an experienced customs brokerage partner matters most they represent the shipment during examination, respond to queries with supporting documentation, and resolve valuation or classification disputes without the importer needing to manage the process directly or make repeated trips to the customs house.

Query resolution speed varies significantly based on how complete and consistent the original documentation was. A shipment with a well-prepared valuation justification (such as a purchase order matching the invoice, and consistent pricing history) typically clears in days; one with inconsistencies can take considerably longer while customs seeks clarification.

Step 5: Duty Payment and Release : Once assessment is finalized, duties are paid electronically through the ICEGATE e-payment gateway, and customs issues an Out of Charge order for imports (or a Let Export Order for exports), releasing the cargo for onward transport. From this point, inland movement via road transport or rail takes the shipment to its final destination or a bonded warehouse for further distribution.

How to Avoid the Most Common Delays : Three practices prevent the majority of clearance hold-ups. First, keep HS code classification consistent across every shipment of the same product rather than reclassifying based on convenience or a slightly different duty outcome inconsistency is a red flag that invites scrutiny. Second, ensure invoice values genuinely match the actual commercial terms of sale; undervaluation disputes are one of the most time-consuming query types to resolve. Third, use a customs broker who files complete, accurate documentation the first time, rather than one who

submits incomplete filings and relies on follow-up corrections, which each add days to the clearance timeline.

The Role of AEO Accreditation : Authorized Economic Operator (AEO) status is a voluntary compliance program that rewards businesses with a track record of accurate, compliant customs filings with tangible benefits: reduced physical examination rates, faster clearance through dedicated processing, and in some cases deferred duty payment facilities. Working with a freight and customs partner that itself holds AEO accreditation and that can help your own business pursue AEO status is one of the most effective long-term strategies for reducing clearance friction.

Special Cases: Bonded Warehousing and Deferred Duty : Not every shipment needs to clear duty immediately on arrival. Bonded warehouses allow imported goods to be stored under customs control before duty is paid, which is useful for importers managing large volumes or seasonal stock they don't need to release all at once. This defers cash outflow and gives more flexibility in managing working capital, though it requires coordination between your customs broker and warehousing provider ideally the same one.

Restricted, Prohibited, and License-Controlled Goods : Not every product can be imported or exported freely. Certain categories chemicals, electronics with specific frequency ranges, agricultural products, defense-adjacent items, and various others require additional licenses from bodies beyond customs itself, such as the Directorate General of Foreign Trade (DGFT), sector-specific regulators, or standards bodies. Shipping these categories without the correct upfront licensing doesn't just delay the shipment; it can result in confiscation or penalty action, so it's essential to confirm a product's regulatory status before booking, not after the cargo has already departed the origin country.

A knowledgeable customs broker will flag these requirements at the quotation stage, based on the HS code and product description, rather than discovering the issue only once the shipment reaches Indian customs and is queried for missing documentation.

Export Incentive Schemes and Documentation : Indian exporters can access various incentive schemes designed to improve export competitiveness, including duty drawback provisions and schemes tied to specific product categories or export destinations. Claiming these benefits correctly requires precise documentation at the time of filing the Shipping Bill retroactive claims are far more difficult and not always possible. A customs broker experienced in your specific industry will know which schemes apply to your product category and ensure the necessary declarations are made at the point of export, rather than leaving potential benefits unclaimed simply because the paperwork wasn't structured to capture them.

How Technology Is Changing Customs Filing in India : The ICEGATE platform has progressively expanded its digital capabilities, reducing what used to require physical document submission and in-person visits to a customs house. Electronic filing, digital signature-based authentication, and online duty payment have cut processing time significantly compared to a decade ago, and continued investment in automation is gradually extending faster processing to a wider share of shipments beyond just those on the green channel.

For businesses, this means the practical difference between a well-organized customs broker and a poorly organized one is widening one that has invested in digital filing efficiency and maintains clean historical compliance data will increasingly outperform one relying on manual processes, both in speed and in the likelihood of triggering unnecessary scrutiny.

Post-Clearance Compliance and Audits : Customs clearance isn't necessarily the end of the compliance story. Indian customs authorities conduct post-clearance audits on a sample basis, reviewing past shipments for consistency in valuation and classification even after goods have been released. Maintaining organized records invoices, correspondence, pricing justifications for at least the statutorily required retention period protects a business if a past shipment is later selected for this kind of review, and a good customs broker will advise on appropriate record-keeping practices rather than considering their responsibility to end once cargo is released.

Preparing for a Customs Audit or Inspection Visit : Beyond post-clearance document audits, Indian customs authorities occasionally conduct physical inspection visits to a business's premises, particularly for importers claiming preferential duty treatment or operating under specific licensing schemes. Being prepared for this means keeping shipment records, License documentation, and inventory reconciliation readily accessible rather than scattered across departments, and briefing relevant staff on how to handle an inspection professionally. A customs broker with experience supporting clients through these visits can advise on what documentation is typically requested and how to organize records proactively, rather than scrambling when a visit is announced.

Working with Customs Brokers Across Multiple Ports : Businesses that import or export through more than one Indian port or airport should confirm their customs broker has genuine filing capability and local relationships at each location, rather than assuming a broker strong in one city can seamlessly extend to another. Local customs house relationships, familiarity with a specific port's examination tendencies, and established coordination with local transport for onward movement all vary by location, and a broker without an actual local presence may rely on subcontracted arrangements that reintroduce the coordination risk this entire guide is designed to help you avoid.

Source: www.everfastfreight.com

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LEVERAGING TARIFF ARBITRAGE OPPORTUNITIES WITH INDIA INDEX: STAY AHEAD IN GLOBAL TRADE

INDIA INDEX

Discover how tariff arbitrage can optimize supply chain costs and how India Index provides real-time insights, vetted suppliers, and exclusive opportunities to help U.S. buyers capitalize on trade shifts. Learn how predictive tariff data can give your business a competitive edge.

In today's fast-evolving global trade environment, staying competitive means finding smart, data-driven ways to capitalize on opportunities. One of the most effective strategies to optimize procurement and supply chain costs is tariff arbitrage, where businesses benefit from differing tariff rates between countries or changes in tariffs. India Index offers a robust platform that helps U.S. buyers and Indian suppliers discover and act on these tariff arbitrage opportunities, offering clear pathways to maximize profits.

What Is Tariff Arbitrage?

Tariff arbitrage refers to the process of exploiting differences in import duties, tariffs, or trade policies between two or more countries to reduce costs. For example, when a product becomes more expensive to import from one country due to a new tariff, a company may find a more cost-effective option by sourcing from a different country with lower duties. This requires not just real-time information but also the ability to act quickly on it — that's where the India Index platform steps in.

