# **ISSN 2320-0758** PRICE ₹ 50/-**IATERIALS MANAGEMENT** REVIEW () IFPSM

Volume 19 - Issue 2 Date of Publication: 1-12-2022 No. of Pages 1-60 December 2022

1

# **RE-INVENTING & FUTURE PROOFING GLOBAL SUPPLY CHAIN MANAGEMENT**





# From the Desk of Chief Editor & National President

Global Supply Chains are operating under rapidly changing but uncertain environment and because of the complexities & number of elements involved in moving the wheels of whole value chain, it is essential to reduce the impact of future shocks. It becomes really challenging to expect the unexpected and accordingly mitigate that unexpected

thing and this is where, notions like Future Proofing ofglobal supply chain originates. There are certain measures, which if implemented will help businesses remain operative during such unexpected event. This can be done by recognizing the new priorities alongside the traditional objectives of Supply Chain in terms of cost/capital, quality, delivery and service.

The first of these priorities is resilience which defines the ability of supply chain to bounce back to normal in shortest span of time possible after some unexpected or unfavourable event has happened. The crack in the Supply chain becomes more visible at the intersection of vulnerability and exposure to unforeseen events and to mitigate such risks one should have clear understanding of the organization's supply chain vulnerabilities in terms of suppliers, processes or facilities. Corrective measures should include structural changes to the supply chain, as well as the development of detailed contingency plans for disruptive events

The 2nd priority is agility which provides enough flexibility to supply chain to meet its objectives in predefined manner. It is pertinent to mention here that agility involves extensive use of digital technologies to make it more transparent which in turn helps supply chain managers to take well informed decisions about any deviation from predetermined objectives. An agile supply chain will also require skilled & flexible people who can work with and alongside advanced technologies and can move between tasks as business needs change.

The next priority is sustainability. Supply chains should not only be resilient and agile but also be sustainable in terms of environment, economy and society. Sustainability allows an organization to identify and tap the significant opportunities for improvement, thereby, helping it develop a future proof supply chain strategy with challenging but realistic goals and can be incorporated at every point of supply chain.

Before trying something new and get carried away with the flow in adoption of technology driven strategy for a particular supply chain, it is important to understand the environment under which this particular supply chain is operating and how this environment will evolve and affect the supply chain during crippled times. Supply chain leaders now have an opportunity to future proof their supply chains.

Maintaining competitive advantage is the key objective of future proofing of Supply Chains. There are four key focus areas where companies should be investing to maintain that advantage. These areas are Talent, Technology, Data & Validation and Insurance.

It is very heartening to note that IIMM is organizing its National Convention on this very theme with experts from subject fields participating in the proceedings on 2<sup>nd</sup> and 3<sup>rd</sup> December 2022 at Chennai. I am sure this will be a great opportunity for professional enrichment.

H. K. SHARMA mmr@iimm.org





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

*Chief Editor & Publisher* H.K.Sharma, National President

Core Committee : Ashok Sharma, Former National President-IIMM T.G.Nand Kumar, Former GM (Materials), TERI

*National President :* **H.K.Sharma**, np@iimm.org

Editors : Malay Mazumdar, IPP ipp@iimm.org JS Prakash Rao Sr.VP srvp@iimm.org Surendra Deodhar, NS&T nst@iimm.org N.V. Raghu Babu, VP Central vpcentral@iimm.org KR Nair, VP West vpwest@iimm.org Ageet Kumar, VP North vpnorth@iimm.org N Swayambhu, VP South vpsouth@iimm.org Shambhu Shekhar, VP East vpeast@iimm.org Prof.(Dr.) V.K.Gupta-IMT Ghaziabad Prof.(Dr.) Goutam Sen Gupta, Vice Chancellor-Techno India University

#### Correspondence : MATERIALS MANAGEMENT REVIEW

#### Indian Institute of Materials Management

4598/12 B, Ist Floor, Ansari Road, Darya Ganj, New Delhi - 110 002. Phones : 011-43615373 Fax: 91-11-43575373 E-mail: iimmdelhimmr@gmail.com & mmr@iimm.org Website : www.iimm.org

#### Printed at :

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



## MATERIALS MANAGEMENT REVIEW

## Volume 19 - Issue 2

#### (December 2022)

	CONTENTS	
		Э.
	CREATING RESILIENT SUPPLY CHAINS THROUGH DIGITAL TRANSFORMATION	5
	GREEN INFRASTRUCTURE FOR SUSTAINABLE FUTURE OF INDIA	9
	INDUSTRY 4.0: SMARTINFRASTRUCTURE FOR A SUSTAINABLE GROWTH.	17
	FUTURE-PROOFING THE SUPPLY CHAIN IN 2022	20
	GROWTH OF INFRASTRUCTURE SECTOR IN INDIA	21
	DIGITAL INFRASTRUCTURE THE KEY TO REBUILDING SUPPLY CHAINS	22
	FUTURE-PROOFING PHARMA SUPPLY CHAINS BY IMPROVING INEFFICIENCIES IN GLOBAL HEALTH ARCHITECTURE	24
	DISHA 2022	26
	FUTURE-PROOF YOUR SUPPLY CHAIN FOR 2025 AND BEYOND	33
	FUTURE PROOFING YOUR SUPPLY CHAIN (THE HUMAN WAY)	35
	HOW TO INCREASE BUSINESS RESILIENCE THROUGH DEMOCRATIZED AI	37
	INDIA INTRODUCES NEW GROUP AT G-20 LEVEL FOR STARTUPS	39
	INDIA NEEDS TO INCREASE URBAN INFRASTRUCTURE INVESTMENTS TO \$55 BILLION A YEAR: WORLD BANK	40
	INDIA PLAYING A MAJOR ROLE IN THE GLOBAL SUPPLY CHAIN SYSTEM	41
	GLOSSARY OF TERMS (INFRASTRUCTURE)	42
	INDIA'S URBAN INFRASTRUCTURE NEEDS TO CROSS \$840 BILLION OVER NEXT 15 YEARS: NEW WORLD BANK REPORT	44
	QUIZ	45
	SUPPLY CHAIN TRENDS FOR 2022 AND BEYOND	46
	THE FUTURE IS YOURS TO SHAPE: 6 SUCCESS FACTORS FOR A FUTURE-PROOF SUPPLY CHAIN	50
	THREE WAYS TO FUTURE-PROOF YOUR SUPPLY CHAIN	52
	BRANCH NEWS	53
NO.	OF PAGES 1-60	

#### Edited, Printed & Published by : INDIAN INSTITUTE OF MATERIALS MANAGEMENT

4598/12 B, Ist Floor, Ansari Road, Darya Ganj, New Delhi - 110 002. Phones : 011-43615373 Fax: 91-11-43575373 E-mail: iimmdelhimmr@gmail.com & mmr@iimm.org Website : www.iimm.org

(Published material has been compiled from several sources, IIMM disowns any responsibility for the use of any information from the Magazine if published anywhere by anyone.)

# CREATING RESILIENT SUPPLY CHAINS THROUGH DIGITAL TRANSFORMATION

DR.C.SENGOTTUVELU, CPM(ISM-USA) LIFE MEMBER, IIMM BANGALORE BRANCH, PROFESSOR AND HEAD- RESEARCH ACHARYA BANGALORE B-SCHOOL (ABBS), BENGALURU-560 091, INDIA.

#### sengottuvelu138@gmail.com

**bstract**: Creating resilient supply chains through digital transformation is a strategic approach adopted by business firms. There is shift from sustainable supply chains to resilient supply chains to leverage the benefits. Resilient supply chains are those supply chains will come back quickly in case of disruptions due man made or nature. This paper focuses mainly on creating resilient supply chains through digital transformation. In this paper, evolution of SCM, resilient supply chain characteristics, ways to create resilient supply chains, procurement 4.0 technologies, VUCA world vs BANI world scenarios, and the challenges to be faced by the companies are highlighted. The main building blocks of resilient supply chains like collaboration, flexibility and visibility are also discussed. Digital transformation initiatives like digitization, digitalization and transformation are also highlighted. The control tower concept in supply chain management and procurement 4.0 technological tools are also discussed.

#### Keywords: Control tower, digital transformation, procumbent 4.0 technology tools, resilient supply chains, VUCA world, BANI world

Introduction : Supply Chain Management (SCM) aims to match supply and demand, wherein products / service flows, information flows, money flows, value flows and risk flows. Every company was trying to build sustainable supply chains in the past. But, now the focus has been shifted to create resilient supply chains. Covid-19 pandemic has made to think the business firms differently. The main focus of any supply chain is to manage upstream and downstream. In both upstream and downstream of any supply chain has many business entities (business partners), so managing all the entities makes the process more complex and difficult.

The objective of Supply Chain Management (SCM) is to achieve operational excellence throughout the enterprise by maximizing revenue, minimizing cost and making full use of all the assets.

Supply chain is understood as the process starting from the procurement of raw materials to the ultimate consumption of the finished product linking across supplier-user companies, or the functions inside and outside a company that enable the value chain to make products and provide services to the customer.

# Supplier à Manufacturer à Wholesaler / Dealer / Distributor à Retailer à End customer

SCM has many definitions and connotations. The author has reviewed and found more than 14 definitions from the literature. All those definitions can be grouped into three headings, i.e process, network and management strategy. The firms have implemented SCM practices to gain competitive advantage in their businesses (Sengottuvelu, 2021). Three key pillars of any supply chain are: Supply Chain Planning, Procurement and Supply Chain Execution (Batra, 2022).

SCM practices have been manifested over a period of time. The evolution of supply chain has many stages as shown table 1.

#### Table 1: Evolution of Supply Chain Management

Year	Evolution	Details
1960s	Fragmentation	Functioning in 'Silos', more of disintegration manner or loosely.
1980s	Consolidation	Materials Management (MM) and Logistics & Warehousing have emerged.
1990s	Integration	Both internal integration (functional) and external integration through SRM and CRM practices.
2000s	Value capture	Through collaboration and adoption companies have enhanced its total business value.
2010s	Automation	Companies started implementing ERP,

EPS, RPA, EDI, now Blockchain, 3D printing, AI/ ML, Data driven decision making.

**Resilient Supply Chains :** Resilience is a dynamic ability of an organization that increases the capability of the organization to react according to disruption and it also depends on the individuals, groups and subsystems that constitute a system (Li et al. 2017).

The ability to respond to an unpredicted interruption, caused by a natural disaster or a terrorist attack, and rapidly come back to its normal operations, Rice and Caniato (2003). The adaptive capability of the supply chain to prepare for unexpected events, respond to disruptions and recover from them by maintaining continuity of operations at the desired level of connectedness and control over structure and function, Ponomarov and Holcomb (2009). The ability to predict the risk, minimize the impact and come back rapidly through survival, evolution, adaptability and growth in the appearance of turbulence alteration Day (2014). The performance of a supply chain exposed to danger when it is affected by a disturbance, e.g., losing competitiveness, reduced short-term financial performance (Ji and Zhu 2008).

In general supply chain resilience means that the ability of the supply chain comes back quickly in case of natural or man-made disturbances. For example, COVID-19 pandemics, civil war, internal conflicts, natural disastrous etc.

ISM uses 29 parameters on which the supply chain resilience is measured. This parameter includes three important building blocks. i.e. collaboration, flexibility and visibility.

**Collaboration**: In the supply chain, collaboration is simply means that supply chain operations are planned and executed jointly by two or more autonomous firms for mutual benefits (Simatupang and Sridharan 2008). Collaborative partnership helps to anticipate the disruption and manage risks efficiently (Raj Sinha et al. 2004; Qian et al. 2018).

**Flexibility:** To be resilience, a supply chain should be flexible and it is characterized as the capacity of a supply chain to adjust according to the required necessities of its partners and environmental condition in the smallest amount of time (Stevenson and Spring 2007). The literature uncovers the different types of flexibility hones that can improve SCR, e.g., flexible transportation, flexible work game plans, postponement, flexible supply base and order satisfaction flexibility (Pettit et al. 2013).Chopra and Sodhi (2004)state that flexibility can be apply both to an organization and to the complete supply chain. In this way, flexibility makes supply chain resilience by upgrading brief versatility amid turbulence (Christopher

and Holweg 2011). A flexible supply chain will help to fast reaction and recovery (Sheffi and Rice 2005).

Visibility : Supply chain visibility is defined as the ability of supply chain manager to see from one end to another and can find the place of disruptive event (Christopher and Peck 2004). Visibility is an intercession apparatus that permits managers the opportunity to react rapidly to interruptions or unsettling influences in view of exact, continuous evaluation (Jüttner and Maklan 2011). Visibility portrays the necessity for straight forward structures and procedures to recognize requirements and interruptions rapidly and to have the capacity to actualize changes in a successful way (Pettit et al. 2010). Visibility fills in as a notice procedure that gives valuable time to firms to adjust their capabilities to limit problematic effect (Tang 2006). It additionally gives information about the current status of working resources and environment of the supply chain by utilizing key execution pointer measurements to monitor execution (Azadeh et al. 2014).

Collaboration, flexibility and visibility are called as building blocks of supply chain resilience.

#### **Digital Transformation Initiatives**

Digital transformation is happening at three levels. They are: i. Digitization, ii. Digitalization and iii. Transformation. Table 2 shows the details of digital transformation.

#### Table 2: Digital transformation

SI.No	Stage	Details
1	Digitization	This is the first level. In this mainly, the companies will convert all documents into electronic mode, i.e scanning or all purchase order files convert into electronic mode and write it on Compact Disk (CD).
2	Digitalization	This is an adaptation process. No manual forms of documents are created. Everything in electronic form. For example, in Electronic Procurement System (EPS), the purchase orders are created in electronic form and transmitted to the suppliers.
3	Transformation	In this stage companies' uses and captures in electronic form only. Example, Electronic Data Interchange (EDI), RFIDs, IoT devices like sensors etc.

**Control Tower :** A supply chain control tower is a cloudbased solution that leverages advanced technologies – such as artificial intelligence (AI), machine learning, and the Internet of Things (IoT) – to proactively manage supply chains. Control tower does more connecting operations. IBM defines a supply chain control tower as a connected, personalized dashboard of data, key business metrics, and events across the supply chain. A supply chain control tower enables organizations to more fully understand, prioritize and resolve critical issues in real-time.

A control tower has 4 levels. i.e level- 1 brings Visibility, level-2 triggers Alerts, level-3 facilitates Decision Support and level-4 provides Autonomous.

#### **Procurement 4.0 Technologies**

The term Procurement 4.0 means the interactive collaboration of all parties involved in a supply chain, as well as ensuring that everyone benefits from this collaboration. Table 3 shows the procurement 4.0 technologies and its application areas.

#### Table 3: Procurement 4.0 Technologies and Its Application Areas

SI.No	Technology Tools	<b>Application Areas</b>
1	IoT, Cloud & Cyber Security	Connectivity & Communication
2	Big data, Data Analytics	Data, Intelligence, Analytics
3	Manufacturing Technologies, Augmented Reality / Virtual Reality (AR/VR) 3D Printing, etc,	Human- Machine Interaction ,
4	Autonomous Transportation, Advanced Robotics etc	Advanced Procurement

According to degree of automation and time line, the procurement 4.0 technologies are: MRP, MRP- II, ERP, EPS and Procurement 4.0 technology tools. Table 4 shows the details on degree of automation and timeline.

#### Table 4: Procurement 4.0 Technology tools based degree of automation and timeline.

SI.No	Tools	Degree of Automation	Timeline
1	MRP, MRP-II	Less automation and internally integrated	Takes less time to implement
2	ERP	Moderate automation and both suppliers and customers are integrated	Takes considerable time and resources
3	Electronic Procurement System	Largely automated on real time basis	Consumes more resources and time to implement
4	Procurement 4.0	High level of automation involved	Takes more time to implement and also will have long term business implications

#### **Creating Resilient Supply Chains**

Metrics and measurement tools are used to assess and ascertain the supply chain performance. Measuring the supply chain performance is very important. Important metrics are:

- i. Time-to-Survive
- ii. Time -to-Recover
- iii. Time- to- Thrive

Creating more resilient supply chains:

- i. Risk assessment of key vulnerabilities
- ii. Supplier network
- iii. 'Supply stocks' to avoid shortages
- iv. Distributive physical inventory across multiple locations
- v. Supply chain network (multiple sourcing, near supply sources and diversity)

**Comparison between VUCA and BANI :** VUCA means – Volatile, Uncertain, Complex and Ambiguous. In the VUCA scenario, predicting demand becomes difficult. In sensing for future is very difficult.

BANI means- Brittleness, Anxiety, Non-linearity and Incompressibility. In the BANI world, prediction for future is possible. The VUCA world has entered into BANI world. Table 5 shows the comparison between VUCA world and BANI world

#### Table 5: VUCA Vs BANI World

#### **VUCA World**

#### BANI World

From 1980s shaped by cold warIndicates the past and predicting the future is difficult.

From 2020 shaped by climate and global systemic change Predicting the future supply chain is possible

**Conclusion :** In recent times, companies are aiming to create resilience supply chains rather than sustainable supply chains. COVID-19 pandemics have taught us many lessons like work from home, new normal, virtual meetings, sourcing from the neighboring countries rather than sourcing from low cost countries. In this paper, the building blocks of resilient supply chains, parameters of resilient supply chains and creating resilient supply chains are discussed. VUCA world versus BANI world characteristics were also discussed.

According to the report of Hackett Group, 84 percent organizations believe that digital transformation will fundamentally change the way their products/ services are delivered.....Yet only 32 percent have developed a strategy for getting there...

Creating resilient supply chain through digital transformation is a strategy coupled with process. Every company should work in that direction to overcome the digital gap and leverage the benefits of digital transformation.

**Acknowledgement :** The inputs and material taken from various sources are greatly acknowledged.

#### References

- 1. Chandra Shekar Singh (2019). Performance indicators for supply chain resilience: review and conceptual framework. Journal of Industrial Engineering International, Vol.15, pp-105-117.
- 2. Jenis Sheth (2018). Supply Chain Tower published by Supply Chain Game Changer.
- Krishan K Batra (2022). Building Resilient Supply Chains through Digital Transformation. Webinar organized by ISM-India and held on October 29, 2022.
- Sengottuvelu (2021). Text book titled 'Rural Supply Chain Management (RM2)' ISBN :978-93-93357-24-3, published by Mahatma Gandhi National Council for Rural Education (MGNCRE), Department of Higher Education, Ministry of Education, Government of India, Hyderabad.
- Sengottuvelu C (2021). Transformation of Supply Chains through Digitization. Materials Management Review (ISSN: 2320-0758), Vol. 18, Issue.2, December 2021 pp-26-28.
- 6. The Hackett Group Report, 2022.

...

# **OBITUARY**



# SHRI BENJAMIN (BENNY) JAMES BOODLE

IIMM fraternity is saddened by the sudden demise of Shri Benjamin (Benny) James Boodle, Former Chairman, National Councillor IIMM-PUNE BRANCH and DISTINGUISHED MEMBER of IIMM on 8 the November 2022. He was Chairman of the Western India Region of YMCAs in India. He was President of the Pune YMCA. He wasPresident of All India Dr.Ambedkar Hockey Tournaments. He was Secretary of the Maharashtra Hockey Association. He wasVice Chairman of the YMCAs Maharashtra English School. He was Hon. Secretary of the Maharashtra Hockey Association, He last served as the Treasurer of the Pune YMCA

He was an accomplished Mouth Organ player and playing of Mouth Organ was a very noteworthy feature of many meetings attended by him. He was National Hockey Players representing the State of Maharashtra as Captain of All India University Hockey team. He was selected as an International Hockey Judge for the Sultan Azlan Shah Cup South Korea.

IIMM fraternity prays for the departed soul to rest in peace and prays the Almighty to give strength to his family and IIMM to bear the great irreparable loss.

Om Shanti Shanti



## GREEN INFRASTRUCTURE FOR SUSTAINABLE FUTURE OF INDIA SN PANIGRAHI, PMP<sup>®</sup>, ATP (PMI - USA), FIE, C.ENG ST & INTERNATIONAL BUSINESS & PROJECTS CONSULTANT,

GST & INTERNATIONAL BUSINESS & PROJECTS CONSULTANT, CORPORATE TRAINER, MENTOR & AUTHOR, NC MEMBER, IIMM snpanigrahi1963@gmail.com

**Introduction :** Infrastructure refers to a variety of **Physical Structures, basic Systems and Services, Institutional Support** such as Transport - Roads, Railways, Bridges, Tunnels, Sea Ports, Air Ports, Dams, Water Supply, Sewers, Sanitary Systems, Irrigation, Power & Energy Supplies, Telecommunications (including Internet connectivity and broadband access), Healthcare Systems & Hospitals, Education System & Schools, Realty & Housing, Monetary System including Banks, Insurance and other Financial Institutions, IT Infrastructure and other Support Systems etc required for **Development of Economic, Social, Business, Regional or National Development** in order to **Operate & Work Effectively and Improve Economic Development, Prosperity and Standards of Living**.

Infrastructure has been the epicenter of developmental initiatives which seamlessly & efficiently move goods & people across various modes of transport, enhances Ability to Work, Support the Linkage in Production, enhances Productivity & Reduces Cost Production, Usher in Industrial Development, Improves the Competitive Advantage, Facilitates Economic Activities, Induces Investments, Attracts Foreign Direct Investments (FDI), Boosts Tourism, Generates Large Scale Employment Generation, Benefits Local Community & their Wellbeing.

Large-scale infrastructure is usually Developed by the Public Sector and Funded by Tax Revenue. Private Sector also involves in Infrastructure Development mostly through Profit making Business Model or Revenue Sharing basis or through Public – Private – Participation (PPP) Model.

**Infrastructure Spending triggers Multiplier Effects to the Economy.** Studies by the Reserve Bank of India and the National Institute of Public Finance and Policy have estimated the multiplier to be between 2.5-3.5x. This means, for every rupee spent by the government in creating infrastructure, GDP gains worth Rs. 2.5-3.5 accrue.

In this article let's discuss on **Green Infrastructure for Sustainable Future of India.** The discussion mainly focusses on Green Initiatives in Developing Infrastructure from Logistics point of view. We shall discuss Major Initiatives taken by Government of India in Developing Infrastructure keeping in mind environmental concerns and commitments.

**Key Words**: Green Infrastructure, Sustainability, PM Gati Shakti– National Master Plan, National Logistic Policy,Net Zero Carbon Emissions, Climate Change

**Logistics : Logistics** is a Subset of Supply Chain involved in Flow of Goods, their Storage & Movement & the Related Service Functions across the Supply Chain.

