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MATERIALS MANAGEMENT REVIEW



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Newly Elected National President IIMM Mr. H. K. Sharma
felicitated by outgoing National President IIMM Mr. Malay Mazumdar

भारतीय सामग्री प्रबंधन संस्थान
Indian Institute of Materials Management

*Congratulations
to you and your*

TEAM NEC -2021-2023



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From the Desk of The National President



Dear Members,

Wish you and your families a very happy prosperous new year 2022.

New National Executive Committee has assumed charge on 17th December 2021 at Vadodara. Let us remember that election is a very small activity of the total activities of this professional body. Election is not Zero Sum game either. On behalf of new NEC Team I assure you that new team will focus on working for all-round development of IIMM without fear or favour. I request all of you to keep aside election and political thoughts for next 21 months and strengthen the hands of new NEC with open minds.

New NEC team will work with a progressive and reformist mindset with passion and energy to bring about a perceptible change in the operations and brand image of IIMM. We shall particularly focus on taking wide range of actions to improve standards of governance, transparency, efficiency and effectiveness. We shall make efforts to create common digital platform across IIMM, establish centres of excellence and central marketing cell, launch expert educational programmes in SCM for industry needs, focus on IT initiatives and work on business process reengineering at NHQ, to mention a few tasks. Special efforts will be made to create compilations of legal and compliance framework applicable to IIMM and the same will be meticulously adhered to. In the long run we will focus on amendment of memorandum of IIMM, electoral reforms, course contents of existing courses and upgrading MMR to a full-fledged journal with focus on research papers.

We have already created new permanent mail IDs for functionaries of NHQ. The work on IT initiatives has also been started. No doubt, the task before us is a daunting one and our targets are ambitious but realistic and achievable. I would, therefore, appeal to all of you to support the new NEC Team in future endeavours. Our ultimate goal is to make IIMM, as the platform of first choice for SCM professionals



H. K. SHARMA

National President, IIMM

np@iimm.org

From the Desk of Chief Editor



Dear Members,

It is worthy to note that, India is the largest provider of generic drugs globally. Indian pharmaceutical sector supplies over 50% of global demand for various vaccines, 40% of generic demand in the US and 25% of all medicine in the UK. Globally, India ranks 3rd in terms of pharmaceutical production by volume and 14th by value. The domestic pharmaceutical industry includes a network of 3,000 drug companies and ~10,500 manufacturing units.

Pharma Industry have played a critical role combating Covid 19 pandemic all across the globe and equally important role was played by Supply Chain Industry. As soon as a drug or vaccine or medicine is developed, it has to reach multiple destinations including large warehouses, distributors, hospitals, clinics, and retailers etc. to cure illness of people at large. Pharma industry have certainly proven itself to be a life saving industry by producing Covid 19 vaccinations.

The Pharma Supply chain is much more complicated in nature compared to other supply chains as it not only involves temperature controlled warehouses, logistics vehicles & equipment but also attracts approvals from various regulatory agencies active in Pharma domain like, ICMR, Central Drug Standards & Control Organisation (CDSCO), National Pharmaceutical Pricing Authority, Ministry of Chemicals & Petroleum and so on. To compound matters further, the same supply chain is responsible for the distribution of prescription drugs, over-the-counter (OTC) medicines, generics, as well as biologics having different handling needs and operational objectives. Success of pharma industry hinges on the right people doing the right things, in the right place and at the right time.

Resiliency is another key factor in pharma supply chain comprising of end-to-end transparency, routine stress-testing and reassessment, reduced exposure to shocks, and integrating the supply chain risk factor in day to day planning and execution, so that right decision can be taken at right time. Pharmaceutical companies can expand their base of suppliers at different but strategic locations so as to strike a balance between Just in Time and Just in Case Inventory levels. With application of latest technological driven tools like IOT, AI, Block Chain and Cloud Computing, it will be easy for pharma industry to track the shipment, its exact location, state & counterfeiting of pharma products.

Without a doubt, the Covid 19 pandemic has kept pharma industry on its toes to push itself beyond boundaries so that human lives can be saved but, Omicron is another test of resilience for Pharma Supply Chains to deliver the goods



H. K. SHARMA
mmr@iimm.org



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Chief Editor & Publisher

H.K.Sharma, National President

Core Committee :

Ashok Sharma,
President 5M India
T.G.Nand Kumar,
Former Head MM, 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.) Gautam Sen Gupta,

Vice Chancellor- Techno India University

Correspondence :

MATERIALS MANAGEMENT REVIEW

**Indian Institute of Materials
Management**

4598/12 B, 1st 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

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INDIAN INSTITUTE OF MATERIALS MANAGEMENT

4598/12 B, 1st 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

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SUPPLY CHAIN 4.0 - TRANSFORMING INDIA'S LANDSCAPE

PREM NARAYAN, IRSS DEPUTY DIRECTOR GENERAL, UIDAI LIFE FELLOW, IIMM LIFE MEMBER, QCI & IRILMM
premn2011@gmail.com

1 . Introduction : If India to become \$5tn economy, a important steps to need to be taken include exploit the opportunities for global trade and become a preferred sourcing hub for the world. The country needs to make it simpler to manufacture and trade within India and globally, investments in trade infrastructure and adoption of digital supply chain alongwith robust logistics infrastructure are necessary to enable Indian businesses stay competitive at a global stage.

Long before industry 4.0 captured the collective imagination, supply chains have been critical cogs across industrial organizations. In recent times, though supply chains have grown to take increasingly worldly and complex shape on adoption of digital and physical technologies that expand the possibilities of what it can deliver. The advent of these technologies have enhanced the interconnected nature of supply chains and allowed it to evolve into more responsive than ever. With this, the supply chain has become more strategically critical component of the organization delivering greatest insights and enabling leaders to take better informed decisions

India's supply chain landscape stand is on the cusp of a revolution with digital's transformative capabilities pushing it to altogether new heights. Considering the backbone of the economy, india's supply chain ecosystem soars to new heights. The Indian logistics sector is expected to be worth \$215 bn by 2020-21, and given its immense potential, there is a need to understand the challenges faced by the sector and remove bottlenecks to progress. With india moving boldly towards claiming its place in the global polity, we are witnessing a fast changing India. As our supply chain infrastructure improves, better regulatory climate, strong global connect and inexpensive and accessible technology present massive opportunities for SCM practitioners to optimize their supply chains. It is only then that supply chain impact will be truly far-reaching and profound.

2. Importance of Supply chain

Over the last thirty years, logistics has undergone a tremendous change: from a purely operational function

that reported to sales or manufacturing and focused on ensuring the supply of production lines and the delivery to customers, to an independent supply chain management function that in some companies is already being led by a CSO - the Chief Supply Chain Officer. The focus of the supply chain management function has shifted to advanced planning processes, such as analytical demand planning or integrated S&OP, which have become established business processes in many companies, while operational logistics has often been outsourced to third-party LSPs. The supply chain function ensures integrated operations from customers to suppliers.

In the Indian context though, the digitally connected supply chain and its potential to drive innovation has yet to fully catch-on, india's nationwide infrastructure issues have often hamstrung our supply chain network, with challenges coming with the territory, be it transporting goods by road, rail or sea. Delay in movement is often the norm, and multiple tax regimes have been an age-old challenge to surmount.

But introduction of GST has eased things considerably so too can digital supply chains kick off the net major growth wave. Logistics costs currently account for as much as 14 percent of india's Gross Domestic Product (GDP), and smart supply chain solutions can play a major role in keeping there costs in check.

Industries as diverse as automotive, retail and manufacturing are adopting digital technologies to help reinvent their supply chains and increase business efficiencies. To note just two examples, RFID AND iot tools are already making their impact by way of operational efficiencies and cargo safety as well as reducing transport costs by increasing the speed of freight movement.

3. Facets of digital supply chains

The emergence of new digital and analytical capabilities, combined with significant policy changes and rising customer expectations, companies in India need to upgrade their supply chain processes. Advance economies with sophisticated logistics ecosystem have demonstrated the benefits of digital transformation

across the logistics value, including warehousing operations, freight transportation, and last mile delivery. There advances can help improve the performance and efficiency of India's logistics sector. Five important facets of digital supply chain namely internet of things (IOT), automation, blockchain, cloud computing and big data analytics are discussed as under.

i) Internet of things (IOT): it represents a unique technology transition that can enable predictive diagnosis and monitoring performance across the ecosystem. Advanced sensors can be deployed to monitor and detect risks pertaining to breakdowns, helping avoid process delays and fatal accidents. Additionally, global positioning system (GPS) and Radio-frequency identification (RFID) systems, are being used to provide real time visibility. This allows service providers not only accurately predict delivery times and improve asset utilization, but also increases engagement as customers track consignments in real time, reducing friction that used to exist on the customer side.

ii) Automation: from the use of robots to self-driven vehicles and drones, automation is going to be a big part of the supply chain of the future. This will reduce manual intervention for better management of costs. Artificial intelligence (AI) can play a big role in this automation drive and improve the quality and speed of services. It also holds the potential to quicken any inspections, curbing the possibility of handling damage and cutting down on inventory holding time.

iii) Block chain: it may be particularly suited to India given the fragmented nature of India's logistics sector and the lack of any common platforms to share information. The sheer quantum of manual data entry increases the risk of human error, and this would help in creating an end-to-end logistics system that is truly integrated.

iv) Cloud Computing: As logistics become increasingly leaner, optimizing asset utilization will be pivotal to enhancing operational efficiency. Cloud computing can enhance collaboration and increase efficiency by allowing service providers to share fleets and networks effectively. It will allow vast amount of data created across the entire value chain to be easily accessed for round the clock monitoring from anywhere.

v) Big Data Analytics: Practitioners can drive future strategy by identifying improvements, all with the use of data analytics. The possibilities are boundless, including estimating the remaining useful life of assets, identifying any operation inefficiencies, and slashing redundancies and costs. Digital can pay rich dividends,

bringing together disparate stakeholders to deliver richer value than ever.

4. Digital supply chain enablers

The transformation into a digital supply chain requires two key enablers - capabilities and environment. Capabilities regarding digitization need to be built in the organization but typically also require targeted recruitment of specialist profiles. The second key prerequisite is to establish IT landscape, an innovation environment with a start-up culture need to be created. This "incubator" needs to provide a high degree of organizational freedom and flexibility as well as state-of-the-art IT systems to enable rapid cycles of development, testing, and implementation of solutions. Fast realization of pilots is essential to get immediate business feedback on suitability and impact of the solutions, to create excitement and trust in innovations, and to steer next development cycles. The "incubator" is the seed of Supply Chain 4.0 in the organization - fast, flexible, and efficient.

Supply Chain 4.0 encompasses the application of the Internet of Things, the use of advanced robotics, and the application of advanced analytics of big data in supply chain management: place sensors in everything, create networks everywhere, automate anything, and analyze everything to significantly improve performance and customer satisfaction.

5. Way forward

India is prioritizing transformation of the logistics sector which will have direct positive impact on the economic growth. It reduces the cost goods and services, improves global competitiveness manufacturers and MSMEs, facilitated trade growth and creates new jobs.

One of the realities of modern day society is that it generates huge amount of data, and this is equally true of modern supply chains. IOT is one definitive technology that will transform India's supply chain through the use of data analytics. It is possible to get real-time data at all points across the supply value chain: inventory levels, point-of-sale information, consumer buying habits, fluctuation in freight costs or raw materials can be adjusted for as needed.

New generation robotics, automated vehicles (AVs) in warehouses, blockchain, IOT sensors are going to permeate India's logistics sector. In the time to come, digital tools will spread across the entire value chain rapidly as organizations start to realize the value of their supply chains with these digital tools.

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PROJECT PROCUREMENT MANAGEMENT AN ESSENTIAL PROCESS FOR SUCCESSFUL EXECUTION OF PROJECTS

SN PANIGRAHI, PMP, ATP INSTRUCTOR (PMI)
GST & International Business & Projects Consultant
Corporate Trainer, Mentor & Author
NC Member & Course Director – IIMM Hyderabad
snpanigrahi1963@gmail.com

What is Procurement?

Procurement is a Formal **end-to-end process** that covers everything from Planning, Sourcing to Negotiating Prices & other Terms, Selecting Vendor, Placing the Purchase Orders, making the Purchases and Acquisition of Goods and / or Services from outside the Organization and Receipt of the Goods.

Procurement Function support the Business Activities that are vital to any organization in accordance with the Quality, Quantity and Timeframe at the Best Price with applied Risk Management Control.

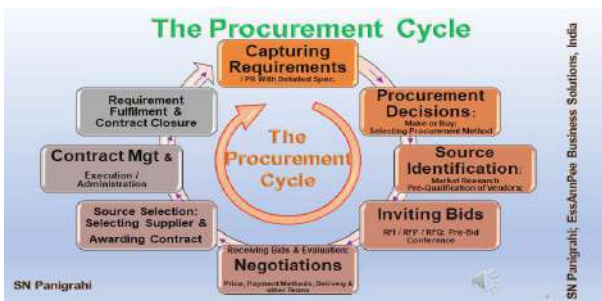
What is Procurement Management?

Procurement Management is Managing all the Processes Involved in Acquiring the Products - Goods and Services needed for Efficient Functioning of the Business Operations and also involves Locating the Best Quality Materials at the Lowest Possible Cost from the most Reliable Suppliers and all the Related Processes, Recordings & Documentation. It also involves Cultivating Positive, Long-term Relationships to Establish Preferred Suppliers.

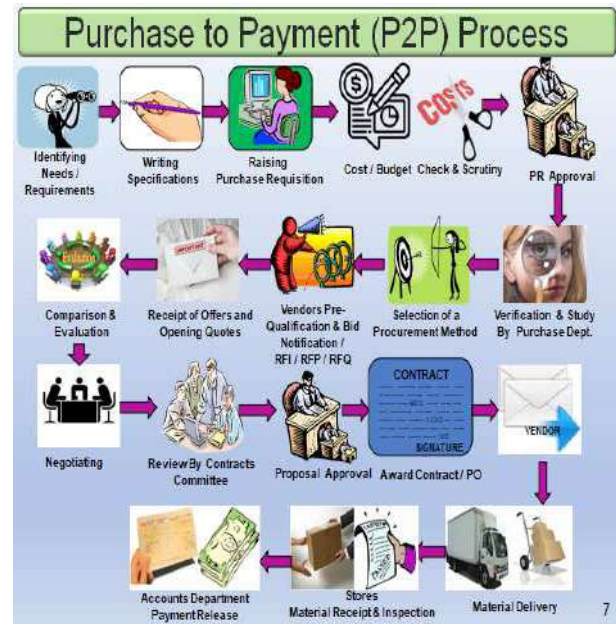
Every **Procurement Process** involves several elements, including requirements determination, supplier research, value analysis, raising a purchase request, reviewal phase, conversion to purchase order, contract administration, monitoring/evaluation of received order, payment fulfilment, and record keeping etc.

Procurement Cycle : The procurement cycle is the transition of events that make up the process of procuring goods or services. An efficient procurement process is critical to the financial efficiency of any project as it aids in paying the right price for goods and services, minimizes delivery times, and helps you choose the best partners to work with your business.

Procurement Cycle includes following Broad Functions:



Purchase To Payment (P2P) Process: Procurement Management is also referred to as the Source-to-Settle (S2S) or Purchase to Payment (P2P) process. It encompasses Identifying Needs / Requirements; Writing Specifications; Raising Purchase Requisition (PR); Cost / Budget Check & Scrutiny; PR Approval @ Different Levels; Verification & Study By Purchase Department; Selection of a Procurement Method; Vendors Pre-Qualification & Bid Notification / RFI / RFP / RFQ; Receipt of Offers and Opening of Quotes; Comparison & Evaluation; Negotiating; Review By Contracts Committee; Proposal Approval; Award Contract / PO; Material Delivery by Vendor; Material Receipt & Inspection @ Stores; Payment Release by Accounts Department.



SN Panigrahi

Procurement – 10 R's

Procurement aims to buy just the **Right Things** - Collectively, the achievement of all the following 10 **Procurement Rights**, provides a framework for effective Purchasing.



Project & Project Management : According to the PMBoK (Project Management Body of Knowledge), Project is a **“Temporary Endeavour to Achieve Defined Objectives by Creating a Unique Product, Service, Result or Outcome with a Definite Start and End Date”**. Project is a Series of Tasks that need to be completed to reach a Specific Outcome.

Project Management is the Application of Processes, Methods, Skills, Knowledge and Experience to Achieve Specific Project Objectives according to the Project Acceptance Criteria within Agreed Parameters. The purpose of Project Management is to Plan and Manage a Project to Successfully Complete its Listed Goals and Deliverables.

Project Management focusses on Planning, Scheduling, Coordinating and Organizing Company's Resources to Execute Specific Tasks or Events towards Successful Completion of the Project Deliverables to the Satisfaction of the Customer.

Examples of Project

- Ø Developing a new Pharmaceutical Compound for COVID - 19,
- Ø Constructing a building or facility or industrial plant or infrastructure
- Ø Developing a new product or service
- Ø Business Takeovers & Acquisitions
- Ø Effecting a change in structure, staffing or style of an organization
- Ø Designing a New Transportation Vehicle
- Ø Developing or Acquiring a New or Modified Information System
- Ø Creating a new piece of software or Upgrade of software
- Ø Designing a new network infrastructure or Installing new workstations
- Ø Implementing a new business procedure or process
- Ø Organizing a Conference; Birth Day Party; Marriage celebration; Holiday Trip
- Ø Organizing a workshop for imparting knowledge

Project Vs Operation



Project Procurement : Project Management involves various activities including **Project Procurement** which is a unique function for Obtaining Goods and Services Required for the Project.

Thus **Project Procurement Management** is a **Structured Process** that is used to **Define, Plan, Implement, Control & Close Procurement Contracts** and involves all the Flow of Processes. It also includes **Establishing and Maintaining Relationships with Vendors of Goods and Services during the Project Life Cycle**.

Operational Procurement Vs Project Procurement



Project Procurement Processes: Project Procurement has Following 3 Processes

1. Plan Procurement Management: It is the process of making Decisions whether to Make or Buy / Lease; Deciding Vendor Selection Criteria; Vendor Pre-Qualification; Planning how to Identify Sellers, Deciding Types of Contracts; How the Contract will be Drafted & Awarded, How the Project will be Executed and Monitored.