Forecasted Opportunities: Predicting the Shifts

India Index employs a sophisticated forecasting model that tracks shifts in tariffs globally. These forecasted opportunities help businesses identify potential arbitrage situations before they occur. By analyzing trends in tariff policy changes, India Index users gain actionable insights on products and markets that could soon become more favorable for trade. For example, if there is a pending tariff reduction on certain electronics imported from India to the U.S., India Index alerts buyers of the upcoming shift, allowing them to re-strategize and capitalize on lower import costs before competitors do.

With this predictive approach, the platform helps U.S. companies secure profitable supply chain alternatives quickly, positioning India as a strong competitor against other countries like China.

Community Opportunities: Shared by Buyers, Exclusive to India Index

India Index also offers community opportunities—procurement deals and sourcing projects shared directly by buyers on the platform. These opportunities are exclusive to the platform and often represent lucrative tariff arbitrage situations. For example, U.S. buyers often post requests for suppliers who can meet specific tariff-related criteria, such as those producing goods unaffected by recent trade restrictions. These opportunities create a collaborative environment where buyers and suppliers work together to solve procurement challenges by leveraging tariff differentials. By joining the India Index platform, suppliers not only gain access to these community opportunities but also build trust and rapport with global buyers.

Private, Invite-Only Opportunities: Personalized and Targeted

Beyond community opportunities, India Index also features private, invite-only opportunities that cater to sensitive, high-value projects. These opportunities are curated by India Index's Customer Success team, ensuring that only trusted and vetted suppliers receive invitations to participate. This approach adds another layer of exclusivity, allowing businesses to tap into tariff arbitrage opportunities that might otherwise remain hidden. For U.S. buyers, these private opportunities can offer a competitive advantage in tariff-sensitive sectors like textiles, steel, or electronics. Suppliers, meanwhile, are able to focus their efforts on high-value contracts and become strategic partners in major global supply chains.

Why India Index?

1. **Real-Time Tariff Insights:** With real-time data, India Index ensures that buyers are constantly updated about shifts in trade tariffs and can act quickly to optimize their supply chains.
2. **Diverse Opportunities:** From open community-sourced projects to invite-only, high-stakes deals, the India Index platform covers a wide range of opportunities for both buyers and suppliers.
3. **Supplier Vetting and Trust:** India Index's Trust Index Certification guarantees that suppliers on the platform are vetted, minimizing risks for U.S. businesses and promoting transparency in international trade.

Conclusion : Tariff arbitrage represents a smart and practical approach for businesses looking to optimize their supply chains, and India Index makes it easier than ever. With the ability to forecast changes, tap into community and private opportunities, and access a vetted network of suppliers, U.S. companies can navigate complex global trade landscapes with confidence. Ready to streamline your sourcing and capitalize on global trade opportunities? Explore India Index and see how we can help your business unlock tariff arbitrage benefits today!

By leveraging the data-driven tools and trusted network available on India Index, companies can effectively reduce costs, improve supply chain efficiency, and stay ahead of their competition.

Source: indiaindex.com

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6 WAYS AI IS TRANSFORMING SUPPLY CHAINS FROM REACTIVE TO AUTONOMOUS

Artificial intelligence is no longer a future-facing concept in supply chain management—it is now a core operational capability. What once required weeks of manual analysis and static planning cycles is increasingly handled in real time by intelligent systems that learn, adapt, and optimize continuously. Across industries, AI is helping supply chains become faster, leaner, and more resilient. Organizations that have adopted AI at scale are seeing measurable improvements in decision speed, inventory efficiency, logistics performance, and risk management. More importantly, AI is enabling a structural shift—from reactive supply chains to predictive and increasingly autonomous ones.

Below are the six most impactful ways AI is reshaping modern supply chains.

Infographic Expanded Below:

1. Demand Forecasting and Predictive Analytics

Traditional demand forecasting relied heavily on historical averages and periodic planning cycles. While useful, these models struggled to adapt to volatility, sudden demand shifts, and external disruptions.

AI changes this by continuously analyzing vast and diverse datasets. Modern demand models incorporate historical sales, real-time order data, pricing signals, promotions, macroeconomic indicators, weather patterns, and even consumer sentiment. Machine learning algorithms identify hidden patterns and correlations that human planners or static models often miss.

The result is demand sensing—near real-time visibility into changes in customer behavior. This enables more accurate forecasts, improved sales and operations planning (S&OP), and faster responses to market shifts. For many organizations, AI-powered forecasting has become the foundation for every downstream supply chain decision.

2. Intelligent Inventory Optimization

Inventory is one of the largest uses of working capital in the supply chain, and it is also one of the hardest areas to optimize. Holding too much inventory ties up cash and increases carrying costs, while holding too little risks stockouts and lost sales.

AI-driven inventory optimization replaces static rules and safety stock assumptions with dynamic decision-making. These systems continuously evaluate demand variability, supplier lead times, service-level targets, and network constraints. Inventory levels are adjusted in near real time across warehouses, regions, and channels.

By balancing risk and cost more precisely, AI helps organizations reduce excess inventory while maintaining—or even improving—customer service levels. This shift has made inventory optimization

one of the fastest-return AI use cases in supply chain management.

3. Warehouse Automation and Robotics

Warehouses and distribution centers are undergoing rapid transformation as AI-powered automation becomes more capable and accessible. Intelligent robots now perform tasks such as picking, sorting, packing, palletizing, and cycle counting with increasing speed and accuracy.

AI enables these systems to adapt to changing layouts, recognize products using computer vision, and coordinate movements to avoid congestion. Unlike traditional automation, AI-driven robots learn from experience and improve over time.

For supply chain leaders, warehouse AI delivers multiple benefits: higher throughput, lower error rates, reduced labor dependency, and the ability to scale operations without proportional increases in headcount. As labor markets remain tight, AI-driven automation has become a strategic necessity rather than a nice-to-have.

4. Route and Logistics Optimization

Transportation is one of the most complex and expensive components of the supply chain. Route planning, load optimization, carrier selection, and last-mile delivery all involve tradeoffs between cost, speed, and reliability.

AI addresses this complexity by analyzing real-time data such as traffic conditions, weather events, fuel prices, delivery windows, and carrier capacity. Machine learning models continuously recalculate optimal routes and schedules as conditions change.

This dynamic optimization improves on-time delivery performance while reducing fuel consumption, emissions, and transportation spend. In high-volume or last-mile networks, AI-driven logistics optimization can deliver immediate and visible performance gains.

5. Supply Chain Risk Management and Resilience

Recent global disruptions have exposed the fragility of many supply chains. Limited visibility beyond tier-one suppliers, long lead times, and geographic concentration have made networks vulnerable to shocks.

AI enables a more proactive approach to risk management. By mapping multi-tier supplier networks and monitoring risk signals—such as geopolitical events, weather disruptions, financial stress, or capacity constraints—AI systems can identify potential issues before they escalate.