Logistics Management : Logistics Management\* refers to the IntegratedProcess of Planning, Designing, Coordinating, Monitoring, Executing, Optimizing and Managing of all logistics activities like Order Processing, Acquiring Resources & Services, Inventory Management, Materials Planning, Warehousing & Storing, Material Handling, Network Design, Inbound & Outbound Routing & Transportation, Fleet Management, Production & Operations Planning, Packaging and other Associated Functions, Activities & Documentations to provide Timely, Cost-Effectively and Efficiently Customer Services from the Point of Origin to the Point of Consumption by Adoption & Integration of Relevant Activities, Systems, Technologies and Communications in order to meet Customers' Requirements. (\*As Defined by the Author SN Panigrahi, in his Article "LOGISTICS 10 R's MODEL" Published in May'2022 issue of MMR).

Logistics Management also involves in identifying prospective Distributors, Suppliers and other Service Providers and Engaging them in Transactions and Tracking of Storage Goods and their Movements, Determining their Efficiency, Effectiveness and Accessibility.



India Ranking in the Logistics Performance Index (LPI)

Logistics has remained one of the Achilles' heels for infrastructure development and supply chain management. India Ranks 44th in the Logistics Performance Index (LPI) 2018 released by World Bank, and the cost of logistics is around 14 percent of GDP, which is significantly higher than developed countries like Germany and the US, which are at 8 percent and 9.5 percent respectively.

Logistics Performance Index (LPI) is **based on** Parameters like Customs, Infrastructure, International Shipments, Logistics Competence, Tracking & Tracing, Time Lines.

Logistic Problems in India : Poor Infrastructure & Connectivity: Logistics infrastructure, covering the Road, Rail, Waterways and Air network of a country, is the backbone on which the nation marches ahead. A lack of logistics infrastructure is one of the main reasons for High Cost of Transportation & Low Competitiveness.

Lack of an end-to-end seamless, multi-modal transportation network.

Growing Demand but High Cost : In financial year 2021, the size of the Indian logistics market was around 250 billion U.S. dollar.

It was estimated that this **market would grow to 380 billion dollars in 2025**, at a compound annual growth rate between 10 to 12 percent. **India has a higher logistics cost as a percentage of GDP at 14 percent**, compared to the BRICS average of 11 percent.

**Over Dependance on Road Transport.** Nearly 64 per cent of freight is currently transported by Road, with the next largest share going to Rail (27 per cent); Coastal Shipping (5 per cent) and Inland waterways (2 per cent).Road transport also acts as a feeder service to railway, shipping and air traffic.

In contrast, the global average for roads and railways is 25 and 60 percent, respectively. **Transporting Goods by Rail Costs 45% less (on a per tonne, per km basis) compared to Road.** Road Transport is Vulnerable to Oil Prices. The Indian transport sector is responsible for 13.5 per cent of India's energy-related CO2 emissions, with road transport accounting for 90 per cent of the sector's total final energy consumption followed by rail and domestic aviation (both at 4 per cent) (IEA, 2020). **Indian Railways Freight Traffic CO2 emissions 0.00996** kg CO2/Ton-Km compared to Road Transport Emits 0.04 kg CO2/Ton-Km (almost 4 times higher).

Furthermore, while many economic zones, industrial parks, logistics hubs and ports were planned, they often suffered owing to **inefficient multi-modal connectivity**, and also due to their **small size**.

The Fragmented Nature of Decision Making, with each Department working in Silos meant that Poor Coordination, Not Taking Timely Actions, Delays in Implementation of Programs & Projects - a disjointed Industrial & Logistic Network was created.

A lack of scale in manufacturing and an inefficient logistics network hampered our global competitiveness.

#### Need for National Master Plan for Multi Modal Connectivity

India's infrastructure growth was hampered by interministerial delays, approval delays and communication gaps between various stakeholders. This often led to slow decision-making, time and cost overruns, and thus, a lacklustre pace for infrastructure-led growth. To address the wide gap between macro planning and micro implementation due to the lack of coordination and advanced information sharing as departments think and work in silos, therefore, need raised for National Master Plan for Multi Modal connectivity to various Economic Zones.

Instead of planning & designing separately in silos, the projects need be designed and executed with a common vision and in a holistic manner.

Another push for such a scheme was the lack of demand in the post-Covid-19 scenario, which in turn led to a lack of private demand and investment demand. Due to land acquisition delays and litigation issues, the rate of implementation of projects is very slow on global standards- issues that the scheme will address.

# Fast Growing Urban Population – Need to Develop Urban Infrastructure

A new World Bank report estimates that India will need to invest \$840 billion over the next 15 years on urban infrastructure.

This means that the country will have to invest an average of \$55 billion per annum if it is to effectively meet the needs of its fast-growing urban population.

# PM Gati Shakti– National Master Plan for Multi Modal connectivity to various Economic Zones

Achieving an Efficient, Seamless Multi-modal Transport Network requires independent government departments to work in close coordination and collaboration, guided by an overarching master plan.

The Gati Shakti Plan consolidates infrastructure projects in specific corridors, and will help various ministries plan projects together without getting hampered by the specific / time-consuming approval processes, and the pan will be game-changer in the space of infrastructure development.

PM GatiShakti National Master Plan (PMGS-NMP) was launched on 13th October 2021 for providing multimodal connectivity infrastructure to various economic zones. Cabinet Committee on Economic Affairs (CCEA) accorded approval for the implementation of PM GatiShakti National Master Plan on 21st October 2021. The GatiShakti program marks a paradigm shift in decision making to break the silos of departmentalism. In the proposed Plan, all the existing and proposed economic zones have been mapped along with the multimodal connectivity infrastructure in a single platform.

Individual projects of different line Ministries would be examined and sanctioned in future within the parameters of the overall Plan, leading to synchronization of efforts. GatiShakti will bring synergy to create a world class, seamless multi-modal transport network in India.

It will increase economic activities and create employment on a large scale due to the creation of quality infrastructure for sustainable development.

The scheme is in synergy with the **National Monetisation Pipeline (NMP)** which was announced to provide a clear framework for monetization and give potential investors a ready list of assets to generate investor interest.

A holistic and integrated transport connectivity strategy will greatly support "**Make in India**" and integrate different modes of transport.

# PM GatiShakti is a Transformative Approach Driven by 7 Engines:

PM GatiShakti is a transformative approach for economic growth and sustainable development. The approach is driven by 7 engines, namely:

- 1. Railways
- 2. Roads
- 3. Ports
- 4. Waterways
- 5. Airports
- 6. Mass Transport
- 7. Logistics Infrastructure



SN Panigrahi; EssAnnPee Business Solutions, India

All 7 engines will pull forward the economy in unison. These engines are supported by the complementary roles of Energy Transmission, IT Communication, Bulk Water & Sewerage, and Social Infrastructure. The approach is powered by Clean Energy and Sabka Prayas – the efforts of the Central Government, the state governments, and the private sector together – leading to huge job and entrepreneurial opportunities for all, especially the youth.

Vision of PM Gati Shakti : PM Gati shakti is a digital platform that will bring 16 Infrastructure Related Ministries including railways and roadways together for integrated planning and coordinated implementation of infrastructure connectivity projects. This will help in removing long-standing issues such as disjointed planning, lack of standardization, problems with clearances, and timely creation and utilization of infrastructure capacities.

- Ø PM Gati Shakti will incorporate the infrastructure schemes of various Ministries and State Governments like Bharatmala, Sagarmala, Inland Waterways, Dry/ Land Ports, Udan etc. Economic Zones like textile clusters, pharmaceutical clusters, defense corridors, electronic parks, industrial corridors, fishing clusters, agri zones will be covered to improve connectivity & make Indian businesses more competitive.
- Ø The Gati Shakti scheme will subsume the Rs 110 lakh crore National Infrastructure Pipeline that was launched in 2019.
- Ø It will help different departments to prioritize their projects through **cross-sectoral interactions**.
- Ø The Gati shakti platform aims to prevent overlapping of works by addressing the issue of government departments working in tandem.
- Ø By incorporating infrastructure schemes under various ministries and states, the platform aims at boosting last-mile connectivity bringing down logistics costs with integrated planning and reducing implementation overlaps.
- A project monitoring group under the **Department** of Promotion of industry and Internal trade (DPIIT) will monitor the progress of key projects in realtime.
- Ø They will also report any inter-ministerial issues to a group of ministries, who will then aim to resolve these.

#### Six pillars of PM Gati Shakti:

- Comprehensiveness: It will include all the existing and planned initiatives of various Ministries and Departments with one centralized portal. Every Department will now have visibility of each other's activities providing critical data while planning & comprehensively executing projects.
- Ø **Prioritization**: Through this, different Departments will be able to prioritize their projects through cross-sectoral interactions.

- **Optimization:** The National Master Plan will assist Ø different ministries in planning for projects after the identification of critical gaps. For the transportation of the goods from one place to another, the plan will help in selecting the most optimum route in terms of time and cost.
- Ø Synchronization: Individual Ministries and Departments often work in silos. There is a lack of coordination in the planning and implementation of the project resulting in delays. It will help in synchronizing the activities of each department, as well as of different layers of governance, holistically by ensuring coordination of work between them.
- Ø Analytical: The plan will provide the entire data at one place with GIS-based spatial planning and analytical tools having 200+ layers, enabling better visibility to the executing agency.
- Ø **Dynamic:** All Ministries and Departments will now be able to visualize, review and monitor the progress of cross-sectoral projects, through the GIS platform, as the satellite imagery will give onground progress periodically and the progress of the projects will be updated regularly on the portal. It will help in identifying the vital interventions for enhancing and updating the master plan.



SN Panigrahi; EssAnnPee Business Solutions, India

Leveraging Technology Extensively : It will also leverage technology extensively. The National Master Plan will employ modern technology and the latest IT tools for coordinated planning of infrastructure. A GISbased Enterprise Resource Planning system with 200+ layers for evidence-based decision-making is one example. Satellite imagery for monitoring - including spatial planning tools with ISRO (Indian Space Research Organisation) imagery developed by BiSAG-N (Bhaskaracharya National Institute for Space Applications and Geoinformatics).

Digitization will play a big role in ensuring timely clearances and flagging potential issues, and in project monitoring as well. It will also allow various government departments to track, in real-time and at one centralized place, the progress of various projects.

#### Targets under the PM Gati shakti Scheme:

Mentioned below are the various targets that will be achieved under the Gati Shakti scheme:

- Ø Cutting Logistics Costs - aiming to trim India's elevated logistics costs by as much as five percentage points by 2030 ie 8-9 per cent from the current 13-14 per cent
- Ø Roadways capacity to be increased with the national highway network to touch the 2 lakh-km mark.
- Ø Aviation will receive a massive boost, with around 200 new airports, heliports and water aerodromes envisioned in the plan.
- Ø Capacity of railways transport cargo to be increased to around 1,600 tonne by FY25
- Ø Aimed at increasing cargo handling capacity and reducing the turnaround time at ports to boost trade.Increase in the total cargo handled at Indian ports to 1759 MTPA
- Ø Ease in the electricity access with the transmission network to be increased to 454,200 circuit km
- Ø Renewable capacity to be increased to 225 GW by FY25.
- Ø Around 17,000 kms of gas pipelines
- Ø 4G connectivity for the villages
- Ø 11 industrial corridors and 2 new defence corridors (Tamil Nadu and Uttar Pradesh), achieving a 1.7 lakh crore turnover in defence production.
- Ø 20 new mega Food Parks
- Ø 202 fishing clusters/harbours/landing centres
- Ø 109 pharma clusters
- Ø Around 38 electronics manufacturing clusters

National Logistics Policy : The policy is basically complementary to PM Gati Shakti National Master **Plan.**To boost the ease of doing business and enhance the liveability quotient, Prime Minister Narendra Modi launched the National Logistics Policy (NLP) on 17th September 2022 in Vigyan Bhawan, New Delhi.

The newly unveiled National Logistics Policy aims to minimize costs and uproot inefficiencies which plague the sector. Currently, the cost of logistics in the economy is estimated to be 14% of the GDP compared to the global average of 8%. This creates a \$180 billion competitiveness gap for India

National Logistics Policy - Vision : To develop a technologically enabled, integrated, cost-efficient, resilient, sustainable and trusted logistics ecosystem

in the country for accelerated and inclusive growth.

Key Objective of National Logistics Policy : The Policy intended to increase the competitiveness of Indian products in both the Indian home market and the international market. Moreover, the reduced cost will also increase efficiency efforts cutting across all sectors of the economy, which encourages value addition and enterprise.

It is estimated that the size of the Indian logistics market would grow from \$ 250 billion in 2021 to \$380 billionby 2025, at a compound annual growth rate between 10 to 12 percent. By these estimates, the logistics sector would grow to \$3 -3.5 trillion by 2047 when India celebrates 100 years of Independence.

The key objective of the National Logistics Policy is the Integration, Standardization, Modernization, Optimization, Formalization, and Democratization of the logistics sector.



It targets to reduce the cost of logistics to the global benchmark (less than 10 percent ) by 2030, break into the Top 25 Rank in Logistics Performance Index (LPI) and create a data-driven approach for the sector. India scored less in all the 6 parameters of Logistics Performance Index, which are— Customs, Infrastructure, International Shipments, Logistics Competence, Tracking & tracing and Timeliness.



Reducing time and money in transport will translate into improved competitiveness of Indian goods and services, increasing exports and accelerating growth. Efficient logistics acts as a growth driver for a rising economy like India.

#### Strategies for Achieving the Targets



SN Panigrahi; EssAnnPee Business Solutions, India

#### How National Logistics Plan Implemented?

The Policy will be implemented through a Comprehensive Logistics Action Plan (CLAP)

1. Integrated Digital Logistics Systems: Develop a system of unified logistics interface to link multiple data sources and develop cross-sectoral use cases for logistics stakeholders.

2. Standardization of physical assets & benchmarking of service quality standards: Enhanceinteroperability, minimize handling risks, undertake process optimization, and improve ease of doing business, through standardization of physical assets and benchmarking of service quality standards in logistics including transportation infrastructure (fixed and rolling), terminal handling, warehousing, temperaturecontrolled logistics, packaging, etc.

3. Logistics Human Resources Development and Capacity Building: Develop an overarching logistics human resource strategy and under its guiding principles, line ministries to develop action plans to address skill development-related and internal capacity building challenges in the respective sector.

4. **State Engagement:** Provide support for the development of state/city level logistics plans, set up an institutional framework to take action at the city/ state level, measure and monitor action by states and rank them.

5. **EXIM (Export-Import) Logistics**: Addressing infrastructure and procedural gaps in India's EXIMconnectivity and creating an efficient and reliable logistics network, with transparent and streamlined cross-border trade facilitation, for improved trade competitiveness and greater integration of India with regional and global value chains.

6. **Service Improvement framework**: Improving regulatory interface to enable seamlessness between sectors, promote standardization, formalization, and inter-operability; eliminate fragmentation in documentation, formats, processes, and liability regimes; reduce gaps in regulatory architecture.

7. Sectoral Plan for Efficient Logistics: Sectoral Plans for Efficient Logistics (SPEL) aligned with PMGatiShakti, will be developed for each sector with underlying philosophies of inter-operability, resiliency, sustainability, and innovation. Specifically, SPEL would (i) address logistics issues aboutinfrastructure, processes, digital improvements, policies, regulatory reforms, and capacity building for a better workforce, and ii) prioritize cross-sectoral cooperation to complement and not duplicate efforts and focus on optimization of a modal mix.

8. Facilitation of Development of Logistic Parks: Logistic Parks (eg : Multi Model Logistics Parks, Air Freight Stations, Inland Container Depots, Container Freight Stations, Cargo Terminals, etc.) are hubs for Intermediary activities (Storage, Handling, Value Addition, Inter-Modal Transfers etc.) in the Supply Chain Connected by a Transportation Network. It is envisaged to take following steps to facilitate development of logistics parks:

- Draft Framework Guidelines to Facilitate Development of Logistics Parks in the Country with Focus on Encouraging private investment.
- Create a Network of Logistics Parks by mapping them on the PM Gati Sakti NMP, for enhanced visibility, improved logistics efficiency, optimum utilisation and connectivity.



SN Panigrahi; EssAnnPee Business Solutions, India

Facilitation of Development of Logistics Parks: Logistics parks (eg. Multi Modal Logistics Parks, Air Freight Stations, Inland Container Depots, Container Freight Stations, cargo terminals, etc.) are hubs for intermediary activities (storage, handling, value addition, inter-modal transfers, etc.) in the supply chain connected by a transportation network.

India – Green Commitment : The focus of green growth is to help achieve the India's long term goal of Net Zero Carbon Emissions target by 2070 as Committed by India at the 26th UN Climate Change Conference.

Earlier, India submitted its Intended Nationally Determined Contribution (NDC) to United Nations Framework Convention on Climate Change (UNFCCC) on October 2, 2015. The 2015 NDC comprised Eight Goals; three of these have quantitative targets upto 2030 namely, cumulative electric power installed capacity from non-fossil sources to reach 40%; reduce the emissions intensity of GDP by 33 to 35 percent compared to 2005 levels and creation of additional carbon sink of 2.5 to 3 billion tonnes of CO2 equivalent through additional forest and tree cover.

As per the updated NDC, India now stands committed to reduce Emissions Intensity of its GDP by 45 percent by 2030, from 2005level and achieve about 50 percent cumulative electric power installed capacity from nonfossil fuel-based energy resources by 2030. The new Commitments takes forward the Hon'ble Prime Minister's vision of sustainable lifestyles and climate justice to protect the poor and vulnerable from adverse impacts of climate change.

In the 2015 Paris Agreement, countries agreed to hold "the increase in the global average temperature to well below 2 degrees Celsius and to pursue efforts to limit the temperature increase to 1.5 degree Celsius. Global carbon emissions in 2022 remain at record levels with no signs of reduction and if the current levels persist, there is now a 50% chance that global warming of 1.5°C will be exceeded in nine years.

# India is the third-largest emitter of greenhouse gases (GHG), with about 2.35 giga-tonnes of carbon emissions in 2021.

India of course contributed only around 4 per cent of global cumulative emissions from 1850 to 2019, despite being home to around one-sixth of humanity. Our per capita emissions are 1.96 tonnes which is less than one-third of the world's per capita GHG (greenhouse gas) emissions and our annual emissions in 2016 are only about 5 per cent of the global emissions.



SN Panigrahi; EssAnnPee Business Solutions, India

#### Climate Change – Damage to Economy

India is one of the worst affected countries by climate change and thus, needs to make giant moves towards achieving a green and decarbonised economy. A Stanford University Study published in Proceedings of the National Academy of Sciences highlights that India's economy is already 31% smaller than it would have been without climate change.Climate Change has been proven to have Reduced Crop Yields and

# caused about US\$ 9-10 billion in Damage per year to the industry.

For a country aiming for a \$5 trillion economy, it will be prudent to inextricably link its policy and investment with dimensions of sustainable development – Social, Economic, and Environmentalto achieve the needed climate proofing of economy. The Green Economy provides a macro-economic approach to sustainable economic growth with a central focus on investments, employment and skills.

# The Initiative on Green Infrastructure, Growth and Development in India

Union Budget 2022-23 referred to the **energy transition and climate action upfront as one of the key focus areas**, and low-carbon development as an economic opportunity rather than a trade-off, for the very first time.

#### Transport Sector Green House Emissions

Freight and the transportation industry have had a major impact on greenhouse gas emissions.

- In 2018, the transportation sector in India consumed about 70 per cent of diesel and 99.6 per cent of petrol in the country.
- India's demand for petroleum products like petrol and diesel will grow by 7.73 per cent in 2022, the fastest pace in the world.
- India's transportation sector contributes about 10 per cent of total national greenhouse gas (GHG) emissions and road transportation contributes about 87 per cent of the total emissions in the sector.
- Energy consumption by passenger vehicles increases by 3.7 to 5.5 per cent per year; energy consumption for freight transport increases by 4.6 to 7.2 per cent per year.
- Emissions from cars represent an increasing share of transportation-related PM2.5 emissions in all the models, representing about one-third of additional PM2.5 emissions in 2050.
- CO2 emissions from the transportation sector will continue to grow by 4.1 to 6.1 per cent per year, leading to an increase by seven times in 2050 relative to 2010.
- A fast increase in energy demand from road transport will further exacerbate India's dependency on imported oil.
- Under the reference scenario, PM2.5 emissions are projected to grow by 2.6 times by 2050. This would exacerbate the severe air-quality problems and create challenges in meeting long-term climate-mitigation goals.

#### Green Development – Focus on Logistics Infrastructure:

Green logistics is the process of reducing the environmental impact of delivery and logistics processes. For all and any stage of logistics operations, the process of going greener is most easily achieved through digitizing processes. **Digitization can be used** to eliminate the paper trail, and reduce energy consumption through alternative fuels and increased efficiencies.

The government has taken initiatives to ensure smooth logistics while promoting the usage of cleaner fuels. The Gati Shakti National Master Plan (NMP) along with National Logistic Policy are initiations in the right direction, will catalyze the benefits of the Logistic Sector, especially in achieving Green Logistics Goals.

PM Narendra Modi launched the Gati Shakti NMP in October 2021 with the aim to Boost Logistic Efficiencies, Reduce Logistics Costs, Develop Infrastructure, improve overall Logistics Performance and Reduce Carbon Footprint.

The Gati Shakti NMP is a transformative economic and sustainable growth approach. This national master plan **lays the foundation of the overall infrastructure in the country and provides an integrated and holistic path to the economy**. The aim is to break departmental silos and bring in more holistic and integrated planning and execution of projects with a view to address the issues of multi-modal and last-mile connectivities.

The **100 lakh crore** mega plan was launched with a digital platform to bring 16 ministries together for integrated planning and ensure faster implementation of Development Projects through Adoption of LatestTechnology, Resulting in a Quicker, Smoother, and more Efficient Delivery. Infrastructure development is a critical enabler to achieve a \$20 trillion economy by 2040.

The government is creating a single-window logistic platform by integrating 24 departments and six ministries into its Unified Logistics Interface Platform (ULIP). It will provide real-time visibility to fill the gap in the movement of goods, reduce costs and enhance the ease of doing business.

The Gati Shakti aims to create roads linked to railway lines that will further feed into major and minor ports, leading to the efficient movement of goods, especially from the frontiers. While integrating all the multimodal connectivity projects, the NMP will optimise the efficiency of the movement of goods and people. More focus on **Developing Rail Freight Infrastructure which is more Efficient and Emits Less Green House Gases**.Transporting goods by Rail Costs 45% less (on a per tonne, per km basis) compared to road. In 2018, an average freight train emitted around 18 grams of carbon dioxide per tonne-kilometer. The emissions of an average truck were much higher: 112 grams of CO2

#### per kilometer.

The Ministry of Road Transport and Highways (MoRTH) and Shipping plan to connect all state capitals in the northeast by expanding the national highway (NH) network to to 2 lakh km by 2025. It will reduce the turnaround time and enhance efficiency in the supply chain.