2. Conduct Procurement: It is the Process of conducting the procurement which includes Inviting

Communication etc

Some of the Bid Documents are shown below :

<h2 style="text-align: center;">Bid Documents</h2>	
RFI – Request For Information	An open inquiry that opens the market seeking broad facts and knowledge. RFIs are used to gather information . An RFI is a solicitation for procurement sent to a broad base of potential suppliers, with the purpose of gathering information, gaining information, preparing for an RFP or RFQ, forming a strategy, or building a database & knowing Supply Risks
RFP – Request For Proposal	A business needs based request for specific solutions to the sourcing problem – how the work will be accomplished. An RFP's procurement's solicitation sent to potential suppliers with whom a creative relationship or partnership is a consideration .
RFQ – Request For Quotation	A chance for potential suppliers to competitively cost the final chosen solution . An RFQ is a solicitation sent to potential suppliers. It contains, in existing detail, a list of all relevant parameters of the intended purchase.
IFB – Information For Bid / Request for Bid (IFB)	A part of the sealed bid process giving detailed written specifications including all the terms and necessary conditions for potential and eligible contractors to bid their proposals for various projects.
Tender Notice	It is process to call vendors for doing a certain job or provide certain service at a competitive price . Usually done through Press Advertisements & Public Notices
Pre-Bid Conference	Pre-bid meetings are gatherings schedule after an invitation for bids or request for proposals is advertised. Their purpose is to clarify any concerns bidders may have with the solicitation documents, scope of work and other details while requirement.
Invitation for Negotiation	An invitation to negotiate is not an offer . An invitation to negotiate is merely a preliminary discussion or an invitation by one party to the other to negotiate or make an offer.



Source Selection Criteria : Under project management, source selection criteria are often included as part of the procurement documents. Source selection criteria describes properties that are crucial for a purchaser when deciding on a supplier.

Source selection criteria describes properties that are crucial for a purchaser when deciding on a supplier and are used to score seller proposals. Some of the Commonly used Criteria are cited below.



Source Selection Criteria	
Least cost	The least cost method may be appropriate for procurements of a standard or routine nature where uniformity of processes and standards is required and where quality and delivery are not critical and where costs can be calculated at different costs .
Qualifications only	The qualifications only selection method applies when the time and cost of a full or partial source selection method make sense because the value of the procurement is relatively small . The owner, solicitor, a consultant, and selects the supplier with the best available qualifications, experience, expertise, relevant qualifications and references .
Quality/price/technical proposal score	The process from a client to select a proposal with commercial and technical and a client involved to prepare the contract if the technical is poor or unacceptable. Using the method, technical proposals are first evaluated based on the quality of the technical proposal offered. The top-ranked submitted technical proposal is selected . If the selection process can be negotiated and discussed.
Quality and cost-based	The quality and cost-based method allows cost to be included as a factor in the final selection process. In general, when risk and/or uncertainty are greater for the project, quality should be a key element when compared to cost .
Sole Source	Sole Sourcing takes place when only one supplier for the required item is available like OEM suppliers. Since there are no competitors, the method is used only when properly justified and should be used as an exception .
Single Source	Single Sourcing a particular supplier is purportly chosen by the buying organization, even when other suppliers are available.
Fixed Budget	The fixed budget method sets the budget for the supplier to select within the GPO and selecting the highest quality or functional proposal within the budget . Actual values are submitted to cost managers. They will select the cost and quality of the selected item. The budget should be the budget . A comparison with the GPO and determine what the GPO is to allocate payment the maximum within the budget. This method is appropriate only if the GPO is already established, no changes are required and the supplier has been selected.

Source Selection - Scoring Model:

A scoring model is a **project management technique used for weighing certain decisions**, such as Selecting a Vendor which uses numerical **scoring** to rank the vendors.

To create a weighted scoring model, the following steps are applied:

- Ø Identify the criteria important to the decision process.
- Ø Assign a weight to each criterion based on its relative importance in the decision.
- Ø Assign numerical Value to each criterion for all of the options (vendors) being considered.
- Ø Calculate the weighted scores by multiplying the weight for each criterion by its value and adding the resulting Scores.
- Ø Ranking is done based on Total Score of each of the vendor.
- Ø Final Selection of Vendor is made based on highest total score.

Source Selection Criteria									
Scoring Model									
Criteria	Sub Criteria	Average	Vendor A	Vendor B	Vendor C	On 1-5 Scale			
			Assigned Value	Score	Assigned Value	Score	Assigned Value	Score	
Financial Soundness	Financial Stability Credit Rating Debtty Arrangements & Inventory Financial ratios	25	3						5: Meets all requirements & Offers Some Added Value
Technical Ability	Experience Plant and Equipment Quality Personnel Other Facilities & Assets Quality Values	35							4: Meets all the Requirements
Management Capability	Past Performance and Quality Management Organization Employee or Technicians Resources Management Knowledge	15							3: Generally known Critical Requirements
Health and Safety	Organization Policy Safety & Health Culture OSHA Incident Rate Management Safety Accountability	10							2: Meets Some Requirements but a Few Major Gaps or Issues
Flexibility	Length of time in business Past Policies Past Order / Customer Relationships & Satisfaction Rating	10							1: Fails to Meet Overall Requirements, Serious Concerns
Compliance	Legal Status Debtty of Financial Obligations	10							0: Does not Meet requirements / Fail to Answer / Impacts
Total Score			Highest Total Score						

SN Panigrahi; EssAnnPee Business Solutions, India

Contractual Terms : In almost all Projects Goods or Services are Acquired from outside the Organization through Contracts. A **Contract** is a written or expressed agreement between two parties to provide a product or service and thereby Legally Binding the Parties to a Contract to Oblige.

Contractual Terms are “Provisions Forming Part of a Contract”. Contractual Terms are incorporated into the contract expressly as agreed upon for binding the Parties to a Contract.

Each term gives rise to a contractual obligation, breach of which can give rise to litigation. Not all terms are stated expressly and some terms carry less legal gravity as they are peripheral to the objectives of the contract.

Some of the Key Contractual Terms are as below:



Project Contract Closeout : The contract closeout phase is a very critical stage of the contract management. The term contract closure refers to the process of completing all tasks and terms as Agreed upon in the Contract.

For the contract to be closed, the seller is required to complete each and every component of the deliverables. The buyer must have accepted the deliverables and settled the Payments.

The contract closeout can have serious Performance & Financial considerations as there may be many left out requirements of completing the final deliverables, unresolved claims, disputes, performance deviations and Conflicts in financial obligations etc. and sometimes even result in Legal Disputes.

Therefore, Proper care need to be Taken in the Contract Closure. Following are Some of the Activities involved in Contract Closure:.



- ✓ Evaluate Performance Results.
- ✓ Confirm Completion with Fulfilment of all Contractual Obligations.
- ✓ Clearances from Concerned Authorities.
- ✓ Get Customer Acceptance & Receive Formal Sign-off.
- ✓ Formally Transfer all Deliverables.
- ✓ Document Lessons Learned & Archive.
- ✓ Archive all Project Documents.

The **Contract Closure** process determines if the work described in the contracts was completed accurately and satisfactorily. With the Completion of Contract in all Respects, the Closure of Project Procurement Process Completes.

For More Details Video can be watched in YouTube @ below Link

<https://www.youtube.com/watch?v=dCvo-9Pmvg&t=1s>

Disclaimer : The views and opinions; thoughts and assumptions; analysis and conclusions expressed in this article are those of the authors and do not necessarily reflect any legal standing.

Author : SN Panigrahi, GST & Foreign Trade & Project Consultant, Practitioner, International Corporate Trainer, Mentor & Author.

Authorized Training Partner (ATP) Instructor, PMI (USA)

Author can be Reached @
snpanigrahi1963@gmail.com;
Mobile : 9652571117



HOW BLOCKCHAIN IS RESHAPING SCM?

DR. BHARTI TRIVEDI

CHAIRPERSON – IIMM VADODARA BRANCH

btrivedi2013@gmail.com

Supply chains are having a moment!!!

Suddenly supply chains are being noticed, everyone is talking about supply chain, not because of the immense success of SCM, but because supply chains have been taken for granted for a long time and are presently congested. This article will throw light on how blockchains can be used in reshaping SCM.

Interesting facts about blockchain

1. It sounds simple, but very complex to understand.
2. Blockchain in 2020s is like internet in 1990s, although they are two fundamentally different technologies, but there are similarities in their technical adoption. According to Forbes, Right now, we're at a point with blockchain technology that's about equal to where we were with the internet in the early 1990s [1]. This was before Google, and even before Amazon. We knew that the "world wide web" existed, but few people understood how it worked, and people couldn't do much on it.
3. Block chain is not a use case of internet, like e-commerce or social networking or emails, which are the use cases of internet. Blockchain is also called as the new internet as something parallel to internet[2].
4. Block chain introduced a revolutionary change to the future of money. The future of money is programmable. When we combine software and currency, money becomes more than just a static unit of value. Programmable money brings democracy in money, and because of this, things are going to change and unfold in ways that we can't even predict.
5. Blockchain technology is relatively new, but it relates to human sentiments, and that is as humans, we are comfortable to exchange values when there is low uncertainty.

Block chain is an exponential technology

The overall size of the blockchain market as per neutral market research firm is 3.67 billion in 2020 [3]. This is not a very large number, so why is this important? There is a concept called **exponential technologies**. Exponential technology is something which states that a few years the growth is almost stagnant or zero and therefore you believe that something doesn't have potential because you know you don't see it growing or expanding rapidly. And then suddenly when there is the movement that technology doubles in power or processing every year, while their cost halves or reduces. For example, Internet was there since late 1960s but its exponential application started in 2000. It is expected

that Blockchain will be adopted by majority by 2028.

What is blockchain and how it works : Blockchain is shorthand for a whole suite of distributed ledger technologies that can be programmed to record and track anything of value from financial transactions to medical records to Public Distribution System to Drug Logistic chain to land registrations to even school certificates.

Reasons why blockchain technology stands to revolutionize the way we interact with each other.

The first reason is the way it tracks and stores data. Block chain stores information in batches called blocks that are linked together in a sequential fashion. If you make a change to the information recorded in a particular block, you don't rewrite it instead the change is stored in a new block showing that X changed to Y at a particular date and time. Sounds familiar that's because blockchain is based on the hand written centuries-old method of the general financial ledger. It's a non-destructive or immutable way to track data changes over time.

This decentralizing of information reduces the ability for data tampering and brings us to the second factor that makes blockchain unique. It creates trust in the data. Before a block can be added to the chain a few things have to happen, first a cryptographic puzzle must be solved thus creating the block the computer that solves the puzzle shares the solution to all of the other computers on the network. This is called proof of work, the network will then verify this proof of work and if correct, the block will be added to the chain. The combination of these complex math puzzles and verification by many computers ensures that we can trust each and every block on the chain because the network does the trust-building for us.

We now have the opportunity to interact directly with our data in real time and that brings us to the third reason blockchain technology is such a game-changer - No more intermediaries.

Currently when doing business with one another, we don't show the other person our financial or business records instead we rely on trusted intermediaries such as a bank or lawyer, local government body or state government regulators, insurance institutions to view our records and keep that information confidential. These intermediaries build trust between the parties and are able to verify. But this approach limits exposure and risk but also adds another step to the exchange which means more time and money spent

While middlemen like banks, government, social media companies and credit card companies may serve us in

many positive ways, they are also vulnerable to being hacked and putting our data, privacy and resources (in this case, our money) at risk.

Now, here's where things get really interesting. Unlike the age old ledger method originally a book then a database files stored on a single system, whereas blockchain was designed to be decentralized and distributed across a large network of computers.

With currency built using blockchain technology, people are able to make peer-to-peer transactions based on an asset they equally trust in. A blockchain financial industry, would bring people prosperity by securing economic mobility, distributing wealth and protecting our data, among other benefits.

On 15 October, the Finance Ministry's Central Board of Indirect Taxes and Customs (CBIC) began a prototype Electronic Cargo Tracking System (ECTS) initiative based on blockchain technology. The initiative seeks to achieve secure container documentation and GPS-based tracking. As per reports, a test run is being done within Delhi for liquor which is a sensitive item and changes hands very frequently [4].

The central board of secondary education (CBSE) has introduced a blockchain system wherein the documents issued by CBSE will be digitized. This has been done following the trajectory of paperless and secure documentation [5].

How blockchain is reshaping SCM?

Supply chains depend on clear communications, which is often missing from non-blockchain systems. Supply chains run on information, and much of the information is in bad shape. We can image data flow in current supply chains as a game of long-distance telephone where messages from the first participant end up totally distorted by the end. Without blockchain technology to ensure the message is clear throughout the ecosystem, the current supply chain systems have learned to live with these big information gaps.

Recent supply chain history : In 1970s supply chains started to be digitized in the 1970s when the theory of manufacturing requirement planning (MRP) was formulated. MRP systems took a bill of materials (BOM), a Bill of Materials (BOM) is the list of materials that are needed to create one unit of product that helped companies place automated orders. MRP planning helped companies in demand forecasting, sales forecasting and constraint management. In theory, the flow of goods at the front of the supply chain, the retail store, affects the entire supply chain all the way to the securing of the most basic raw materials. In reality, the results of the theory are rarely used in the inventory analysis. The data and technology gaps are the real concerns in the current supply chains.

In a normal year, these gaps aren't too noticeable because most of the events were predictable throughout the year. Diwali comes every October or November which reliably follows by Christmas followed by new year boom. The supply chain gears up to address these yearly surges in activity. But recently, nothing about demand has been predictable.

The coronavirus pandemic has brutally exposed the

weaknesses in many supply chains. A supplier missing a shipment, for example, typically ignites a cascade of bad events that can turn a small shortfall into a planet-wide production crisis – the microchip shortage has affected the entire automobile industry across the world [6].

The power of blockchain : Blockchain technology enables every party to trace the goods and ensure that it is not being replaced or misused during the supply chain process. It's biggest advantage to the supply chain is its ability to connect companies without giving one company a competitive advantage.

The industrial advantage that blockchain can bring is improved efficiency and speed. Blockchains support the compatibility of tokens between locations, increasing the flow of information across the network bringing transparency, accuracy and consistency.

Transparency is one of the big issues in the current industry. To improve transparency, organizations have tried to implement more rules and regulations. But there is one thing that doesn't make any system 100% transparency, i.e., centralization. With blockchain, an organization can go for a complete decentralized network where there is no need for a centralized authority, improving the system's transparency [7].

The coronavirus pandemic has truly exposed the big misconception related to supply chain management that the data used for most process is transparent and accurate. Blockchains can provide the solutions for end-to-end consistency and compatibility clearing up the confusion and ensuring the smooth, efficient delivery of goods.

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COLLABORATIVE PLANNING FORECASTING REPLENISHMENT IN SUPPLY CHAIN

PALLIKKARA VISWANATHAN
MEMBER OF IIMM BANGALORE BRANCH
vid_shy@yahoo.com

ABSTRACT OF THE STUDY/REVIEW

Collaborative Planning, Forecasting, Replenishment is a practice developed to reduce supply chain costs, through proper collaboration, among the organisation, in supply chain. CPFR is also an approach towards the integration, by assisting, supporting, through joint representation of products, through the information shared between suppliers, retailers, satisfying customers demands through the best supportive systems in supply chain.

CPFR is a process in which supply chain collaborates, integrates, forecasts with proper data, provided by the suppliers, customers, as CPFR cannot be considered as one time activity, it is continuous, a collaborative, complete execution, analysis, with results that can reset the strategic planning in supply chain.

CPFR collaborates with suppliers, customers, that is necessary to share the information to provide necessary forecasts, production schedules with suppliers by collaboration, especially with proper planning, forecasting, replenishment to drive accuracy, stock out reduction, overstock reduction, which is also to augment production plans to meet the customer's needs in supply chain.

CPFR is likely to jointly plan supply chain activities, to ensure plans in the behaviour of the business in the organisation, thus minimising costs, maximising efficiency, using strategies that help in focusing on end-to-end collaboration in supply chain.

Key Words: Collaborative: Planning: Forecasting: Replenishment: Integrates: Augment Production: Schedules: Execution: Analysis:

INTRODUCTION:

Vendor Managed Inventory in CPFR brings reduction in safety stock, obsolete stock, unmoved stock, standardizes order procedures, also handles process to bring long term relationships with customers, thus automatically placing orders, by planning on reliability in production planning, with supplier, manufacturers bringing reduction in costs, optimizing delivery intervals, with reduction in bullwhip affect on using materials thus monitoring stocks in supply chain.

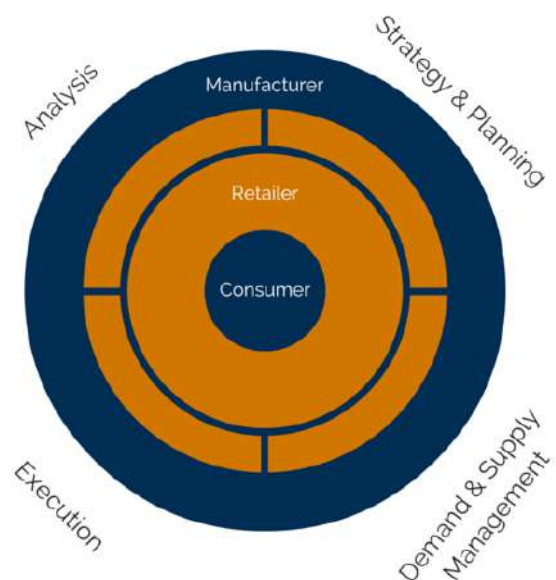
Supply chain reduce the need for safety stock, non-moving stock, coinciding with this with inventory management, necessarily used to forecast the variability of both the demand, supply, with tangible benefits

gained from effective CPFR, thus improving the relationship in supply chain.

Supply chain CPFR coordination with various supply chain activities which includes production, procurement, demand, forecasting, and inventory management, between replenishment of inventory between supply chains.

CPFR benefits from extensively from order cycles, reduction in costs, reduction in product damages, smaller shipments, better information, frequent deliveries, accuracy in information, shorter products, timely information, also delayed information, with increased customer service, stock-outs, improved reliability, faster deliveries, with better inventory turnover, bring reduction in overstock of products, with continued reduction in inventory holding in supply chain.

CPFR in supply chain operation involves laying down strategy planning, with ideas that all the organisation, involved in collaboration for common business goals, responsible for procedures, to set out strategy playing in supply chain.



PURPOSE OF THE STUDY:

CPFR in supply chain is to improve performance as a competitive advantage, with efforts to improve

inventory management, control process, bring in improvement in quality, with initiative to achieve better performance, collaborate between organisation, suppliers, customers, with successful collaboration, which subsequently has been difficult to collaborate fundamentally in supply chain.