Advanced AI tools support scenario planning and stress testing, allowing organizations to evaluate "what-if" situations and design mitigation strategies in advance. This capability is increasingly critical as companies pursue diversification, nearshoring, and local-for-local sourcing strategies to improve resilience.

6. Digital Twins and End-to-End Simulation

One of the most powerful applications of AI in supply chains is the creation of digital twins—virtual representations of physical supply chain networks. These models mirror real-world operations in real time, integrating data from planning systems, execution platforms, and IoT devices.

Digital twins allow organizations to simulate disruptions, test policy changes, identify bottlenecks, and evaluate tradeoffs before taking action in the real world. They also support predictive maintenance, capacity planning, and network redesign initiatives.

For executives, digital twins provide a clear, visual understanding of complex supply chains, enabling faster and more confident decision-making across functions.

From Predictive to Autonomous Supply Chains

Individually, each of these AI use cases delivers measurable value. Together, they represent a fundamental shift in how supply chains operate. When combined with generative AI, agentic workflows, high-quality data, and strong governance, supply chains move beyond prediction toward autonomous execution.

In an environment defined by volatility and uncertainty, the competitive advantage no longer comes from reacting faster—it comes from anticipating change and acting before disruption occurs. Organizations that scale AI across planning, execution, and risk management are building supply chains that are not only more efficient, but also more adaptive and resilient.

Source: www.supplychaintoday.com

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HOW 'INDUSTRY 5.0' INTEGRATES HUMAN EXPERTISE WITH ARTIFICIAL INTELLIGENCE

Physical AI can improve the efficiency of a manufacturing process, allowing staff to focus on aspects that require critical thinking

The European Commission defines Industry 5.0 as placing human-centricity, sustainability and resilience at the core of industrial progress. In practice, this means AI-powered robots take on repetitive, physically demanding or hazardous work while people focus on critical thinking and higher-value decisions.

The future of manufacturing is about using intelligent technology to help people be better at what they do, while making operations more adaptable. This is where physical artificial intelligence (AI) and agentic AI become particularly important.

Physical AI gives digital intelligence the ability to act in the real world. By combining robotics, sensors, edge computing and simulation, machines can move beyond traditional fixed automation.

They gain multi-modal perception whereby an AI system can process different types of data to augment human processing, decision making and adaptive learning, allowing them to respond to changing conditions in real time.

A strong example is Lenovo's robotic inspection solution, designed to navigate complex or hazardous environments with minimal human intervention. It helps reduce employee exposure to risk by carrying out tasks in unsafe conditions, remote locations, or during night shifts – supporting staff well-being, strengthening workplace safety and enabling greater operational visibility and continuity.

While physical AI handles the sensing and acting, agentic AI connects that action to decisions and workflows across the wider operation. It can reason across data, coordinate processes and determine what happens next.

Together, they can turn what a machine detects on the factory floor into a meaningful operational response.

This also changes the relationship between people and machines. Traditional industrial automation often relied on separating the two. Physical AI makes shared environments viable because machines can perceive proximity, movement and changing conditions. Systems can slow down, change direction or adjust behaviour when people enter shared operating spaces.

Lenovo's pickassist autonomous mobile robot (AMR) combines human intelligence and the dexterity of human hands with AMR payload capability and movement endurance. The complementary strengths of human and machine help drive higher productivity.

In this model, safety and productivity do not have to be trade-offs.

The same principle applies right across smart warehouses. AI can make logistics more responsive, identify quality issues earlier and help detect emerging safety risks.

Solutions driven by artificial intelligence and autonomous robots can help companies process orders more efficiently. Photo: Lenovo

We see this in practice at a leading logistics company based in Singapore. By integrating AI and autonomous robots into its warehouse operations, the company achieved up to 40 per cent faster order processing, alongside a 30 per cent reduction in energy consumption. It shows that efficiency and sustainability can reinforce each other.

Yili Group illustrates another side of this shift. As a large-scale producer of a wide range of dairy products, the company manages consumer goods with short shelf lives. AI-driven customer insights and supply-chain control can help turn fragmented information into more timely decisions.

In Industry 5.0, sustainability is increasingly tied to this kind of operational intelligence. When organisations can see how equipment, energy and materials are being used, they can optimise those resources continuously.

Lenovo's Smart Energy Efficiency Solution applies AI to energy-intensive systems including HVAC (heating, ventilation and air-conditioning), chillers, boilers, air compressors and lighting. At Lenovo's global headquarters, the platform has reduced electricity consumption by 34 per cent year on year.

But intelligent operations depend on the right foundations. Manufacturers still face fragmented systems, limited training data, and the cost and risk of deploying AI in live environments.

Ultimately, the infrastructure behind AI matters as much as the technology itself. The real challenge is to make AI useful, reliable and scalable where people actually work.

Yet, a smart factory remains vulnerable if its broader supply chain is reactive. True Industry 5.0 resilience requires intelligence across suppliers, planning, manufacturing, logistics and fulfilment.

Lenovo iChain uses AI to improve the efficiency of supply chains and make them more reliable and resilient to disruptions. Photo: Shutterstock

This is where Lenovo iChain is an extension of the Industry 5.0 model. It connects data, decisions and execution across the supply chain, helping organisations move from reacting to disruptions, to anticipating them.

Powered by AI, Lenovo iChain can increase the efficiency of the production process, while still catering to evolving customer needs.

When incorporating it within Lenovo's own supply chain, which encompasses more than 30 manufacturing sites, the company was able to improve the accuracy of its delivery system by 30 per cent and reduce its order-to-ship lead times by around 20 per cent.

This more reliable supply chain lessens the need for buffer inventory, which saved the company over US$150 million in 2025.

That approach reflects a broader experience we have built over years of managing a complex global supply chain and it has been recognised externally, with Lenovo ranked No 5 in research and consulting firm Gartner's 2026 Supply Chain Top 25 list.

We learned the value of this resilience through experiences from global events that reinforced the need for continuous visibility, scenario planning and faster responses to emerging risks.

Winning in the Industry 5.0 era won't belong to the most automated companies. It will belong to the ones that see where technology can make people better at what they do: helping their business stay adaptable, sustainable and resilient.

Source: www.scmp.com

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SCALE 2026 – AI-DRIVEN SUPPLY CHAINS FOR INDUSTRY 5.0

The **SCALE 2026**, organized by the **Indian Institute of Materials Management (IIMM), Bangalore Branch**, was successfully held on **19th September 2026 at The Capitol Hotel, Raj Bhavan Road, Bengaluru**. The conference brought together professionals, industry leaders, academicians and supply chain practitioners to deliberate on the theme **"AI DRIVEN SUPPLY CHAINS FOR INDUSTRY 5.0: Delivering Sustainable People First Performance."**

The conference focused on the rapidly evolving role of Artificial Intelligence, digital technologies, automation and human-centric approaches in transforming supply chains and manufacturing ecosystems. The theme highlighted the importance of combining technological innovation with sustainable, resilient and people-first business practices to build future-ready organizations.