PM Gati Shakti focus on Generation of Renewable Energy Sources. India ranks 3rd in renewable energy country attractive index in 2021 and 3rd largest energy consuming country in the world.

The country has set an ambitious target to achieve a capacity of 175 GW worth of renewable energy by the end of 2022, which expands to 500 GW by 2030. This is the world's largest expansion plan is in renewable energy.

India's target is to produce 5 MT of green hydrogen by 2030. Green Hydrogen target is set at India's electrolyzer manufacturing capacity is projected to reach 8 GW per year by 2025.

The government is constantly trying to promote natural gas as a long-haul transportation fuel. It is expected to become a more reliable choice due to its lower storage costs and lesser emissions.

The CNG dispensing stations might grow at a 17% CAGR, and the government plans to set up 1,000 LNG stations across India in the next three years.Green logistics can enhance operations across the logistics sector significantly, saving cost and time, tracking, reliability, transport infrastructure, and transparency while attracting logistics infrastructure investments for green and resilient multimodal connectivity.

Through these such measures, Green Infrastructure for Sustainable Future of Indiais Ensured.

#### References:

- E book on Launch of National Logistics Policy; The Department for Promotion of Industry and Internal Trade (DPIIT)
- Fast Tracking Freight in India NITI Ayog & RMI India
- PM Gati Sakti The Department for Promotion of Industry and Internal Trade (DPIIT) -https:// dpiit.gov.in/logistics-division#pmgsnmp
- Cabinet approves India's Updated Nationally Determined Contribution to be communicated to the United Nations Framework Convention on Climate Change - PIB https://pib.gov.in/ PressReleaselframePage.aspx?PRID=1847812

•••



# INDUSTRY 4.0: SMARTINFRASTRUCTURE FOR A SUSTAINABLE GROWTH.

#### **DR.KAVITHA VENKATACHARI**

## HOD-BUSINESS ANALYTICS, UNIVERSAL BUSINESS SCHOOL, KARJAT kavitha.venkatachari@ubs.org.in

ntroduction: From traffic lights and parking to environmental sensors and waste management, IoT helps urban areas operate more smoothly, sustainably and efficiently, which enhances the quality of life for residents and saves money in the process. As is the case any time large amounts of personal and public data fly back and forth, there are security concerns, but they seem to have had little impact on growth. According to one report, cities are expected to invest about \$41 trillion through 2035 "to upgrade their infrastructure to benefit from the IoT." The cost savings of doing so could be huge, as well. Cities all over the world are getting smarter. And this smart city technology has everything to do with the everburgeoning Internet-of-Things — the vast network on which numerous linked devices share data that's analysed and then acted upon to optimize conditions in a variety of sectors.

Smart Infrastructure: A smart infrastructure is a smart system that uses a data feedback loop to improve decision-making regarding a matter. A system that can monitor, measure, analyse, communicate and act based on data collected by sensors." Smart infrastructures are based not only on their physical structure (cabling, sensors, etc.) Smart infrastructure provides the inspiration for all of the key themes associated with a smart city, as well as good quality, good economy, good living, good governance, and good atmosphere. The core characteristic that underlies most of those elements is that they are connected, which they generate knowledge, which can be used showing intelligence to make sure the optimum use of resources and improve performance. It introduces some key elements of smart city infrastructure, which conclude by highlighting the requirement for an integrated approach in handling such infrastructure.



Image1: Data integration of smart infrastructures.

Source: Smart Infrastructure - an overview | ScienceDirect Topics

# Common problems associated with building infrastructure:

- Scale and time
- Capacity planning
- Balanced growth
- Regulatory uncertainty
- Ecological issues
- Paucity of funds

Every country's economy relies on communicationsenabled infrastructure and manufacturing for its fundamental operations as a society. The Internet of Things drives how we work, play, and live. From smart manufacturing systems to smart grid, intelligent vehicles, thriving communities, smart homes, and smart workplaces – society relies on connected systems.

**Components of a Smart city:** The smart city has a collection of smart components. These components help to solve the problems in an intelligent way, and also provide facilities to its users to build a smart society. It shows how the components are interrelated, and the impact of data and communications in building the smart city. Following are the smart components:

- Smart Infrastructure: This includes the use of sensors and smart grid technologies to facilitate smart infrastructure, such as water and energy networks, streets, buildings, and so forth.
- ✓ Smart Transportation (or Smart Mobility): This includes transportation networks with improved, embedded real time monitoring and control systems.
- Smart Environment: This component provides a smart innovation and ICT to incorporate natural resource protection and supervision, such as a

**IIMM** Materials Management Review

waste product management system, sensor-based pollution control, and so on.

- ✓ Smart Services: Smart services utilize the technology and ICT for health, education, tourism, safety, and so forth.
- Smart Governance: This component introduces smart government in the urban space, associated with technology for service delivery and resource utilization with respect to government policy.
- Smart People: This component deals with creativity and innovation introduced by individuals in the society.
- ✓ Smart Living: This refers to the advancements that improve lifestyles and quality of life in the urban area.
- ✓ Smart Economy: This is the technology and innovation that escalate business growth, employment, and urban growth.

A big part of this ICT framework is an intelligent network of connected objects and machines (also known as a digital city) transmitting data using wireless technology and the cloud. Cloud-based IoT applications receive, analyse, and manage data in real-time to help municipalities, enterprises, and citizens make better decisions that improve quality of life. Citizens engage with smart city ecosystems in various ways using smartphones and mobile devices and connected cars and homes. Pairing devices and data with a city's physical infrastructure and services can cut costs and improve sustainability. Communities can improve energy distribution, streamline trash collection, decrease traffic congestion, and improve air quality with help from the IoT.



For instance,

 Connected traffic lights receive data from sensors and cars adjusting light cadence and timing to respond to real-time traffic, reducing road congestion.

- Connected cars can communicate with parking meters and electric vehicle (EV)charging docks and direct drivers to the nearest available spot.
- Smart garbage cans automatically send data to waste management companies and schedule pickup as needed versus a pre-planned schedule.
- And citizens' smartphone becomes their mobile driver's license and ID card with digital credentials, which speeds and simplifies access to the city and local government services.

Together, these smart city technologies are optimizing infrastructure, mobility, public services, and utilities.



- Efficient service provision: optimizing the use of public funds and providing excellent quality of life.
- Sustainability: helping the city grow and develop while taking environmental impact into account.
- Mobility: ensuring that city residents and visitors can move freely within the city.
- Safety and security: improving public safety and the perception of security, both daily and during specific events, as well as being prepared for potential emergencies and/or disasters.
- Economic growth: attracting companies, investors, new residents and visitors.
- City reputation: continuously improving the city's image and reputation.

#### Smart grids:

A smart grid is an electricity network/grid enabling a two-way flow of electricity and data whereby smart metering is often seen as a first step. Smart grids – as a concept – became known over a decade ago and are essential in the digital transformation of the electricity sector. An introduction with definitions, trends and essential characteristics of smart grids. A smart grid is an electricity network enabling a two -way flow of electricity and data with digital communications technology enabling to detect, react and pro-act to changes in usage and multiple issues. Smart grids have self-healing capabilities and enable electricity customers to become active participants. Big data analytics and IoT technologies are important technology drivers in smart grids whereby analytics shift to the edge, as in edge computing. Smart grids leverage more technologies but aren't just about IT nor even technologies. A smart grid serves several purposes and the movement from traditional electric grids to smart grids is driven by multiple factors.



Image: Smart grid infrastructure with communication networks

Smart solutions: The strategic components of areabased development in the Smart Cities Mission are city improvement (retrofitting), city renewal (redevelopment) and city extension (green-field development) plus a Pan-city initiative in which Smart Solutions are applied covering larger parts of the city. Below are given the descriptions of the three models of Area-based smart city development:

**Retrofitting** will introduce planning in an existing builtup area to achieve smart city objectives, along with other objectives, to make the existing area more efficient and liveable. In retrofitting, an area consisting of more than 500 acres will be identified by the city in consultation with citizens.

**Redevelopment** will affect a replacement of the existing built-up environment and enable co-creation of a new layout with enhanced infrastructure using mixed land use and increased density. Redevelopment envisages an area of more than 50 acres, identified by Urban Local Bodies (ULBs) in consultation with citizens.

**Greenfield** development will introduce most of the Smart Solutions in a previously vacant area (more than 250 acres) using innovative planning, plan financing and plan implementation tools (e.g. land pooling/ land reconstitution) with provision for affordable housing, especially for the poor. Greenfield developments are required around cities in order to address the needs of the expanding population.

Accordingly, the purpose of the Smart Cities Mission is to drive economic growth and improve the quality of life of people by enabling local area development and harnessing technology, especially technology that leads to Smart outcomes. Area-based development will transform existing areas (retrofit and redevelop), including slums, into better planned ones, thereby improving liveability of the whole City. New areas (Greenfield) will be developed around cities.

#### **Conclusion:**

Smart city technology uses IoT's hyper-connectivity to make cities safer, greener and more efficient. IoT devices are being deployed throughout cities to measure and monitor everything from air quality to traffic and crime patterns. There has never been a more urgent need to create resilient and sustainable infrastructure. With smart infrastructure, we are shaping an ecosystem that connects the real world with the digital world. Making decisions based on data and analytics empowers our customers to make their energy systems and processes in buildings and industries more efficient and sustainable. Together with our customers, we transform the everyday. For a better tomorrow.

#### **References:**

https://www.apac-comms.axis.com/

Smart City Technology: 12 Top IoT Smart City Companies | Built In

Smart grid infrastructure with communication networks. | Download Scientific Diagram (researchgate.net)

SMART GRID INFRASTRUCTURE in INDIA TO WITNESS HIGH GROWTH | Electrical India Magazine

#### (Footnotes)

<sup>1</sup> HOD- Business Analytics, Universal Business School, near Mumbai, Karjat.

•••

# FUTURE-PROOFING THE SUPPLY CHAIN IN 2022

Supply chains continue to be affected by global events. Find out how to navigate through these supply chain vulnerabilities.

While much of the world is rebounding from the COVID-19 crisis' economic downturn, global supply chains are facing continuing pressures from changes in consumption patterns, surging demand for goods, shortages of workers, and preexisting political pressures.

The global hard-stop triggered by COVID-19 and its associated restrictions proved a difficult operating environment for the corporate sector and the global restart has not been without its challenges. Clearly, the direction of travel has been positive, with vaccines easing health risks and a barrage of fiscal and monetary policy helping companies avoid drastic labor cuts, providing supportive financing conditions, and boosting revenues.

When it comes to future-proofing supply chains in 2022 organizations are facing numerous challenges. For example, the ability of a supply chain to continue to delivery even when under stress, or its resilience, is becoming increasingly important. There are both internal and external elements to supply chain resilience. Examples of internal factors include financial health of an organization, where it's located in the world, and its different levels of risk and control standards. External factors include events like war, the pandemic and third-party actions, such as cyberattacks expose these internal vulnerabilities.

When Supply Chains are not resilient and failure occurs, clients generally don't care if delays were caused by a supplier. If you are unable to deliver your obligations to a customer, or you don't handle a customer's data in the appropriate way due to a supplier issue, your organization will be held accountable.

# Transparency in an organization's supply chain adds value.

Investor sentiment will react very quickly based on the perceived control an organization has on its supply chain. For example, talking in a positive way about sustainability and how they're investing to increase diversity in their supply chains, can increase value. On the reverse, when a story breaks about a supply chain breach or a failure to deliver on client commitments, it can result in a significant reduction in the value of an organization.

# Where to invest now to help maintain a competitive advantage.

Investment is critical. Standing still in this space isn't an option. There are four key focus areas where companies should be investing:

- **1. Talent.** Having the right people is crucial. This is a complex space and you need experts.
- 2. Technology. The days of being able to manage supply chains on spreadsheets and paper are long gone. You need a purpose-built dedicated technology solution.

- **3. Data.** You need to be able to identify the right data signals and data points that truly help you understand your supply chain.
- 4. Validation and assurance. This includes doing a deep dive into the suppliers that you think are critical and high-risk and making sure that they are living up to their obligations and have the right controls in place

# Where S&P Global's Know Your Third Party (KY3P $^{\circ}$ ) can help.

Third-party solutions and vendor relationships are under increasing scrutiny from regulators, the media, and consumers. As firms increase reliance on third-party vendors to deliver business-critical processes and services, oversight complexity also increases.

At S&P Global we partner with our customers to ensure that they are managing their supply chain risk effectively. We work with our global community of end-users to realize best-in-class third-party risk management programs. Our solutions and services drive efficiency, streamline due diligence, and deliver transparency across their organizations.

KY3P is an integrated suite of solutions to manage end-toend third-party and vendor risk management. Through a combination of robust technology and workflow solutions integrated with our data signals, our in-house experts are on hand to help customers make the right decisions at the right time and continue to monitor supply chain risk for the long term, covering:

- **Onboarding and Oversight:**/standardized onboarding, due diligence, inherent risk calculation, oversight, and off-boarding of third-party products, services, and outsourcing arrangements. This enables the enforcement of compliance by codifying the organizations' vendor risk policies and oversight procedures.
- **Due Diligence and Monitoring:**/helping firms collect and maintain risk information, including cybersecurity and financial ratings, sanctions data, news alerts, cyber event data, and questionnaire responses from third parties that can be used to generate risk scores and drive remediation.
- Shared Assessments:/delivering services and software for third-party risk assessments. We offer standardized, cost-effective on-site, desktop, or express assessments by accredited partners based on market standard criteria delivered through the KY3P platform.

Today, the sheer scale of pandemic-related disruption and altered consumption patterns, along with existing political pressures on supply chains, have created considerable difficulties. Input and freight costs have risen dramatically, shipping volumes have surged and created bottlenecks, and lead times for manufactured goods have worsened.

Source: scmr.com, S&P Global KY3P®

# GROWTH OF INFRASTRUCTURE SECTOR IN INDIA

The infrastructure sector is a key driver of the Indian economy. The Indian government places a strong emphasis on this sector as it is crucial to India's overall growth and helps to ensure that world-class infrastructure is built in the nation on schedule. Power, bridges, dams, highways, and urban infrastructure development are all included in the infrastructure industry. The Indian government is trying to create an intense push through policies to ensure world-class infrastructure in India, making it India's new identity. For example, India is undertaking major infrastructure and industrial projects worth \$ 1.3 trillion approx.

Between April 2000 and December 2021, Foreign Direct Investment (FDI) in the construction development (townships, housing, built-up infrastructure, and construction development projects) and construction (infrastructure) activity sectors totalled \$ 26.17 billion and \$ 26.30 billion, respectively, according to the Department for Promotion of Industry and Internal Trade (DPIIT). Infrastructure-related operations made about 13 per cent of the \$ 81.72 billion total FDI inflows in the financial year (FY) 2021. India's infrastructure is anticipated to expand at a compound annual growth rate (CAGR) of almost 7 per cent during the forecast period.

Highway construction would be done, with 2,500 km of access control highways, 9,000 km of economic corridors, 2,000 km of coastline and land port roads, and 2,000 km of strategic highways among the highways that would be built. The FASTag system promotes greater highways commercialisation, allowing the National Highways Authority of India (NHAI) to raise more funds. Before 2024, it was projected to monetise at least 12 lots of roadway bundles totalling more than 6,000 km. The government has set aside INR 1,963,943 crore in the budget for road infrastructure.

The PM Gati Shakti National Master Plan, which includes implementation, monitoring, and support mechanisms, was approved by the Indian Union Cabinet in October 2021. As a part of this plan, the government launched a geospatial platform like remote sensing to facilitate projects, including telecom networks and gas pipelines in roads and railways. Road and railway infrastructure are the most crucial of all public resources because they promote economic interaction between big cities and the towns they connect. Because of this connectivity, economic activity can expand, helping underdeveloped areas catch up and promote equitable and balanced growth.

The government-sponsored National Investment and Infrastructure Fund (NIIF) received a funding commitment of \$ 100 million from the multilateral Asian Development Bank (ADB) in 2020. India needs foreign investments to rebuild its infrastructure, ports, airports, and motorways, to spur economic growth. Infrastructure is one of the industries that receive the most foreign direct investment (FDI). Between the financial years (FY) 2000 and (FY) 2019, inflows in the verticals of townships, construction development projects, and housing were estimated at \$ 25.5 billion. The "Smart Cities Mission" and "Housing for All" programmes have benefited from these initiatives. Saudi Arabia seeks to spend up to \$ 100 billion in India in energy, petrochemicals, refinery, infrastructure, agriculture, minerals, and mining.

Initiatives: India, the United States (US), Israel, and the United Arab Emirates (UAE) launched a new guadrilateral economic forum in November 2021 to concentrate on regional infrastructure development projects and improve bilateral cooperation. With the introduction of the "Infrastructure for the Resilient Island States" programme in November 2021, India played an important role in improving the lives of other vulnerable nations around the globe regarding climate change. For example, awareness regarding aspects of disaster and climate resilience of infrastructure was shared. It helped to create a mechanism to assist countries in upgrading their capacities and practices in infrastructure development regarding risk and economic conditions. Road building would be accelerated in the financial year (FY) 2022 by government efforts like the National Infrastructure Pipeline, in which around 217 projects under infrastructure ministries were completed. National Monetization Pipeline, BharatmalaPariyojana, and modifications to the Hybrid Annuity Model (HAM) were also started. The National Highway Authority of India (NHAI) also created Guinness World Record by completing the construction of 75km of continuous bituminous concrete road in a single lane in less than five days. The Indian government announced road projects in September 2021 to build Jammu and Kashmir's road infrastructure for \$13.48 billion. The number of national highways in the region also increased, going from 7 in 2014 to 11 in 2021. India will likely have faster infrastructure growth due to the government prioritising infrastructure for overall economic development. Gati Shakti, for example, is an extensive 'productivity" booster programme for the infrastructure industry. This project will aid in removing the significant delays caused by the abundance of approvals and slowly processed clearances. Additionally, given the endless possibilities, engaging private enterprises in national infrastructure projects may aid India in raising its infrastructure to world levels.

The Government of India's primary area of attention is the infrastructure sector. India intends to invest \$ 1.4 trillion in infrastructure between 2019 and 2023 to achieve sustainable national development. Since 2019 many road infrastructures, gas pipeline initiatives and industrial development have taken place. For the period 2018 to 2030, the government has recommended investing \$ 750 billion in railway infrastructure. Despite the hardships nations face in the pandemic, the Indian infrastructure sector has shown remarkable growth, setting up records and helping in the growth of economic activity in India.

This has been co-authored by Bhakti Jain and IshitaDhar. STRATEGIC INVESTMENT RESEARCH UNIT (SIRU) Source: www.investindia.gov.in

...

# DIGITAL INFRASTRUCTURE THE KEY TO REBUILDING SUPPLY CHAINS

## ERIK WANBERG HEAD OF INVENTORY MANAGEMENT AT TAULIA A PROVIDER OF WORKING CAPITAL SOLUTIONS

### Shifting demand, compounded by material shortages, has created significant supply headaches for retailers & manufacturers in all industries, says Taulia

Digital infrastructure is key to rebuilding supply chains as resilient "networks"

Record inflation and the prospect of recession has created a significant change in consumer spending habits in recent weeks. Shifting demand, compounded by material shortages, has created significant supply headaches for retailers and manufacturers in all industries.

Reports of stockpiling and over-ordering to meet unpredictable demand are commonplace. In an economy much different from the seamless and open one in which global supply chains as we know them have developed, it is clear that new technology and new thinking are needed to ensure resources can be properly managed and maintained.

Digital infrastructure and real-time information will be key to this, but so too is the reality that linear supply chains must be reimagined as 'networks' to ensure that both risk and resources can be evenly distributed.

Since the 1980s, globalisation, and therefore global supply chains, have developed rapidly during a period of relative geopolitical calm. As a result, the process of finding buyers and suppliers in an open international market has been relatively simple, relying only on price, capacity, and service.

Broadly speaking, commodities of every kind

have been available and affordable for a very long time, keeping consumer spending stable and, critically, predictable. The supply chains that have supported this have therefore been large, but they have been simple.

Changing the rules of the game

However, geopolitics and economics are perhaps now more complicated than they have been for at least 40 years, and this has changed the rules of the game. Consumer habits are also perhaps at their least predictable in that time too, as they realise the increased costs of living. Amid varying lockdown policies, ongoing wars, and spiraling price pressures, linear global supply chains are facing their first real systemic and structural challenges at both ends of the spectrum, and they are struggling to cope.

Perhaps for the first time, businesses have been forced to reassess what constitutes security in their supply chain and are diversifying their networks in order to ensure supply is steady.

The answer for many has been to stockpile, and in many cases, businesses are stockpiling the wrong things as consumers look to buy cheaper alternatives or cut back spending entirely.

The problem is that this supply chain diversification and stockpiling is global. There are too many buyers fighting over scarce resources. A sudden change in the market can change scarcity to a glut more rapidly than in And at the heart of the problem is the fact that supply chains have developed in comfortable global conditions. This means that most have developed without the type of technological infrastructure and real-time information that can mitigate supply and inventory issues. These technologies are available, but with most businesses playing catch up when it comes to optimising data and inventory visibility, further implementation is needed.

#### The dawn of a new age

We now must consider a new age for supply chain management whereby adaptability, reliability, and communication are foundational. A global 'shoring-up' phase is imminent, and it is necessary. Pre-pandemic conditions are unlikely to return, meaning that predictability, which has been taken for granted for decades, can no longer be relied upon.

In the face of this, many have turned to overordering to meet unpredictable demand, but this is an unsustainable solution that needs to be addressed quickly.

Factories have a finite amount of materials, and sudden spikes in demand for anything from food staples to semiconductors can cause numerous supply chain links to overorder, leading to vast amounts of excess inventory.

his 'Bullwhip Effect' is currently playing out on a global scale and, if conditions remain as they are, could perpetuate as a result of supplier and buyer guesswork.

Removing the guesswork from the equation must become a priority for everyone. The need for more real-time information sharing between trading partners is critical to this and will help cultivate more adaptable networks that have flexibility built in.

An example of this in practice is with modern "buffer storage" units. This is the idea that numerous suppliers are able to communicate with one another to share a mutual location to store valuable materials. Central to this is information sharing, providing knowledge of available stock for sudden demand changes or, for suppliers who have difficulty delivering on time, the benefit of being digitally connected to thousands of other suppliers in a so-called 'network'.