CPFR in supply chain promptly adhering to sales can drive production, scheduling, distribution, planning, warehouse, stores, with changes in forecasts, beyond any exceptions, will generate collaboration to align planning, order forecast, to be checked by exceptions, then realign the actual replenishment of the order in supply chain.

Supply chain CPFR concept is to be linked to planning, forecasting, replenishment, operations, in regard to develop a category plan for the type of products, quantities, that are required, so that the manufacturers can incorporate production, forecast, to be shared by the data in supply chain.

LITERATURE REVIEW:

CPFR in supply chain coordinates on 75% of the replenishment, promotional activities, having the buyer to determine the quantities of materials needed, while the customer service department obtains the request to maintain the volume of products, to keep the flow of goods to avoid stock out in supply chain.

Supply chain in CPFR benefits from 60% of better supply, demand, as vendors with long manufacturing lead time, approach manufacturers for price reduction for the products, as customers exaggerate demand forecast, when they find that the supplies are difficult, also the chances to get the right quantity, as most of manufacturers pay attention to customers data, that have caused multiple factors, in business cycle, forecasting shortage, speculation as a result of 60% of the market data, prices, estimate market demand becomes a major challenge in supply chain.

CPFR benefits 50% in supply chain, improves by connecting other activities using the framework process, information, taking joint decisions, made across the organisational efforts with mutual advantage on the return on investment, with increased efficiency, on inventory management in supply chain.

RESEARCH METHODOLOGY:

Visible effective leadership is highly considered important being the key factors in CPFR, implementation which sometimes may be considered of complex nature, as it requires full leadership, full attention on planning, implementation, of the concept enhancing leadership, by considering small scale CPFR projects, aligning them to full scale projects over a time in supply chain.

CPFR in supply chain from a traditional planning, forecasting, will be on the most of the emphasis on collaboration, horizontally, vertically, both internally, externally, meeting the fluctuating demand, supply, managing resources with planning action to activate

supply chain.

CPFR is an organisational process, backed by information technology, with vast network, infrastructure in which internal, external, environment, agree to meet the mutual aspect in the organisation, with an objective to cultivate mutual understanding, so as to develop sales operation, collaborating to generate forecasts, replenishment plans in supply chain.

RESULTS:

Demand forecasting technique in CPFR with the estimation of future variants based on past demand, forecasting, creates a base for planning, logistics, finance, flow of products, whose main function is to enable business plan, with the future needs, with consequential to make final decisions in supply chain.

Supply chain demand forecasting in CPFR provides the information, regarding the volume of the products, place, time, in which the product is required using different type of system to accelerate the flow of raw-material, beginning with supply modification of products, distribution, with collaborative forecasts, which is one of the methods followed in manufacturing process in supply chain.

Customer's place orders for products in CPFR with manufacturer, who in turn places order for raw-material with supplier, for the requirement of input material, to carry out work-in-progress, inventories, also carry minimum finished goods inventories, as the order forecasting policies in place for manufacture from an upstream or downstream supplier in supply chain.

CPFR analysis the planning, forecasting, replenishment, of Vendor Managed inventory, with the total inventory management, in order to establish the fluctuations in manufacturers, wholesalers, dealers, so that the total inventory stored can be reduced, to improve the stability, effectively to restrain the Bullwhip affect, thus reduce inventory, improve efficiency, relationship, forecasting accuracy in supply chain.

Planning, control, demand, supply involve wide range of decisions in CPFR from long term strategic to short term operational decisions, with perspectives' involving inventory locations, production capacity, scheduling of shop floor execution activities, demand planning, distribution, planning, includes network planning, as the supply chain concepts suggests, that business competition takes place between supply, demand rather than in individual organisation in supply chain.

DISCUSSION AND FINDINGS:

CPFR with the globalisation taken up in supply chain, is liable to face more challenges, than it has faced before, with shorter production cycle programs, also consolidation among the industries, with rapid advancement having made in manufacturing, information technology, is liable to have more efficient, effective in supply chain.

Joint determinations taken up in forecasting CPFR have

gone through a combined knowledge of information technology, enabling supply chain to improve the efficiency of the operational efficiency through a systematic process of knowledge sharing in supply chain.

Today with complex competitions in CPFR, having considered supply chain for a better performance, which may be limited to manufacturing organisation only, rather creating or extending the coverage to the whole of supply chain, in order to create a competitive market in supply chain.

Customisation in considered to be critical in supply chain, with CPFR becoming valuable with the technological changes, innovation, to strategically, tactfully, operationally support several type of the transaction, to improve the design, manufacture, quality of the products, to be compatible to the needs, rapidly at the lowest cost, as most of the requirement of the materials, collaborate with improved data use with efficient, effective of communication in supply chain.

FUTURE WORK AND CONCLUSIONS:

CPFR with the emergence of e-commerce, wireless, electronic communication information technology, is also able to share the information among the organisation, which have a significant advantage of sharing information on a larger scale, however with adverse affect may be liable to bring in leakage of information in supply chain.

Improving CPFR includes the potency of accuracy in collaborative packing, collaborative forecasting, collaborative replenishment, dealing with exceptional events, as a method that has to be implemented as a part of the supply, which may be entered into an agreement with the best produced results, that can be

achieved by getting involved in implementation, with also the initiative that can make with proper link, to meet the needs of the buyer or manufacturer in which the supplier has to prepare as an individual offer including the delivery in supply chain.

Inbound logistics in manufacturing industry, for CPFR service providers, to provide quick timely service, according to the requirement of manufacturers including the requirement of spares, transportation, storage, handling, packaging, distribution, processing information, as processing will be on the main focus, on the inbound logistics, of manufacturers, operations of the inbound logistics, the analysis, also comparing the implication of inbound, outbound, transportation logistics, leading to strategic framework in supply chain.

CPFR tries to bring in multiple supply chain, with combined knowledge, better orders, synchronising, forecasts, planning, promotional changes, determining effective, efficient production facilities, replenishing, structuring, collaboration between operations to achieve alignment between supplies, demand, eliminating certain data process, with fulfilment in inventory to reduce cost in supply chain.

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4. **WHAT IS CPFR IN SUPPLY CHAIN: PLEX: Demand Caster:**

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COMMODITY INDEX

Commodities	Days's Index	Prev. Index	Week Ago	Month Ago
Index	3375.2	3383.0	3387.5	3440.8
Bullion	7299.8	7340.5	7313.6	7344.3
Cement	2497.5	2497.5	2497.5	2497.5
Chemicals	3033.5	3033.5	3033.5	3242.8
Edible Oil	2789.1	2843.6	3077.3	3112.0
Foodgrains	2537.1	2535.7	2569.3	2633.5
Fuel	3533.9	3533.9	3533.9	3582.9
Indl Metals	1920.0	1920.0	1920.0	1919.9
Other Agricom	2355.2	2376.9	2355.4	2352.1
Plastics	2697.3	2697.3	2697.3	3170.1

Source: ETIG Database dated 24th December 2021

INITIAL PROVISIONING OF MRO ITEMS (SPARES, CONSUMABLES & SUPPORT ITEMS)

PART FOUR:ASSET MANAGEMENT – AN INTRODUCTION

CL ROY B.SC(ENG.); MBA; CSCP[LIFE TIME DESIGNATION]
LIFE MEMBER - IIMM (BANGALORE) , CHIEF CONSULTANT, RA CONSULTING,
BANGALORE , roycl@raconsulting.co.in

1.0. INTRODUCTION

In part three of Initial Provisioning of MRO Items, it was discussed that the sole objective of acquiring an **Asset** (Production Equipment) is to generate Profit for the Enterprise (Manufacturing Organization or Company) by producing products in demand. This can be achieved only by ensuring Maximum Equipment Availability with Minimum Total Cost of Ownership (TCO) of the Equipment. In fact, this establishes that the Production Equipment, a physical Asset has to be managed efficiently and cost effectively to make it Available for Production at the Design Capacity throughout its Productive Lifewhich spans from the “period from asset creation to asset end-of-life” (#01: Section 3.2.2. of ISO 55000:2014(E) to accomplish the primary objective of Profit Making for the very Survival of the Enterprise. In this article, Asset stands for Physical Asset and Asset Management denotes Management of Physical Asset. Section 2.2 of ISO 55000:2014 clearly and truly states that “Asset management enables an organization to realize value from assets in the achievement of its organizational objectives”. ISO 55000 series of Asset Management standards are globally accepted and practiced by organizations employing Physical Assets for manufacturing of products. If implemented and practiced properly, Asset Management (AM) will ensure that assets will fulfil their intended purpose. For **Asset Management** to be result oriented with respect to Operational Availability of Equipment, we have to follow standardized procedures and practices of maintaining the assets. This article elucidates the concept of Asset Master Management.

Definitions of Key Terms:1] The terms **Enterprise, Organization, Firm** and **Company** denote the same entity and are used interchangeably in this article with Enterprise being the preferred one.2] **Spare** stands for Equipment and its Spares which include Spare Equipment Unit, Spare Assemblies of the Equipment and single Spare Part of the Equipment in this article. 3] **Item** is a Generic Term used to indicate a distinct and independent entity in a list or group of things comprising manufactured and or purchased Parts, Subassemblies, Assemblies, Accessories, Groups, Parents, Attachments, Equipments and other objects used by Enterprises for the Business Operations. An

Item can also be defined as any device, functional unit, equipment or system etc. which can be individually considered4] **Materials** are purchased and or manufactured physical things having unique qualities, stocked and used by an enterprise for its Business Operations which include Raw Materials, Spare/Service Parts, Parts/Components, Assemblies, Industrial and General Consumables and other things but exclude Property, Plant and Machinery. 5] **Materials:** A term used mainly in military context and very rarely in industrial parlance, include Materials and Property, Plant and Equipment. 6] **Asset:** In this article, asset stands for Physical Asset such as Property, Plant and Equipment (especially Production Equipment).

2.0. ASSET – AN INTRODUCTION ON DEFINITIONS AND CLASSIFICATIONS

Standard Definitions of Asset and its Classifications are discussed in the ensuing paragraphs.

2.1.0. ASSET – A FEW STANDARD DEFINITIONS

Sections 2.3. and 3.2.1. of **ISO 55000:2014** define “An Asset is an item, thing or entity that has potential or actual value to an organization”. The value can vary from organization to organization. It is quite required to read the definitions given by two more international organizations. European Financial Reporting Advisory Group (**EFRAG**) states “An asset of an entity is a present economic resource to which the entity has a right or other access that others do not have”. International Financial Reporting Standards (**IFRS**) clarifies “An asset is a resource controlled by the enterprise as a result of past events and from which future economic benefits are expected to follow to the enterprise”.

These Standard Definitions are highly **generic in nature**. Hence, even though these are accepted in principle and practised globally, identification of Assets has to be carried out judiciously while implementing Enterprise Asset Management (EAM) to prevent proliferation of Assets. Thus to suit to the requirements of the individual Enterprise, these definitions have to be modified to get a pragmatic definition. This situation is explained later in section 3.0.

2.2.0. CLASSIFICATION OF ASSETS

Examples of the Assets generally owned and stocked

by manufacturing enterprises include the following:

- Cash and cash equivalents
- Inventory
- Investments
- Property, Plant, and Equipment
- Vehicles
- Office Equipment & Furniture
- Patents & Brands (intangible asset)
- Spare Equipment and Spare Parts etc.

Assets can be generally classified into three categories based on Financial Convertibility (easiness to convert to cash), Physical Existence and Business Operation (#02). These classifications are shown in below given table 2.2.a. the contents of which are self-explanatory:

Asset Classifications			
Classification Criterion	Name of Class	Characteristics of Class	Examples
Financial Convertibility	Current Asset	<ul style="list-style-type: none"> Items that can be sold or converted into cash within one accounting year Items that can be used up / consumed completely within one accounting year 	Cash, Cash Equivalents, <i>Expendable and Replaceable Spare Parts</i> , Consumables, Account Receivables etc.
	Fixed Asset	<ul style="list-style-type: none"> Stocked or installed for the purpose of producing goods or providing service over many years. Not Stocked for sale in the normal course of business. Capitalized Service Equipment and Stand-by Equipment. Depreciation is applicable Provides Service / Supports Production Run for several years. 	Property, Plant and Equipment (PPE), Spare Equipment, Vehicles, <i>Spare (Rotables, Repairables and Replaceables having long life etc.</i>
Physical Existence	Tangible Asset	<ul style="list-style-type: none"> Physical Assets Used for producing Products and providing Services 	Inventory, Cash, PPE, <i>Spare (Rotables, Repairables, Replaceables and Expendables), Consumables, Vehicles etc.</i>
	Intangible Asset	<ul style="list-style-type: none"> No Physical Existence but have monetary value because they represent long-term potential revenue. Intangible Assets have more value and more life expectancy than Tangible Assets. 	Good will, Patents, Copy rights, Brands, Intellectual properties, Technical Know-How etc.
Business Operation	Operating Asset	<ul style="list-style-type: none"> These Tangible and Intangible Assets are actively involved in the day-to-day operations of the Company to generate main revenue and income stream. These are not for resale but crucial for business operation and business cannot operate without these. A fixed portion of Asset Cost is allocated to Expenses in each operating year. This allocation is termed Depreciation in the case of Tangible Assets and Amortization in the corresponding term with respect to Intangible Assets. If the Physical asset is Natural Resource, Depletion is the term to be used. 	Property, Plant and Equipment (PPE), Vehicles, Spare Equipment, <i>Spare (Rotables, Repairables, and Expendables) and Consumables etc.</i>
	Non-operating Asset	<ul style="list-style-type: none"> The Tangible and Intangible Assets owned by the Company and not used for any operation, are defined Non-operating Assets. Even though these are not essential for ongoing operations, may still generate income or provide Return On Investment (ROI) 	Unused Land, Plant and Equipment; Retired Equipment, Unwanted Spares in Stock, Investment Securities etc.

Table 2.2.a.

2.2.1. Financial Convertibility and Classification of Current and Fixed Assets

ISO 55000:2014(E) 3.2.1. declares that Physical Assets generally mean for Property, Plant and Equipment (PPE) owned by organizations. Indian Accounting Standard (AS 16) states that one of the purposes of holding tangible items such as Property, Plant and Equipment (PPE) by enterprises is for use in the Production or Supply of Goods or Services. To keep the Production Equipment in usable condition, they have to be maintained properly. It is added further that the cost of an item of PPE shall be recognized as an Asset if, and only if the reliably measurable future financial benefits will flow to the enterprise. This flow of economical benefits will occur through the use or operation of Items of PPEs.

The Physical Assets held by enterprises are divided into Current Assets and Fixed Assets and the primary determinant in this classification, is the anticipated timeline of their financial benefit to the enterprise.

AA: Current Assets

Accounting Standards state that an enterprise classifies an asset as current asset when it expects to realize the asset or intends to sell or consume it, in its normal operating cycle. With respect to Spares, it can be

concluded that the enterprise can classify them as Current Assets based on realization or consumption during the normal Operating Cycle which begins from the acquisition of assets and ends with their realization of financial benefits. It is further clarified by Accounting Standards that if Operating Cycle is not clearly identifiable or measurable, it can be assumed to be twelve (12) months.

BB: FIXED ASSETS

Fixed assets are the ones an enterprise intends to hold for long period and hence termed Long-term investments. In this case, full value will not be realized within one accounting period. They typically include Property, Plant and Equipment (PPE), Land, Intellectual Property etc. Fixed Assets are highly illiquid indicating that these assets cannot easily be converted into cash. In essence, non-current assets can be regarded as Fixed Assets.

In this context, the treatment of Spare Parts requires critical analysis. In accordance with the above given concept of classification, Spare Parts need special consideration. Spares can be used only in connection with an item of Plant and Equipment to make them available for production of goods and services and majority of them are expected to be in useful service to generate profit for more than one accounting period. Hence, they are to be classified into Fixed and Current assets as per Company standards based on Practical Usability.

2.3. CLASSIFICATION OF EQUIPMENT SPARES BASED ON USABILITY AND ASSET CRITERIA

In table 2.2.a., there are four categories of Spares namely **Rotable**, **Repairable**, **Replaceable** and **Expendable** and these are classified based on their Practical Usability to the End Users.

Oxford dictionary defines **Usability** as "The degree to which something is able or fit to be used". Thus it is a relative ability to perform the intended function by a physical asset, for example any equipment and or its spares. The hidden sense indicates that the item has to fit to the environment for functioning. Practical Usability emphasizes the practicality of use of an asset during its Useful Life. Any asset has various types of life namely Design Life, Economic Life, Useful Life etc. [1] Design Life is the theoretical period of use arrived at by Engineers' calculation of life based on its use within the specified parameters and physical properties of the asset. Life Expectancy is the alternative term. [2] Economic Life may be defined as the age in years that maximizes the profit return from the use of the asset by an enterprise. If replaced very soon, there will have unnecessary loss, whereas the enterprise waits very long, the asset will have exhausted its periods of economic operation. Another definition given in #04 - James L. Riggs, et al, 2004, states that "Economic Life is the time period that minimizes the asset's total equivalent annual cost or maximizes its equivalent net

annual income". At the end of this period, an economical replacement has to be considered. Another term for this period is Optimal Replacement Interval.[3] Useful Life of an asset is the period of time the asset can be used beneficially by an enterprise to generate Profit. The emphasis of economic benefit puts onus solely on the management of user enterprise to make the best use of its assets. A detailed analysis will reveal the very fact that Useful Life is basically determined by asset's age, frequency of operation, operating environment, customer demand, maintenance policy etc. In addition to the above factors, it is very much affected by Asset Management Policy, Equipment Replacement policy, Technological changes and improvements, Government Regulations, Economic changes etc. Therefore, the useful life of an asset may be shorter than its economic life. It is also known as Ownership Life or Service Life (#04).