The programme commenced with **Registration and Networking**, providing participants an opportunity to interact with fellow professionals and industry representatives. The formal inaugural session began with **Invocation and Lighting of the Lamp**, followed by the **Welcome Address by Dr. D. Subramani, SCALE Chairman, IIMM Bangalore**.

Mr. P.M. Biddappa, National President, IIMM NHQ, delivered the address by the National President, emphasizing the importance of continuous professional development, innovation and the evolving role of IIMM in supporting the materials management and supply chain profession.

The conference featured a keynote address by **Dr. Arindam Sen, Senior Director, HCL Technologies**, who shared perspectives relevant to the digital and technology-driven transformation of modern business and supply chain ecosystems.

A major highlight of the inaugural session was the presentation of the **Best CEO Award to Mr. Shantanu Roy, CMD, BEML**. Mr. Roy subsequently addressed the gathering as the **Chief Guest**, sharing valuable insights from his leadership experience and perspectives on the changing industrial and business environment.

The technical sessions commenced with **Mr. Rajesh K.S., General Manager, Bosch Limited**, who spoke on **"Technology Driven Smart Manufacturing."** The session highlighted the growing importance of connected technologies, automation and digital capabilities in enhancing manufacturing performance and competitiveness.

This was followed by a session on **"Data Protection and Cyber Security"** by **Mr. M.D. Sharath, Superintendent of Police**, addressing the increasing importance of cybersecurity, data protection and security awareness in an increasingly digitized business environment.

Mr. Suresh Srinivasan, Co-founder, Potentia, presented an engaging session on **"Happy People Perform Better,"** highlighting the importance of employee engagement, workplace well-being and the human dimension of organizational performance.

Following the lunch break, **Prof. Rajender Desai, SJIM**, provided a briefing on the **SCM Data Analytics Certification Programme**, highlighting the importance of analytical capabilities and professional education for supply chain practitioners.

The programme continued with a session on **"AI Driven Workflow Automation"** by **Mr. Karthik Krishna, Alchemist**. The session explored how Artificial Intelligence and automation can streamline workflows, improve productivity and enable organizations to enhance operational efficiency.

Mr. Kamlesh Jogi, MCX India, addressed the topic **"Building Resilient Supply Chains – Managing Commodity Price Risk."** His session provided valuable perspectives on commodity markets, price volatility and the importance of effective risk-management strategies in building resilient supply chains.

An important social-impact segment of the programme featured **Swami Sridhama Krishnadas / Mr. Mukesh Tiwari, ISKCON**, who presented **"Akshaya Patra Foundation – ISKCON Movement and Drive."** The session brought attention to the role of organized supply chains and social initiatives in supporting broader societal objectives.

The conference further explored the human dimension of Industry 5.0 through the session **"The Human Centric Architecture of Industry 5.0 for Sustainable Performance"** by **Mr. Mannatham Perumal, Former Head of HR, Raymond Lifestyle Limited (Garmenting Division)**. The session emphasized the importance of placing people at the centre of technology-led transformation and creating sustainable performance through a balanced integration of technology and human capabilities.

The post-tea technical session featured **Mrs. Suchitha Bansal, General Manager – Global Supply Chain, A.P. Moller – Maersk**, who addressed the thought-provoking topic **"Is AI the Disrupter or Creator in VUCA Supply Chain World."** The session examined the changing role of Artificial Intelligence in supply chain decision-making and the opportunities and challenges presented by AI in a volatile, uncertain, complex and ambiguous business environment.

The conference also featured the **release of the SCALE 2026 Souvenir by the Vice President (South) and National Secretary Treasurer (NST)**, marking an important milestone in the event and documenting the contributions and proceedings associated with SCALE 2026.

The programme concluded with the **Vote of Thanks delivered by Mr. Achyuth Rao, Vice Chairman – SCALE 2026**, acknowledging the contributions of the distinguished speakers, dignitaries, delegates, sponsors, supporters and the organizing team for making the conference a meaningful platform for professional interaction and knowledge sharing.

SCALE 2026 provided a valuable platform for professionals from the supply chain, manufacturing, technology, logistics, procurement and allied sectors to exchange ideas and perspectives on the future of supply chains. The conference brought together technological innovation, business transformation, risk management, cybersecurity, smart manufacturing and human-centric Industry 5.0 principles under one platform.

The event reaffirmed the commitment of **IIMM Bangalore Branch** towards promoting professional excellence, knowledge sharing and continuous learning in the field of materials management and supply chain management. SCALE 2026 served as an important forum for exploring how **Artificial Intelligence and emerging technologies can be leveraged to create sustainable, resilient and people-first supply chains for the future.**

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Indian Institute of Materials Management

MISSION

- To promote professional excellence in Materials Management towards National Prosperity through sustainable development.

OBJECTIVE

- To secure a wider recognition of and promote the importance of efficient materials management in commercial and industrial undertakings.
- To safe guard and elevate the professional status of individuals engaged in materials management faculty.
- To constantly impart advanced professional knowledge and thus improve the skill of the person engaged in the materials management function.
- Propagate and promote among the members strict adherence to IIMM code and ethics.

CODE OF ETHICS

- To consider first the total interest of one's organisation in all transactions without impairing the dignity and responsibility of one's office :
- To buy without prejudice, seeking to obtain the maximum ultimate value for each rupee of expenditure.
- To subscribe and work for honesty and truth in buying and selling; to denounce all forms and manifestations of commercial bribery and to eschew anti-social practices.
- To accord a prompt and courteous reception so far as conditions will permit, to all who call up on legitimate business mission.
- To respect one's obligations and those of one's organisation consistent with good business practices.

BRANCH NEWS

ALWAR BRANCH

Indian Institute of Materials Management, Alwar branch conducted it's AGM on 22/8/2026 at Hotel Moti Dungri Palace Alwar. Annual accounts were passed during the AGM and future plans for next One year was discussed.

Mr. Satish Kumar Branch Chairman welcomed the members of the branch and appreciated the efforts of the founder Chairman Mr. Lalit Raj Meena to bring the Branch among as vibrant branch in Northern India.

After the AGM a seminar on Logistics and warehouse Management was organised by the Branch. Mr. Rajesh Luthra, CEO was the chief Guest and Mr. Lalit Raj Meena

Immediate Past President presided the program. Dr. (Prof)Saroj Koul from O P Jindle Global University Sonipat and Dr. Veerendra Singh Rathore from Ajmer were the speakers.