Knowing available stocks in buffer or in production can prevent over-ordering and smooth out the peaks and valleys of the bullwhip. The siloed supply structures that have functioned so effectively for decades are quickly becoming obsolete.

#### Looking forward

The reality is that supply chains will probably not return to the predictable comfort of prepandemic conditions, where the cheapest route always wins. In the next decade, we will likely see supply chains become multifaceted with built-in flexibility and interoperability.

This gravitation to more collaborative and open networks that can provide adaptability that is badly needed in a new-look economy has already begun and is gathering pace.

As digital infrastructure is more commonly implemented to help manage supply and inventory challenges, supply chains will gradually become diverse, agile, and perhaps predictive. In time, we may even refer to them as supply 'webs' or 'networks' that provide the foundation for more informed decisionmaking in managing complex supply chains.

Source: supplychaindigital.com



# FUTURE-PROOFING PHARMA SUPPLY CHAINS BY IMPROVING INEFFICIENCIES IN GLOBAL HEALTH ARCHITECTURE

### RICH QUELCH, GLOBAL HEAD OF MARKETING AT ORIGIN

t became apparent very quickly that the world was not ready to respond to the novel COVID-19 virus.

Despite regular warnings from the scientific community that a deadly global pandemic appearing was a question of when, not if, opportunities to prepare were missed by those with the power to act.

As a result, the rapid spread of COVID-19 caused widespread disruption and panic, taking most of humanity by surprise. And we're still learning to live alongside it, almost three years later.

While many extraordinary feats have taken place in response to the pandemic to minimise its impact on public health and get us back to normality faster, inefficiencies in global health architecture have been exposed for all to see. And with the threat of more global pandemics in the future a certainty, not a question, these inefficiencies must be addressed.

The crucial role of pandemic preparedness and response (PPR) in protecting global security, public health and economic prosperity has been demonstrated, not through modelling but through lived experience.

Now is the time for us to start building stronger health systems, increase investment and coordination, and modernise the pharma supply chain.

So, what are the key lessons COVID-19 has taught us and how can the international community work closer together to ensure future pandemic preparedness?

#### The challenge of financing pandemic preparedness

Financing pandemic preparedness often falls short due to its 'what if' nature. But as we have seen with COVID-19, the risks are very real.

Until 2020, while many scientists predicted a global health pandemic, few accepted the urgency of the issue and the importance of investment upfront. Fast-forward over two years and we are still learning to live with the COVID-19 virus.

It took a global pandemic to prepare the world for a global pandemic, but we are learning from our historical mistakes.

Big pharma recently lobbied for a slice of the G20 fund to prepare for the next pandemic, leading to the

establishment of a financial intermediary fund (FIF). This will finance critical investments to strengthen capacities at national, regional and global levels, with a focus on low- and middle-income countries.

It aims to strengthen pandemic preparedness during 'peacetime', rather than ad hoc, by raising funding from private, philanthropic and bilateral sources in advance.

While over \$1bn in financial commitments have already been announced from public and private sources, many critics have said this figure falls far short of what is needed.

According to the G20 High-Level Independent Panel on Financing the Global Commons for Pandemic Preparedness and Response (HLIP), we need \$10bn per year (at least) to fill preparedness gaps.

To prepare for future pandemics, other tried and tested innovative finance mechanisms also need to be utilised and expanded. This will help to take the financial sting out of the price of preparation.

The principle of 'front-loading' is a good example, which makes the rate of return attractive to capital market investors and makes money immediately available for urgent causes while allowing donor governments to spread the cost.

There is also untapped potential for more innovative funding mechanisms to put an early stop to outbreaks before they become pandemics. Innovative financing can make preparing for pandemics more palatable for both rich and poorer nations by helping to spread the cost.

Given the \$12.5tn cost of COVID-19 to the global economy, governments have come to accept that if they don't invest the billions of dollars needed to achieve global pandemic preparedness, they will surely pay for it later.



#### Strengthening the R&D pipeline

Today's research is tomorrow's treatment. But worldwide, while the number of potential pathogens is very large, the resources for disease R&D are limited.

The international R&D effort to find experimental treatments and vaccines for COVID-19 has been laudable, given its novel nature and urgency. But this has come at the expense of efforts to address other emerging infectious diseases (EIDs), including the running of clinical trials.

For example, in 20 drug companies studied by the Access to Medicine Foundation, there were empty R&D pipelines for ten out of 16 EIDs. This is described as alarmingly low by the researchers and it's predicted that the full impact of the COVID-19 crisis on R&D for neglected disease likely won't be felt for several years.

As much as the costs of the pandemic might raise concerns about the availability of funding, the impact of the pandemic has also been a stark demonstration of the harm caused by an uncontrolled infectious disease and of how rapidly a global response can turn the tide.

The COVID-19 crisis has made global health more salient in the minds of policymakers and philanthropists, attracting new funding and demonstrating that tools for controlling infectious disease are both valuable and within reach.

Recent evidence for this growing support includes GSK's announcement of a £1bn investment over ten years to accelerate R&D dedicated to infectious diseases that disproportionately impact lower-income countries. Focuses include malaria, tuberculosis, HIV, neglected tropical diseases (NTDs) and antimicrobial resistance (AMR).

#### Pharma 4.0 and supply chain transformation

While efforts and ingenuity are ramping up in drug innovation, forecasting and inventory management, untapped opportunities remain across the supply chain, from packaging to final delivery.

From advanced analytics to artificial intelligence (AI), new technologies offer opportunities to transform the way the pharma supply chain operates during times of unprecedented demand. By meeting Pharma 4.0 standards, the sector could increase throughput and reduce cycle times while still maintaining quality.

For too long, pharma has relied on outdated manufacturing operations and overly complex supply chain networks. Periodical reviews of the supply chain must be carried out on a regular basis as a risk management strategy and to boost PPR. End-to-end visibility is key, and data can help give clarity that was impossible to achieve until now. Modern pharma firms and healthcare systems have access to vast data banks, but many don't have the structures or knowledge in place to maximise its value.

To be part of Pharma 4.0, leveraging data insights is key. One way of achieving this is by shifting operations from enterprise resource planning software to the Cloud, allowing all organisations to connect to a shared system regardless of company IT infrastructure – thereby creating a virtual supply chain.

Pharma operations executives can leverage big data, external and internal indicators, and machine learning algorithms to better forecast demand, and automatically identify and mitigate supply risks.

In manufacturing, analytical models can accurately predict and respond to critical events in real time to increase efficiency, reduce downtime and avoid serious shortages. This is essential during public health crises, such as the one the world experienced during the emergency phase of the COVID-19 pandemic.

Innovative technologies promise effective therapies and sustainable new business models, but they also introduce a lot of new challenges.

Legacy systems and tools won't help us overcome these challenges. To conquer EIDs, while effectively treating more common diseases, we need to undertake an honest examination of our industry, our companies and our facilities, eliminating the systems that no longer work and making room for innovation and reinvention.

#### The way forward for PPR

In recent years, we've witnessed numerous epidemics and pandemics that have each caused considerable loss of life and severe economic loss

The COVID-19 pandemic was a wake-up call for many and led to the implementation of relevant policies and countermeasures – some pre-existing and some innovative. But despite lessons being learned over the past two and a half years, there is much work still to be done. Greater political will, upfront investment, public health awareness and R&D are just some of the many parts of the puzzle that need to be solved.

It is not an overstatement to say that the planet is at a crossroads. As eloquently stated by Christina Figueres, former Executive Secretary of the UN Framework Convention on Climate Change: "We did not ask for the COVID-19 crisis to converge with the climate, biodiversity and inequality crises, but all converged in 2020. We have no other option but to make the solutions converge too."

#### Source: www.originltd.com

 $\bullet \bullet \bullet$ 

## DISHA 2022

Theme : 'Reimagining Supply Chain - Path to Resilient, Profitable and Sustainable Business Agility - Infrastructure - Value Delivery - Green Energy Transition'

9<sup>th</sup>&10<sup>th</sup> Nov22 at Hotel Westin, Mumbai

ifteenth edition of Disha - annual signature event of IIMM, Mumbai, in physical form, was held on 9<sup>th</sup>&10<sup>th</sup> Nov22 at Hotel Westin, Mumbai on the theme of '**Reimagining** Supply Chain - Path to Resilient, Profitable and Sustainable Business Agility - Infrastructure -Value Delivery - Green Energy Transition'.

The two-dayevent had 29 speakers with a key note address keynote address on the theme, one fire side chat, two panel discussions and was loaded with several stimulatingfeatures like opinion polls, 7 exhibition booths, lucky draws.Considering that auditorium was full, right till events official closure, it would have certainly been a value enriching and exciting experience for participants.

This episode, which was extremely well received byabout 230 delegates, was made possible by tieless efforts of Mumbai team for weeks before & during the event, shaped under constant guidance & motivation provided by Disha 22 convenor, past national president Bala lyer, and branch chairman Animesh Shah.

Day one started with National anthem 'Vande Mataram' followed by lamplightening at the hands of Key note speaker Siddharth Jain of AT Kearney, Past IFPMM& IIMM presidents Ashok Sharma, Richard Morass&past National presidents Bala lyer, G K Singh along with current national President H K Sharma, Mumbai Chairman Animesh Shah, Past Mumbai chairman M H Varma. After the felicitation of guest of honours, Shri Ashok Sharma & Richard Morasand Disha Convenor Bala lyer, Technical sessions started.

Animesh shah, Mumbai Branch Chairman set the context in his opening speech by focussing on Disha 22 theme and urged participants to join IIMM and its courses for self as well as industry advancement.

In his address as a Disha Convenor **Mr Balalyer**, while emphasisingon IIMM's mission on

knowledge enhancement, skill building and elevation of Supply chain profession, shared BCG model for resilience with vividly with trend charts and figures.

**MR H. K. Sharma, National president of IIMM** highlighted how SCM has gained vital importance in the eyes of common man too, who is also now showing interest in national logistics policy and expounded on Resilience and managing disruptions while giving some tips on common resilience building.

In his speech as **Guest of honour, Mr Ashok Sharma** emphasised on need for change in supply managers mind set with ever readiness to face shocks and disruptions, while elaborating on various aspects of resilience in very crisp and succinct manner.

Siddharth Jain, Managing Partner of AT Kearney gave very structured key note address. In his presentation he defined 3 focus areas for sustainability, resilience, adaptive and regenerative and then 8 dimensions of resilience with 4 on demand side and 4 on supply side like manufacturing adaptability, supplier diversity or advance planning, He also distinguished between digital agility, physical agility, and process agility.As per him supplier collaboration has a highest potential for regenerative value chain for moving from 'Net 0 to Net positive.

Former IFPMM president & past national president of IIMM gave short, metaphoric& little humorous talk with anecdotes on World congress of IFPMM which was held in Mumbai in 1992, When Mr Ashok Sharma was IFPMM president with Richard himself as Secretary General. He recalled that first use of 'digitisation' during IIMM event happened during World congress and apparently through Ingenuity of Bala Iyer as an ordinary volunteer of IIMM then. Next was **Mr. Ashwani Narang & Country head, SAP India subcontinent** spoke on Digitisation. As per Ashwani, focus areas for value delivery using digitisation would be Managing disruptions, Reducing supply risks, category management, sustainability, Managing labour shortfalls, Managing In sourcing &out sourcing shortages and reimagining.

Swapn Malpani, EVP & Global supply chain head of Cipla Ltd then shared some Out of box ideas for improvement based on his pharma experience.

Just before Lunch Break **Mr Sanjiv Moolgaonkar**, **General Manager of L&T heavy engineering** to churn the appetite for 'Make in India' through his breath-taking presentation showcasing some of iconic projects of 'make in India 'like first nuclear submarine, and projects calling for epithets like longest, largest, or tallest etc. To describe complexities of these defence projects, he shared some facts on development of KT Vajra-5000 drgs,13000 components, 6 L &T work centres and 550 suppliers located across India and 1 million assemblies while facing challenges like access to technology, large investment capital, getting quality certifications and finally long project gestation period.

Mr J B Sharma, Executive Director legal & company secretary elucidated participants on Alternates for Dispute resolutions. Starting with history of dispute resolutions systems in India like Bengal resolution of 1772 to arbitration & conciliation act 1996 up to amendments of 2019 covering grading & qualifications of arbitrators.

**Preeta George, Associate Dean of S P Jain Management institute** gave excellent overview on Challenges for the industry due to Global macroeconomic condition & current geopolitical situation outlining trends and drivers of inflation.

**Mr A R Gokhe, Director MSME**. followed with his briefing on latest developments as well as its plans of MSME.

He explained new defining criteria for MSMEs applicable from July 2020 and revised stipulation on PSUs for minimum buying from MSEs- overall 20% to 25%,4% from SC/ST MSE and 3% from women entrepreneurs. He explained about simple UdYAM registration, credit facilities available to MSEs and about TReDS. Before final session for the day, **Disha 22 Souvenir** was released at the hands of **Managing Director of Ultratech, Mr K C Jhanwar** along with Disha Convenor, Bala Iyer, and Mumbai Branch Chairman Animesh Shah.

Then it was time for exciting fireside chat. Mr KC Jhanwar, Managing Director of Ultratech shared his excellent insights on 'Reimagining supply chain path to resilient, profitable, and sustainable business' while responding brilliantly to Mr Ravindra Sharma, Procurement Adoption Director of SAP -Ariba. Some of the points –good customer connect through customer centricity is vital and hence CEO should have consumer experience.

Before day was closed, **Swapnil Dubey & Sachin Akude were felicitated by national president with IIMM gold medals** for their contribution for successful roll out of Disha 22.

Day one was adroitly anchored by M/s Swapnil Dubey (first half) and Animesh shah (later half).

Day 2 opened on spiritual notes by **Shri Chaitanya Lila Das of ISKCON though his discourse on'Comeon! Spirituality and me** '. Some of his spiritual nudges were'Shraddha is Heart +place or putting your heart in some place or purpose, Life is not just for playing around or just to be happy, but to have purpose or goal and playing with purpose, Just don't go through life, but grow through life ,one can rise above the problem to see it from above ,by raising your perspective.

Next was **Mr Amit Varma, Head digital transformation of Reliance Industries to give presentation on 'SCM Capability building using big Data'**. He shared cricket ball movement prediction app example to high light how advanced analytics, and AI is entering into our lives. As per him we have now moved from VUCA to BANI (brittle, anxious, nonlinear, and Incomprehensible) world and moving from Cloud computing to Edge computing.

Green Energy was the next topic, comprehensively presented by Mr Satish Palekar, EVP and Head of L&T Energy-Power. His crisp talk covered Global warming, India's Mission 2070, Global energy transition, future of energy and Energy generation in India through his succinct slides. Some revelations were-COP27 enjoins us to look at ESG score of tier 3 suppliers also, for carbon emission reduction, power, industry, and Mobility are 3 focus areas for India.

Green hydrogen would be a big game changer for India once its cost is brought down from 5/6 / kg to 1/1.5 per kg.

After mid-morning tea, Mr **Amandeep Singh Bhan**, **Sr VP,Moglix shared case study on 'Aggregation of tail spend-a growing industry practice '.** In addition to 2 case studies, he shared survey of MRO buying processes of 1000 suppliers to capture losses in various processes. Some of the issues noticed were unoptimized inventory due to poor data quality, supplier fragmentation etc.

Next, Niteesh Agrawal, Sr. Manager of central Railway gave a detailed and well-structured overview on 'Latest Developments of Procurement through Gem Portal, through the perspective of user. Neetish explained finer details of this feedback-basedportal, like in last 1 year alone 25000+ new developments have been done on the portal. some of the recent functionalities like 1 Robust seller rating system, buyer focused functionalities like Facility to upload drawings, price variation clause, staggered deliveries etc., seller focussed functionalities.

Finally, **Sushanta Dey Director of KPMG** gave excellent brief on **National logistic policy**. After Highlighting three targets of policy like being globally competitive in terms of cost, improve India's Global Logistics performance index and having full digital interface, Pralhad explained various features of unified logistics interface platform which ambitiously aims to have digital interface between all modes of transport.

Ramesh Krishnamoorthy, Group CEO of Vivi med Groupshared some nuances on challenges of commodity buying through interesting illustrations and analogies. As per him in this new operating context VUCA must be taken as a new normal for your commodity with risks and opportunities coming like waves in ocean one after another. So full stack business knowledge with commodity insights gained through technical &financial analysis essential.

Post Lunch there were two panel discussions.

A Panel Discussion on 'All PSUs/Government organisations to align their procurement manuals with the government manual released by ministry of finance' was moderated nicely by Mr. Arun Mehta, Principle chief Manager of Indian Railways with distinguished panellists being Mr. Niranjan Sonak, General Manager RCF, Manoj K., General Manager (procurement)BPCL, Mr Narendra Jha, group General Manager of ONGC.

After nice overview on topic for discussion by Arun Mehta some of the takeaways from discussion were. Latest changes in the manual incorporating provisions like GeM, MSME, Make in India (MII), CPPP Integrity pact etc. Major focus was on the introduction of QCBS in the Works contract. Also merits and demerits of QCBS were discussed as in high value contracts it may create huge controversy if due diligence is not done. NPCIL is going ahead first time on this with its upcoming 700 MW nuclear power plant at Kaiga Karnataka. NPCIL is going ahead first time on this with its upcoming 700 MW nuclear power plant at Kaiga Karnataka.

Panel Discussion on 'pandemic Learnings in current ecosystem" was brilliantly moderated by Swapnil Dubey along with eminent Panellists, Satya raj, CPO, Ultratech, Mr Rajiv Gaur,CPO, LANXESS Gmbh, Ms. Ujwala More VP Procurement Fine Organics Ltd.Some of the learnings from pandemic were work paperless, lean inventory is not the way, need to move away from JIT to +1, or single to multilocation, substitution for imports as well as for local supplier, more collaboration base approach, suppliers training for sustainability and its assessment through independent agency etc.

The 2<sup>nd</sup> day event proceedings were anchored brilliantly by Surendra, in his inimitable style.

Finally, there were 2 lucky draws with prizes galore. First Lucky draw was for the participants who could manage to visit exhibition booths, with 10 lucky delegates winning cash prizes. Second lucky draw was open to all registered participants with 3 lucky participants getting cash awards.

The event concluded after formal vote of thanks by vice chairman Swapnil Dubey, followedby National Anthem.

The two-day seminar was a feast of knowledge for all participants. We all at IIMM Mumbai look forward to its sixteenth edition in next year.





























































VALUE DE











































# FUTURE-PROOF YOUR SUPPLY CHAIN FOR 2025 AND BEYOND

#### **BRENT DAWKINS**

t's no secret that events like COVID-19 and the Russian invasion of Ukraine have continued to impact and alter the supply chain. Other issues like extreme weather, massive labor shortages, and changing governmental regulations pertaining to issues like environmental and due diligence policies all point to a clear sign of fundamental shifts across all industries and the necessity of being prepared for the unexpected.

The supply chain had been facing significant upheavals long before the pandemic. In 2020, analysts were already forecasting a Compound Annual Growth Rate (CAGR) of 11.2% for the global supply chain market from 2020 to 2027, resulting in a \$21.56 billion market value increase. These projections have proven true, even throughout the pandemic. In Q1 of 2022, the value of world merchandise exports increased 16%, according to the World Trade Organization. As more customers shop online and expect goods to arrive at their resident doors faster than ever, the culprit to this fluctuation and variability in trade is simply that supply chains are not keeping up with the latest technology to stay ahead of the curve. While many can blame it on "The Amazon Effect," where there is an ever-increasing demand for quick fulfillment and deliveries, this market shift was inevitable, and these current issues are simply catalysts to expedited change.

It's time companies adapt and evolve. Here are some ways to future-proof your supply chain for 2025 and beyond:

**Embrace Digitization** : It wasn't too long ago that the process of aggregating and analyzing data took a team of people. They would first have to compile and analyze pages upon pages of spreadsheets—or even place post-it notes on a bulletin board—before a decision could be made weeks later. Technology offers a better way, but for many, there remains a large opportunity to boost digital efforts. In fact, according to Gartner's 2021 Future of Supply Chain survey, only 1% of supply chain leaders have a digital ecosystem, but 23% of supply chain leaders expect to have one by 2025. A digital ecosystem is a framework of software and technology that creates a cohesive digital strategy across an organization. When it comes to the supply chain, this could translate to global trade and transportation execution (GTTE) software that provides an adaptive solution to manage global trade, compliance and distribution activities. GTTE digitizes the supply chain and automates processes, providing access to a global trade network and real-time information to control costs, mitigate risk and rapidly adapt to changing regulations.

# **#1.** To future-proof your supply chain, find ways to digitize and transform each process.

For example, perform a time-to-value study to identify areas to automate. This can be easily done by using a timer to track the duration of printing to processing to loading inventory. Even something as simple as the amount of time it takes to print a carrier compliant shipping label can make all the difference. If it takes under a second to print a label, you can process 1,000 labels in less than 17 minutes. If it takes 2 seconds, you're looking at more than half an hour. That's not a big deal if you are processing only 1,000 parcels a day. But if you are shipping 10,000, 20,000 or more parcels a day, those extra seconds add up.

In addition, today's digital supply chain tools have the ability to quickly find the fastest route or cheapest carrier in real-time, allowing for instant decisionmaking to meet customer expectations. Plus, with the proper software, they're all located in one platform, with easy-to-read reports. With greater digital connectivity with supply chain partners and without the need for all the extra steps, both shipping and labor costs are cut, while productivity is improved.

**Shift to e-Commerce** : Digital transformation can lead to entirely new business models that factor in the growing e-commerce sector, whether businessto-consumer or business-to-business. According to the same Gartner survey, 79% of supply chain leaders think that an internet- or platform-based approach is the most critical new business model to support post-pandemic recovery.

# **#2.** Future-proof your supply chain by building scalable capacity.

Now, more than ever, consumers are buying online and the number is only increasing. A good supply chain partner will help assess customer needs and identify the right software to support them. Having a model that supports market shifts like the ecommerce boom and COVID-19 will make sense for the bottom line while improving customer experience.

Go to the Cloud : Without a finger on the pulse of the customer, companies will inevitably lag behind. They have to adapt to the constantly evolving trends. Gartner/Oxford reports that 98% of supply chain leaders believe working from home will increase over the next five years. This will require a completely new strategy to find cohesion among departments to keep the supply chain moving. With so many businesses still reliant on manual processes and legacy technologies, not only is supply slowing down, but collaboration is becoming nearly impossible. In a 2021 Oxford Economics procurement survey, 38% of organizations are still stuck using manual procurement processes (like phone calls and spreadsheets) as their primary method of communication with external supply chain partners, taking up to weeks to make sure everyone is properly looped in.