Practical Usability of an asset is mainly derived from Asset's Design Life, Task oriented Performance, Ergonomic quality, Maintenance Policy and Practices and very much depends on the working Environment. In other words, it is Enterprise specific. Because of these factors, Practical Usability of identical assets varies from enterprise to enterprise as well as from service to service within the enterprise also. The classification of Spares based on Practical Usability is discussed below:

2.3.1. Rotable Spares

A Rotable Spare can be technically and economically repaired to its functional state and in the normal course of operation, it can be repeatedly restored to a fully serviceable condition for reusing over a period, closely equivalent to the useful life (20 to 25 years) of its parent equipment. This Item can be an Asset itself or an Assembly or Subsystem of an Asset. Useful life is a period in which an asset, in this case the Rotable item is capable of functioning properly to generate revenue in a cost-effective manner. The name Rotable is obtained owing to its characteristic of Interchangeability among various units of an equipment and or among units of various equipment. The repair cost is much less than that of a new one. Generally this Item's very high Unit Cost, very low Failure and Scrap Rates combined with very high Replenishment Lead Time, make it an automatic choice for Stock Pooling among Enterprises even. Further, Unit wise Usage and Performance tracking is possible. So dedicated Maintenance Resources can be made available for repair and Overhaul. After repair the item can be returned to Inventory / Stock for future use. The financial benefit arising from using a Rotable Spare is accrued over its lifespan which constitutes multiple accounting years and hence it is classified as Fixed Asset, provided the Unit Cost is above the company selected Capitalization value.

2.3.2. Repairable Spares

A Spare that can be technically and economically

repaired to the serviceable state and kept in stock for repeated use in place of the damaged Part removed from the parent equipment, is termed Repairable Spare. A new / repaired spare kept in stock, can be fitted to the parent Equipment to save Production Downtime while the failed one can be removed, repaired and returned to store for future use. In this case, there will be only one unit of the parent equipment. A Repairable Spare also has all the properties of a Rotable Spare except Interchangeability. In this case also, the financial benefit is accrued over multiple accounting years making it to be classified as Fixed Asset, provided the Unit Cost is above the company selected Capitalization value.

2.3.3. Replaceable Spares

A Replaceable Spare, by definition is the one that cannot be reused because of the very fact that the damaged one cannot be repaired technically and or economically. A new Spare is mandatorily required to replace the damaged one, in this case. However please note that the undamaged removed one can be reused. In other words, the damaged part has hundred percent Scrap rate. The useful life can be either less than or equal to one accounting period or it can be extended to multiple periods. Hence these Spares have to be analyzed individually to classify them into either Current or Fixed Asset Category, as the case may be, based on useful life span, traceability and its unit cost. If not traceable, it is only advisable to classify it as Current Asset.

2.3.4. Expendable Spares / Items

Based on the definition given in Oxford Dictionary, it can be judiciously stated that Expendable Spares / Items are Single Use Items which are to be replaced after their intended functions and are to be mutilated beyond Repair and or destroyed to prevent Reuse. In actual industrial environment, the characteristic of Single Use is derived from two sources, namely: [1] the OEM (Original Equipment Manufacturer) Directive and [2] the Actual End User's Maintenance Practice.

à OEM Design and Directive:

The OEM designs the Spare/Item to be of Single Use only as necessitated. The reuse of the Item after the completion of the intended function, is not at all recommended because of safety factors. In other words, reuse of these after Repairing or Reconditioning is mandatorily prohibited by OEMs. To be specific, these are Life-limited Items in practice. The criterion for replacement of these is either [1] Time Interval (Filter Insert) or [2] Cycles of Operation (Aircraft Landing Wheels) or [3] Condition of the Spare / Item (Insulating Oil in Minimum Oil Circuit Breaker) as appropriate.

These Life-limited parts whether damaged or not, must routinely be replaced at predetermined intervals which are specified by

the OEM based on any one of the above said criteria. Life- status in this context is the record of accumulated cycles, hours, or any other mandatory replacement criterion of the part and has to be maintained up-to-date. If Life-limited item is found to be, unserviceable during inspection, it has to be replaced mandatorily.

à End User's Maintenance Practice:

Generic Spares such as Bolts, Gaskets, Springs, V-Belts etc. form Expendables based on Maintenance Practices. To remove and replace damaged parts of Assets, many a time, covers may have to be opened or the foundation of the equipment may have to be removed. At the time of refixing, the preferred maintenance practice is to replace the complete set of gaskets even if there is no visual sign of damage. This is done because of the fact that the gaskets might have innately deformed due to bolting pressure. The same practice is followed in the case of Bolts also. Torque is applied at the head or nut to tighten the Bolts. The objective is to stretch the bolt. And by this stretching of the bolt, clamping is achieved (#05 - Joel Levitt, 2011). As the removed bolts are already stretched once, it is advisable to replace them with new ones. Another situation is related to springs and drive belts. In many an equipment, especially control valves and presses, there will be multiple springs used. The practice is to replace the complete set of springs whether damaged or not, to save unwanted breakdowns due to failures of springs, in the near future. The same is applicable in the case of V-belt sets. There may be say, five belts in the drive and one gets damaged. The best economical maintenance practice is to replace all the five belts to prevent the failure of other belts one by one due to wearing-out.

The removed Bolts, Gaskets, Springs, V-Belts etc. are to be abandoned after mutilation and or destroyed. This is to prevent re-use of Spare Parts to keep the reliability of the parent equipment at the desired level. So these form expendables, as they become Single Use Items which are replaced when removed, as determined by End Users.

à General Conditions:

Individual unit wise Financial and Performance tracking of Expendables are not usually possible. Because of these, the Useful Life of these expendables are fixed to be less than a fiscal period for accounting purposes. Thus these are treated as Current Assets and expended at the time of issue itself. Also these

items are not returnable to inventory.

2.3.5. Consumable Items

Consumable Item is defined in Oxford dictionary as "intended to be used up and then replaced". In essence, all these items are consumed in the process of execution of the work or function. Fuel, Electricity, Water, Welding Rods, Lubricants, Electrodes, Compressed Air etc. are examples. It is to be noted that these items are consumed without being directly incorporated in the work. One important point to be noted at this juncture, is that **no Spare can be classified as Consumables** based on the very fact that Spares are not at all **used up** while in use.

Figure 2.3.a. shows summary of Spares Classification based on Practical Usability and Asset Criteria

Spare Part Classification Based on Practical Usability - shows Applicability												
Usability Class	Classification Criteria											
	Technically & Economically Expendable	Reusable after Repair	Reusable, if not damaged	Single Use Only	Life span can be multiple	Accounting period	Life span can be one	Accounted for	Can be an Assembly	Can be a single Component	Low Scrap Rate	100% Scrap Rate
Rotable												
Repairable												
Replaceable												
Expendable												

Table 2.3.a.

3.0. ASSET – A PRAGMATIC DEFINITION FOR ASSET MANAGEMENT IMPLEMENTATION

Because of the fact that Standard Definitions are highly **generic in nature**, a pragmatic and enterprise specific definition has to be created judiciously to prevent unnecessary proliferation of Assets in an Enterprise during Asset Management Implementation (section 2.0.). Brian Maier has explained this situation with respect to an Oil and Gas company, in an article given as reference (#06). The article explains the following:

- * The Oil company had more than 200,000 assets in their Master Equipment List (MEL) which used to grow by more than 10,000 assets yearly. Interestingly MEL included PLCs (about 6000 numbers), Temperature Elements (about 2100 numbers), CO₂ Fire Extinguishers etc. Hence the company wanted to limit and control the proliferation of assets. With this aim in view, Emerson Reliability Consulting was invited. On inspection, Emerson observed two important short comings in the process of Asset creation and they were: 1] Absence of company specific definition of Asset and [2] Creation of Assets directly into CMMS by a third party based on vendor data without any physical verification. After analyzing and reviewing the situation, Brian Maier of Emerson Reliability Consulting recommended to make a definition of Asset by modifying the

ISO 55000:2014 definition (“An Asset is an item, thing or entity that has potential or actual value to an organization”), by adding a requirement that it should satisfy any one of the following conditions also:

- “ The Unit Cost of the Item should be greater than or equal to Company Selected Value
- “ The Item should be a Critical Equipment or a Safety Critical Device
- “ The Item should have a Maintenance Manual and a Spare Parts List
- “ The Item should have a Name Plate with Serial Number
- “ The Item should undergo Periodical Inspection and Testing by a Regulatory Agency

Based on decades of experience in Maintenance and MRO (Spare Parts) Management, this author fully endorse Brian Maier’s recommendation as it will definitely prevent unnecessary proliferation of Assets to have an effective Asset Management in an Enterprise.

4.0. ASSET MANAGEMENT – AN INTRODUCTION

ISO 55000 3.3.1. defines **Asset Management** as the “coordinated activity of an organization to realize value from assets”. Though it is very generic, it explains that Realization of value involves the balancing act of costs, risks and opportunities. The existence of an efficient and effective Asset Management can only ensure the execution of the afore said balancing act and hence the importance of Asset Management. If an explanation is needed, it has to be more informative and pragmatic to the general public than that given in ISO 55000.

4.1.0. A FEW PRAGMATIC DEFINITIONS OF ASSET MANAGEMENT AND ITS ANALYSIS

United States Environment Protection Agency states that “Asset management is maintaining a desired level of service for what you want your assets to provide at the lowest **life cycle** cost. Lowest life cycle cost refers to the best appropriate cost for rehabilitating, repairing or replacing an asset”.

Asian Development Bank (#07 – ADB, 2013) defines that “Asset management involves achieving the least cost and least risk of owning and operating assets over their **life cycle** while meeting service standards for customers”.

Federation of Canadian Municipalities gives the explanation that “Asset management is an integrated approach, involving all organization departments, to effectively manage existing and new assets to deliver services to customers. The intent is to maximize benefits, reduce risks and provide satisfactory levels of

service to the community in a sustainable manner – providing an optimum balance. Good Asset Management practices are fundamental to achieving sustainable communities”.

Terry Wireman (#08 – 2015), writes that “Asset management converts the business plan for the organization into coordinated activities that realize the maximum value from the assets” (Page 18). ——— — “Although asset management is much more than just maintenance and reliability, many of the activities are the focus of maintenance and reliability. As highlighted previously, maintenance and reliability play a large role in the **life cycle** of the asset” (Page 21).

An Extended Definition of Asset Management is given by Nicholas AJ Hastings (#09, 2015, Page 10) when he writes that “Asset Management is the set of activities associated with identifying what assets are needed, identifying funding requirements, acquiring assets, providing logistic and maintenance support for assets, disposing and renewing assets, so as to effectively and efficiently meet the desired objective”.

The Asset Management Council defines Asset Management as “The **life cycle** management of physical assets to achieve the stated outputs of the enterprise” (#11 – Asset Management Council Ltd (AMCL), 2014, Page 7).

These definitions enlighten the very fact that Asset has to be managed efficiently, effectively, economically and environmental friendly throughout its **Life Cycle** to perform its intended function of Profit Generation for the enterprise. This naturally compels us to know more about **Asset Life Cycle**.

4.2.0. ASSET LIFE CYCLE PHASES

Even though ISO 55000 defines Asset Life as the “period from asset creation to asset end-of-life”, we have to consider it to commence from Asset Need Identification. Seven distinct and different phases or stages of Asset Life Cycle are shown, each with related and relevant elements of source, information, cost, tasks etc. in figure 4.2.0.a. below:

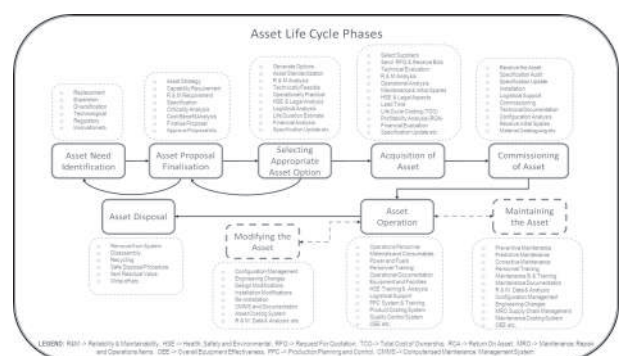


Figure 4.2.0.a.

The phases indicated are Asset Need Identification,

Asset Proposal Finalisation, Selecting Appropriate Asset Option, Acquisition of Asset, Commissioning of Asset, Asset Operation and Asset Disposal. Maintaining the Asset and Modifying the Asset are not independent phases but only the two major activities associated with Asset Operation Phase and are quite essential to achieve its intended objective.

4.3.0. MAINTAINING THE ASSET

This phase of the Asset Life Cycle needs special mention at this juncture. John Moubray (#12 – Page: 7) states that “Maintenance: Ensuring that physical assets continue to do what their users want them to do”. ISO 14224:2006 states that Maintenance is “Combination of all technical and administrative actions, including supervisory actions, intended to retain an item in, or restore it to, a state in which it can perform a required function”. An Item is identified as any device, functional unit, equipment or system etc. which can be individually considered. A combination of functions of an Item, needed for providing a predefined service is termed a Required Function. On analyzing the definition, we understand that Maintenance has to perform two distinct actions: one to **retain** the Asset in the performing state and the other to **restore** to the performing state when it fails. Thus the former action is Preventive in nature while the latter one is Responsive or Corrective. These definitions emphasize that without Proper Maintenance, Assets cannot carry out their functions to satisfy their owners continuously. So logically, two types of Maintenance Actions are required to satisfy two distinct objectives and they are called Preventive Maintenance (PM) and Corrective Maintenance (CM).

4.3.1. Objective wise Classification of Maintenance

Preventive Maintenance (PM) and Corrective Maintenance (CM) are the two Objective wise Classifications of Maintenance in this context.

Preventive Maintenance (PM): ISO 14224:2006 states that PM is “Maintenance carried out at predetermined intervals or according to prescribed criteria and intended to reduce the probability of failure or the degradation of the functioning of the Item”. Joel Levitt (#05 , 2011, Pp:49-51) gives an elaborate definition and it says “ PM is a series of tasks performed at a frequency dictated by the passage of time, the amount of production, machine hours, mileage, or condition that Extend the life of an Asset”. These definitions give importance to Prevent and Postpone the failures of the Asset. Thus PM is a maintenance strategy based on adjusting or replacing a part of an equipment or overhauling the equipment itself per some predetermined criteria, regardless of their condition at the time.

Corrective Maintenance (CM): ISO 14224:2006 defines Corrective Maintenance as “Maintenance carried out after fault recognition and intended to put an Item into a state in which it can perform a required function”. A

couple of definitions more are shown: “Corrective maintenance –Unscheduled maintenance or repair performed as a result of failures or deficiencies” (#14 - Douglas K. Orsburn, 1991, P 310). John Moubray (#12 , 1997, P171) writes “Corrective maintenance means fixing things either when they are found to be failing or when they have failed”. So basically CM is a Reactive activity carried out either when an Item failure is imminent or when it is in the process of failing or when it is already failed. And thus this activity may consist of repair, restoration or replacement of components.

Predictive Maintenance (PdM): The only true fact related to all man-made Items is that they will fail, sooner or later. So “ It could be said that the natural state of machinery is to be broken!” (#05 - Joel Levitt, 2011, P xxiv). However PM extends the life of the Items by Preventing and Postponing their failures. If failures can be predicted PM and CM can be used judiciously to save a lot of time and money. As manually it is not possible to predict all the failures well in advance by Observing, Hearing and Sensing alone, scientific means are needed. If there are scientific ways and methods to predict the occurrence of failures with respect to Time and Type, heavy losses can very well be reduced or even minimized. This essential requirement led to the development of Predictive Actions. These Predictive Actions are known as Condition Monitoring Techniques and their prime objective is to identify the point of Potential Failure to assess the time interval between Potential Failure and Functional Failure of an item to take appropriate Maintenance actions. This time interval is termed P – F Interval and is shown in figure 4.3.1.a.

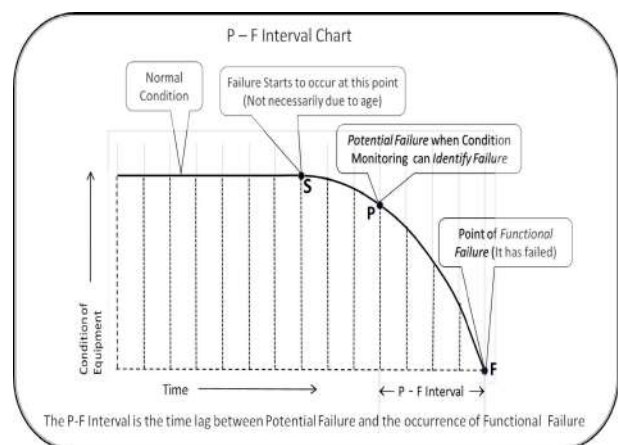


Figure 4.3.1.a.

The very success of Condition Monitoring depends on the identification of the point of Potential Failure, **P**, well ahead of actual failure. And if it happens to be nearer to Failure Starting Point **S**, the better the Condition Monitoring System (Technique and its Application method). By Condition Monitoring, the detection of **P** can be done earlier than Manual means. This is an opportunity to carry out the subsequent

Corrective Maintenance and this is how the Reliability of an Item can be improved. The decision to select the time to do Corrective Maintenance depends on the duration of P - F Interval. If it is short, the Opportunistic maintenance can be advanced or otherwise it can be deferred and of course, the decision is based on the availability of logistical support.

Joel Levitt (#05, 2011, Page: 145) interprets that "Predictive Maintenance is a proclamation or declaration in advance based on observation to preserve (something) from failure or sustain it against danger". ISO 14224:2006 gives a very similar explanation for term Predictive Action as "Action to monitor the condition of an asset and predict the need for Preventive action or Corrective action". Thus both Predictive Maintenance and Predictive Action are used synonymously. In fact, Predictive Maintenance is a preferred term and it is an essential ingredient of Integrated Asset Maintenance strategy.

4.3.2. Maintenance Classification

Maintenance activities are classified in two levels. The first level is based on the objective or purpose of Maintenance. The second level classification is within the first level. And it depends on the execution time. Figure 4.3.2.a. shows the Maintenance classification. The types of maintenance at both levels are mutually exclusive. Short descriptions of some of the second level maintenance types are given below for ready reference:

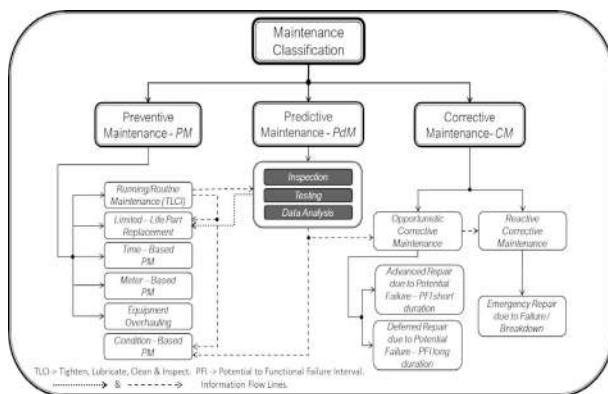


Figure 4.3.2.a.

a) Running / Routine Maintenance: The activities included are Tighten, Lubricate, Clean and Inspect (visually). These activities are carried out mainly, when equipment are running. This can be included in TPM (Total Productive Maintenance) and the equipment operators can very well do it with more effectively compared to the Maintenance staff.

b) Limited-Life Part Replacement: These are Single Use Items as designed by OEM. The replacement criterion can be Time Interval or Cycles of Operation or Condition of the Spare. Condition of the Item can be known either

from visual inspection from Running / Routine Maintenance or from Condition Monitoring from Predictive Maintenance.

c) Condition-Based PM: This can be initiated based on information either from Running / Routine Maintenance or Predictive Maintenance as shown in figure 4.3.2.a.

d) Opportunistic Corrective Maintenance: This is a type of Maintenance emanated from Predictive Maintenance (Condition Monitoring). This can be scheduled in an opportunistic window and hence this name. The decision to select the time to do Corrective Maintenance depends on the duration of P - F Interval. If it is short, the Opportunity maintenance can be advanced or otherwise it can be deferred.