Dr. Saroj Koul made the presentation that how from ancient era to 2026 and future by 2030 ,the Journey of indan logistics and Warehouse Management. The logistics cost has come down from 13-14% to about 9% in india. Still India has to reduce logistics cost by another 2-3% to make India competitive in Global market. Dr. Veerendra Singh Rathore spoke about the Government logistics policy and Road Safety aspects in logistics Management.

Mr. Tariq Badar Hon. Secretary of the branch was MOC and Mr. Banwari Lal Meena Vice Chairman proposed the Vote of thanks. All Past Chairman Lalit Raj Meena Mr. Gulab Singh Rathore, Mr. V D Gupta, Mr. Chandan Kathuria, Mr. Pradeep Sharma were present. During the AGM Mrs. Shashi Yadav ,1st women entrepreneur was falisteted by the Branch. The program was followed by Gala dinner.

CHENNAI BRANCH

GM & ANNUAL GET TOGETHER 2026, 29th August 2026 | MMA Auditorium, Chennai

IIMM Chennai Conducts AGM & Annual Get Together 2026 : The Indian Institute of Materials Management (IIMM), Chennai Branch, conducted its Annual General Meeting (AGM) on 29th August 2026 at the MMA Auditorium, Chennai, followed by the Annual Get Together (AGT). The combined event brought together members, family members and guests for an annual review of the Branch's activities, discussions on future initiatives, and an evening of fellowship and celebration.

Strong Member and Family Participation : A total of 83 members attended the AGM, while the overall gathering, including family members and guests, was approximately 80 persons. The participation reflected the continued association of members and their families with IIMM Chennai. Members actively shared their views and suggestions on Branch activities, member engagement, educational programmes, professional networking and the future utilisation of Branch assets.

Chairman's Welcome Address : Mr. T. Sornakumar, Chairman – IIMM Chennai, welcomed the Office Bearers, Executive Committee Members, National Committee Members, distinguished members, invited guests and family members. He reviewed the Branch's activities and achievements during 2025–2026 and emphasised the importance of collective involvement in shaping the future of IIMM Chennai.

The Chairman made special reference to Spectrum 2026, the Branch's 18th Annual Supply Chain Management Convention, and appreciated Dr. B. Sampath, speakers, sponsors, industry partners, volunteers and members for their contributions to the event.

Secretary's Report – Activities and Achievements : Mr. R. Balakrishnan, Honorary Secretary, presented the Secretary's Report for 2025–2026. The report highlighted the Branch's continued focus on professional development, education, membership growth, industry interaction, knowledge sharing and professional networking.

During the year, the Branch continued its regular Executive Committee meetings, educational programmes, Executive Development Programmes (EDPs), professional meetings, membership activities and industry interactions. Educational initiatives included DSCM, PGDMM, PGDLSCM, certificate programmes, EDPs and corporate training programmes.

The Branch continued to provide opportunities for professionals to enhance their knowledge in Procurement, Supply Chain Management, Inventory Management, Stores Management, Vendor Management, Cost Management, Negotiation, Digitalisation, Artificial Intelligence and other emerging areas.

A major corporate training initiative highlighted in the report was the Executive Certificate Programme conducted for HL Mando Anand India Pvt. Ltd., covering areas including Vendor Management, Cost Management, Supply Chain, Negotiation, Inventory Management, ESG, Taxation, Safety, Leadership and Relationship Management.

The Secretary also highlighted Spectrum 2026, the 18th Annual SCM Convention held on 27th February 2026 at MMA Auditorium, Chennai, with the theme "Reimagining Supply Chains with AI." The convention brought together professionals, academicians, industry experts and SCM practitioners.

Treasurer's Report and Audited Accounts : Mr. M. Praveen Kumar, Honorary Treasurer, presented the Honorary Treasurer's Report for the financial year ended 31st March 2026. The audited financial statements and Auditor's Report were placed before the General Body for consideration and approval.

The General Body approved the Audited Financial Statements for the year ended 31st March 2026. The appointment of M/s. Abraham Philip LLP, Chartered Accountants, as Auditors of IIMM Chennai Branch for 2026–2027 was also considered, subject to the applicable rules and approvals of the Institute.

Members' Suggestions and Key Discussions

Revival of Monthly Physical Meetings : Mr. Loganathan, Senior Member of IIMM, suggested reviving regular monthly meetings in physical mode, similar to the practice followed before the COVID-19 pandemic. He highlighted that such meetings would provide opportunities for members to meet fellow professionals, exchange knowledge and experiences, strengthen professional relationships and improve networking. Members present appreciated the suggestion and expressed their support.

Preserving IIMM Chennai's Legacy and Member Support : Mr. T. A. B. Barathi, NC Member & Director Education, IIMM Chennai, supported the proposal for monthly physical meetings and emphasised that IIMM Chennai's long-standing legacy should be preserved and carried forward for future generations. He encouraged members to actively participate in Monthly Meetings, EDPs and the DSCM Course.

University of Madras and Property Utilisation : Mr. S. L. Ashok, Life Member, sought an update on the MBA programme share amount relating to the University of Madras and requested appropriate follow-up with the concerned authorities. He also suggested exploring productive utilisation of the Padappai land and examining future utilisation and development possibilities of the Laxmi Bhavan property. The Branch indicated that these matters would be examined and appropriate follow-up action taken.

AMPA Building Reconstruction – Single Point of Contact : During the discussion on the proposed AMPA Building reconstruction/development and the proposal received from the builder/promoter, Mr. T. A. B. Barathi suggested that a dedicated single point of contact be identified. He proposed Dr. B. Ramesh, Former Chairman of IIMM Chennai and present National Council Member, for this responsibility.

The proposal was discussed and unanimously agreed to by the members present. Accordingly, Dr. B. Ramesh may coordinate the matter with the promoter and represent IIMM Chennai before the appropriate National-level committees, subject to applicable IIMM approvals and procedures.

Way Forward : The AGM discussions reflected a strong interest in strengthening member engagement, professional networking, education, training and the continued development of IIMM Chennai. The Branch's future focus includes professional education and certification, EDPs and corporate training, membership development, industry–academia interaction, knowledge sharing, professional networking, digital and technology-oriented SCM programmes, and engagement with young professionals and students.

Contemporary areas identified for continued attention include Artificial Intelligence, Digital Supply Chains, Strategic Procurement, Sustainability, Risk Management and Supply Chain Resilience.

Annual Get Together – Fellowship and Family Celebration : Following the formal AGM proceedings, the Annual Get Together continued as a family and fellowship programme. The AGT provided members, family members and guests with an opportunity to interact in an informal and enjoyable setting and to celebrate their association with IIMM Chennai.