# **#3.** Future-proof and unify these connections by moving to the cloud.

Platforms that utilize the cloud are able to access real-time visibility into supply chain conditions. Without being solely reliant on the information provided by one facility or one carrier at a time, quick access to all locations' data across the supply chain's business network and cloud platform allows organizations, and their supply chain partners, to respond and adapt quickly. Quicker visibility can greatly improve supply chain performance by enabling faster and more cost-efficient delivery of products, enhancing products' traceability and improving coordination between supply chain partners. Your access to this information and subsequent reaction can be the difference between business resilience and ongoing customer satisfaction or delayed orders, unhappy customers and spiraling costs. Cloud technology brings a company into the future by adopting a collaboration process that is no longer linear, but one that is connected by many branches, ultimately minimizing risks that arise.

This future-proof tip simply requires you to be diligent on a global scale. Avoid complications that can cause costly fines or reputational damage by becoming well-versed in trade compliance.

# #4. Future-proof your supply chain by putting trade compliance at the forefront to mitigate potential disruptions.

An effective global trade management solution reduces the risk of non-compliance, avoids delays at the border and simplifies import/export processes. For example, knowing the specific requirements of a cross-border transaction or the exact tariff implications helps the company better plan and execute global trade and transportation—at a lower cost and quicker timeframe.

#### Localize the Stock

You can even take it a step further by taking advantage of Foreign-Trade Zones (FTZs). FTZs, also referred to internationally as "free-trade zones" (and formerly named "free ports"), are areas where goods may be landed, handled, manufactured or reconfigured, and re-exported without the intervention of the customs authorities. The companies that have leveraged these zones drastically reduce or eliminate duty costs, encourage domestic trade and improve supply chain productivity.

Even with an ability to communicate and collaborate instantly on a global scale, the final future-proofing tip is to reassess offshoring strategies and bringing some of the supply closer to the demand. Investing in local sources like FTZs or regional manufacturers will increase the supply chain's resilience and the agility needed to go to local markets or meet global regulations.

#### Looking Ahead

Ultimately, the future is now for supply chain professionals to boost digital efforts and connect more tightly with partners. It's important to assess the potential of digitalization on current processes and the deployment of a connected ecosystem with other firms. Yes, this requires a resource commitment but the investment results in improved supply chain performance and competitive advantages. Following these 4 tips not only gives companies a competitive edge, they will help shield from future unplanned disruptions

Source: www.globaltrademag.com



#### **Ensure Ongoing Trade Compliance**

## FUTURE PROOFING YOUR SUPPLY CHAIN (THE HUMAN WAY)

#### EXAMINING THE HUMAN ELEMENT OF THE DATA CENTER SUPPLY CHAIN

#### **CLAIRE FLETCHER**

In the data center world, strong supply chains ensure the survival of the facilities they serve. But despite their importance and our dependence upon them, the supply chain is an often-overlooked asset, only making it onto the radar when major problems arise, and boy have they arisen. As if the pandemic wasn't disruptive enough, the Russo-Ukraine war wasn't far behind, affecting the production and lead-times of essential data center commodities such as steel for use in bus bars, steel cages and enclosures, as well as other crucial materials, including copper, tin and silicon, used in anything from microchips to server racks, to RPPs in switchgear.

In these discussions, it's easy to forget the effects supply chains have on people as wellJade Sutton, CBRE Operators also have the ever-increasing price of fuel to contend with, with diesel being a particular issue for data centers. Even the price of neon gas (produced as a byproduct of making steel and used in the production of semiconductors) has shot up, due to the fact that three Ukraine-based companies – Iceblick, Ingaz and Cryoin – are responsible for 60 percent of its global production.

Despite the disruption, the data center industry did – and is still doing – a fantastic job at ensuring the show goes on. Whether through advanced planning or seeking materials from alternative sources and locations, data centers not only supported the monumental shift to remote working, but kept us connected and entertained when we weren't able to leave our homes – after all, without data centers, there would be no Netflix.

With no control over the trajectory of global catastrophes, we are at the whim of this kind of interference. But the supply chain isn't just about the ability to obtain materials or come up with alternative solutions, the people that make it all happen are essential. As a supply chain-led business with a plethora of partners around the globe, who better to ask about the supply chain challenges – and solutions – currently facing the industry than CBRE? DCD sat down with Jade Sutton, procurement director for CBRE Data Centers, to pick her brain about where our focus should really lie.

**Human resources :** Sutton tells us that, as far as residual effects of the pandemic are concerned, day to day she is seeing very little lingering impact in her field in terms of assets. But when it comes to servicing, it's a different story. "In these discussions, it's easy to forget the effects supply chains have on people as well," says Sutton. "Issues affecting servicing at the moment are things like labor rates, and most prevalently, the so-called 'great resignation' catalyzed by Covid-19. "Our IT vendors in particular are coming to us very honestly and admitting that they're struggling to hire."

Young talent are willing to give everything to the role, and

you really can make them into that next level engineer or next level area manager. It's definitely a missed opportunityJade Sutton, CBRE

This kind of transparency is born from CBRE's close relationship with its supply chain partners; these relationships are held in high regard at CBRE, says Sutton. The company's collaboration with its partners is an intrinsic part of CBRE culture, but despite these open lines of communication, an already existing skills shortage (compounded by the pandemic) is still an industry-wide point of contention. But, why? To answer that question, we need to look at the bigger picture, and an often-overlooked part of that picture is inclusivity. "STEM subjects at a school level often lack diversity among students, which then transfers to the professional engineering world. In my experience, the homogeneity is even greater in the data center industry, which is a cross section of both IT and engineering. It just doesn't seem like the most accessible market for those who feel they won't fit in culturally."

Sutton goes on to explain that she didn't need extensive industry tenure or an IT degree for her particular role, but that this preconceived mold could still be discouraging to people who aren't already in this field.

**Combatting the status quo :** "At CBRE, our internal inclusivity targets are robust, and we have many networks and support groups, like the Women's Network, to create a sense of community and provide resources across all demographics.

"I'm now starting to see a bit of a cultural shift, which is why I've been at CBRE for so long and why I intend to stay. It's not just lip service, there is genuinely a greater respect for those who break that barrier."

And due to the cross section within the data center industry, Sutton tells us that although it's been a slower start compared to CBRE's standard facilities management business, in the time she's been with the company, the acknowledgment and internal changes have been established very quickly. The company is now around 30-40 percent women, which, for the data center industry is incredible progress, given that the current industry average sits at around 10 percent.

Sutton also considers graduates to be an invaluable and underutilized resource when it comes to plugging the skills gap. SMEs often overlook graduates as they are considered to be too inexperienced to work in critical environments. But CBRE sees the value this group can bring and provides opportunities for career growth.

"We have a fantastic graduate programme at CBRE that is building year on year, which I think is amazing. We have highly skilled people coming out into a working world with very little opportunity. If you can offer these people free training in a field they know is going to be there for a long time, like data centers and green initiatives, you've got a very easy market to pick the best of the best at very reasonable rates for salary and training.

"Young talent are willing to give everything to the role, and you really can make them into that next level engineer or next level area manager. It's definitely a missed opportunity."

A cyclical problem : So, we've established that inclusivity is good, as is fresh talent, and it's encouraging to see companies with the scale CBRE has actioning the kind of change we want to see. Ultimately, the more people we have entering the industry, the wider and more diverse the talent pool will be. But how are recruitment issues affecting the supply chain?

"In terms of assets, there are very specific needs that only data centers have, but these specific assets come with a specific skill set that you can't transfer from a general site to somewhere else," says Sutton.

She adds that the Russo-Ukraine war has added a certain specificity to the issue, in that our reliance on increasingly expensive fossil fuels is spurring the need for alternatives, and the industry is looking even more towards renewables.

In terms of assets, there are very specific needs that only data centers have, but these specific assets come with a specific skill set that you can't transfer from a general site to somewhere elseJade Sutton, CBRE

It's all very well saying 'by 2030 we will reach net-zero' or 'by 2050 we'll be green' and other lofty commitments that convey sustainable intentions, Sutton says, but what CBRE is seeing now, is a genuine desire for progress, which many companies are ill-equipped to deliver.

"Clients are now asking, 'How quickly can we switch to renewables?' 'How quickly can we have an energy reduction plan?' which is great. But then what we're seeing is, 'Oh, hang on, do we have enough energy specialists or enough green specialists to not just greenwash this?"

Clients need people on board who know exactly what they're talking about and can deliver actionable change very quickly, and at the moment, they simply don't have the staff.

"It circles back to the workforce, and a lack of skilled labor. These kinds of roles are quite new to the market and having a sustainability officer and energy managers is relatively novel. When you combine that with the data center knowledge needed to do those jobs well, that's when we see challenges arise."

Overall, the industry at large needs to realize that a lot of the barriers to a successful supply chain come back to this lack of skilled labor.

"It all comes down to pre-planning for what you need, with people, and the rest will come. We can talk about pre-buying goods and components, but we still need people to understand where is best to pre-buy and from whom, and how to plan and action those elements so you don't over buy. This is all very new to a lot of people," says Sutton.

#### Stay in your lane

It's safe to say that in terms of change, the data center industry moves at speed, which has pros and cons. SMEs

essentially need to build the plane while flying it, and it can be easy to get caught up in the chaos. To avoid flying blind, the key is to know your limits and play to your strengths, says Sutton.

"I'm seeing issues with a lot of SMEs trying to be everything at once and they simply cannot, especially with their size and financial constraints. They need to be taking pause to understand the needs of the bigger fish and pick a lane they can really focus on."

For example, HVAC vendors have been significantly affected by recent supply chain challenges. So as long as it's safe, should they go for the cheapest option, even if it's not green, in order to maintain data center operations? Or instead, should a specialist come in and switch everything to backdoor cooling to save on water use?

"Pick a lane, identify your own unique selling point, and market yourself as that. Only then should you begin to diversify on your own sacred ground," advises Sutton.

#### A declaration of trust

The transparency and trust CBRE has with its clients and partners is a major differentiator. Customers can be reluctant to use unfamiliar suppliers because they fear being too honest about the challenges they're facing could be leveraged against them.

As a result, customers end up withholding information, or approaching orders at the very last minute. "To avoid all that, the trust has to be there to begin with," says Sutton. "You need to be able to have frank conversations, 'Where are you now, where do you want to be in six months, 12months. What are your clients saying?"

"If our clients trust us with that information, we can then create the optimum solution that will reduce lead times, potential risks and improve output. If we have as much information as possible up front, early on, all these issues are greatly reduced."

And when it comes to mitigating supply chain risks, knowledge is power, whether it be via the personnel you employ, or knowing your vendors inside out. And as a customer, if you don't know everything, having a trusted partner you can rely on and collaborate with means you don't have to.

"A client might want to get greener as quickly as possible, they might have aging kit, or maybe they have new customers pressuring them for these previous nice to haves. CBRE can help them action their needs very quickly thanks to our internal people and our vendor partnerships.

"Clients don't need to come to us saying, 'This is what we need'. We can be involved long before that. We can act as a consultant to help them do it, more quickly, more efficiently, and at a more competitive price. We don't work in silos, and we can leverage our size, flexibility, and agility to formulate the best way forward with the best partners."

Overall, supply chains shouldn't be seen as 'the other', nor should they be viewed exclusively in terms of material commodities. Investment in people is one of the most proactive steps you can take toward securing the solid supply chain needed to carry your business not only now, but into the future.

Source:www.datacenterdynamics.com



# HOW TO INCREASE BUSINESS RESILIENCE THROUGH DEMOCRATIZED AI

## ASHOK PANDA, ASSOCIATE VICE PRESIDENT & GLOBAL HEAD – AI AND AUTOMATION SERVICES, INFOSYS

The last two years have taught us that business resilience has never been more important than it is today. Resilient organizations are ones that maintain continuous business operations no matter the economic conditions that surround it and safeguard its people and assets.

Forward-thinking businesses have realized that this pandemic-induced uncertainty is merely a sign of times to come and have learned the importance of being prepared for potential volatility. Implemented right, Artificial Intelligence (AI) can offer businesses deep insights that in turn can make businesses more resilient.

#### Businesses can envision the future better as AI connects the dots

For a business to be agile, it requires harmonization of disparate content from information management solutions. Al can accomplish this and keep a business nimble—a crucial quality in times as uncertain as these. As organizational data grows at a rapid rate, enterprise Al can help glean worthwhile insights to empower people to take well-informed decisions.

Al models have been helping businesses across sectors. In the retail industry, which is deeply impacted by potential supply chain issues, Al's ability to forecast weekly sales and inventory requirements is transformative. In the food industry, these models can help restaurant managers predict footfalls by factoring in data such as weather forecast. Such insights help businesses make better decisions, plan their operations better, optimize expenses, and ultimately maximize sales.

Today, AI is being used to manage and automate IT infrastructure, glean new insights about customers, identify cyber threats, and even improve the hiring process. But more can be done. To extract maximum value from this technology, companies must make it accessible to employees across different lines of business with varying levels of experience.

# Empowering business with technology through democratization of AI

The full potential of technology can be achieved only when it is made available to everyone who has a use for it. Business leaders and users are well versed with the business that they drive but they are not AI experts. On the other hand, data scientists can create cool AI models, but they may not always align with business goals as they are not familiar with nuances of business. By democratizing AI, organizations can bridge the gap between business goals and the AI models built to achieve these goals. Business users and data scientists become partners and work in synergy. Democratization creates dialogues between them to identify the problems they want to solve, build and test hypotheses, assess models, and experiment till they arrive at the right model.

For example, an AI-powered real-time dashboard instead of an Excel sheet in the hands of the sales team would empower them to make well-informed decisions and be proactive in their dealings with access to real-time data. Imagine the number of

opportunities lost if this data was available only to select senior employees!

Just as AI use cases need to be accessible to all, its development should be democratized Sophisticated businesses too. are recognizing that the responsibility of creating such solutions need not always rest with the IT team and can be outsourced to data scientists within citizen the organization, using tools such as Low Code No Code software. This doesn't just reinvent productivity but also drives data-driven culture within the company and helps businesses scale.

# What are the best practices to democratize AI within an organization?

To democratize AI, organizations must first scale it and ensure it is embraced by employees across the organization. There are three steps to establishing an enterprisewide AI agenda in the organization.

- Identify opportunities that promise business viability and technical feasibility for AI adoption
- 2. Standardize AI models, their deployment and lifecycle to ensure ease of adoption
- 3. Reduce or eliminate risks by reviewing AI projects for risks in data, process, and models and building necessary controls to drive trustworthy governance

The above-mentioned framework-based approach helps define the organization roadmap to scale and future-proof AI. Most often, AI is seen as a subject matter of an elite group of scientists. Democratizing AI will need change management to ensure minimum resistance to adoption. Here are some best practices for managing the micro changes.

Accessible to all: AI technology must be available to every employee, irrespective of the role they play, by using a centralized AI platform that could be built to suit different personas such as business heads, data analysts, or systems managers.

**Facilitate innovation and collaboration:** An environment that encourages employees to think out of the box and create solutions for their business needs without going through complex approval processes can encourage innovation. A gamified design culture that builds collaboration between citizen data scientists and AI experts can pay rich dividends.

**Inculcate an AI-First approach**: Everyone must be provided with the tools and the motivation to be a problem solver.

**Establish an Al academy:** Specialized centers of excellence (CoE) and digital enablement platforms can act as catalysts to encourage new ideas and solutions. Reskilling workforce on new-age digital skills by providing them access to latest enablement courses and industry-recognized certifications is a step in this direction.

**Create an AI store**: A repository of precurated array of AI-based platforms, solutions and services can make AI adoption very easy for employees. With self-service options and an experimentation platform, it can become the source for crowdsourcing of models.

For democratization of AI, organizations must measure their readiness with respect to people, processes, and technologies. Each of them could be at different stages of maturity. They must also be wary of the downfall of AI democratization, where technology could be misused or mishandled. Companies must create standards and guidelines needed to ensure that democratization is implemented with the required governance, training, and transparency.

Source: Express Computer



# INDIA INTRODUCES NEW GROUP AT G-20 LEVEL FOR STARTUPS

### **TEAM STARTUPCITY**



ndia has pitched for a new engagement group to fuel the growth of startups across the G-20 countries.

A top government official believes that the growth of startups, globally, is curtailed due to several challenges including availability of funds, proper guidance and policy support.

"To deliberate on such issues, India has proposed a new engagement group...Startup-20 under India's G-20 presidency," Secretary of the Department for Promotion of Industry and Internal Trade (DPIIT) Anurag Jain said.

India has also called for G-20 countries to adopt open source and inter-operable platforms like UPI and Aadhaar to promote inclusive digitisation across the world.

Jain said knowledge, innovation, and sustainability have emerged as the new age drivers of economic growth.

India has created a host of open-source public digital infrastructure such as CoWIN platform, Aadhaar, financial inclusion programmes, and UPI interface.

"G-20 should work towards creating and adopting guiding principles for such open source and interoperable platforms and standards to promote inclusive digitisation across the world," he said.

Jain was addressing B20 Indonesia Global Dialogue, organised by industry chamber CII.

Indonesia assumed the presidency of the Group of Twenty (G20) this year. It also chairs the Business 20 or B20 forum. It is G-20's primary engagement group comprising business sectors from around the member countries. India will hold the presidency of the G20 in 2023. Jain added that India has created GIS (geographic information system) based PM GatiShakti planning and decision support system for integrated infrastructure development. "This has more than 1,500 layers providing details of land, forest, mines and existing and planned infrastructure like roads. This has completely changed the way the infrastructure projects are planned and implemented in India," he said.

Speaking at the event, India's G20 Sherpa Amitabh Kant said the forum should drive economic growth and financial progress across the world.

The world is facing several challenges due the ongoing war between Russia and Ukraine and it has deep implications on food and energy security, he said adding the G-20 members must discuss all these issues irrespective of the conflict and arrive at certain principles to take the world forward.

"It is important because by the time India takes over the presidency of G-20, global growth will be impacted and there is no other forum other than G-20 to drive the global growth," Kant said. G-20 is a grouping of developed and developing nations which accounts for 85 per cent of global GDP, 78 per cent of global trade, and two-thirds of global population.

"So to my mind, there is no other grouping in the world other than G-20 which can actually take on progressive decision making for the global economy and for the crisis that we are in," he said.

He added that the grouping needs to talk about sustainable growth for all.

Kant also regretted that the developed world is not living up to its commitment of providing climate finance.

Timely, fair and adequate finance by the developed world is key and commitments made by them should be fulfilled, he added.

Further, Kant advocated for reforms in global institutions like the World Bank and IMF.

Such institutions "need to be the institutions for climate finance...They do not provide blended finance," he said adding "they need to be restructured".

Source: www.siliconindia.com



# INDIA NEEDS TO INCREASE URBAN INFRASTRUCTURE INVESTMENTS TO \$55 BILLION A YEAR: WORLD BANK

he report, titled 'Financing India's Infrastructure Needs: Constraints to Commercial Financing and Prospects for Policy Action', estimated that India would need \$840 billion over the next 15 years.

To meet the needs of the growing urban population, India needs to increase its annual investment in city infrastructure from an average of \$10.6 billion a year in the past decade to an average of \$55 billion a year for the next 15 years, a World Bank report released Monday said.

The report, titled 'Financing India's Infrastructure Needs: Constraints to Commercial Financing and Prospects for Policy Action', estimated that India would need \$840 billion over the next 15 years.

"By 2036, 600 million people will be living in urban cities in India, representing 40% of the population. This is likely to put additional pressure on the already stretched urban infrastructure and services of Indian cities – with more demand for clean drinking water, reliable power supply, efficient and safe road transport amongst others. Currently, the central and state governments finance over 75% of city infrastructure, while urban local bodies (ULB) finance 15% through their own surplus revenues," a World Bank statement said.

About half of the investment needed – \$450 billion – in the next 15 years was in the basic municipal services sector that includes water supply, sewerage, solid waste management, roads and streetlights, while most of the remaining amount was to address urban transport requirements, the report said.

As of now, only 5 per cent of the urban infrastructure investments were coming from the private sector.

"With government's current (2018) annual urban infrastructure investments topping at \$16 billion, much of the gap will require private financing," the statement said.

The report studied the ULBs of Tamil Nadu and

Gujarat, where it found that all-India trends for financing were reflected. Over three-quarters of the total urban capital expenditure in the two states came from the Union and state governments. About 70 per cent of the urban capital expenditure in Tamil Nadu and 55 per cent in Gujarat came from the state governments.

"Commercial financing was negligible in Gujarat, contributing only 1% of total ULB capex state-wide. ULBs in Tamil Nadu, on the other hand, raised as much as 12% of their total capex from commercial financing – primarily loans from state-controlled FIs [financial institutions]," the report said.

The report said the relatively low charges for municipal services and a weak regulatory framework were adding to the challenges.

"Between 2011 and 2018, urban property tax stood at 0.15% of GDP compared to an average of 0.3-0.6% of GDP for low and middle-income countries. Low service charges for municipal services also undermines their financial viability and attractiveness to private investment," the report said.

Among its suggestions, the World Bank report recommended making the transfer of funds to cities formula-based and unconditional and increasing the mandates of city agencies gradually.

"The Government of India can play an important role in removing market frictions that cities face in accessing private financing. The World Bank report proposes a range of measures that can be taken by city, state, and federal agencies to bend the arc towards a future in which private commercial finance becomes a much bigger part of the solution to India's urban investment challenge," said Roland White, a co-author of the report and the global lead of city management and finance at World Bank.

Source Indian Express. First published on: 14-11-2022





# INDIA PLAYING A MAJOR ROLE IN THE GLOBAL SUPPLY CHAIN SYSTEM

### LALIT DAS, FOUNDER AND CEO, 3SC SOLUTIONS

Ver the last decade, the world's perception of India and its capabilities has shifted. For the rest of the world, our nation is becoming an example of a thriving economy. On a world scale, India is regarded as an important factor in the global supply chain, portraying itself as an attractive destination for global corporations. The entire world is waiting for India's steadfast and consistent efforts to convert the nation into a worldwide leader through its many initiatives.

#### Covid-19's Impact on the Worldwide Supply Chain

Covid-19 has had a significant influence on the logistics industry in recent years, and since it is one of the most significant sectors that serve other industries, the rate of recovery has been gradual. According to the McKinsey Global Institute, India's logistics sector would increase at a compound annual growth rate of more than 10% from \$200 billion in early 2020 to at least \$320 billion by 2025. Even though the logistics business is constantly developing, the future is more unpredictable now than it was when MGI made that prediction, due to the continued Covid-19 attacks on a variety of sectors. Because India's logistics economy is consumer-driven and unstructured, the epidemic caused significant disruptions. It is, nevertheless, on the mend and seeking to recapture its former splendor.