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PUBLIC PROCUREMENT: IS IT TIME FOR GOVT TO ENHANCE CPSES' TARGET OF PROCURING 25% FROM MSEs?

SANDEEP SONI

Ease of Doing Business for MSMEs: Within the 25 per cent annual procurement target, 4 per cent has to be procured from MSEs led by scheduled caste/scheduled tribe entrepreneurs (SC/ST) and 3 per cent from women entrepreneurs. However, government departments have never been able to meet those targets.

Increasing the procurement target to 30 per cent is also among the key budget expectations for MSMEs.

Ease of Doing Business for MSMEs: Central ministries, departments, and public sector enterprises (CPSEs) have gone all out to purchase their targetted share of goods from micro and small enterprises (MSEs), at least in the past few years. That's what it seems going by the government data. Here's a quick backgrounder leading to that: Till 2018, the target for government units to procure from MSEs was 20 per cent of their overall annual purchase. Importantly, during the FY15-FY17 period, the government ministries, enterprises, and departments failed miserably in achieving that target – 11.6 per cent in FY15, 4.5 per cent in FY16, and 10.3 per cent in FY17, analysis of official data from the MSME Ministry revealed.

This was until FY18 when it miraculously jumped to 23.1 per cent procurement from MSEs. The reason for this transformation couldn't be known but what the government did in 2018 was that it increased the target from 20 per cent to 25 per cent, perhaps buoyed by the astonishing performance of government departments, ministries, and CPSEs.

From FY19 onwards, the target has been constantly overachieved – 26 per cent in FY19 with procurement worth Rs 40,399 crore from 1.28 lakh MSEs, 30.18 per cent in FY20 with purchases amounting to Rs 39,665 crore from 1.57 lakh MSEs, and 28.18 per cent with procurement worth Rs 40,723 crore from 1.75 lakh MSEs, data from public procurement monitoring platform MSME Sambandh showed. So far in FY22 as

well, the share stood at 31.62 per cent with procurement amounting to Rs 24,037 crore from 1.15 lakh MSEs.

Now, MSME experts have opined that the government can look at further enhancing the current target of 25 per cent to a minimum 30 per cent, particularly looking at the record procurement share in FY20. This is likely to help MSEs sell more to government departments and CPSEs, resulting in related benefits such as more employment avenues, and more business overall. While these benefits wouldn't translate for every MSE in the country but at least those who actively engage with the government can expect relatively better revenues, experts noted.

Also read: Anti-dumping duty on imports from China may trigger price rise: Experts

"If we look at the Atmanirbhar Bharat vision, it is only fair to say that the government has done its bit in purchasing from MSEs and supporting them. Government must continue procuring 30 per cent as MSMEs definitely need this. However, this is squarely on the government's capability. If it thinks it is capable of doing more than 25 per cent and the revise the target, they should do it. This would help MSMEs grow," Shreekant Somany, CMD, Somany Ceramics, and Chairman, National MSME Council, CII told Financial Express Online.

Increasing the procurement target to 30 per cent is also among the key budget expectations for MSMEs. MSME association Indian Industries Association (IIA) has also urged the government to allow a minimum of 30 per cent procurement by government organisations through the government e-marketplace (GeM) portal.

"We have already asked for 30 per cent as MSMEs are already the growth centre of the country. This would help businesses provide more employment to people," Ashok Agarwal, President, IIA told Financial

Express Online.

In the current financial year so far, among the 54 ministries' data available on public procurement, Ministry of Agriculture, Ministry of Consumer Affairs, Ministry of Defence, Ministry of Housing and Urban Affairs, Ministry of MSME, Ministry of Power, Ministry of Science and Technology, Ministry of Shipping, Ministry of Textiles, and Ministry of Tribal Affairs have already crossed the 25 per cent threshold based on their respective overall purchases so far and irrespective of the purchase amount.

For instance, the Ministry of Tribal Affairs' 25 per cent targetted procurement value stood at Rs 29 lakh while the actual procurement has been worth Rs 40.21 lakh, as of December 27, 2021. The maximum procurement has been made by the Ministry of Petroleum and Natural Gas worth Rs 11,068 crore, however, the 25 per cent target amount stood at Rs 12,844 crore.

"If the government increases the procurement target, it would be good for MSEs but it should be based on every purchase made by the government departments instead of 25 per cent on the gross purchases made in a year. This would mean that MSEs selling goods, which are more likely to be bought from large enterprises, would also be purchased by the government. Once this is done for every order, MSEs would benefit more," Govind Lele, National General Secretary at MSME body Laghu Udyog Bharati told Financial Express Online.

However, the government doesn't intend to increase the 25 per cent target. "There is no thought on revising the 25 per cent to a higher level currently," Ishita Ganguli Tripathy, Additional Development Commissioner, Office of DC-MSME, Ministry of MSME told Financial Express Online.

Moreover, more purchases from MSE units might also lead to more receivables stuck with the government department for payments. "Nothing better than a more competitive target but the only worry here is that it might add up to the cases where payments from the central government departments are pending and haven't been cleared yet. While gradually MSMEs are getting their money but payments would have to be cleared in a more timely manner for businesses to operate flexibly," a consultant at a financial advisory firm told Financial Express Online on anonymity.

As of November 25, 2021, PSUs and government

departments had cleared Rs 50,350 crore in pending payments to MSMEs in the current calendar year, showed an analysis of the official data on payments cleared. Since May 2020, when Finance Minister Nirmala Sitharaman had announced Covid relief measures for MSMEs and highlighted in her press conference that MSME receivables from the government and CPSEs will be released in 45 days, total pending dues worth Rs 77,171.82 crore have been cleared as of November 25, 2021. The latest data was shared by MSME Minister Narayan Rane in Parliament during the winter session.

In September last year, the MSME Ministry had written to 500 corporates as well followed by another 2,800 of such enterprises in October to clear pending MSME dues in the respective month. The government had also urged buyers to onboard the Trade Receivables Discounting System (TReDS) platform to tide over their delayed payment issue. CII also in its expectations for the upcoming budget had urged the government to actively use TReDS for settling the delayed payments to MSMEs.

"There are MSE Facilitation Councils working on delayed payments issue and very soon PSUs will register themselves on TReDS. In our recent meeting with Commerce Minister Piyush Goyal, we were told that all government departments will be soon on the invoice discounting platform that will ease payments," added Agarwal.

Within the 25 per cent annual procurement target, 4 per cent has to be procured from MSEs led by scheduled caste/scheduled tribe entrepreneurs (SC/ST) and 3 per cent from women entrepreneurs. However, government departments have never been able to meet those targets. In fact, it hasn't been more than 0.54 per cent from SC/ST entrepreneurs and 0.50 per cent from women MSEs till FY21.

"Mismatch is primarily the reason for this because CPSEs requirements don't really match with what women or SC/ST entrepreneurs are making. Then there are quality issues as well while product range is also very limited. Hence, the percentage hasn't really gone up to 3 per cent," Tripathy had earlier told Financial Express Online.

This article was updated with comments from the MSME Ministry

Source: Financial Express

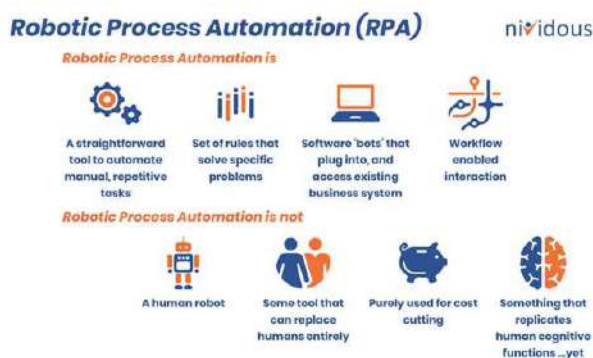
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POWER OF ROBOTIC PROCESS AUTOMATION AND ARTIFICIAL INTELLIGENCE IN MANUFACTURING INDUSTRY

DR. KAVITA VENKATACHARI, IT & OPERATION ANALYTICS FACULTY
(DEAN-EXAMINATIONS) IBS MUMBAI. POWAI, kavitav@ibsindia.org

Introduction: The Covid situation has increased the need for automation within the warehouse. Companies are forced to change replenishment and picking processes to be more efficient (for example batch picking). Automation increases productivity while reducing labour and it provides for greater social distancing at the same time.” RPA provides organisations with the deployment of smart software bots that automate common business-operational processes which help eliminate human error and reduce overhead. Machine learning, artificial intelligence, and natural language processing are leveraged to understand the context and automate processes correctly while allowing for better human interaction.

Robotic Process Automation: Robotic process automation (RPA) is a software technology that makes it easy to build, organize, and manage software robots that compete with human actions interacting with digital systems and software. RPA is ultimately about automating some of the most mundane and repetitive computer-based tasks and processes in the workplace. Edwards, the COO at Eggplant says, “The RPA software can now handle the return, which includes a series of repetitive steps: sending a message confirming receipt of the return, updating the inventory system, making the payment modification to the customer, confirming that the internal billing system is updated, and so on.” RPA is practical software that reduces human efforts.



Source: <https://www.pm365.tk/ProductDetail.aspx?iid=181825786&pr=41.88>

Benefits of implementing RPA in the Manufacturing Industry:

- **Cost savings:-** companies can enhance productivity with the 24/7 operating ability of RPA bots that subsequently enhances the total savings.
- **Reduced wastages and mistakes:-** rule-based execution of RPA systems reduces any manifestation of errors. Next, wastage is reduced significantly too.
- **Increased focus and efficiency:-** the manufacturers in maximizing efficiency by cutting down on errors.

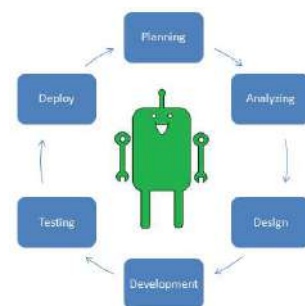
- **Enhance bank office operations:-** executing RPA, manufacturers can oust their traditional systems which have more chances of errors with more dependable digital ones.

Manufacturing Business Area	RPA Use cases	Examples
Finance & accounting	<ul style="list-style-type: none"> • Invoice payment • AP automation • Freight rating and payment • Auditing 	Invoice Processing RPA helps to scan invoices of different types and templates from various suppliers and automate error details in accounting systems like SAP
Operations	<ul style="list-style-type: none"> • Product administration • Inventory re-ordering • SKU updates • Inventory, AP, sales pipeline and pricing report creation • MES integration 	Administration RPA in the administration will help the industry to get all the reports of their production and all other work in their business
Customer Service	<ul style="list-style-type: none"> • Front office support • Quote creation • Order correction • Product registration • Approval 	Front Office Support When deploying RPA in front office, employees can access multiple stored data at one place and serve customers better

Source: <https://www.clariontech.com/platform-blog/learn-how-rpa-in-manufacturing-is-riding-the-success>

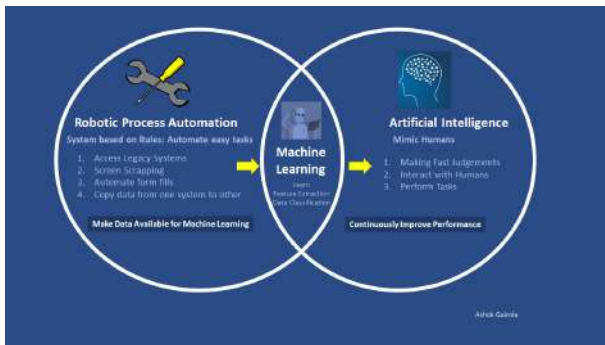
Open Source RPA tools:

- TagUI- is a command-line interface for RPA that can run on any of the major OSes.
- RPA for Python- boasts website automation, computer vision automation, optical character recognition, and keyboard-and-mouse automation.
- Robocorp- to deliver cloud-based, open-source RPA tool for developers.
- Robot framework- it emphasizes natural or human-readable language to make it easy to use
- Automagica: a computer-based task that can be automated with RPA,
- Taskt- its feature is a screen recorder that records a user's computer-based actions and then translates those steps into a repeatable script (a.k.a. RPA bot.)



Source: <https://www.w2ssolutions.com/blog/rpa-2021-trends-and-predictions/>

RPA and AI: Artificial intelligence debate the machines that are designed to simulate human reactions, judgement and behaviour. AI software is a combination of cognitive automation with machine learning, language processing, hypothesis generation, analysis and algorithm mutation to produce analytics and insights to match with the human's ability or to surpass beyond. RPA is a "doer" but AI is a "thinker". RPA is a robot that only imitates human functions and will do only what it is told to do but AI analyses data and processes on its own. In a business process, RPA is perfect for filling the data into forms but AI will differentiate which data needs to go where on the form.



Source: <https://medium.com/@ashok.gairola/robotic-process-automation-rpa-vs-artificial-intelligence-8af3c26803be>

RPA 4.0 or Intelligent automation: The difference between Intelligent Automation and Robotic Process Automation in terms of cost reduction is simple: IPA automates more efficiently than RPA, because IPA processes unstructured data, handles exceptions, and continuously learns.

Intelligent Automation technology helps complex organizations "ensure adherence to quality and compliance." IPA has improved staff productivity, process accuracy and regulatory compliance. By automating many middle levels and back-office works connected to customer queries, companies can lower the "average handle time" (AHT), process requests with greater accuracy and it can create high-level customer satisfaction.

- **Machine learning, computer vision, text analytics and Natural language processing:-** process unstructured data, automate tasks that require judgement and detect and adapt to constant change.
- **Predictive and prescriptive analytics:-** help leaders plan resources and set achievable KPIs, plus ensure optimal operational results.
- **Self-managing, self-healing robots-** handle exceptions and reduce bot management



Source: <https://www.workfusion.com/blog/benefits-of-intelligent-automation-ia-vs-rpa/>

Application of RPA in Manufacturing Industry: Manufacturing companies are changing their production unit from human resources to physical industry robots for their products to assemble, checking the quality and packaging it. Though these robots help to repair the assembly line, the manufacturing companies are still struggling to manage their operational process and back office works. They started implementing manufacturing automation with the help of RPA to reduce human errors and reduce human resources and the ability to increase productivity. Using RPA technologies in their back-end operations, they can attain **up to 40%** cost savings in various areas of work.

Bill of Materials: (BOM) The most important object in the manufacturing process is the Bill of Materials (BoM). It includes the various raw materials, components, and sub-components that go into the manufacturing of a specific product. These documents/objects are necessary so employees know which items to purchase, how much to purchase, and when to purchase these resources. If an error occurs in interpreting the BoM, the cost to the manufacturer could be very high. RPA can assist in the BoM process by empowering manufacturing companies to:

- Eliminate spreadsheets to manage BoM systems and reduce the need for paper
- Set up automatic alerts for changes in the system for digitized communication
- Strengthen supply chain procedures
- Enhance regulatory compliance
- Access real-time process monitoring and analytics

Customer support and service desk: Irrespective of the industry, providing great customer service is one of the keys to success. RPA can be helpful in the front office for enhanced communication with the customer.

Data Migration: RPA is the perfect choice to assist with the migration of data. Even when it comes to small needs data migration time and costs can be reduced with proper planning and execution of RPA.

Administration and reporting: Manufacturing is characterized by the need for constant administration and a large number of reports generated on numerous indicators and for different periods. The various processes of report generation can be a burden for many employees: it requires a lot of time with precise concentration to avoid mistakes. Since most basic reports are rule-based and call for the same actions time after time, an RPA tool can be used to optimize this process. With an RPA, you can set when reports need to be processed, what data should it use, how to visualize it, and more.

Invoice processing: Invoice processing is an exhausting, manual, time-consuming process because it involves multiple procedures by different people to check and approve items. This makes the process prone to mistakes due to accidental misclicks, inaccuracy, or inattentiveness.

Logistics data automation:

- Automate shipment scheduling and tracking: RPA can extract shipment details from incoming emails, log jobs in your scheduling systems and provide pick up times in customer/carrier portals all with robots.
- Automate shipment scheduling and tracking:- Automate manual shipping tasks

- **Eliminate manual process for capturing loads and rate look ups:-** Automatically perform rate look-ups from multimodal carriers and 3PLs.
- **Speed invoicing by integrating systems with customer portals:-** Automatically extract shipping data, attach scanned purchase orders and invoices, and update customer portals in seconds, rather than days.
- **Enhance customer responsiveness with automated order/inventory tracking**
- **Gain insights to improve forecasting and logistics planning**

RPA in Inventory Management:

Having unorganized inventory management can be troublesome for your business in today's competitive era. Besides inefficient business operations, a mismanaged inventory management system can also lead to loss of money due to inaccurate stock information.

Stockout conditions:- due to inefficient inventory management, the businesses fail to accurately calculate their limited stocks and inventories, and as such suffer a loss both in terms of finance and in brand value.

Inaccurate visibility:- The traditional inventory management systems could not offer real-time information on your inventory status. Moreover, the data you get so far is also somewhere 63% accurate reveals a study!

Decreased customer loyalty:- If the inventory levels may not be managed properly, we could potentially lose your valuable customers. The inefficiency in fulfilling their demands and orders may cost you a loss in brand value and customer loyalty.

Uneven Forecast:- An inaccurate demand forecast, either less or more, can both result in business loss. Therefore, having adequate and reliable inventory management technology is foremost needed to eliminate such losses both in terms of finance and brand value.

Benefits of RPA in Inventory management:

- **Smooth communication:-** Custom RPA bots, paired with ERP solutions can help you know the accurate inventory levels, and the future demand and supply forecast.
- **Seamless integration with legacy systems:-** A well-planned RPA application can seamlessly integrate with any device or existing system while making your work efficient and cost-effective.
- **Automated inventory management:-** A well-configured custom inventory management software, with the capabilities of RPA and AI, can help you automate all the big and small tasks of your inventory management, thereby saving much of your time and cost.