A special entertainment and engagement programme was presented by Ms. Kasturi, actress, public speaker, quiz master and entertainer. Her interactive programme added a lively dimension to the evening and provided an enjoyable experience for members, families and guests.

The programme concluded with fellowship and dinner. The Vice Chairman invited all participants to join the dinner following the programme.

Vote of Thanks : The AGM placed on record its appreciation for the Chairman, Office Bearers, Executive Committee Members, National Committee Members, faculty members, programme coordinators, staff, students, corporate associates, sponsors, speakers, trainers, academicians, industry professionals and well-wishers who contributed to the activities of IIMM Chennai during the year.

Dr. B. Sampath, Vice Chairman – IIMM Chennai, proposed the Vote of Thanks. He acknowledged the contributions of members, speakers, industry professionals, institutions, corporate partners, sponsors and volunteers to Spectrum 2026 and other Branch initiatives. He also thanked MMA for its continued support and cooperation, the IIMM Chennai staff, Mr. Siva for his photography services, and the families of members for their participation and support.

Conclusion : The AGM & Annual Get Together 2026 was a significant occasion for IIMM Chennai to review its activities, receive valuable suggestions from members, discuss future initiatives and reaffirm its commitment to professional development and member engagement. The Annual Get Together further strengthened the spirit of fellowship by bringing members and their families together for an interactive and enjoyable programme.

The Branch looks forward to the continued participation and support of its members in strengthening IIMM Chennai and carrying forward its professional legacy in the years ahead.

KANPUR BRANCH

IIMM Kanpur branch has organized Annual General Meeting on 30th August 2026 Sunday in Hotel Priyadarshan near PAC mod Kanpur .Prior 21 days advance notice was sent to all the members for the AGM for passing the account for FY year 2025-26.

Branch Chairman Mr Sanjay Awasthi has welcomed all the present members. He has also apprised to the members the various activities done by the branch during the above period. He expressed serious concern on the poor growth of life membership and requested all the present members that all out efforts should be made to increase the membership in the next financial year. He has further requested to start the AGM.

The Balance Sheet for the year 2025-26 was presented by Mr Abhishek Roy which was first by Mr Ashwani Kumar and seconded by Mr R K Dixit. The balance sheet was passed by all the present members by clapping.

In this occasion Dr Raj Pandey Sr physiotherapist and Mr Rahul Singh Manager Marketing Matrabhomi Real Estate Lucknow was also invited. Mr Kailash Nath Hony Secretary has apprised them in details about the various activities both at branch and National level. Both of them have been requested to associate with IIMM Kanpur Branch and work together for increasing the Life membership. Their response was favorable.

The vote of thanks given by Mr G K Agnihotri Former V P North and NC Kanpur Branch. AGM was concluded followed by Dinner

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VADODARA BRANCH

Following the annual tradition of kicking off branch activities with a Satyanarayan Katha after the AGM, the IIMM Vadodara Branch organized a Satyanarayan Katha on September 6, 2026 at IIMM Office. During this auspicious occasion, EC members, their spouses, and office staff were present.

Evening Lecture on "Diet, Nutrition & Lifestyle Diseases" by Dr. Kiran Jayswal on September 12, 2026 at IIMM Hall.

Dr. Kiran Jayswal talked about Life Style Diseases. In his speech, he emphasised more on dietary part (prioritize fruits, vegetables, whole grains, and lean proteins, while minimizing sugar, salt, and unhealthy fats), eating habits, regular physical activity, quitting smoking and managing stress to keep away the life style diseases. He also explained about endoscopic spine surgery & its procedures, post-surgery care, recovery period, etc.

Diet, Nutrition & Lifestyle Diseases : An unhealthy diet high in processed foods, sugars, and bad fats directly causes chronic lifestyle diseases like type 2 diabetes, heart disease, and obesity.

The growing prevalence of diet-related diseases, such as obesity and hypertension, underscores a paradox within global nutrition trends. While undernutrition remains a significant concern in certain regions, the widespread availability of processed foods and unhealthy dietary options has contributed to a rise in noncommunicable diseases linked to poor nutritional habits.

Glimpses of the Evening Talk

Evening Lecture on "Import Export Management: From Classroom to Real Business Excellence" by Mr. Jitesh Kumar on September 19, 2026 at IIMM Hall.

Mr. Jitesh Kumar is a seasoned Supply Chain Professional, Consultant and Trainer with nearly three decades of experience spanning shipping, logistics, sourcing, port operations, commercial negotiations and business leadership in India and overseas. He currently serves as Director of Kamya Shipping Pvt.Ltd. and Knowledge Partner with ThinkPeepal Consulting, where he contributes to building practical, industry-oriented learning and business excellence frameworks.

From Classroom to Real Business Excellence:

Bridging Knowledge, Experience and Business Impact in Supply Chain Management

Supply Chain Management today extends far beyond the concepts taught in classrooms. While academic education provides essential foundations in procurement, inventory management, logistics, forecasting, risk management and supply chain strategy, real business success depends on the ability to apply this knowledge in dynamic and unpredictable environments.

In this thought-provoking session, Jitesh Kumar shared insights drawn from nearly three decades of hands-on experience across shipping, logistics, port operations, sourcing, vessel management and supply chain leadership. Through practical examples and real-world case studies, he highlighted the critical gap between theoretical knowledge and business reality.

The presentation explored how today's supply chain professionals must navigate challenges such as global volatility, AI-driven transformation, supplier risks, sustainability requirements, geopolitical disruptions, rising customer expectations and talent shortages. The discussion emphasized that modern supply chain leaders are expected to combine technical expertise with commercial acumen, strategic thinking, problem-solving ability, communication skills and leadership capabilities.

Drawing lessons from recent global disruptions, including the COVID era, the session underscored the importance of resilience, supplier diversification, digital visibility and agile decision-making. It highlighted the evolution of Supply Chain Management from an operational support function to a strategic business enabler and a source of competitive advantage.

A key takeaway from the presentation was that professional growth follows a continuous journey from classroom learning to experience, continuous development and ultimately leadership. The session encouraged students, professionals and industry leaders alike to embrace lifelong learning, adopt emerging technologies, develop future-ready capabilities and focus on creating measurable business value.

Concluding with the powerful message that "Knowledge creates understanding, experience builds judgment, and continuous learning creates leaders," the speaker reaffirmed that the future belongs not to those who merely know supply chains, but to those who can continuously transform knowledge into business excellence and sustainable value creation.

Glimpses of the Evening Talk

AYODHYA BRANCH

Meeting dt 22-8-2026 of 3rd AGM of IIMM Ayodhya branch* With due compliance and around 75 members including first batch students, dignitaries from Indian Army, academicians, Nari Shakti, etc were in attendance during the AGM. Meeting started with VANDE MATARAM and welcome address by Mr Abhay Mehrotra, Branch Chairman. All the participants were honoured with *anga vastram* and rose bud by a team lead by Mr Deep Chand, Treasurer.