#### Covid-19's Impact on the Indian Supply Chain Industry

During the Covid-19 pandemic, however, India arose as the chosen destination. This was made possible by clearly defined global corporate and country targets to reduce supply chain risks in the longer—term and repair damaged value chains in the short term. Companies that depended on overseas goods, were severely impacted as a result of supply chain breakdowns. Methods that had been tested were no longer feasible. It was felt that the entire process needed to be varied, altered, and shifted.

#### Role of India in the Supply Chain Industry

Because of its quick turnaround time, India became the favored business location during and after the Covid-19 pandemic. As firms attempted to repair their damaged value chains in difficult times and reduce long-term supply chain risks, India was an alternative choice to fill the distribution network and vast domestic market with expanding disposable incomes. These elements are combined with the comparative void, since it is a stable nation with safe investment conditions. The country's claim is strengthened by its diverse corporate environment; skilled, inexpensive labor readily available in the market will also contribute to the country's emergence as an international commercial hub.

By creating a parallel environment for industrial success and becoming a member of global supply chains, India may benefit from a better legal structure for SEZs (Special Economic Zones) featuring duty-free imports. The SEZs have had a favorable impact on IT-related operations, but only a little impact on manufacturing. One of the key reasons seems to be that the private sector was in charge of building SEZs. Most of them were too small to compete in the global markets.

Expressway access to the National Highway network, harbors, and airlines will boost the SEZ's desirability as an investment location. The new DFI (Development Financial Institution) ought to be able to provide long-term finance for such large-scale initiatives. Infrastructure such as lowercost power, shared effluent treatment centers, skill development centers, global testing centers, and certification facilities, would also be required. The most major change would be to allow sales of SEZ-produced items to the domestic market, with duties charged at the lowest prescribed rate to imports from every trading partner, as well as any trade agreement's value-added standards.

**Summing Up:** India may present itself as an appealing investment location for investors worldwide, thanks to its strong macroeconomic fundamentals, positive demographic dividend, improved ease of doing business (EoDB), and access to resources for expanding manufacturing facilities. This would involve the government, local governments, and businesses all working together to realize this potential. According to the government, India is on its way to becoming a member of the international supply chain. If the potential opportunities are embraced and a well-thought-out course of action is devised and successfully performed, it will quickly be catapulted, and further development will follow

Source: timesofindia.indiatimes.com



# **GLOSSARY OF TERMS (INFRASTRUCTURE)**

• overnment Infrastructure Projects (PPP): Infrastructure projects owned, developed and implemented jointly by the Government and private sector, through a partnership arrangement. Public Private Partnership means an arrangement between government or statutory entity or government owned entity on one side and a private sector entity on the other, for the provision of public assets and/or related services for public benefit, through investments being made by and/or management undertaken by the private sector entity for a specified period of time, where there is a substantial risk sharing with the private sector and the private sector receives performance linked payments that conform (or are benchmarked) to specified and pre-determined performance standards, measurable by the public entity or its representative.

**Government Infrastructure Projects (Traditional Procurement):** Infrastructure projects owned, developed and implemented by the Government.

**Private Sector Infrastructure Projects:** Infrastructure projects implemented by the private sector.

Sector and Sub-sector: The main domain and subdomain to which the project belongs.

Status: The current phase of project life cycle.

**Type of PPP:** Mode under which the project is being implemented.

**Annuity:** In this type of BOT model, the government harnesses private sector efficiencies through contracts based on availability/performance payments. The granting authority pays the concessionaire annuities on scheduled dates throughout the concession period.

**Build Operate Transfer (BOT):** BOT is a framework where the private entity receives a franchise to finance, design, build and operate a facility (and to charge user fees) for a specified period, after which ownership is transferred back to the public sector. This type of arrangement involves greatest level of private sector participation across a set of different functions and often covering a long period. The risk allocation to the private sector may be significant, including volume and finance risk, and potentially price risk.

**Build Own Lease Transfer (BOLT):** It is a non-traditional procurement method of project financing whereby a private or public sector client gives a concession to a private entity to build a facility (and possibly design it

as well), own the facility, lease the facility to the client, then at the end of the lease period transfer the ownership of the facility to the client.

**Build Own Operate (BOO):** This is a type of PPP project model in which a private organization builds, owns and operates a project or structure with some incentive from the government. Although the government doesn't provide direct funding in this model, it may offer other financial incentives such as tax-exempt status. The developer owns and operates the facility independently.

**Build Own Operate Share Transfer (BOOST):** This is a type of PPP model, in which a concessionaire is authorized to finance, construct, own operate and maintain, share a part of the revenue and transfer the infrastructure facility at the end of the period. The proponent is allowed to recover its total investment, operating and maintenance costs plus a reasonable return thereon by collecting tolls, fees, rentals or other charges from facility users.

**Build Own Operate Transfer (BOOT):** In this type of PPP model the developer designs and builds a complete project or a facility at little or no cost to the government, owns and operates the facility as a business for a specified period (usually 10 to 30 years), after which transfers it to the government at a previously agreed-upon or market-price.

**Design Build Finance Operate (DBFO):** This is a type of PPP model where the private sector party is awarded a contract to design, construct, finance and operate a project. In consideration for performing its obligations under the agreement, the private sector party may be paid by the government agency or from fees collected from the project's end users. The government or government-owned entity retains ownership of the project.

**Design Build Operate and Transfer (DBOT):** In this type of PPP model the project is financed only to the extent of a certain percentage of the cost by the private investor and this investment is recovered through annuity payments to be made by the Government/ Authority over a specified period commencing from the date of commissioning of the project. The balance percentage of the project cost is provided by the Government during the construction period.

**Hybrid Annuity Model (HAM):** HAM combines EPC (40 per cent) and BOT-Annuity (60 per cent). On behalf of the government, NHAI releases 40 per cent of the total

project cost. It is given in five tranches linked to milestones. The balance 60 per cent is arranged by the developer. Here, the developer usually invests not more than 20-25 per cent of the project cost (as against 40 percent or more before), while the remaining is raised as debt.

Lease: Under a lease, a private firm (Lessee) leases the assets of an enterprise from a properly empowered government authority (Lessor) and assumes full responsibility for operations and partial responsibility for investments for a period usually between ten and fifteen years. Typically under a lease, the user fee, or tariff in the case of utility services, is used to pay the "lessee fee", which remunerates the Lessee for his costs, plus a reasonable return. The remainder of the tariff goes to the government and is used to fund capital investments.

**Lease Develop Operate Transfer (LDOT):** In this type of PPP arrangement, assets are leased out to the private sector under specific terms, to operate and maintain the asset for the term of the concession period, after which the assets are transferred to the authority.

**Design Build Finance Operate and Transfer (DBFOT):** In this type of PPP mode, the project is developed by the concessionaire on Design, Build, Finance, Operate and Transfer concession framework. In consideration for performing its obligations under the agreement, the private sector party may be paid by the Government agency or from fees collected from the project's end users. The project is transferred back to the Government at the end of the concession duration.

**Management contract:** The private partner takes responsibility for managing specified aspects of the service provision. Ownership and investment typically remain with the public sector, although some rehabilitation responsibilities can be transferred to the private partner.

**Operations & Maintenance (Service contract):** The Government bids out the right to deliver a specific service or gives part of the undertaking to the private sector for operations and maintenance of the assets.

**Rehabilitate Operate Maintain and Transfer (ROMT):** Rehabilitate Operate Maintain and Transfer (ROMT) is a contractual arrangement whereby an existing facility is turned over to the private sector to refurbish, operate and maintain for a franchise period, at the expiry of which the legal title to the facility is returned to the government.

**Build Lease Transfer (BLT):** This type of PPP model involves building a facility, leasing it to the Government and transferring the facility after recovery of investment.

**Contract Period:** The length of time measured in years that the terms of a contract agreement are in place.

**Concessionaire:** The private player who signs a concession with the government department to develop a project and / or operate a facility as per the terms and concession of the Concession Agreement.

**Concession Period:** The period beginning from the appointed date and ending on the termination date of the concession.

**Financial Closure Year:** The year in which private sponsors agree to a legally binding agreement to invest funds or provide services. Closure occurs when there is legally binding commitment of private sponsors to mobilize funding or provide services. The definition of financial or contractual closure varies among types of private participation.

Harmonized Master List of Infrastructure Sub-Sectors: This refers to the Harmonized List (as per notification of Ministry of Finance, Department of Economic Affairs vide Gazette No. 240, dated October 13, 2014,) of Infrastructure Sectors and sub-sectors. The database captures information on projects aligned to this Harmonized list. These sectors and sub-sectors are listed in Appendix 4 of this User Manual.

**Project Capacity:** It is the size of a project measured in the units of the capacity type assigned to the project. For example:

- Number of kilometers is used for road, railway, energy transmission, and telecommunications long-distance carrier projects.
- Installed megawatts are used for electricity generation projects.
- Thousands of cubic meters per day is used for water treatment plants.
- Thousands of installed connections is used for telecommunications network and water or electricity distribution projects.
- Throughput (thousands of TEU per year) is used for seaport terminals.
- Population (thousand) is used for electricity and electricity distribution projects when information of installed connections is not available.

**Project Cost (As per agreement):** This is the cost mentioned in the concession agreement at the time of signing the agreement.

**Project Cost (Revised):** This is cost of the project which has been revised during the on-going construction of the project.

**Project Cost (Actual):** This is the final cost that has been incurred after completion of the construction of the project.



# INDIA'S URBAN INFRASTRUCTURE NEEDS TO CROSS \$840 BILLION OVER NEXT 15 YEARS: NEW WORLD BANK REPORT

new World Bank report estimates that India will need to invest \$840 billion over the next 15 years—or an average of \$55 billion per annum—into urban infrastructure if it is to effectively meet the needs of its fastgrowing urban population. The report, titled "Financing India's Urban Infrastructure Needs: Constraints to Commercial Financing and Prospects for Policy Action" underlines the urgent need to leverage more private and commercial investments to meet emerging financial gaps.

By 2036, 600 million people will be living in urban cities in India, representing 40 percent of the population. This is likely to put additional pressure on the already stretched urban infrastructure and services of Indian cities – with more demand for clean drinking water, reliable power supply, efficient and safe road transport amongst others. Currently, the central and state governments finance over 75 percent of city infrastructure, while urban local bodies (ULB) finance 15 percent through their own surplus revenues.

Only 5 percent of the infrastructure needs of Indian cities are currently being financed through private sources. With government's current (2018) annual urban infrastructure investments topping at \$16 billion, much of the gap will require private financing.

"Cities in India need large amounts of financing to promote green, smart, inclusive, and sustainable urbanization. Creating a conducive environment for ULBs, especially large and creditworthy ones, to borrow more from private sources will therefore be critical to ensuring that cities are able to improve living standards of their growing populations in a sustainable manner," **said** 

# Auguste Tano Kouamé, Country Director, World Bank, India.

The new report recommends expanding the capacities of city agencies to deliver infrastructure projects at scale. Currently, the 10 largest ULBs were able to spend only two-thirds of their total capital budget over three recent fiscal years. A weak regulatory environment and weak revenue collection also adds to the challenge of cities accessing more private financing. Between 2011 and 2018, urban property tax stood at 0.15 percent of GDP compared to an average of 0.3-0.6 percent of GDP for low- and middle-income countries. Low service charges for municipal services also undermines their financial viability and attractiveness to private investment.

Over the medium term, the report suggests a series of structural reforms including those in the taxation policy and fiscal transfer system - which can allow cities to leverage more private financing. In the short term, it identifies a set of large high-potential cities that have the ability to raise higher volumes of private financing.

"The Government of India can play an important role in removing market frictions that cities face in accessing private financing. The World Bank report proposes a range of measures that can be taken by city, state, and federal agencies to bend the arc towards a future in which private commercial finance becomes a much bigger part of the solution to India's urban investment challenge," said **Roland White, Global Lead, City Management and Finance, World Bank, and co-author of the report.** 

Source: World Bank



- 1. Supply chain can be considered as a group of organizations connected by a series
  - of\_\_\_\_\_relationships
  - a) Behavioural
  - b) Managerial
  - c) Commercial
  - d) Cordial
- 2. Identify the statement that is NOT true about warehouse
  - a) Warehouse is a static unit in the logistics system
  - b) Warehouse is a critical link between manufacturing and external customers
  - c) Warehousing is a labour intensive process that affects productivity
  - d) Warehouse adds value to the products that move through it
- 3. Value chain is the concept developed by
  - a) Michael Porter
  - b) Michael Hammer
  - c) Peter Senge
  - d) Peter Drucker
- 4. "Quality is free" is the slogan created by
  - a) Edward Deming
  - b) Joseph Orlicky
  - c) John Oakland
  - d) Philip Crosby
- 5. A statement NOT true about material requirement planning (MRP) is
  - a) Computer based information system
  - b) Material requirements are calculated
  - c) Designed for dependent demand items
  - d) MRP works on web enabled technology
- 6. The distribution type used by a car manufacturer is
  - a) Intensive distribution
  - b) Selective distribution
  - c) Exclusive distribution

- d) Direct distribution
- 7. Kaizen denotes
  - a) Continues improvement
  - b) Exponential improvement
  - c) Radical improvement
  - d) Marginal improvement
- 8. The Japanese term that stands for irregularity
  - a) Muda
  - b) Mura
  - c) Muri
  - d) Jidoka
- 9. Reverse logistics covers all of the following except
  - a) Product recalls
  - b) Warranty replacement
  - c) Commercial returns
  - d) End of life returns
- 10. Bullwhip effect occurs due to
  - a) Uncertainty
  - b) Irregularity
  - c) Variability
  - d) Flexibility

#### Crossword Puzzle Ans.

#### Across

- 1a. Benchmarking
- 4e. Digital
- 8d. Exw
- 10a. Sole
- 10g. Reuse
- 12a. Blockchain

#### Down

- 1a. Bullwhip
- 1d. Carriage
- 1h. Resilience
- 1l. Gemba
- 6k. Value
- 7l. Kanban

# SUPPLY CHAIN TRENDS FOR 2022 AND BEYOND

Supply chains, much like living organisms, need to evolve to survive. New technology, like robotic process automation (RPA), cloud computing and artificial intelligence (AI), replaces weak links and alters the supply chain software market at large. We looked to the experts for their thoughts on the future of supply chain trends.

Robots, automation, the ever-growing cloud, a postpandemic environment, security and more. We'll discuss the trends influencing supply chains and their SCM software counterparts.

#### Key Takeaways

- Supply chains will focus more on resilience and risk management to deal with post-pandemic disruptions.
- Blockchain will see more use throughout supply chains globally.
- Digital supply chain twins will give decision-makers digital environments to view real-time input from their physical supply chains.
- Supply chain as a service (SCaaS) providers will see a boom in adoption.
- Circular supply chains will help turn operations into zero-waste environments.
- Cloud SCM solutions will continue to grow in popularity.
- AI, IoT and embedded analytics will grow in popularity and see massive integrations.
- Automation and robotics drive innovation to the forefront.
- 5G networks will give businesses the power to support huge amounts of devices and connections.
- The capacity crunch will continue as shipping demand continues to surge.

#### Challenges

The pandemic led to shortages of workers and truckers worldwide. According to the American Trucking Association, truck driver shortages will likely surpass 160,000 in 2030, up from 80,000 in 2021. This event slowed the movement of goods while pushing shipping

rates higher than usual.

An Accenture report also mentions that pandemicbased supply chain disruptions could cause European economies to lose up to €920 billion in GDP by 2023.

Persistent labor shortage, rising freight costs, lack of materials supplies, port congestions and logistics breakdown are root causes of these disruptions. Although supply chains are constantly improving, recovery will take longer than anticipated.

As business leaders undergo changing dynamics in supply chains, they rely heavily on technology and strategy restructuring. Let's discuss the important current and future trends in supply chain management.

#### **Top Trends**

These are the top supply chain management trends as we move through the next few years:

#### 1. Post-pandemic Resilience

Economic disruptions, school closures and variable lockdowns threw countless industries into upheaval. Supply chains worldwide are picking up the pieces and charting new territory. A Statista report shows a very volatile supply chain pressure index since the pandemic's onset.

According to McKinsey, companies need to uncover and address hidden risks while rethinking their short-term and outdated strategies to stay resilient.

Supply chain disruption damage goes beyond the value chains themselves. Value chains include everything from gathering raw materials to customers receiving their products.

While it is true that higher-tier suppliers were affected by the pandemic, some of the real damage happened to the nearly invisible lower tiers. Any choke point or disruption in a value chain has devastating effects on multiple processes down the line.

These emergent dangers caused supply chains to rethink how they handle risk assessment to stay flexible and resilient in an unstable global environment. The recent upheaval forced supply chain managers to take a step back and consider their vulnerabilities:

• Where are the weak links in your supplier

#### partnerships?

- Are any critical areas of your value chain entirely out of your control?
- Do you rely on single-source items that could disrupt your supply chain if they encounter problems?
- Do you have enough visibility into your end-to-end processes to stay agile during unexpected disruptions?

When we talked to Joanna Martinez, Supply Chain Advisors Founder, she said:

"Resilience and flexibility are not new supply chain goals. They have been there for years, under the umbrella of Agility. But many times, instead of being balanced with cost objectives, the goal of reducing cost won out, like a balance scale with more weight on one side than on the other."

While cutting costs across the supply chain can be helpful, she pointed out the need to be cautious with such an approach:

"The supply chain of the future should no longer tilt to the lowest cost options; it can be fashioned with the objective of being able to 'turn on a dime.' Memories are short, but supply chain leaders have a wonderful chance to implement real change as business returns to a normal state. As long as they move quickly."

#### 2. Blockchain

It makes sense to follow the demand for an increase in supply chain visibility with the growing popularity of blockchain. Blockchain's database structure can set supply chains up for success with end-to-end transparency. Before diving into this further, what exactly is blockchain?

Blockchain leverages chunks or "blocks" of data, whereas normal databases store their information in tables. These storage blocks eventually hit their capacities, and as data flows in, new blocks are created and chained to their predecessor.

These blocks form immutable records that give users valuable transparency into all of their transactions with accurate time stamps. That's all well and good, but how does this tie into the world of supply chain management?

Blockchain comes with multiple benefits that include:

- Improved materials tracking from a source, through the supply chain, to the customer.
- Reductions in paperwork and administrative processes.
- Increased transactional security and visibility with

suppliers and subcontractors.

• Better fraud detection and prevention for highvalue items.

These advantages make it easy to see why a report from Research and Markets shows the global supply chain market for blockchain growing to \$3,272 million by 2026.

#### 3. Digital Supply Chain Twins

As social distancing becomes a new norm, making decisions based on real-time supply chain data through manual methods is less appealing. Combatting this requires more than things like prescriptive analytics; real-time data from all physical fronts of your supply chain is necessary to avoid costly disruptions.

Digital supply chain twins continue to be among key supply chain trends. Digital supply chain twins faithfully recreate an entire supply chain and its processes in an easily accessible, digital environment.

Real-time information gathered from IoT (Internet of Things) devices can give decision-makers a crystal clear picture of everything from customer orders to individual items moving through the chain.

It can point out production delays and their possible repercussions while notifying you of equipment that needs repairs. However, the systems, equipment and costs associated with creating a digital supply chain twin are big investments.

Digital twins provide huge advantages for numerous industries outside of supply chain management, paving the way for their usage worldwide.

#### 4. Supply Chain as a Service (SCaaS)

With value chains becoming more complex, handling all of your supply chain processes in-house is nearly impossible. Switching from manual processes to a digital environment, leveraging large amounts of IoT-enabled devices, analyzing data and maintenance will become necessary things that require skilled manipulation and maintenance.

Many companies won't have the right talent to carry out these tasks and will outsource many of these critical processes.

The benefits of SCaaS include better customer service, increased productivity and lower costs. SCaaS provides similar offerings with specific supply chain benefits like boosted asset management. Flexibility is a standout advantage, with resilience and agility at the forefront of the pandemic landscape.

We asked Kelly Barner, Managing Director at Buyers Meeting Point, about her thoughts on the SCaaS model.

"SCaaS provides a strategic opportunity to work with

#### an organization whose sole focus is to make each component of the supply chain more efficient. When individual segments are able to focus their energy and attention on asset management, inventory rotation, etc., new types of innovation and competitive advantage become achievable.

Relinquishing control over key pieces of your supply chain makes adopting SCaaS daunting; change is and always will be scary. However, as you offload responsibilities, you'll find valuable time to innovate, improve and optimize.

#### 5. Circular Supply Chains

Sustainability is rapidly becoming a front-runner in the world of supply chains. In the past, linear supply chains generated waste by disposing of leftover items after creating a product.

Instead of producing an item and returning to the beginning of the chain with brand new materials, circular supply chains recycle unused fragments back into their value chains. Long story short, circular supply chains promote a zero-waste environment.

Customers care about the ethics of their products. Often requesting specific details about how, with what and where manufacturing happens. Consumers aren't the only variables here either; governments often set boundaries that limit waste and push for reclamation.

Ethical practices and sustainable sourcing are vital components of a successful operation, and opting for a circular chain can help push you in the right direction.

While this strategy can be difficult to implement, the circular method can cut costs considerably.

A Research and Markets report expects the reverse logistics market to exhibit a CAGR of 5.80% during the forecast period of 2022 to 2027.

#### 6. Cloud-based Products

Cloud systems offer similar levels of functionality and security as their on-premise counterparts while reducing sunk costs and customization woes that plague traditional software.

The cloud SCM market is expected to grow in 2022 and beyond. In fact, a recent Markets and Markets report shows the cloud-based supply chain management market will grow to nearly \$45.2 billion in value by 2027.

When we spoke to Jim Tompkins, Chairman and CEO of Tompkins International, he gave us a few reasons for this growth. The biggest reason he gave above all else was that "people are over the fear of someone else controlling them."

In the past, many opponents of cloud-based software were worried about an outside party accessing their

software, especially with complete control over their uptime and security. But as cloud-based systems gain popularity, vendors work to be reliable and trustworthy business partners.

Since people aren't so afraid of the cloud anymore, they can focus on the actual benefits of this deployment.

"Now, [people are starting to think about] speed of implementation, cost of upgrades, the overall lifecycle of the software and working in the cloud environment in a way that follows the best practices of the developer of the product."

Tompkins noted that companies looking to invest in an SCM solution should be ready to adapt to their new system. Many new buyers believe a customized system must match their business's exact processes and requirements.

In reality, businesses should consider configuring SCM products to support their ultimate goals, either through cloud-based flexibility or ultra-customizable on-premise solutions.