- **Order processing:-** Firstly, it completely automates your order processing operations, right from placing the orders to generating receipts. Secondly, the custom bots seamlessly handle the payment and the communication process, while enhancing your businesses' customer experience.

Conclusion:

"The first rule of any technology used in a business is that automation applied to an efficient operation will magnify the efficiency. The second is that automation applied to an inefficient operation will magnify the inefficiency." –Joe Kaeser, CEO of Siemens

In short, every siloed dataset limits the analytical insight that makes process owners strategic contributors to the business. We can't create value – or transform a business operation – without converged, real-time data. Digitally-driven organizations must create a Digital Underbelly to support the front office by automating manual processes, digitizing manual documents to create converged datasets, and embracing the cloud in a way that enables genuine scalability and security for a digital organization. Organizations simply cannot be effective with a digital strategy without automating processes intelligently. This is where RPA adds the most value today... however, as more processes become digitized, the more value we can glean from cognitive applications that feed off data patterns to compose more intelligent, broader process chains that link the front to the back office. In our view, as these solutions mature, we'll see a real convergence of analytics, RPA and cognitive solutions as intelligent data instrumentation becomes the true lifeblood – and currency – for organizations.

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(Footnotes)

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INDIA HAS ROBUST MANUFACTURING CAPABILITY WITH SUFFICIENT SKILLED MANPOWER TO FOSTER INNOVATION

LAKSHMIPRIYA NAIR

PoornachandraTejasvi K, Senior Director - Emerging Markets, India, Pharma Intelligence, talks about shifts and trends in healthcare, growth opportunities and challenges in Indian biopharma industry, its role towards global harmonisation for biopharma regulatory guidelines and drug discovery, advancements in biologics, cell and gene therapy, vaccines and biosimilars segments, and more, in an interaction with Lakshmipriya Nair

Give us an overview of the major advancements, shifts and trends in healthcare and lifesciences due to the COVID-19 pandemic. How will these spur investments in the research and manufacturing of biopharmaceuticals in India?

The pandemic made the world rethink the way of doing business across industries. It's no different for the biopharma industry. One of the major disruptions seen in 2019-2020 was the immediate need to ensure that the production of raw materials critical for the development of drugs and vaccines and other essentials for maintenance of the healthcare system was not affected. However, with multiple countries around the world going into lockdown to contain the spread of the pandemic, there was a large-scale shortage and an inability to access raw materials due to international transportation restrictions and protectionist measures. This made businesses reconsider and rethink the way they sourced their raw materials from a single source/country. Experts have underscored the need to build resiliency through diversification to offset risks posed by factors such as natural disasters, political upheaval and disease outbreaks.

Over the past few years, lifesciences companies have faced intensifying pressure from many directions, including cumulative regulatory necessities, constant technological advances and intense pricing pressure. Moreover, the unprecedented pandemic has accelerated the need

to modernise compliance and upraise the value and partnerships within syndicates as well as external stakeholders.

India is an emerging hub in the biopharma and biosimilar industry and currently tops the chart for domestically-approved biosimilars and clinical trials surpassing the US and Europe. Hyderabad is a major scientific and R&D hub with over 800 lifesciences companies and an emerging destination for biopharma, biosimilars and vaccine manufacturing in India. Given India's prevalence of cancer, diabetes, rheumatoid arthritis, respiratory and other immune-mediated diseases, there is a need to manufacture affordable biosimilars and further develop novel approaches in biologics and vaccines, and revolutionise cell- and gene-therapy manufacturing. Pockets of promise have already emerged – for instance, a startup backed by the Indian Institute of Technology and the National Cancer Institute in the US, which has been the “knowledge partner” for the research effort, hopes to deliver a cut-price CAR-T cell therapy.

There is also an unmet need to cater to India's rare and neglected diseases where our capabilities in biopharma and vaccines can be explored further.

With the lessons learnt from the coronavirus pandemic and prior biological calamities, it is important to have a further structured ecosystem for pursuing different variations in the biopharma and lifesciences space to manage future biological risk.

India has already demonstrated its strength with COVID-19 vaccine manufacturing as well as developing its own vaccines. However, we cannot ignore the fact that there are individuals who are vaccinated, who can still be prone to infections with new SARS-CoV-2 strains, and a large part of the world still remains unvaccinated.

On the other hand, business and manufacturing automation also saw an unprecedented uptake to ensure that business continuity was in place and optimised, based on the challenges that they encountered. Repurposing of already approved molecules for additional indications, including the COVID-19 virus, was also looked into. During this period, digital acceptance grew to unprecedented levels across industries that changed the way research and development, sales and marketing, learning and development, health care professional engagement, etc. were conducted. Almost all documentation from the laboratory, the regulatory departments, to the doctor's clinic, became paperless. Even audits were carried out in real-time and remotely. The pandemic is also estimated to have triggered the development and release of a tsunami of digital health apps in 2020.

The pandemic has underscored the need for global benchmarks of quality and supply reliability for pharma/biopharma products. So, as a major player, how is the Indian biopharma industry working towards global harmonisation for biopharma regulatory guidelines and drug discovery?

The rigorous and robust regulatory process in the biopharma segment can, at times, lead to uncertainties in approval timelines for products. During the pandemic, various regulatory bodies, governments and pharmaceuticals companies came together to find solutions to fast track development and approval timelines in view of the unprecedented situation. In doing so, they were able to collaborate towards regulatory transparency, continuous dialogue with regulators, advance mutual recognition agreements (like the FDA has with EU member states, etc), application and acceptance of digitisation of records. This is an ongoing process, and will potentially be the way forward to ensure an effective and streamlined regulatory system.

India has also been moving towards Pharmaceutical Inspection Convention and Pharmaceutical Inspection Co-operation Scheme (PIC/S) membership, but needs support from across industry/stakeholders. The pandemic has also shone the light on the potential to accelerate regulatory processes as well as the importance of partnerships and transcending boundaries both in R&D (as we saw for COVID-19 vaccines) and on the regulatory front.

India has been working to address concerns around long approval timelines; for instance, setting up a new API manufacturing plant in India historically could require securing several approvals from multiple departments of state and central governments. With multiple regulatory bodies directly or indirectly engaged in framing rules and guidelines for the pharma and bulk drug segments in India, this can, at times, lead to sub-optimal allocation of resources at the policy-making level. However, for instance, the new Production Linked Incentive (PLI) scheme for active pharmaceutical ingredients (APIs)/key starting materials (KSMs) aimed at self-reliance and securing the country's medicine supplies, provides for time-bound clearances. Approval timelines have also been streamlined in the clinical trial segment in the country.

Access and innovation are the buzzwords in the lifesciences industry, not just in India, but across the world. So, which are the focus areas for the industry to build and accelerate progress on both these fronts? Why?

The most important buzzwords in the lifesciences industry globally are 'innovation' and 'access.' While these have been well-known in the industry earlier, the pandemic has spotlighted the multiple roadblocks to 'innovation' and 'access' to the forefront and full view of the world.

Innovation – The pandemic has served to spur biopharma research and development (R&D) backed by the multi-billion dollars provided by governments to support the development of vaccines and drugs. However, the 'Big Pharma' remains continuously in the hunt for new assets amid some challenges in late-stage development, as evidenced by continued targetted licensing deals and mergers and acquisitions, while investment flows into the biotech/bioventure sectors remain strong.

Oncology remains the main R&D focus globally, with the now well-established immuno-oncology approaches and newer modalities such as gene therapy, and even "post gene therapy" research continuing to progress. Rare diseases continue to generate interest given the high medical need and the possibility of profitable niche positions amid limited competition. Meanwhile, completely new options such as digital therapeutics continue to nudge the 'Big Pharma' interest, investment and deals.

The pandemic-related difficulties in recruiting and running clinical trials have accelerated the development of new approaches to this phase of development including decentralised trials, the use of virtual tools and remote monitoring, as well as the greater exploration of real-world evidence in the R&D process. Multiple initiatives are underway at major regulatory agencies globally to guide these changes and build them into processes in the future.

Access – Continuing inequities in global access to COVID-19 vaccines have cast a spotlight on wider issues around access to new medicines and medical technologies, and some of the existing global COVID vaccine distribution programmes have missed their targets. While companies have recently renewed their commitment to the COVID-19 Vaccines Global Access (COVAX) facility, the R&D-based industry continues to be generally opposed to intellectual property waivers around the vaccines, instead of focusing on increased production capacity and selected licensing deals.

More broadly, the innovative pharma industry continues to be involved in multiple individual company schemes, such as patient-assistance programmes, to improve access to selected products. At present, much of the access debate is focussing on the costs of newer and expensive, but often highly effective, technologies such as gene and cell therapies.

The industry faces the challenge of communicating the broader health and economic benefits of these one-time treatments. Part of its approach has also been to encourage holistic debate on the funding and efficiency of healthcare systems and the overall economic benefits of new medicines to create sustainability and the financial headroom to accommodate such treatments.

What is the strategic approach needed for India to move away from mere incremental innovation and become a global player in innovative drugs? What are the strengths to focus on and the challenges that can hinder the country from achieving its research and innovation potential?

It is well-known that investment in research and development across sectors is the only way to remain competitive in the age of globalisation. With a population of around 139 crore Indians, there is no dearth of talent. However, the focus on developing high-quality scientific breakthroughs

has not been a focus area for many years. With the pandemic forcing individuals, organisations and institutions to bring out frugal and scalable solutions to solve the multitude of healthcare and other problems that the country was facing, there were a large number of solution providers that came forward to save the day. Now that it's evident that talent is available but has to be nurtured, a long-term approach needs to be followed with:

- a focus on nurturing scientific talent at the entry-level as seen in the approach of the Indian Pharmaceutical Alliance (IPA).
- fostering more industry-academia collaboration for breakthrough research.
- building separate R&D setups/subsidiaries with sufficient funds and autonomy.

Innovative startups should be spotted and encouraged early on with financing, so they don't have to look offshore for support. Venture capital firms should step in where publicly-held companies are unable to. Another route for achieving the goal of accelerated high-quality research is through partnerships with global research-based biopharma companies, and companies like Biological E and Gennova Biopharma are set to bring cutting-edge mRNA technology via this route.

On the policy front, the Indian government has set the right tone by offering incentives for areas like cell and gene therapy, apart from building self-sufficiency in APIs. Now, the industry needs to follow through with the right intent and execution.

India has robust manufacturing capability, with sufficient skilled manpower to foster innovation and the COVID-19 vaccines developed by Bharat Biotech and ZydusCadila are examples. The challenge lies in shifting focus from easy gains to a high-risk approach that might not always be welcomed by shareholders, but could yield dividends in the long term.

At the same time, one needs to remember that India's "Pharmacy of the World" status is on account of the economically viable drug options it engineers, without which several low- and middle-income countries would be bereft of options. The COVID-19 vaccines are a classic example of the invaluable contribution India makes globally.

Source: Express Pharma



TECHNOLOGY TRENDS THAT ARE RE-SHAPING THE PHARMACEUTICAL SUPPLY CHAIN IN INDIA

CYRUS KATGARA
PARTNER – JEENA& COMPANY

In the backdrop of this change, the national cold chain sector is expected to grow at over 20% CAGR by 2025, as per a recent report by JLL.

By leveraging Big data, data analytics, blockchain, and AI one can forecast demands and plan for consolidation of shipments based on special transit infrastructure requirements, location and urgency.

The Indian Pharma and medical supply chain has undergone a major transformation, facing challenges like unorganised last mile service providers, ill-equipped warehouse facilities, and lack of trained labour and the slow pace of digital adoption. However, during the pandemic, the Indian Pharmaceutical and healthcare supply chain has been a strong pillar in the fight against COVID-19. From life-saving medicines, vaccines, and essential nutraceuticals, to oxygen concentrates and surgical materials vital for COVID Frontline workers and doctors, the pandemic has now opened up immense opportunity for expansion of 3PL and 4PL cold supply chain for pharmaceuticals, in not only Tier-I cities but also in Tier-II cities and towns.

In the backdrop of this change, the national cold chain sector is expected to grow at over 20% CAGR by 2025, as per a recent report by JLL. Listed here are key areas where tech adoption can help overcome these challenges and rise up to meet the new demands of the world struggling with a global pandemic:

AI AndBlockchain leveraging Big Data: Like all activities, planning and forecasting demand, plays a vital role in optimising supply chains. By leveraging Big data, data analytics, blockchain, and AI one can forecast demands and plan for consolidation of shipments based on special transit infrastructure requirements, location and urgency. Additionally, this data can also be used for route optimisation, to ensure the fastest and most cost-effective route can be undertaken for the shipment. By leveraging AI AndBlockchain, one can digitise the documentation process, like e-bill, custom clearance etc., which otherwise can be a time consuming process, on ground. Apart from documentation, invoices and

payments, customer updates, tracking etc., can all be facilitated through an app/ a web based dashboard, where the client can have complete access to their past and current shipments, can place orders for their next shipment and be abreast of the real time news and updates that may impact their transport/ logistic needs, especially during the times of a pandemic and partial lockdown.

IoT and ML: Effective digitisation of operations can help to not only cut down on time and labour but also helps drive proactive consumer engagement, build trust and drive productivity. An integrated Warehouse automation system, that utilises the best of IoT, Robotics, and ML enabled devices, can help monitor the accurate temperature controlled storage environment, drive energy optimisation and enable workers to keep stock, log arrival and departure of shipments, predict and report any probable damage and help keep the warehouse efficiently functioning, 24x7, with little human interference. ML and IoT, including Robotics, have also been leveraged for Automation of Warehouses, Driverless transportation, Drone based deliveries etc., all which can all be of vital significance for temperature controlled Pharma supply chains.

In addition to the above, the government decision of conferring infrastructure status to logistics has been one of the most important impetus for growth of the pharma and healthcare supply chain is the recent times. Apart from a lot of other benefits, this move has enabled the sector to be eligible for 100% foreign direct investment (FDI), especially in the storage and warehousing sector. While all of the above factors are key drivers for growth of the sector, largely brought about due to the global pandemic, the renewed push for manufacturing and vocal for local initiatives are going further to ensure there is a continuous impetus for growth, in the post COVID era.

(Views expressed are personal and do not reflect the official position or policy of the Financial Express Online.)

Source: financialexpress.com



WHY SHOULD INDIA ADOPT IOT FOR THE PHARMA SUPPLY CHAIN?

KAREN RAVINDRANATH
DIRECTOR, WEBNMS

The IoT division of Zoho Corp. outlines how IoT implementation can help ramp up efficiency, quality assurance and customer satisfaction in the pharma supply chain

Healthcare and pharma industries have always been crucial to the economy and human welfare. However, with the pandemic affecting markets and people across the globe and the need for unexpected demand for life-saving drugs and new research for vaccines, the pharma industry is seeing an acceleration in its growth trajectory.

India has been a leading player in the global pharma industry, in terms of generic medicines. It has been a major supplier of crucial medicines for some of the developed countries like the US, European countries and Japan. However, China still holds a major share of the pharma supply chain. With more than 70 per cent of the global supply of raw materials and APIs coming from China, the pandemic and its aftermath has led to many companies rethinking their dependence on a single provider and is looking to diversify its supply chain.

India, already one of the top players, can capitalise on this opportunity to further empower the pharma industry with reliability, quality and supply chain transparency to have a leading edge in the future.

Quality above everything for the pharma business

The pharma industry, with its strict compliance policies and approvals from the FDA and other agencies, is always under pressure to deliver optimal quality. The industry deals with lifesaving drugs and in case of any deviance in quality, the brand reputation and lives at large could be at stake!

Therefore, right from manufacturing and storage to distribution, various stages of the pharma supply chain need to be under constant monitoring in order to track discrepancies and curb any damage. IoT can empower the pharma supply chain with continuous monitoring, predictive maintenance and remote automation that can save millions of dollars lost on

reactive maintenance, unexpected downtime, delays and costly loss of approvals due to underqualified medicines.

Let us discuss the various stages of the supply chain like manufacturing, warehousing and distribution and logistics where IoT-powered remote monitoring and automation can instil a profound difference in the way the operations are carried, even during a global crisis.

Manufacturing: Considering medicines deal with lives, it is highly essential for pharma companies to produce drugs at good quality and maintain standards and government regulations. Digitising the manufacturing process by using IoT application and getting timely data can help identify discrepancies early. This will ensure the quality and effectiveness of the drugs produced.

Automation in processing and packaging, along with continuous monitoring with IoT, will help create visibility into the process. It will also make the process data available online for higher management and administrative staff who are working remotely.

Testing and quality assurance take a different level when they are backed by process and manufacturing data. It is easier to identify and rectify issues or problems in quality by looking into the wealth of process data and help avoid such errors in future.

Warehouse and storage: Once the products are out of the manufacturing units, it is highly critical to store them at a conducive environment in the warehouse. Various aspects of the warehouse environment like temperature, humidity, safety and hygiene can be monitored and managed using IoT applications. Moreover, data from manufacturing can be effectively connected to warehouse data in order to plan storage ahead and also align staff and other supply chain processes for smooth transfer of products from one stage to another. Considering crucial times such as the recent pandemic which requires the safety of staff and restricted movements, automation and proactive data from the warehouse

can help them stay on the vigil and also be alerted in case of any operational snag.

Logistics and distribution: Safe movement and delivery of medicines are as important as maintaining the quality during manufacturing and storage. When there is a spike in demand for life-saving drugs, especially during such unexpected COVID -19 situations, it is important that pharma companies equip themselves with prompt logistics and distribution.

The advantage of using IoT in the pharma supply chain business is that it isn't restricted only to stationary assets and operations. It can be a major game-changer in pharma logistics and distribution. Be it safety, consignment tracking, order tracking or organising and managing field staff, IoT applications can be used for different purposes within the industry. There are IoT applications to monitor the temperature and other aspects of drugs on the move by continuously monitoring the storage units of vehicles that transport the drugs. Besides, major factors like location of fleet, estimated time of arrival, fleet capacity, product capacity planning, distribution planning and even task allocation for the supply chain staff for loading and unloading can be managed using IoT solutions which are simple and effective visual applications. They can also engage field staff on the move with features to track locations, hospital visits, safety and other major factors that are crucial for business and management.