The agenda points that were deliberated and resolutions passed thereof are as detailed below:-

1. Passing of *Statement of accounts* of the branch for year ending 31st March 2026 was presented by Mr Ashish Khairkar and Deep Chand, Treasurer. After due deliberation Statement of accounts were passed as proposed by Mr Ganga Vishnu and seconded by Mr VP Singh.

2. 'For hosting a *National Seminar* on Sunday, November 1st, 2026 with pre-seminar dinner on 31st October, 2026, members consented unanimously.

3. 'For attending the *NATCOM 2026* being held at Nagpur professionals namely Sri VV Chaturvedi, Deep Chand, Ashish Khairkar, Dinesh Srivastava, Chandra Mohan Mishra and Navin Srivastava volunteered to attend the Natcom.

4. 'Reimbursement of travel and hotel expenses for attending NC, Natcom and other signature programs of IIMM, members agreed in principle and authorised the Branch Chairman, Hon Secretary and Treasurer to look into it and approve the same with maximum ceiling as *Rs 10,000 towards travel and Rs 2,500 per day (maximum two days) towards hotel etc per participant*.

The key note speaker *Col Vinay Singh* made participants aware on disaster management whereas *Prof PK Singh* former Director AIIMS Patna and former Vice Chancellor UPUMS spoke on Robotic Surgery and SCM.

Guests were served with snacks and dinner with address of Dr Harendra Kumar on IIMM activities in general and activities of IIMM Ayodhya in particular. Meeting ended with vote of thanks by the Vice Chairman Mr Sanjay Dua. Sri VV Chaturvedi, Dinesh Srivastava, Pradeep Verma etc graced the occasion. The overall program was mentored by Dr Harendra Kumar, NC.

Ayodhya branch* : With due compliance and around 75 members including first batch students, dignitaries from Indian Army, academicians, Nari Shakti, etc were in attendance during the AGM. Meeting started with VANDE MATARAM and welcome address by Mr Abhay Mehrotra, Branch Chairman. All the participants were honoured with *anga vastram* and rose bud by a team lead by Mr Deep Chand, Treasurer.

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DURGAPUR BRANCH

REPORT ON AGM FOR YEAR 2025-26 HELD BY IIMM, DURGAPUR BRANCH : Annual General Meeting (AGM) of the IIMM, Durgapur Branch for the year 2025-26 was held on 30.08.2026 at Creek Resort, Bolpur. The meeting was well attended by the members of the branch.

The Branch Chairman, **Sri N. C. Parida**, welcomed all the dignitaries, office bearers and members present at the AGM. He assured the house that the Managing Committee would continue to make every possible effort to further strengthen and expand the activities of IIMM, Durgapur Branch.

The **Chief Patron, Sri B. S. Popli, Executive Director (MM), DSP & ASP**, and **National**

Councillor, Sri R. Deb, addressed the gathering. They appreciated the initiatives undertaken by the Durgapur Branch and encouraged the members to continue their active participation in the professional and educational activities of IIMM.

The Honorary Secretary, **Smt. K. Bhattacharya**, presented the report covering the activities and achievements of the Branch during the last year. In recognition of the increase in number of members of branch, **IIMM, Durgapur Branch received the "Best Branch for Membership Growth" Award from IIMM, National Headquarters in October 2025.** The Honorary Secretary further highlighted the various professional and educational activities conducted during the year, including **lecture sessions, National Seminar, Vendor Meet and other knowledge-sharing programmes.**

(Hony. Secretary reading annual report)

Hony. Secretary presented the annual statement of accounts for the year 2025-26 before the house. After discussions the annual accounts for the year 2025-2026 was passed in the AGM.

Deliberations & Informative discussions took place among the members & thought-provoking suggestions were expressed by the Branch members. It was suggested to continue interactive activities & sessions which benefits the members in their professional development.

(Gathering of members)

The Vice Chairman, **Sri C. Patra**, proposed the Vote of Thanks and expressed his sincere gratitude to all the dignitaries, members, office bearers, and others associated with the organisation for their valuable support and contribution towards the successful conduct of the AGM. The programme concluded on a memorable note with a vibrant cultural performance by local tribal artists.

HYDERABAD BRANCH

IIMM Hyderabad Branch celebrated India's 80th Independence Day with g great patriotism and joy by hoisting the Tiranga and we all sang Vande Mataram.

2) Teacher's Day – We felicitated our Senior Faculty, Mr Kuldip Rai in recognition of his valuable contribution to IIMM education and professional development programs. "Achaaryaat paadam aadatte, paadam shisyah sva-medhayaa| Sa-brahmachaaribhyah paadam, paadam kaala-kramena ca||"

It highlights that a Guru is essential as the starting catalyst, but complete educational development requires active personal effort, peer collaboration, and patience over time.

3) AGM 2026 – Our 51st AGM held on 12.09.2026 at FTCCI Surana Hall and apprised all members present, of all the activities and financials and the AGM concluded successfully.

4) July 2026 Admissions - Branch has successfully completed admissions for July 2026 and a total of 15 students got admitted for this session.

All Other activities of the Branch are going on well under the able guidance of the seniors of EC Team and NHQ, Branch has fully geared to take IIMM Hyderabad Branch to next level. Dhanyavaadah

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NALCONAGAR BRANCH

LECTURE PROGRAMME : A Lecture Programme was organized by the IIMM, Nalconagar Branch, on 30-08-2026 at Hotel Suryansh, Bhubaneswar. The theme of the programme was "Smart and Intelligent Supply Chain: Industry 5.0."

The programme was attended by Life Members, Office Bearers, NC Members, EC Members, Nominated representatives of Institutional Members of the Branch, and delegates from some leading industries.

Prof. Satish Kr. Panda of IIT Bhubaneswar delivered a talk on the use of Simulation-based models, Image processing, Artificial Intelligence, Deep learning, Computer vision, and AI-enabled applications in Supply Chain Management.

The other distinguished speaker, Prof. Rashmi Ranjan Panigrahi, Associate Dean (R&D), XIM University, Bhubaneswar, delivered his talk on the theme with reference to Industry 4.0, 5.0, and 6.0. In his speech, he emphasized the role of AI in the context of Global disruptions, Inventory Management, Supply chain and Logistics, Digitalization, the Circular economy and sustainability.

The programme was highly educative and informative and was greatly appreciated by the dignitaries and members present. The programme was anchored by Prof. Arijit Mitra of XIMB, Bhubaneswar. The vote of thanks was offered by the Secretary of the Branch, Shri S. N. Baghar, and the programme concluded on a satisfactory note. The Lecture Programme was supported by M/s. National Aluminium Co. Ltd. and M/s. Jk Paper Ltd., Rayagada.