An on-premise solution allows you to customize your software to support your business processes exactly as they stand. Configurability means your software will support your business overall, but you may find yourself changing some processes to work better with the technology.

#### 7. AI and IoT

KushalNahata, CEO of FarEye, is focused on how software can give businesses a competitive edge.

Stakeholders will [need to] know the status of every resource and when and where their shipments are ... In today's time where eCommerce is disrupting the online shopping landscape, supply chain management can be a brand differentiator.

In order to keep the customers hooked and loyal towards one brand, a lot of effort [should be put] into upgrading the technology,"

According to Nahata, the first supply chain management trend to grow is the Internet of Things (IoT).

"The main drivers behind the growth of IoT are the availability of cheap and reliable sensors, internet penetration, the massive increment in data storage, processing capabilities and the emergence of AI.

The future of IoT will increase productivity in delivery and supply chain industries. Many logistics experts use these new resources to enhance their supply networks, reduce costs and generate revenues."

He also predicts an increase in artificial intelligence to solve the many inefficiencies in today's supply chains.

"The supply chain has historically been like a black box for enterprises, with customers not knowing about their goods' condition.

Due to unpredicted freight movement, manufacturers are losing a lot of time, money and inventory. India alone spends about \$160 billion on road logistics, twice [what is spent by] countries with efficient transportation infrastructure."

Nahata stated that many companies are already turning to AI to optimize their supply chains, as it easily reduces time and money spent while speeding up processes.

"Artificial intelligence can reinvent business models by revamping how you look at future supply chain management trends. Al analyzes today's operations patterns to predict the possible outcomes of tomorrow's scenarios.

It automates lower-level decision-making and balances the supply with the forecasted demand. Managers can thus indulge their skills in high-level decision making and strategizing."

#### 8. Robots and Automation

For years, we've all heard about how autonomous mobile robots (AMRs) transform supply chain trends. The adoption of modern robotics in the supply chain comes with a few obvious benefits.

These advantages make it easy to see how the global robotics market will rise to a value of \$91.8 billion by 2026 from \$55.8 billion in 2021.

Instead of requiring human presence to set up new machinery at a physical location, robotics providers can activate and integrate their product with your processes from a safe and remote location.

Automation carries an, albeit understandable, stigma for snatching up jobs. It takes over low-value tasks while allowing you to re-focus more on high-priority tasks and challenges.

Instead of shedding employees, managers can upskill their current workforce. This strategy means WMS (warehouse management system) companies may see a greater effort to ensure their systems can work with AMR systems.

We may also see a greater emphasis on automation in general for the small market segment that has to choose between the two products.

#### 9. 5G Networks

Now that we have 5G networks beginning to enter the world stage, how will this technology alter the future of supply chain management? With IoT-enabled devices flooding the market, networks that can handle huge amounts of devices are necessary.

The difference between 4G and 5G network density is staggering. 4G networks can handle 10,000 devices per square mile, while 5G supports 100 times that amount. With digital transformations becoming mainstream, a heavy-duty network needs to be in place to ensure that communication between processes, machinery and users is quick and seamless.

5G boosts quality and optimizes vital portions of the supply chain from logistics to distribution and warehouse management.

#### 10. Capacity Crunch

For the past few years, the specter of a capacity crunch pushed the trucking industry to the limit. There were signs that things could correct themselves in 2020, but with the advent of the pandemic, things look grim for the near future.

As consumers turn to an online environment, delivering goods to them on time is a challenge. There were hopes that things would slow down enough for crunched distributors to catch up, but this isn't the case today.

The constant need for product transportation means an increase in revenue, but with major logistics challenges. Among the obvious issues with nearconstant demand, smaller issues like truck maintenance become vital to head off.

A truck breaking down or going out of service can cause a devastating ripple of slow-down, especially in times of record demand. It's going to be more important than ever for companies to keep track of their business processes in an agile way that can keep up with changes in the market.

Truck manufacturers will need to invest in manufacturing software to help them automate processes and cut costs. Shippers and trucking companies may need stronger supply chain collaboration systems to navigate a changing landscape that has otherwise been relatively stable in the past.

#### In Conclusion

The coming years will bring both new challenges and technologies to businesses working in the supply chain. Businesses will begin to focus on supply chain resilience to combat unexpected disruptions. Leveraging technology like digital supply chain twins, robotics, Al and automation will help keep chains agile, flexible and scalable.

Blockchain will step into the spotlight and provide visibility into transactions and processes. The market for cloud-based systems will continue to grow, alongside supply chain support in the form of SCaaS.

Source: www.selecthub.com





# THE FUTURE IS YOURS TO SHAPE: 6 SUCCESS FACTORS FOR A FUTURE-PROOF SUPPLY CHAIN

**SENIOR PARTNER, PRODUCTION & LOGISTICS** he year 2020 was a living demonstration of

how fast and dramatic supply chain disruptions could become. Ninety-four percent of Fortune 1000 companies still haven't recovered. Over half of them are forced to downgrade their growth projections in the foreseeable future, as a result. Only a few businesses have achieved the supply chain agility which is necessary to tackle these new challenges. "Future-proofing" has shown to be critical to ensure a company's resilience in times of crisis. To build a future-proof supply chain, a few crucial imperatives need to be considered. Luckily, you don't have to be a fortune teller to see the future just read on to do so.

#### 1. KNOW YOUR WEAKNESSES AND PREDICT YOUR RISKS

In the sporting world, you're only as agile as you are alert. It takes extreme awareness to react to unexpected swipes and throws on the field. In supply chain management it's similar, the faster you can detect opportunities and threats, the sooner and better you can respond to them. Therefore, one huge goal is to guarantee supply chain visibility and transparency. The benefits of supply chain transparency lie in the possibility to identify potential risks and vulnerabilities at an early stage. This identification may require a bit of digging – looking deep into your network to identify strong dependencies on e.g. one single supplier - but believe me: it's definitely worth it.

The most adaptive supply chains are able to predict shipment disruptions long before they occur. Strategic planners are increasingly turning to predictive analytics as an enabler for forecasts once transparency is guaranteed and data is collected. Building on observations and learnings of the past as well as actual data, analytics can spot for example weather extremes, material shortages, and demand fluctuations before they become influential to supply chains. Of course, Artificial intelligence (AI) also has its part to play. The more information you have, the more proactive measures can be initiated. So, it's time to haul out those crystal balls. It can save you a fortune in supply chain costs.

HENRIK SONNENBURG

SIEMENS

Naturally, not every potential disruption of your supply chain can be predicted – this would be magic. However, creating supply chain transparency while controlling vulnerabilities will reduce risks significantly.

#### 2. LOOK BEYOND YOUR BORDERS AND STRENGTHEN YOUR ECOSYSTEM

A strong ecosystem of partners is essential to collaboratively tackle supply chain threats. The importance of ecosystems to ensure future-proof value chains is steadily growing. Companies need to break up internal as well as external silos to ensure faster data sharing and value creation. They need to decide which stakeholders (suppliers, business partners, organizations, etc.) to include and how to collaborate efficiently. If single suppliers have been identified to be of high risk for your supply chain, diversifying the network can be the answer. To give a concrete example: Multitier supply chains are becoming more popular in numerous sectors as they rely on several single-level collaborations instead of one multi-level one. Multitier collaboration platforms aren't always easy to use, though. One weak link in the collaboration annihilates the entire chain, means they're only as effective as their least adept participant. Digital platforms can be a great enabler in this area creating consistent transparency and improving connectivity. Platform-based ecosystems can help by integrating all supply chain tools and synchronizing timelines and therefore optimize your processes sustainably. To unlock the benefits of supply chain resilience, you have to invest in not only building up but also managing a strong ecosystem.

#### **3. INTEGRATE INNOVATIVE TECHNOLOGIES TO STAY AHEAD OF TIME**

We live in a world where automated processes and robotics become more and more part of modern life basically a world that science fiction authors pictured decades ago. The technology landscape changes rapidly. Characteristics of supply chain 4.0 like digital twins, big data, augmented reality and the Internet of Things (IoT) revolutionize processes and organizations and can bring enormous benefits for your operations. Automation can increase efficiency for repetitive and high-volume tasks, freeing up time for your staff to concentrate on more value adding activities. Technologies like process mining increase transparency, can be used to track process quality and process deviations in real-time and allow you to be ahead of your competitors by immediately taking corrective actions. Also, on a more operational level, technologies like automated guided vehicles (AGVs), picking robots and more can speed up your warehouse processes and support you in satisfying your customer needs faster and more reliable.

Implementing new technologies turbo-charges your analytics by gathering more data than ever before, benefitting your predictive power enormously. However, technology needs to serve the business – not the other way around. Make sure to prove that the selected solution brings long-term business value before applying it.

# 4. ACT SUSTAINABLY TO SHARPEN YOUR FOOTPRINT

Successfully implementing future supply chain strategies must mean that there is an operational fit in your organization that puts sustainability at its core. True, certain aspects of digital transformation in supply chain management can help to overcome some of the short-term pains associated with organizational change, but the transformation must always focus on how sustainable business practices will become. In this regard, organizations must have a clear vision of what sustainability means to them and how they will put this at the heart of their supply chain systems going forward. Acting responsibly requires integrating sustainability criteria in daily decisions and assessing environmental and social risks at any stage. Designing a sustainable supply chain is about looking beyond the next quarter, year or decade and act upon a long-term vision of the future. We all know: the time to act is now!

To make your supply chain future-proof, you will need to see the holistic picture and make your

supply chain not only transparent, but sustainable, data-driven and focused on a strong ecosystem while leveraging your own strengths.

#### **5. FOCUS ON YOUR STRENGTHS**

In many ways, supply chain resilience is an aggregation of your greatest strengths. When you focus on the personal assets you bring to the table, you can push your resilience to unparalleled heights. It's you who tweaks your strategy and you who decides on your business values. Your supply chain might be marching into the future, but it still needs some traditional human values. Similarly, your corporate culture and brand determine the strength of your ecosystem. Business leaders need to foster new digital-driven mindsets. If the individuals in your supply chain are allowed to flourish, so will the greater system. The modern supply chain is overwhelmingly reliant on digital technology, but the more human its strengths, the more adaptive its future.

# 6. THINK BIG, THINK VISIONARY – BUT WITH A CLEAR GOAL IN MIND

Ultimately, you might think of your supply chain as an attempt to control the future, so don't forget your vision along the way. Having a clear vision in mind, based on your business strategy, fitting your operational processes and cultural environment is core for success. Your goals will determine the principles you espouse in your everyday transactions. In the end, making your supply chain future-proof is about implementing long-term change. Failing to do so will mean that your more forward-thinking competitors are beginning to outstrip your organization already. And yet, change for change's sake will not work either.

Think big. Think clear, and your ultimate supply chain strategy will come to the fore. To make your supply chain future-proof, you will need to see the holistic picture and make your supply chain not only transparent, but sustainable, data-driven and focused on a strong ecosystem while leveraging your own strengths. Avoiding future disruptions won't come easy (as long as you are no fortune teller) – but will make your company navigate the digital future

Source: www.siemens-advanta.com



# THREE WAYS TO FUTURE-PROOF YOUR SUPPLY CHAIN CHARLIE STEER-STEPHENSON

#### The global supply chain is facing unprecedented challenges. But, these hurdles can be overcome with resilience, agility, and a commitment to sustainability

Supply chains continue to struggle against the enduring impact of the COVID-19 pandemic, the ensuing economic crisis, and the ongoing conflict in Ukraine. Amidst these uncertainties in the financial and manufacturing worlds, companies are also being advised to take extra care in managing risks that could interrupt the supply chain by planning ahead as much as possible. McKinsey outlines three ways that companies can, and must, prepare for the future: by building resilience, boosting agility, and strengthening sustainability.

**Building supply chain resilience by managing risk :** Avetta reports that 85% of companies are hit with at least one interference in their supply chain every year. Not all of these interruptions can be predicted, but careful risk management will protect you against a complete downfall in the face of unforeseen events. At our recent Procurement & Supply Chain LIVE event, David Shepherd, the Global Head of Strategic Partners Director and Risk at LSEG explained:

"The pace of risk is changing. This is not the first time we have faced disruption and it won't be the last, contingency planning will be important to navigate these challenges. And those that are the quickest to react to risk will gain a competitive advantage." Sportswear manufacturer and seller Nike is a prime example of how, when it comes to supply chain resilience, future-proofing with risk management can be life-saving. When the COVID-19 pandemic broke out, Nike responded quickly by using radio frequency identification (RFID) technology to track goods along the supply chain. The company also used predictivedemand data to prevent inventory build-up, as sales transferred from in-store to online, thereby reducing the impact of store closures.

As a result, Nike's sales in China fell by only 5% - a minor figure compared to the much higher sales reductions experienced by other clothing brands. These are unprecedented times for the global supply chain. It's therefore crucial that companies take measures to build their resilience, by preparing for threats to cybersecurity, finance, operations, and reputation.

Using technology to increase supply chain agility: Whereas resilience is about being able to survive in the face of unexpected challenges, agility depends on companies responding to change with adaptability. In a world where consumers' demands are ever-changing, it's important that brands can match customers' needs. This involves altering the supply chain where necessary – for example, by switching to a predominantly online platform when in-store sales are likely to go down, like Nike did during the pandemic. Following a recent panel at the 84<sup>th</sup> Inland Transport Committee roundtable, McKinsey's Tom Bartman explained how automation is one way that companies can respond to the effects of the ongoing labour shortage and global bottlenecks on the international supply chain.

"This isn't an easy thing to overcome. The executives that we spoke with on the panel are focusing their effort on two high-promising places. The first is around automating their supply chains. What's really interesting about this is, before the COVID-19 pandemic, the logic and rationale for automation was very much financial. Today, the cause for automation is as much, if not more, about risk mitigation as it is for financial performance" Bartman said.

Automation technology has the potential to transform the efficiency of manufacturing production and logistics. Some companies (such as AspenTech) have already started using artificial intelligence (AI) and machine learning (ML) to analyse predictive-demand data. Once adopted more widely across the supply chain, this technology will be a huge boost to the speed and efficiency of autonomous planning.

"The second thing that we're seeing is more coordination up and down the supply chain. So these executives are looking for ways to bring together all participants across their supply chain, to have more seamless transmission and visibility of data about status and process through the supply chain. The goal here is, really, to provide more transparency, to take action in advance of a challenge, and seeing further up and down the supply chain allows each player to make decisions in better coordination with other players in the supply chain", Bartman added.

**Identifying and promoting ways to be more sustainable:** When it comes to companies' environmental, social and governance (ESG) commitments, transparency along the supply chain is also important. Despite the chaos that destabilised the supply chain during the COVID-19 pandemic, over two thirds of supply chain executives claimed that sustainability was a top priority.

With the United Nations' 2030 Sustainable Development Goals taking centre stage in 2021 and 2022, and consumers' increased attention to businesses' outward commitment to sustainability, companies smart enough to avoid reputational or financial risks are paying careful attention to their ESG goals. Supply chain management is central to this global sustainability initiative, whether it's by reducing packaging and emissions or supporting the circular economy and post-consumer recycling. UPS is a key example of a leading ESG-friendly supply chain promoting its sustainability initiatives to the world. One of the company's primary targets is to achieve carbon neutrality by 2050. It plans to do this by increasing efficiency with resources, switching to alternative technologies (like AI powered infrastructures and electric vehicles), and improving communication across the supply chain.

The uncertainties of the present and future mean that companies have no choice but to become more resilient, more agile, and more committed to the global sustainability movement. Technology is a vital component within risk management, increasing agility and improving sustainability. But ultimately, it's the people behind supply chains who must look ahead and plan for the future – if their company is to have one.

Source: https://supplychaindigital.com/



## **AURANGABAD BRANCH**

Society of Automotive Engineers India (SAEINDIA) had organised Two days Conference in Association with Indian Institute of Materials Management, Aurangabad Branch on the theme - " Global Automotive Supply Chain Challenges and Opportunities" - Inching towards Atmanirbhar Bharat as on 9th & 10th Nov 2022 at Marathwada Auto Cluster (MAC), Aurangabad.



From Left Mr. Prasad Kokal Dr.Ulhas Shiurkar-Director Mr.Rushi Bagla -CMD Bagla Group Mr.Lalit Lohade - Mr. Pawan Chaudhari visited IIMM Stall



Group Photo of Visit to IIMM Stall by SAE India National President IIMM Committee during two days conference

The two days conference was graced by top class speakers. **Mr.SanjaySanghai**, Executive. Vice -President (Group Purchase) at Endurance Technologies Ltd as well as National Council Member of IIMM was the keynote speaker on Topic - **"Redefining Innovations for Supply Chain".** 

Other Keynote Speakers - Mr.PrasadKokil, Mr.S.N.Panigrahi, Mr.Mohan Nair who all are life members of IIMM delivered excellent sessions on various topics of Supply Chain.



Mr. Sanjay Sanghai was Key Note Speaker on topic Redefining Innovations for Supply Chain.

IIMM, Aurangabad Branch also had their stall in the exhibition centre where various students and Industry people visited. Mrs.RashmiUrdhwareshe recipient of President's

Nari Shakti Award, Mr.Rishi Kumar Bagla, CMD of Bagla Group Of Industries, Mrs.MohiniKelkar, MD of Grind Master Ltd, Mr.PrasadKokil, MD of Sanjay Techno Products Pvt Ltd and other esteemed dignitaries visited the stall and appreciated the work of IIMM, Aurangabad Branch.

From Aurangabad Branch - Mr.K.Srihari (Chairman), Mr.SushantPatare (Vice Chairman), Mr.Shrikant Muley (Hon. Secretary), Mr.LalitLohade (Hon Treasurer), Mr.Phanikumar (EC Member), Mr.RaviKathavi (EC Member) and Mr.RameshJaulkar (Course Coordinator) attended the event with nominated delegates from Endurance Technologies Ltd, Marathwada Auto Compo Ltd, Badve Engineering, BG-Li-In Electricals Limited, Techno craft Tooling's, etc attended the event.

### **BANGALORE BRANCH**

**21**<sup>st</sup> **September 2022 – Inhouse Training Program :** Indian Institute of Materials Management, Bangalore Branch organized an Inhouse Training Program on "**Open - yard warehousing systems**" for the executives of **Tata Power Company Limited** on 21<sup>st</sup> September 2022 from 9.30am to 1.00 pm.

Senior Faculty Mr. T.S. Balachandran and Mr. Jayaraman handled the sessions and covered on the topic, Classification of Materials, Open Yard Storage Layout, Ware house processes, Root cause analysis methodology, logistics FMEA, and defining action plan for implementation.



Dr. P. Sengottaiyan Branch Chairman handing over a Certificate to CSCM Successful Candidate



Mr P.M.Biddappa, Chairman SCALE 2022 felicitating Mr. CL Kapoor on the occasion of Get together meeting

The faculty made the proceedings lively and interactive with a good mix of professional inputs, case studies. We have received excellent feedback on the value addition from the participants.

#### 14th October 2022 – Evening Lecture Program/ Webinar:

Indian Institute of Materials Management, Bangalore Branch organized the Monthly Lecture Program / Webinar on "National Logistics Policy 2022" on 14<sup>th</sup> October 2022 on MS Team Meet. Mr. A.V. Sham Sundar, Vice Chairman, welcomed the gathering. Mr. G. Balasubramanian, MC and co-ordinator of program, introduced the Speaker and presented about IIMM Activities.

Mr. V. Guruprasad, Chartered Accountant, discussed and address on the salient features of the New NLP 2022. The program was well received by the participants. Mr. M.R. Achyuth Rao, Honorary Secretary, proposed Vote of Thanks.



Mr. Himanshu Srivastav, Addressing the Gathering



Mr. Kamal Jain Speaker addressing the Gathering

#### 20th October 2022 – Study Circle Meeting / Webinar:

IIMM-Bangalore Branch organized a Study Circle Meeting / Free Webinar on 20<sup>th</sup> October 2022 (Thursday) on the topic "Emerging Trends in Manufacturing and Quality on MS Team. Mr.Sham Sundar A.V., Vice Chairman, welcomed the gathering. Mr. G. Balasubramanian, Co-ordinator introduced the speaker and presented on about the IIMM.

Speaker: Dr. Narasimha Murthy M.A. Senior Director – Infineon Technologies addressed the gathering. The study circle meeting was conducted by him a close overview on emerging technology which will drive the future and was useful and well received by the participants.

Mr. M.R. Achyuth Rao, Honorary Secretary proposed a Vote of Thanks.

#### 9<sup>th</sup> November 2022: Industry visit:

IIMM Team Mr. P.M. Biddappa, NC Member, Mr. Kapanipathi, Honorary Treasurer and Mr. S.M. Nagaraj, Senior Manager Administration, IIMM, visited Bosch Limited, discussed Education Courses, and Membership of IIMM.

#### 9<sup>th</sup> November 2022 – Evening Lecture Program:

Indian Institute of Materials Management, Bangalore, organized the Monthly Lecture Program /Webinar on "Decoding National Logistics Policy 2022 in association World Trade Centre (WTC) Bangalore, Kochi & Chennai.

Dr. P. Sengottaiyan Branch Chairman, IIMM Bangalore

Branch welcomed the gathering and introduced the speaker. Keynote Speaker Mr. K.M. Harilal ITS, Joint Director General of Foreign Trade, Kochi, Address the Gathering. Other speakers Mr. Hmanshu Srivastava, National Head, Business Advisory Services ASA & Associates LLP and Mr. Kaml Jain, Director, Cargomen Logistics India Private Ltd addressed the gathering and interacted with the participants and also clarified for the points raised by the participants.

Mr. Vivek George, of WTC proposed vote of Thanks and Co-ordinated entire webinar very nicely, with Technical support of Mr. Sandeep.

This has been one of the most well received Lecture programs in recent times with more than 160 SCM professionals in attendance. The feedback received from the participants is excellent.

16<sup>th</sup> November to 19<sup>th</sup> November 2022: Workshop :

IIMM Bangalore Branch organized a Four-day workshop on **"Warehousing and Logistics Management Through Data Driven"** from 16<sup>th</sup> November 2022 to 19<sup>th</sup> November 2022 in association with ISME. The workshop was very interesting with good interaction from the participants and speakers and good feedback received.

## **CHANDIGARH BRANCH**

IIMM Chandigarh branch organized one day training program on Negotiation Skills for Sourcing and Project team of Steel Strip Wheels India Ltd at Hotel KLG Starlite, Chandigarh on 15 th October 2022. Types of Negotiation, strategies, Negotiation process, when one has to do Negotiations, different behavioral aspects, conflicts resolving techniques, traits of a good negotiator etc were discussed with participants. Case studies and role plays were the main attraction of the program. Training was organized by our faculty Mr S K Sharma and Mr Tej Magazine. Mr Sandeep Sharma Sr Executive Director, SSWIndia shared his rich experience in his inaugural speech. At the end, on the spot written test was organized. Program was well appreciated by Management and participants. More such programs with the company are in the pipeline in near future.