IoT for enterprise-wide management in pharma business

Data is the biggest asset. With IoT to connect multiple aspects of the pharma supply chain, it is only fair that the data obtained from various stages benefit the betterment of entire business operations. IoT can connect the data siloes of the different stages discussed, like manufacturing, storage and distribution, centralise the process and also offer valuable insights for the management to create better operational and business practices. Apart from centralising the supply chain operations, a good IoT application should be able to connect the data with other enterprise applications like CRM and ERP will offer an enterprise-wide orchestration of data that can offer seamless communication between teams even during limited workforce availability and unforeseen crisis

Source: EP News Bureau



Indian Institute of Materials Management

MISSION

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

OBJECTIVE

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

CODE OF ETHICS

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

INDIAN LOGISTICS SECTOR: ON THE PATH OF TRANSFORMATION

NITI AAYOG

The presence of a robust logistics-related infrastructure and an effective logistics management system facilitates seamless movement of goods from the point of origin to that of consumption, and aids an economy's movement to prosperity. The progress of logistics sector holds an immense value for Indian economy as well; as such advancement would increase exports, generate employment and give the country a significant place in the global supply chain.

As per the Economic Survey 2017-18, the Indian logistics sector provides livelihood to 22 million-plus people and improving the sector would facilitate a 10% decrease in indirect logistics cost, leading to a growth of 5-8% in exports. Further, the Survey estimates that the worth of Indian logistics market would be around US\$ 215 billion in next two years compared to about US\$ 160 billion currently. The boom in next couple of years is expected largely due to the implementation of Goods and Service Tax (GST).

The Indian logistics sector is a sunshine industry and is going through a phase of transformation. Due to the initial efforts of Government of India (GoI), such as Make in India programme and improvements in infrastructure along with the emergence of skilled professionals, the country's position bettered from 54 in 2014 to 35 in 2016 in the World Bank (WB)'s Logistics Performance Index (LPI), in terms of overall logistics performance. In fact, India improved its tally in all the six components of LPI. India also registered an overall 30 points rise in 2017 and stood at 100th position compared to 2016, in the WB's

Ease of Doing Business Index (EoDBI).

There exists a tremendous scope for further jump in India's rankings if the existing infrastructural and cost inefficiencies are addressed. The Survey goes on to identify the challenges that beset the Indian logistics industry, the foremost of which is it being largely in the unorganized realm. The other challenges hindering its growth include high cost, underdeveloped material handling infrastructure, fragmented warehousing, presence of multiple regulatory and policy making entities, lack of seamless movement of goods across modes, and poor integration with modern information technology. These challenges, particularly the ones pertaining to procedural complexities, redundant documentations and involvement of several agencies at our ports and borders, severely dent our performance in international trade, resulting into about 70% of the delays.

To ensure ease of trading in the international and domestic arena it is important that steps are taken to build the Indian logistics sector in an integrated manner. The Survey suggests to achieve the same by harnessing the potential of emerging technologies, bringing in investment, creating human capital, removing bottlenecks, improving intermodal transport mix, automation, single window clearance system, and simplifying procedures.

The need of the hour is to formulate an integrated logistics policy. Today the stakeholders have to deal with multiple government agencies at the union, state and local levels, which result into avoidable delays.

The integrated logistics policy could go a long way in streamlining and consolidating multidepartment requirements, besides facilitating corrective action, effective monitoring and prompt grievance redressal. Along with it, a mechanism needs to be created to measure the sector's performance at regular intervals against the set benchmarks, thus, providing evidences to the policymakers so that a favourable policy environment is created.

To alter the country's logistics landscape, Gol has taken a number of decisions. The GST regime is certain to expedite faster conversion of informal logistics setups to formal ones and speed up freight movement at interstate borders due to dismantling of check posts. There is a target to reduce the logistics cost in India from the present 14% of GDP to less than 10% of it, by 2022. A national committee headed by Cabinet Secretary is in place to develop the pan-India roadmap for trade facilitation.

A new Logistics Division in the Department of Commerce has been established to coordinate integrated development of the sector by way of policy changes, improvement in existing procedures, identification of bottlenecks and gaps, and introduction of technology-based interventions. A concerted effort in collaboration with central line ministries and state governments is on to simplify the regulatory processes in domestic and export-import logistics. The Ministry of Commerce and Industry (MoCI) is developing an integrated logistics portal which would serve as a transactional e-marketplace by connecting buyers, logistics service providers and the relevant government agencies such as customs, port community systems, port terminals, shipping lines, railways, etc. Once functional, it would reduce delays and facilitate a transparent, informative and convenient trading system. Recently the Ministry also launched a new Logistics Ease Across Different

States Index to rank states for the support they provide to improve logistics infrastructure within their respective jurisdictions.

The logistics sector now finds a place in the Harmonized Master List of Infrastructure Subsector. This inclusion is set to benefit the logistics industry as it will now have an access to cheaper and long term credit. Such a move will also lead to simplification of the approval process for the construction of multimodal logistics parks. Lastly, it will encourage market accountability through regulation and will attract investments from debt and pension funds into recognized projects.

The commitment of Gol towards an integrated development of logistics sector through policy amendments, infrastructural development, tax reforms and technology adoption will certainly deliver desirable results. It will enhance our trade competitiveness, create jobs, shoot up country's performance in global rankings and pave the way for India to become a logistics hub. Such measures will also contribute to creation of a New India by 2022, as envisioned by the Prime Minister of India.

The authors are Adviser and Young Professional respectively in the Infrastructure – Connectivity vertical of NITI Aayog. The views and analysis expressed in the publication are personally those of the authors. They do not reflect the views of NITI Aayog. NITI Aayog does not guarantee the accuracy of data included in the publication nor does it accept any responsibility for consequences of its use.

The presence of a robust logistics-related infrastructure and an effective logistics management system facilitates seamless movement of goods from the point of origin to that of consumption, and aids an economy's movement to prosperity.

Source URL: <https://niti.gov.in/content/indian-logistics-sector-path-transformation>



POWER OF BIG DATA ANALYTICS FOR SOCIAL GOOD

SARWESHWAR GOSAVI

Big Data Analytics is a Buzz Word these days. Well, it means what it sounds like. It's a term used to describe any gigantic chunk of information, which can be used as useful information.

It is often characterized by five 'V's: *Volume, Variety, Velocity, Veracity, and Value.*

Big Data Analytics is currently being extensively used in the fields of supply chain optimization, fraud & risk detection & control, web search & internet, insurance & banking, e-commerce, mobiles, travels & airline industry, share market, meteorological department, social media, space, and marine science, etc. A recent example is our *Chandrayaan-2 mission*, which made extensive use of data analytics and Artificial Intelligence (AI).

The power of Big Data Analytics can be effectively used to improve the world in which we live. Here are my thoughts related to some areas wherein we can use analytics for social good.

Urban Planning: Sustainable urban planning is becoming more and more complicated with multiple systems competing for resources — utilities, energy, housing, transportation, and infrastructure to name but a few. Municipalities can make use of big data for managing waste, reducing costs, and improving the quality of living and working in large cities. Using big data in urban planning also helps with parking problems, pollution, and energy consumption. Big Data can also help to have landmark remodeling, which will result in optimizing expenses incurred for infrastructure face lifting in megacities.

Public Health: Big data allows scientists to unravel entire DNA sequences in minutes. This means an increased ability to predict patterns in diseases and mutations. This will help in finding quicker solutions and to fight with diseases in a smart way. Analytics can help to have preventive measures in countries, which are more susceptible to infections.

Predictive models built by taking information like genes, localized environment, individual lifestyle, pre-existing conditions, socioeconomic factors, and demographics can give us enough information to take corrective action in our lifestyles to disrupt or reverse the progress of a disease or perhaps prepare for its arrival by taking the necessary precautions.

Energy Management: Data analytics can be used in the areas of energy management and cover areas like energy optimization, smart-grid management,

distribution of energy, and building automation for cities. Data analytics application here focuses mainly on monitoring and controlling of dispatch crew, network devices, and make sure service outages are properly managed. Utilities get the ability to integrate as much as millions of data points within the performance of the network, which allows the engineers to make use of the analytics in monitoring the network.

Agriculture: Currently typically, in India farmers tend to take a particular crop year on year without much of analytics. Though agriculture universities are helping farmers to have more scientific farming; however still there is a long way to go. The use of data analytics can help farmers to know about the quality of the soil they are having, a requirement of fertilizers based on soil composition. Based on data, models can be designed to take crops based on current country demand. This will help to fulfill the country's demand, avoid scrappage due to low/ no rate, and make farmers profitable. Similar studies can be applied for dairy products also.

Education: Since the last many years in urban areas, students and are aspiring for engineers, doctors, commerce graduates, MBAs. This has created a flood of people in these areas far more than the market demand. Big Data Analytics can help in this area. Real-Time Data Model can be designed which can integrate the country's current skill demand along with future trends. This will help to revamp the education system, which can focus on developing skills, which are required to sustain in current and future market scenarios.

Environmental Protection: AI or Big Data Analytics can play a big role in Environmental Protection. Based on data points, models can be developed to check biodiversity, to check forest areas and their depletion, to have control on wildlife poaching, to monitor changes in river routes & sea levels, to monitor ice melting, to monitor the ozone layer, to monitor environmental pollutants, for population mapping, etc.

Such models will help us to take corrective actions well in advance and manage environmental protection in better way. There are many more field wherein *Big Data Analytics* can be effectively used for social good. Let's use *Power of Data* to make world a better place to live.

What are your thoughts on the applications of Big Data Analytics? Please let isknow in comment section.

Source: sourcingandsupplychain.com

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ROLES OF CFO

ARIJIT DAS

CFO, Chief Financial officer is one role which we assume that we understand completely. Let me help you unravel a few of its branches to attain the importance of this role. CFOs are playing a major role in a company as they are entitled to manage the entire financial data as well as the operational strategies. The role has its limitations and liberty in each company as it often depends on the structure, size, and processes of the organization.

So what are the roles and responsibilities performed by Finance Chiefs ?

To carry out a role & responsibility one must carry certain characteristics and qualities. Even for our Finance chiefs, it is a must to have some of the qualities for example CFOs needs to have a vision and foresight of the financial capabilities of the company, CFOs tell their CEOs what will happen in the future, A holistic view of the overall business, A Results-oriented mindset, Analytic, Data-Driven, Adaptive and also proactive in every action. If we were to talk about areas, it can be said that the modern age CFOs are involved in human resource authorities:

- Challenges faced in managing payrolls
- Maintaining laws and legal aspects
- Developing Entrepreneurship and Business Strategies
- Presenting the Data Visualization
- Managing legal, financial, and administrative data

It is needless to say that the financial world has become more high-tech. Therefore, the chief financial officers need to be much skilled and tech-savvy to face the upcoming challenges in this competitive world.



Do you know how the role has evolved over time ?

The role of the CFO has undergone some significant changes over the years. If we look back almost thirty years ago, we will see that the major role of a CFO was to keep a book or record of the company history, maintain the financial statement, and develop statutory compliance. Now, if you look at the current corporate market, the scenario has been drastically transformed.

Some of us can predict the probable reason behind such changes in the Role of a Finance Chief. However, we are going to explore some more reasons, which are significantly influencing such evolution.

In today's world, accountants and strategists tend to think of some unique methods to capture the market value. It is needless to say that the usage of diversified technologies, i.e, machine learning, Artificial Intelligence, and data analytics, has changed the mindset of the CFOs. You can now assume how competitive this market has become. It is thus quite obvious, the companies have been more likely to hire new talents, who are quite adaptive towards these modern-age technologies. Who doesn't like to deep dive into the broader exposure, especially, when they have conducted extended market research.

We must admit that most of the CFO's area of skill-set is based on the broader aspects of the current business market. In this field, they considered first looking at the conformance, i.e. conducting extensive research on the business market that aligns with the legal and regulatory factors. However, one can always consider the stewardship of the organizational assets.

In this competitive business market, we tend to collaborate with a set of finance chiefs. A set who are skilled, vision to make the team efficient to adapt the new Digital world & can transform the processes into completely digital with Expense Management solutions such as Happay, Esign solution such as DocuSign, ERP solutions such as Oracle, Net suite and Contract management solution such as Ivalua wherein the finance operation reshapes itself into paperless operation.

What skill set determines his candidature?

Skills such as managing all kinds of corporate spending, Reimbursements, Petty Cash, Business Expenses, Payments, Cards, Travel, and more are equally

important. We have stepped into an Era wherein decision-makers decide with data and digital dashboards. Hence, A chief who can completely create a space for visibility & control of Finance becomes more and more important. In fact, with all these the finance operation reshapes itself into a paperless operation and helps the decision-making in the areas such as policy check, leakages, spillage, and expense records.

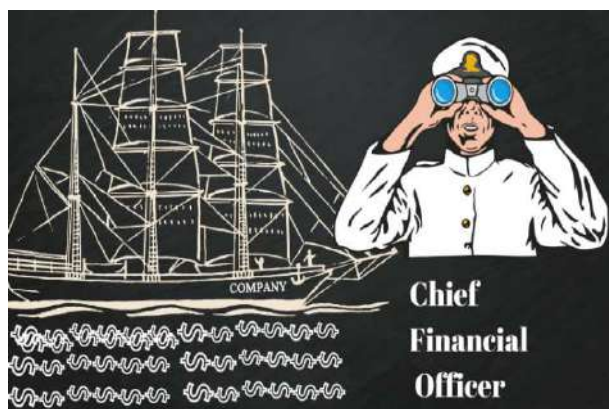
What are the major KPIs of a CFO?

A CFO proactively gets the idea about the Investment planning, Money Management, and Capital Structure of the company. If we have to look at the major duties of the CFO, we can find that they are mainly managing the financial risks, keeping a track of the expenditures, structuring long term financial planning, handling both the taxation, Companies law and contracts, and investment issues. It is quite significantly noticeable that the role of the CFO has been evolving in the last 30 years.

The KPI dashboard of CFO in the current business market must include the following aspects:

- 1) Current Ratio
- 2) Quick Ratio
- 3) Total-Debt-to-Equity-Ratio
- 4) Operating Cash Flow
- 5) Working Capital
- 6) Per-share earnings
- 7) Gross Profit Margin
- 8) Return on Equity
- 9) Employee Count
- 10) Compound average growth ratio
- 11) Interest coverage ratio

These KPIs are the specific subcategory of the financial KPIs. These are quite helpful for a CFO to make fruitful & profitable decisions regarding the company's financial data to drive towards the right direction. CFO takes care of these areas and presents a clear outlook to drive benefits in the future. Moreover, it helps in measuring the associated risks as well the future growth possibilities.



What influence does a CFO have in organizational performance?

4 ways to define

- Converting information into strategic insights
- Strategy Commercialization
- Alignment of Realistic Strategies with the business Decision-making process
- Improvement of the decision making quality by developing a structured scenario planning strategy

So what additional responsibilities does a CFO perform?

Not only these but with time CFOs are also responsible for stabilizing the Bottom Line. What do you often look for when you think of reducing the costs? Of course, the best procurement team secures the bottom line costs. During this pandemic situation, many of the companies have tried to do so. They were simply cutting down the operational costs. But, have you ever thought of saving the costs when the suppliers were unreachable, non-active suppliers during a lock down?

With the help of the organic database and strong bonding with the suppliers, the current business marketers have been able to drive such initiatives. It enables the process to provide sourcing-as-a-service when the internal team feels an urge to develop their capabilities in a specific area. In general, it can be stated that the delivery model is that of co-sourcing, where the internal operations bring the process and category knowledge to bear, whilst relying on the local market intelligence of the in-house team to execute each market/sourcing engagement.

Many of the procurement or financial companies deal with the complete Source-to-Pay solution, yet flourishes in the market of Standalone-Services. This service can be controlled manually or using advanced technologies.

What benefits CFOs bring to an organization?

Now, you must be thinking what are the major benefits CFO or the team has been receiving right?

Just have a quick look at the following welfare:

- Predictable Implementation Cost
- Standard Reporting Across all Subject areas
- Robust Visibility Model tailored for your organization
- Role-based security and Secure Data Access
- The maximum profit on ROI
- Get rid of the complexity and risks

You can compare the CFOs with the procurement heads

who are constantly fighting to get the best service out of the system. One can say the CFO is the one who maneuvers the ship but Procurement will always sail the ship in the best direction. In a nutshell, if you see CFO's are thriving to act as a driving force to such digital transformation. These cost initiatives have not only helped in flourishing the financial market, but these have also made the businesses more agile and adaptive towards challenges. So if you are the one heading the Finance don't forget to look for opportunities to contribute and experience in these areas as the Role and Headhunters have been looking for the same.

In a candid conversation, one of the Industry Leaders added "In the past, CFOs were challenged with turning the numbers into something meaningful, deriving insights, and delivering information to the rest of the organization with lots of integrity, flexibility, and speed. Today as a leader, CFO's emphasize managing risk (VUCA world), driving performance, and forward-looking to steer into the Future. All in all CFO (he/she) emerges as the first port of call for CEOs for advice and direction."

RAVI GOSALA, CFO(CPET) INDORAMA VENTURES PCL, THAILAND

Is he running the SHIP?

All of us need to gather some basic ideas about the efforts a CFO and a CPO have been providing to drive the company's financial position. Do you know the procurement process is most likely quite a hard process considering the several moving parts? It is thus necessary to equip the business with the most suitable tools for maximizing the values and priorities. Here are some of the areas, which are benefited by the CFOs and CPOs.

V' Alignment of the procurement with the business strategic procedure: CFO and CPO ensure to drive the procurement service by presenting a clear and concise outlet that gives the idea about the possible risks and potentiality of the business on a competitive ground. CPOs need to work with the CFOs for developing a balanced procurement performance scorecard. CPOs are positioned to influence the control suppliers who generally deliver strategic insight to the business CEO.

V' Optimization of the working capital: When the procurement team works directly with the suppliers, they usually influence the strategic procurement process by managing associated working capital. The CFO can then present accurate cash flow information by negotiating advantageous payments and managing the stock levels.

More Contribution to be taken into Consideration:

- During any crisis situation, the CFO's voice plays quite a critical role. But, it is a CPO who contributes

directly to a firm's resilience. It also has a strategic role in leading the business through the tough times ahead. Thus, it can be stated that in order to ensure better management of crucial situations, a close and coordinated relationship must be created between the CFOs and CPOs.

- Without the leadership of a CFO, performance efforts will lack a meaningful benchmark to bring success to the organization. Managers will be tempted to focus on projects that are clearly visible instead of those that promise the highest value. This is why, while planning transformations, CFOs play the broader role in modelling desired mindsets and behaviour while transforming the finance functions.