The Programme was followed by Lunch.

ANNUAL GENERAL MEETING : The Annual General Meeting (AGM) of IIMM, Nalconagar Branch was held on dt.30-08-2026 in hotel Suryansh, Bhubaneswar in the presence of NC Members, Office Bearers, Members of Executive Committee, Life Members and Representatives from Institutional Members of the branch.

The meeting was presided over by the Chairman, Nalconagar Branch, Dr. (Er.) Dibakar Swain. The Vice-Chairman of the Branch, Shri Anshuman Dash delivered the welcome address and the Annual Audited Accounts of the branch for 2025-26 was presented by Hony. Secretary, Shri S.N.Baghar and was passed after due deleberations.

In the meeting, it was discussed and deliberated to conduct webinars, lecture programmes, one Executive Development Programme and a State Level Convention in this year.

The AGM ended with the Vote of thanks by Ms. Arati D. Patra, Executive Committee Member of the branch.

INDIAN INSITUTE OF MATERIALS MANAGEMENT
VALLABH VIDYANAGAR

Minutes of the 26th Annual General Meeting held on 21st August, 2026 at Vallabh Vidyanagar

As per the mandatory requirement, notices regarding AGM – 2026 dated 1st August, 2026 were sent to all eligible members by courier.

The proceedings of AGM started at 6:20 p.m. at Vitthal Udyognagar Industrial Association's conference Hall in the presence of required members.

The Chairman, Mr. Keyur Amin, confirmed the quorum and welcomed all members followed by self-introduction of all members.

After self-introduction of all the members present, as per the agenda's point # 1, unaudited income and expenditure account and balance sheet for the year ending 31st March, 2026 was proposed to be passed by Mr. Harshad Mehta and seconded by Mr. Hemal Patel. Accordingly, it was unanimously passed in the AGM.

Discussion was carried out on how to increase participation by industry people by making their employees members of IIMM followed by discussion on organizing programs regarding use of AI in helping purchasing executives in purchase function.

Meeting ended with light refreshments being served to members present.

VALLABH VIDYANAGAR BRANCH

VAPI BRANCH

LUCKNOW BRANCH

One day seminar of IIMM,LKO Branch held on 4/10/2026 in IIMM Conference hall. Subject: How Artificial Intelligence(AI) can help Supply Chain Management Professionals to minimize inventory without any Production Hold Risk? Subhash Choudhary, Ex. Vice President (SCM) Reliance Industries Limited, IIM-Ahmadabad Alumni, Life Member IIMM, Life Coach, Social Influencer and Content Creator.

Geast of lecture are as under:- How Artificial Intelligence(AI) can help Supply Chain Management Professionals to minimize inventory without any Production Hold Risk? Subhash Choudhary, Ex. Vice President (SCM) Reliance Industries Limited, IIM-Ahmadabad Alumni, Life Member IIMM, Life Coach, Social Influencer and Content Creator Artificial Intelligence(AI) can help Supply-Chain Professionals to move from "keeping high inventory just in case" to "keeping minimum inventory needed for a defined production-service level." The key is not simply better demand forecasting; it is combining demand risk + supplier risk + production risk + lead-time variability in one decision system. In the below paragraphs it is suggested ways how AI can help SCM professionals to optimize the inventory level along with minimizing production hold up for want of inventory. 1. AI calculates dynamic safety stock Traditional approach: "For example, a material normally has 15 days' safety stock, so keep 15 days." AI approach: "Given current demand uncertainty, supplier reliability, lead time, production schedule and customer commitments, how much stock is required today?" AI can continuously adjust safety stock instead of using one fixed number. Inventory optimization systems can incorporate demand variability, supply variability and lead time when determining reorder points and safety stock. For example: Situation Traditional stock AI recommendation Stable supplier + stable demand 15 days 7 days Demand suddenly increasing 15 days 12 days Supplier showing delay risk 15 days 20 days Alternative supplier available 15 days 10 days Production demand falling 15 days 5 days So, inventory becomes risk-based rather than calendar-based. 2. AI predicts production-hold risk This is particularly valuable for manufacturing. Suppose you need: Raw material A ! 500 kg/day Your normal inventory is only 3 days. A supplier says delivery will be 4 days late. A traditional ERP may identify the shortage only after the problem becomes obvious. An AI system can identify: "Material A will become critical on say 28 September. Current inventory + confirmed receipts will cover only 2.4 days. Probability of production interruption is high. Recommended action: expedite 300 kg OR shift 200 kg from Plant B OR activate Supplier 2." AI can monitor supplier performance, delays, inventory, production schedules and other signals continuously and flag emerging risks. 3. Create a "Production Hold Risk Score" for every critical material This is one of the most useful applications. For every SKU(Stock Keeping Unit)/raw material, AI can calculate something like: Production Hold Risk Score = • Demand variability • Supplier reliability • Current inventory • Supplier lead-time variability • Open purchase orders • Production requirement • Quality rejection history • Transit risk • Alternative supplier availability • Material criticality 4. AI can connect demand forecasting directly to procurement This is where the real benefit comes. Instead of: Sales forecast ! Planner ! Purchase requisition ! Buyer ! Supplier you can create: Demand signal ! AI forecast ! Production requirement ! Material requirement ! Supplier capacity ! Inventory requirement ! Recommended PO AI systems can continuously update forecasts using historical demand and real-time signals, then connect those forecasts to inventory and replenishment decisions. 5. AI should predict supplier failure before it happens Imagine Supplier A historically delivers in 10 days. But AI notices: • Recent deliveries: 10 ! 12 ! 14 ! 16 days • Quality rejection increasing • Supplier capacity utilization increasing • Open orders accumulating • Raw-material prices increasing • Previous shipments delayed AI could generate: Supplier A risk: HIGH Expected lead time: 18–21 days Recommended action: place partial order with Supplier B. This is much better than waiting for Supplier A to miss the delivery. AI systems can monitor supplier performance and recommend alternatives or changes in sourcing strategy. 6. The most important concept: "Risk-adjusted inventory" Don't ask: "How do I minimize inventory?" Ask: "How do I minimize inventory subject to zero/acceptable production interruption risk?" Mathematically, your objective becomes something like: Minimize: Inventory carrying cost + expediting cost + stockout/production-loss cost Subject to: Required customer service level • required production continuity • supplier constraints This changes the role of the supply-chain professional from inventory controller to risk optimizer. Human approval should remain for significant procurement, supplier and production decisions. The ultimate goal is not zero inventory. It is minimum economically justified inventory with a controlled probability of production interruption. AI is particularly useful because it can continuously reassess that trade-off instsead of relying on static safety-stock rules.

Vote of thanks given by Mr. Prashant Singh Chairman, LKO Branch & invited for Lunch.

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

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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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