## **NEW DELHI BRANCH**

**Report on the seminar on "Contract Management and Dispute Resolution":** IIMM Delhi branch organized a one-day seminar on Contract Management and Dispute Resolution on 12 November 2022 at Hotel The Park Connaught Place.



The Programme was inaugurated by Dr Atul Gupta, Additional Member, Railway Stores, Railway Board, Ministry of Railways. In his inaugural address he differentiated procurement from purchasing. He mentioned that procurement was the most important activity that entails 60% of revenue of business transaction. He also stressed upon the need for disruptive innovation quoting present context. Shri H K Sharma, National president, IIMM and Former Additional DG Commerce Ministry in his key note speech set the base for the seminar by explaining contract in simple terms and also emphasized the need for an effective contract management that could lead to zero disputes. Shri Sanjay Shukla, Chairman IIMM Delhi branch welcomed the guests and the gathering. Shri T G Nandakumar, Seminar Chairman and Coordinator proposed a vote of thanks for the inaugural function.

In the first technical session Shri Sanjay Agarwal, Advisor, Procurement Policy, Ministry of Finance explained consultancy and service contracts. In his speech he highlighted the aspects which were required to term a contract as a consultancy contract and changes that had taken place in the last ten years. He stressed upon the importance of the use of Quality-Cost Based Selection (QCBS) for non-consultancy contracts and Fixed Budget Selection (FBS) for consultancy contracts.





Shri Kanwalpreet, Director Public Procurement Division, Deptt. Of Expenditure Ministry of Finance in the second technical session presented various stipulations of procurement policy. He highlighted the clauses that were under the "shall" category which could not be modified whereas other clauses might be modified with approvals from competent authority with proper justification.

The speaker of the third technical session was Shri H K Sharma, National President, IIMM and Former Additional DG, Commerce Ministry. His presentation was a continuation of his key note speech and stressed upon the need for a more careful planning and RFP stage. He mentioned that a poor contract management always resulted in "CHAOS".

The fourth technical session was on Smart Contracts. Shri Madhu Ranjan Kumar, Head Rresearch in Public Procurement Ministry of Finance speaking on the occasion explained what a smart contract was. He also explained the concept of block chain associated with smart contract. The fifth and final technical session was on Dispute resolution. Shri Tejas Karia, Partner and Head Arbitration, Shardul Amarchand Mangaldas detailed various clauses in arbitration and how arbitration could be made effective by quoting various cases. Especially the amplified the concepts of penalty and liquid damages.

During the seminar Dr Suresh Kumar Sharma, Past National President and Joint Chairman CRIMM brifed various activities of CRIMM. Shri Sanjeev Kumar Bhatia, Hony. Treasurer, IIMM Delhi branch and Vice President Indraprastha Gas Ltd summed up the activities of the day and proposed a vote of thanks. The seminar was well received and attended by 70 delegates.

## VADODARA BRANCH

**PRELIMINARY ROUND OF YOUNG MATERIALS MANAGER COMPETITION HELD AT IIMM VADODARA BRANCH ON 16<sup>TH</sup> OCTOBER 2022**: IIMM Vadodara organized the Preliminary round of Young Materials Manager Competition 2022 with Theme being "**Risk and Resilience Management in post pandemic Supply Chain**" on 16<sup>th</sup> of October 2022 with Participants from 8 Companies from in and around Vadodara taking over the show. The participant Companies were as follow:

- 1. Aarti Industries Limited represented by Mr. Anand Sarvaiya & Mr. Nitin Katrodiya.
- 2. Prodair Air Products India represented by Mr. Nirav Thakkar & Ms. Avani Bhatia.
- DCM Shriram Limited Team 1 represented by Mr. Gaurav Chhabra & Mr. Akshay Patel.
- DCM Shriram Limited Team 2 represented by Mr. Jaymeen Vaghasiya & Mr. Hardik Bhatia.
- L & T Energy Hydrocarbon Team 1 represented by Mr. Kunal Purohit & Mr. Himanshu Aggarwal.
- 6. L & T Energy Hydrocarbon Team 2 represented by Ms. Deepdisha Rathore & Ms. Dipti Bapat.
- 7. Idex India Pvt Limited represented by Mr. Dhaval Naik & Mr. Ricky Shah.
- Siemens India Limited represented by Ms. Mohita Pandya & Ms. Kirti Ramchandani.

The jury decided to go and declare Two Winners for the Top prize and 2 Runners Up Prize which are as follow:

- 1. Winner: Mr. Dhaval Naik & Mr. Ricky Shah from M/s Idex India Pvt Ltd.
- 2. Winner: Ms. Mohita Pandya & Kirti Ramchandani from M/s Siemens India Ltd.
- 3. 1<sup>st</sup> Runners Up: Mr. Nirav Thakkar & Ms. Avani Bhatia from M/s Air Products India.
- 4. 2<sup>nd</sup> Runners Up: Mr. Gaurav Chhabra & Mr. Akshay Patel from M/s DCM Shriram Ltd.

# IIMM Vadodara Branch has decided to send Both the Winners Team to NHQ for their Participation in the Final Rounds of Young Materials Manager Award to be held in Chennai on 1<sup>st</sup> December 2022.

Mr. Malay Mazumdar Concluded with Vote of Thanks and also stretched upon how the competition has helped all the participants to brush their knowledge of what is going on in the present scenario and also to the audience for keeping themselves updated with the current industry perception.

He also put forth the need of young Materials professionals to come and join a Professional body like IIMM so that they can be groomed by such kind of activities being regularly taken under the brand umbrella of IIMM.



Joint Winners Trophy and Certificates awarded to Ms. Mohita Pandya & Ms. Kirti Ramchandani from M/s. SEIMENS INDIA LIMITED by Mr. Krishna Nair and Mr. Kamlesh Vitthalani.



Joint Winners Trophy and Certificates awarded to Mr. Dhaval Nayak & Mr. Ricky Shay from M/s. IDEX INDIA PVT LIMITED by Mr. Krunal Shah and Mr. Kishorkumar M Patel.



Runners Up Trophy and Certificates awarded to Mr. Gaurav Chhabra & Mr. Akshay Patel from M/s. DCM SHRIRAM LIMITED (Team No.1) & to Mr. Nirav Thakker& Ms. Avani Bhatia from M/s. Prodair Air Products India.



Group Photo of all the Participants who Participated in Preliminary Round of YMM Competition held on 16<sup>th</sup> of October 2022.



### MATERIALS MANAGEMENT REVIEW (MMR) Annual Subscription (for 12 Issues) Rs. 1000.00 Order Form / Renewal Form

		Subs. No.: P.N	
Name of the Subscrib	er / Organization		
Address of the Organi	zation		
Phone	Fax	E-mail	
Subscription Period From (month year)		to (Month, Year)	
<i>Payment enclosed</i> Cheque / Draft (Favor for Rs	uring IIMM, Payable at Mum Drawn on Bank	nbai) NoDated	
Branch Please bill us Signature of the Subs	criber	·	
Please return the fo Indian Institute of Ma 4598/12 B, Ist Floor, Phones : 011-436153 E-mail: mmr@iimm.o	<b>rm to :</b> aterials Management (IIM Ansari Road, Darya Ganj, 73 Fax: 91-11-43575373 ro	<b>M)</b> New Delhi - 110 002.	

E-mail: mmr@iimm. Website : iimm.org

## ADVERTISEMENT TARIFFS

Position		Monthly Rate (Rs.)	Annually Rate (Rs.)
Back Cover	(4 Colors)	30,000.00	2,50,000.00
II/III Cover	(4 Colors)	25,000.00	2,00,000.00
Full Page	(4 Colors)	20,000.00	1,75,000.00
Full Page	(B/W)	15,000.00	1,25,000.00
Half Page	(B/W)	10,000.00	1,00,000.00
Quarter Page	(B/W)	8,000.00	75,000.00
Strip		5,000.00	50,000.00
Tender Notice	(F/P B/W)	20,000.00	
Placement News	s(H/P B/W)	10,000.00	

Advertisement material alongwith Cheque / Demand Draft should be drawn in favour of IIMM Mumbai and despatched at the following address

#### INDIAN INSTITUTE OF MATERIALS MANAGEMENT

4598/12 B, Ist Floor, Ansari Road, Darya Ganj, New Delhi - 110 002. Phones : 011-43615373 Fax: 91-11-43575373 E-mail: mmr@iimm.org

#### Add Rs. 20/- Extra for Outstation Cheques.

IIMM NHQ : Plot No. 102 & 104, Sector-15, Instl. Area, CBD Belapur, Navi Mumbai-400614. Tel.: 27561754 / 2756 5831, Fax : 022-27571022 E-mail NHQ : iimmnhq55@gmail.com, members@iimm.co.in E-mail Edu, Wing : iimmedu@iimm.co.in, Website : www.iimm.org

## AURANGABAD BRANCH Indian Institute of Materials

ManagementThird floor,T-01, Khivansara, August High Street, Ulka Nagari, Aurangabad - 431005 Mob-09423455983/9765402066 iimmau@rediffmail.com

#### AHMEDABAD BRANCH

Indian Institute of Materials Management C/o Sa Raa Group Of Companies406, Kalasagar Shopping HubOpp, Saibaba Temple, Nr Sun N Step Club Sattadhar Cross Road Ghatlodia, Ahmedabad,-380061(Gujarat) Mob-099099990711/7383012684/ 9374012684 iimmahmedabad@gmail.com

#### ALWAR BRANCH

Indian Institute of Materials Management 15, Shopping Centre, Shanti Kunjalwar -301001 (Rajasthan) MOB-09731245655/07877745655 Email-id-iimmalw@gmail.com,

#### BANGALORE BRANCH

Indian Institute of Materials Management # 304, A-Wing, III Floor, Mittal Tower # 6 M G Road, Bangalore – 560001 TEL-080-25327251/52 iimmbg@airtelmail.in

#### **BHARUCH BRANCH**

Indian Institute of Materials Management303, Vinay Complex, Near Dudhdhara DairyOld NH Highway # 8, Bhaurch Mob-09998975891

#### iimmbharuch@gmail.com **BHILAI BRANCH**

Indian Institute of Materials ManagementRoom No. 326, 3rd Floor Ispat Bhawan, Bhilai Steel Plant Bhilai - 490001 Tel-0788-2892948 krparker@sail.in

#### BHOPAL BRANCH

Indian Institute of Materials Management 4/9-B, Saket Nagarbhopal – 462024(MP) Mob-08085856437/09479747246 sameersharma3@rediffmail.com

#### BILASPUR BRANCH

Indian Institute of Materials Management C/o. Gen. Manager (MM) HOD3rd,Floor,MM Department South Eastern Coalfields Ltd.,Seepat Road, Bilaspur - 495006 (CG) Mob-09827185719 iimmbsp@gmail.com

#### BOKARO BRANCH

Indian Institute of Materials ManagementPurchase Dept. Ispat BhawanBokaro Steel City – 827001JharkhandMob-08986873175/ 8986874786iimmbokarobranch@gmail.com

#### BURNPUR BRANCH

Indian Institute of Materials Management New Materials Building,Ground Floor,Near Crs Store sail- lisco Steel Plant, Burnyur-713325. ASANSOL (West Bengal) iimmburnpurbranch@gmail.com 09434776532/09434777365

#### CHANDIGARH BRANCH

Indian Institute of Materials ManagementSCO 19-B, Swatik Vihar ManagementSCO 19-B, Swatik Vihar Mansa Devi Complex, Sector - 5Panchkula - 134109 (Haryana) TEL-0172-2556646/4730170 iimmchandigarh2@gmail.com.

#### CHENNAI BRANCH

Indian Institute of Materials Management 4th Floor, Chateau D'Ampa110 (New# 37), Nelson Manickam Road Aminiikarai. Chennai – 600029 TEL-044-23742195/23742750/9444656264 admin@iimmchennai.org

#### **COCHIN BRANCH**

Indian Institute of Materials Management GCDA Shopping Complex, Gandhi Nagar Kadavanthra PO Kochi - 682020 (Kerala) TEL-0484-2203487/9400261874 iimmcochin@gmail.com

#### DEHRADUN BRANCH

Indian Institute of Materials Management Indian Institute of Materials Management Co. Mr.JayeshJoshi, Riddhi Engineering Works, 111, Madhav Complex, Opp: DKV Collage, Jamnagar – 361008 Tel-0288-2750171/9824263869 C/o. 30, Kalindi Enclave Balliwala Chowk, Lane No.2 Dehradun-248001 (UK) Mob-09410397734 raj\_rajender@ongc.co.in,

# DHANBAD BRANCH Indian Institute of Materials Management C/O. Office Of GM (MM) Department, B.C.C.L.Koyla Bhawan,Koyla Nagar,

iimmdhanbad@gmail.com

DURGAPUR BRANCH

durgapuriimm@gmail.com

GANDHIDHAM BRANCH

Mob-09925066322/7046737857 iimm\_gim@rediffmail.com

Guiarat

Indian Institute of Materials Management Ispat Bhawan Durgapur Steel Plant Steel Authority Of India Ltd Durgapur – 713203 (WEST BENGAL)Tel-0343-2740980

Indian Institute of Materials Management1,2,3, Plot # 356, Ward-12B

8,Umashripad Behind NSDNear Vishal

Mega mart Anand Estate Dabolim.GOA

GREATER NOIDA BRANCH Indian Institute of Materials Management

B-193, Swarn Nagri Opp: JP Golf Course Greater Noida – 201308

HARIDWAR BRANCH Indian Institute of Materials Management

97,b Vigyan Kunj, Indian Institute of Technology Roorkee Haridwar - 247667 Tel-01332-284886

Indian Institute of Materials Management

HYDEHABAD BRANCH Indian Institute of Materials Management Building No.6-3-347/9/4/C, First Floor, Union Bank Building,Behind Model House, Dwarakapuri Colony, Punjagutta, Punjagutta, Hyderabad-So0082(f.s) Mr.P.Somayajulu Mob-09949872010 iimm.hyd1719@gmail.com,

Indian Institute of Materials Management 03, Rajmahal Colony, Ext Manik Bag Road, Indore - 452007 (M.P)

Indian Institute of Materials Management

48, Mohan Nagar, Gopalpura Bypass, Jaipur – 302018

Indian Institute of Materials Management

C/o. Mr. Purushottam Khandelwal

Mob-09799299157/09001893395 iimmjaipur1@gmail.com

Room # 6, Russi Modi Centre for Excellence, Jubilee Road,

JAMSHEDPUR BRANCH

Jamshedpur - 831001 Mob-09798171971

iimm jsr@yahoo.co.in

Mob-09350261642

ageetkumar@yahoo.co.in

iimmharidwar@gmail.com

HYDERABAD BRANCH

HOSUR BRANCH

INDORE BRANCH

Mob-09826625417

JAIPUR BRANCH

dr.stmgmt@gmail.com

Tagore Road, Gandhidham -370201 (Kutch)

K G F BRANCH Indian Institute of Materials Management C/o.Santosh Kumar, Manager–Materials EM Division, BEML Ltd., K.G.F-563115 Mom.-09743977684 emvh@beml.co.in Dhanbad-826005 (JHARKHAND) TEL-0326-2230181

HUBLI BRANCH

JAMNAGAR BRANCH

riddhieng@yahoo.com

Indian Institute of Materials Management

Karnataka Chamber of Commerce & industry Bldg., 1<sup>st</sup> Floor,Jayachamaraj Nagar, Near Nehru Ground, Hubli-580020 Tel-0836-2264699/09972703336

KANPUR BRANCH Indian Institute of Materials Management C/o.Kailash Nath, 58, New Defence Colony Opp.Krishna Nagar Telephone Exchange G.T.Road, Kanpur-208007(UP) Mob-07897000150/09935032495 kailashnath119@gmail.com

#### **KOLKATA BRANCH**

Indian Institute of Materials Management 8/B, Short Street, Kolkata – 700017 Mob: 09830952363/9836123999 limmcal17@gmail.com

#### LUCKNOW BRANCH

Indian Institute of Materials Management C/o PK.Bajpai 86/106,Kurmi Tola, Maqbool Ganj, Lal Kuan, Lucknow (UP) – 226018, Modeust 15752999/6307080159 GOA BRANCH Indian Institute of Materials Management124/ iimm lko@rediffmail.com 403801 Vasco-da-Gama Mob-09923425037 sateesh.vernekar1238@gmail.com

#### LUDHIANA BRANCH

Indian Institute of Materials Management C/o. Guru Nanak Industrial Corporation Adj. Hero Cycle Ltd., G T Road, Ludhiana - 141010 (Punjab) Mob-09814027317 iimmldhbr@gmail.com,

MUMBAI BRANCH Indian Institute of Materials Management 2-A, Arihant Bldg, Above Bhandari Co-op Bank Ltd,Goregaon (East),Mumbai– 400063 TEL-022-26863376/4528/09820393639 iimmbom@gmail.com

#### MUNDRA BRANCH

Indian Institute of Materials Management C/o. Durlubh Singh, No. B/04/03, Samudra Township, Old Port Road,Nr.Adani Hospital Dist-Kutch, Mundra - 370421 (KUTCH) Mob-07574807369/09687660462 durlubhsingh.khalsa@adani.com

#### MYSORE BRANCH

Indian Institute of Materials Management Anubhav Udyog, K-64, Hootagalli Ind. Area Mysore - 570018 (Karnataka) TEL-0821-4282124 mysoreiimm@gmail.com,

#### MANAGALORE BRANCH

Indian Institute of Materials Management C/o. Exclusive Shipping&Exports IV Floor,Via: Ashirwad building G H S Road Mangalore-575001 D.K. TEL-0824-2245513/08884345513/ 9845080613, philipcc13@hotmail.com

#### NAGPUR BRANCH

Indian Institute of Materials Management 404, Suryakiran Complex-1 Bajaj Nagar, Nr. VNIT Gate Nagpur – 440010 TEL-0712-2229446 iimmnagpur@gmail.com

#### NASIK BRANCH

Indian Institute of Materials Management 1, Parag Bldg, Patel Lane # 4 College Road, Nasik – 422005 TEL-0253-2314206 iimmnasik@gmail.com

#### NEW DELHI BRANCH

Indian Institute of Materials Management U-135, Vikas Marg, Shakrapur, Near Laxmi Nagar Metro Station, Delhi – 110092 Tel-011-41354969 admin@iimmdelhi.org

NALCONAGAR BRANCH Indian Institute of Materials Management C/o. Mr.S.N. Baghar House, No.A-04, Shree Ganesh Villa Bikash Nagar, P.O-Turanga, Dist-Angul-759123 (Orissa) Mob- 09437081126 snbaghar@gmail.com

PUNE BRANCH Indian Institute of Materials Management Multiple Market Mar Market Mar

RANCHI BRANCH Indian Institute of Materials Management Gen Manager (IMI) Office Central Coalfields Ltd., Darbhanga House, Ranchi – 834001 Mob-08987784115/7257995864 abinashkthakur@gmail.com

#### RAE BARELI BRANCH

Indian Institute of Materials Management 497, Acharya Dwivedi Nagar, Near CMO Office, Jail Road, Rae Bareli -229001 Mob-09451077744/9454146676 iimmrbl@yahoo.com

ROURKELA BRANCH Indian Institute of Materials Management TH-01 (West) Sector-4, Near Mahla Thana Dist: Sundergarh, Rourkela-769002 (Odisha) MOB-08260711943/8895501056 Imar cauricle / Percedi area mm.rourkela@gmail.com

SURAT BRANCH Indian Institute of Materials Management C/o. General Manger(CommI) Krishak Bharati Co Ltd, PO: Kribhaco Nagar, Surat -394515, TEL-0261-2802032 pravendrasingh@kribhco.net

#### TRIVANDRUM BRANCH

Iniyan Institute of Materials Management TC-9/1447, 2nd Floor, Future House Temple Road, Sasthamangalam Thiruvanathapuram – 695010 Mob-07994512438/TeI-0471-2724952 iimmtvpm@gmail.com

UDAIPUR BRANCH Indian Institute of Materials Management 2nd Floor, Above Manohar Furniture 13. Ashwini Marg, Udaipur - 313001 (Raj) TEL-0294-2411969/8107283099 iimmudpr@gmail.com

VADODARA BRANCH Indian Institute of Materials Management Vishal Chambers, 2nd Floor 34, Vishwas Colony, Alkapuri, Vadodara 390007, Mob-07802053410/7043959060 immvadodara@gmail.com,

#### VADI BRANCH

VAPI BHANCH Indian Institute of Materials Management Chip & Bytes, Fortune Mall, Above Jade Blue Via Road, GIDC, Vapi – 396195 Mob-09724214353 iimmvapi@gmail.com

#### V U NAGAR BRANCH

V U NAGAH BHANCH Indian Institute of Materials Management Champs Engineering, 1-57, GIDC Estate Vitthal Udyognagar – 388121 Dist-Anand, (GUJARAT) Mob-09825028050 harshad.champs@gmail.com,

VISAKHAPATNAM BRANCH Indian Institute of Materials Management C/o. CMA Bhavan, Akkayyapalem Jn. Akkayyapalem Highway, Visakhapatnam - 530016 Mob-09885310934/7093802468 iimmvizag@gmail.com

NHO/EDUCATION WING IIMM, Plot Nos. 102 & 104, Sector-15 Institutional Area, CBD Belapur Navi Mumbai – 400614 TEL-27565592/27571022 Admin@iimm.org/ Education@iimm.org

Postal Reg. No. DL(C)-05/1303/2022-24 L.No. U(C)-288/2022-24 Licensed To Post Without Pre Payment

SAP Ariba THE BEST RUN **Reimagine your** Procurement from Source-to-Pay Your company's Procurement function can drive innovation and business value. Connect virtually through every step and piece of data together across the entire source-to-pay process, with SAP Intelligent Spend and Business Networks. = Consolidate and Find new sources Build a healthy, Leverage business control all spending of savings agile supply chain networks for better from source to pay collaboration See what's possible for your organization. Request a demo to learn how SAP can transform your procurement end-to-end, control spending, and build a sustainable supply chain.

> Scan the QR code to schedule a personalised demo today!



**60** Printed & Published by H.K.Sharma on behalf of Indian Institute of Materials Management, 4598/12-B First Floor, Ansari Road, Darya Ganj, New Delhi - 110002 and Printed at Power Printers, New Delhi-110002