Conclusion

Hence, it can be stated that the contribution of the CFO and CPO is much commendable in terms of managing organizational performance. Moreover, managing these specific financial areas help the company to drive the ship towards a positive direction where it can ensure the strategic position in a highly competitive market. So, on a concluding note, the combined effort of the CPO, CEO, and CFOs.

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PHARMACEUTICAL SUPPLY CHAIN VULNERABILITIES: ROLE OF INFORMATION TECHNOLOGY

PROF. KALYANA C CHEJARLA, IMT, HYDERABAD

kalyan@imthyderabad.edu.in

Introduction : A supply chain is a set of processes, people, infrastructure, operating policies and agreements among different entities, whose objective is to transform the raw materials into finished goods and deliver to end customers, profitably. Modern supply chains are typically global and dynamic network arrangement of business entities that process the demand information upstream and coordinate product delivery downstream. Increased specialization and the drive towards efficiencies have resulted in burgeoning number of independent players across all supply chains necessitating the increasing need for integration across both strategic and operating levels. Additionally, pharmaceutical supply chains are vulnerable to a set of specific external forces acting on them. Goal of supply chain integration is to ensure smooth flow of product and information on one hand and plug the vulnerabilities on the other hand. Information Technology is the oil with which this integration machinery works. This paper examines the pharmaceutical supply chain vulnerabilities and role of Information Technology in enabling a better integration in light of these vulnerabilities.

Pharmaceutical Supply Chains : Pharmaceutical supply chains consist of the following entities:

1. **Product Development Organizations :** These are either specialized independent research organizations or in-house R&D departments of large pharmaceutical companies, whose focus is to develop new drugs for different therapeutic applications. New drug development process is long, arduous, costly, highly regulated and is ridden with uncertainties. A new drug development begins with evaluation of thousands of potential molecules to zero-in on one. It is not uncommon for this process to take 8 to 10 years before a successful launch and burn a couple of billions of dollars in the course.
2. **Active Pharmaceutical Ingredient (API) Manufacturers :** API (also known as bulk drug) is the main raw material used for making final drugs (also called formulations). API is essentially molecule that is produced using a series of chemical and physical processes. API manufacturing is a capital intensive, batch processing and quality sensitive task. Good Manufacturing Practices (GMP) and regulations govern the quality standards to be followed in API manufacturing. A typical batch processing cycle-time can run into days and a WIP of 30 to 60 days is common. Most of API manufacturers are situated in India and China. Often, API manufacturers also outsource

part of the production processes to Intermediates and may also have downstream formulation plants.

3. **Secondary / Finished Dosage / Formulation Manufacturers :** Formulation manufacturers (also known as secondary or finished dosage manufacturers) are involved in producing the ready-to-consume form drugs in tablets, capsules, injection vials etc. from APIs and other pharmaceutically inert binding material. These are the global majors of the pharmaceutical industry. Formulation plants are typically smaller in size, closer to markets and produce smaller batch sizes in comparison to API manufacturers. Formulations consist of drugs within (branded) and outside (generic) patent expiry date. While Formulations manufacturers typically focus on branded drugs, API manufacturers contend to move up the value chain by developing the generic formulations for drugs approaching patent expiry. Formulation manufacturing may be outsourced or handled in-house. Similar quality norms prevail in Formulations manufacturing processes as in API manufacturing.
4. **Transportation, Warehousing and Distribution :** The distribution of Finished Dosages to the patients happens through a multitude of channels such as company's own warehouses, wholesalers, 3rd party distributors, large pharmacy retailers, Group Purchase Organizations, direct-to-customers (typically large healthcare providers or NGO organizations), government operated public healthcare organizations etc., to name a few. Global transportation of bulk drugs is typically through a combination of ocean and over the road networks. Formulations are transported using air and over the road carriers. Transportation and warehousing of different drugs requires controlled temperature (ambient: 20~25°C, refrigerated: 2~8°C, frozen: sub-zero) conditions and specialized end-to-end cold chain infrastructure. Dispensation of drugs to patients happens through the end-points of the above mentioned distribution nodes either on prescription or over the counter depending on the type of drug.

Pharmaceutical Supply Chain Vulnerabilities : In comparison to the traditional consumer durables or FMCG supply chains, pharmaceutical supply chains are quite complex. Following vulnerabilities contribute to this complexity:

1. **Temperature excursions :** Any temperature excursions of the drug in the lengthy supply chain

may render the entire batch useless at best and out-right dangerous at worst. There are pockets of supply chains such as transportation, transshipment and loading & unloading which are highly vulnerable for excursions. Management of interfaces between different supply chain partners with a focus on such excursions is crucial for the overall supply chain success.

2. **Rigid Production Processes :** Usage of conventional batch processing is no longer suitable for the current dynamic environment. Make-to-order and continuous production are the order of the day as (a) there is a proliferation of specific drugs for specific conditions and (b) nobody in the supply chain wants to keep excess inventory of potentially non-moving drugs. Advanced Manufacturing Technologies that support continuous production are now already available. It is a moot question as to how many of the pharmaceutical supply chains are ready to radically overhaul their production processes.
3. **Multitude of stakeholders :** Pharmaceutical supply chains are constantly subject to nudges and forces from a variety of stakeholders such as public-at-large, regulatory bodies, insurance companies, Group Purchase Organizations, NGOs, medical device manufacturers, healthcare providers, camps promoting alternate medicines / treatment methods etc., to name a few. Given the sensitivity of outcomes in terms of the physical well-being of patients, it is imperative that the pharmaceutical supply chains cannot afford to ignore the voice of any of these stakeholders.
4. **Expansion of the coverage :** Measures by national governments to increase the insurance coverage for poorer sections, increased life expectancy, decreased infant mortality, emergence of life-style related diseases in affluent countries, out-break of epidemics in developing countries etc., are putting immense pressure on pharmaceutical supply chains to come up with custom supply chain designs that are suitable for individual market segments.
5. **Increasing accountability :** The complete traceability of a drug's batch is a key requirement for pharmaceutical supply chains, in order to assign accountability to the correct entity. Even the unknown or unforeseeable side-effects missed during drug development and approval can result in huge implications for a pharmaceutical supply chain.
6. **Sustainability :** Reverse logistics to collect and safely dispose the expired drugs, adhering to mandatory affluent treatment, hazardous material disposal by the API and formulations manufacturers are the key sustainability requirements of pharmaceutical supply chains.
7. **Radical Innovations :** New developments in Biologics, Nucleic acids, cell therapy, regenerative medicine, implantables and bioelectronics have the potential to totally alter the way new drugs are

developed and administered to patients. This may mean a complete overhaul of current pharmaceutical supply chains to remain relevant in the new reality.

8. **Counterfeits :** The menace of Counterfeit drugs is rampant across the globe. It is important for the pharmaceutical supply chains to sensitize pharma retailers and customers on the perils of these counterfeit drugs and also put sufficient security measures in their supply chains to detect and prevent infiltration of the counterfeits.

Information Technology & Supply Chain Integration : Integration of supply chains involves shared strategic objectives, transparency and timeliness of information sharing, creation of joint planning, feedback & performance review mechanisms, institutionalizing flexibility of operations and undertaking continuous improvements projects together by different supply chain partners. Integration can be achieved in different degrees depending on the length and trust in the relationship. Lowest level of integration is at the operational planning and execution and the highest level is when the supply chain partners share the strategic objectives and align their commercial relationship to suit these objectives. Information Technology is a foundation on which supply chain integration can be realized among the supply chain partners. The following section briefly describes about a few existing and emergent technologies and how pharmaceutical supply chains can leverage these technologies to achieve integration.

Supply Chain Management Electronic Data Interchange (EDI) : Real-time information on plans, reports, transactions and alerts can be exchanged between the enterprise systems of partners via supply chain electronic data interchange (EDI). Information documents such as purchase orders, shipment notices, invoices etc., are pre-coded and standardized in EDI framework. Implementation of EDI is known to reduce the business cycle times and improve data quality.

To illustrate the point, a specialty pharmaceutical company offering consumer healthcare & prescription products has been able to achieve same day dispatches to its trading partners such as McKesson, Cardinal Health, Walmart, Target and CVS. ProcessOne has helped this company automate the order fulfillment process data transmission through P1 EDI implementation. Purchase orders (at customers) trigger Sales Order generation (at the company HO), which in turn raise Advance Shipment Notice (at the Company Warehouse) followed by Invoice generation (at the company HO). These documents are electronically transmitted to the relevant trading partner with no manual intervention. This was a huge improvement compared to 2 or 3 day delay in dispatches, manual errors and high cost of fulfillment process.

Cloud Computing: Cloud based SCM solutions promise rapid scalability, immediate deployment and access from anywhere. Pharmaceutical supply chain partners, especially the ones without existing in-house enterprise systems could consider this solution to be digitally visible and integrate with the rest of the supply chain.

A few use cases for cloud in pharma industry identified by IDC2 and Ponemon Institute are: locating and managing subject patients in a certain area for clinical trials, access to product identifier database for pharma shipments by various heterogeneous stakeholders simultaneously and search virtual chemical libraries to identify potential molecules for future developments.

Industry 4.0 : Industry 4.0 collectively refers to a cyber-physical setup in which all the connected systems communicate with each other and manage decentralized and localized planning and execution. Key building blocks of Industry 4.0 are Advanced Robotics, Additive Manufacturing, Augmented Reality, Simulation, Horizontal & Vertical Integration, Industrial Internet and Cybersecurity. Pharmaceutical supply chains can use Industry 4.0 in production and logistics planning and controlling. Automated batch level tracking and control within the plant and pallet level tracking and control during transit is possible by using suitable sensors. Simulations can be used to optimize the production across the supply chain without having to incur costly set-ups.

According to a report by Frost and Sullivan, ApotexPharmachem3, a Canadian pharmaceutical manufacturer has implemented IIoT concepts such as autonomous vehicles, RFID tracking and smart sterilization that helped the company achieve real-time view of the plant operations, improve efficiency and productivity and thereby increase its capacity.

Block Chain : A block chain is defined as an open, distributed ledger that can record transactions between two parties efficiently and in a verifiable and permanent way. Thus the transactions recorded in block chains are immutable and the updates are traceable. By having the sensors record details such as chemical composition, temperature, package open status etc., into a block chain directly, everybody in the supply chain is aware of the prior transactions that have occurred on their shipments.

Merck4 has developed a PoC (Proof of Concept) Blockchain application in partnership with SAP to ensure authenticity of the returned drugs. This mobile application keeps track of the item number, a serial number, a batch number, and an expiration date every time the shipment changes hands in addition to geographically tracing the shipment, making it virtually impossible for the counterfeit drug to enter the supply chain.

Big Data & Analytics : Big Data refers to those IT applications that can collect, preprocess and generate learning / insights from this data. Typically sources of big data are social media platforms, company & other related websites and a hoard of sensors deployed across the supply chain. Analytics is of three kinds, namely descriptive, predictive and prescriptive. Pharmaceutical supply chains can find immense value in developing Big Data & Analytics capabilities in areas such as drug development (shortlisting molecules), impact of different local events on drug demand, quickly respond to reported drug side-effects etc.,

Merck5 had analyzed its production data of 255 batches over last 10 years that was spread over 16 databases

pertaining to one vaccine, performed over 15 billion calculations using Big Data concepts with a help of an analytics firm, Hortonworks to identify variable levels (from among hundreds of variables) of batches with highest yields. Using the insights, the company had significantly improved the yields and reduced the cost of production of this vaccine and later by applying same principles, other vaccines as well.

Conclusion : In conclusion, we summarize the efficacy of various Information Technology options in achieving integration and in addressing vulnerabilities of pharmaceutical supply chains as follows, with a caveat that IT is just a tool and it is the managers that must make it work:

Vulnerability / IT Solutions	EDI	Cloud	Industry 4.0	Block Chain	Big Data & Analytics
Temperature excursions			Y	Y	
Rigid Production Processes			Y6		
Multitude of stakeholders	Y	Y		Y	Y
Expansion of the coverage	Y	Y	Y		Y
Increasing accountability	Y	Y	Y	Y	
Sustainability			Y7		Y
Radical Innovations				Y8	Y
Counterfeits				Y9	

The above analysis indicates that whilst for some vulnerabilities (viz., Multitude of stakeholders, Expansion of coverage etc.) a combination of IT solutions are relevant for best results whereas for the vulnerability, Radical Innovations the existing IT solutions are inadequate in their current state.

(Footnotes)

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6 Advanced Manufacturing Methods are considered part of Industry 4.0 portfolio

7 Effluents emission can be simulated using Industry 4.0 and Analytics suite and appropriate managerial decisions be taken

8 Once the company has built Radical Innovation capability, Block Chain, Big Data & Analytics can be useful in integration

9 Counterfeits infiltrating into the legitimate pharmaceutical supply chains can be detected and blocked using block chains

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WTO UPDATE

INTERNATIONAL ORGANIZATIONS DISCUSS HOW TO IMPROVE ACCESS TO COVID VACCINES, COUNTERMEASURES

The heads of the International Monetary Fund, World Bank Group, World Health Organization and World Trade Organization held on 17 December high-level consultations with UNICEF and Gavi aimed at increasing access to COVID-19-related vaccines and other critical medical countermeasures in low- and lower-middle-income countries. The four agency heads — Kristalina Georgieva (IMF), David Malpass (World Bank), Dr Tedros Adhanom Ghebreyesus (WHO) and Dr Ngozi Okonjo-Iweala (WTO) — issued a joint statement on behalf of the Multilateral Leaders Task Force

Seventh Meeting of the Multilateral Leaders Task Force, December 17, 2021:

“From Vaccines to Vaccinations”

Joint Statement

The heads of the International Monetary Fund, World Bank Group, World Health Organization, and World Trade Organization held high-level consultations with Gavi and UNICEF on December 17, 2021 aimed at increasing the use of COVID-19 vaccines and other critical medical countermeasures in low-income (LIC) and lower middle-income (LMIC) countries and supporting countries to be better prepared, resourced, and ready to roll out vaccines.

We agreed on the urgency to accelerate vaccinations in LICs, where under 5% of the population is fully vaccinated, as well as in LMICs, where around 30% of the population is fully vaccinated. We agreed to work with countries to support and strengthen their national vaccination goals consistent with the global target to vaccinate 70% of the populations in all countries by mid-2022. The emergence of the Omicron variant underscores the vital need for fair and broad access to vaccines as well as testing, sequencing, and treatments to end the pandemic.

Addressing vaccine inequity, particularly in LICs, requires increasing the supplies of vaccines to COVAX and AVAT, encouraging LICs and LMICs to purchase additional vaccine doses, and enhancing country readiness to deploy vaccines. Furthermore, to facilitate trade flows to support the manufacturing and distribution of vaccines and other COVID tools, export restrictions must be rolled back and trade-facilitating measures must be put in place. Fully funding the ACT-A Accelerator's Financing Framework would play an important role in narrowing these gaps and reaching the global target.

Some LICs and LMICs are facing serious challenges in vaccine deployment. Constraints related to storage, cold chain capacity, and trained vaccinators are exacerbated in some cases by doses arriving with short

shelf lives and without adequate lead time and shortages in ancillary supplies (such as syringes, safety boxes, and diluents), with challenges to plan and finance vaccination campaigns in a timely manner. As in wealthier countries, vaccine hesitancy is also an issue in some LICs and LMICs.

To address such challenges, we call on governments that have already achieved high coverage to:

- fulfill their donation pledges as quickly as possible to accelerate near-term deliveries to COVAX;
- release manufacturers from contracts and options and implement delivery swaps, so they can prioritize supply to COVAX, AVAT, and low-coverage countries.

We urge governments that have yet to achieve high vaccination coverage to:

- contract additional doses immediately through AVAT, COVAX, or bilaterally;
- establish in-country surge capacity to increase the rate of vaccine utilization as supplies increase; and
- coordinate between health and finance authorities for making increased use of multilateral development banks' resources that are readily available for both vaccine purchase and deployment.

We call for better coordination among vaccine manufacturers, dose donating countries, COVAX, AVAT, and other partners to improve visibility on vaccine supply schedules and quality of supply for LICs and LMICs, to support country-level planning and preparedness for turning vaccines into vaccinations. Visibility on schedules along with adequate lead times and shelf lives of vaccines are critical for both equitable distribution as well as for recipient countries and their partners to prepare for in-country deployment.

Growing volumes of COVID-19 vaccines are forecast to arrive in LICs and LMICs in the coming months. Close coordination amongst all stakeholders will be crucial to help provide countries with the assistance and necessary resources to increase their capacity to administer those doses. In this regard, we welcome the recent appointment by UNICEF and WHO, in partnership with Gavi, of the Global Lead Coordinator for COVID Vaccine Country Readiness and Delivery, who will play an important key role in strengthening in-country vaccine deployment.

Source: WTO website



PUBLIC PROCUREMENT IN INDIA RISKS AND CHALLENGES INHERENT IN SUPPLYING TO THE GOVERNMENT

BTG LEGAL

INTRODUCTION

The increasing volume of public procurement opportunities in India, coupled with the scale and magnitude of government projects, holds tremendous economic potential for both local and overseas companies. The recent uptick in procurement opportunity in India can be attributed to a variety of measures and initiatives.

For one, foreign investors are today being granted greater access to the breadth of India's market than ever before. The Parliament has recently approved a proposal to further liberalize investment and increase foreign direct investment inflow into India, easing investment caps and opening up previously restricted sectors to overseas investors.

The government's push towards modernising existing infrastructure and equipment has also resulted in a number of procurement opportunities, as have new initiatives such as "Digital India" and "Make in India" which are geared towards improved physical and social infrastructure, connectivity and local design and manufacturing capability.

Nonetheless, working with the government can be a mixed bag of opportunities and challenges, and business exposure to the public sector is not without legal and compliance risks. To this end, we have distilled a few key takeaways from our experience advising clients on public tender processes and vendor contracts with the government.

PUBLIC PROCUREMENT REGIME – OVERVIEW

There is no comprehensive central legislation exclusively governing public procurement in India. Instead, the public procurement regime comprises a framework of overlapping administrative rules and guidelines, sector-specific manuals and state-specific legislation.

At the core of the procurement framework lies the General Financial Rules ("GFR") initially implemented in 1947 and last modified in 2017. The GFR comprises comprehensive administrative rules and directives on financial management and procedures for government procurement. All government purchases must adhere to the principles outlined in the GFR, which includes specific rules on procurement of goods and services and contract management.

Additionally, the Manual for Procurement of Goods, 2017 contains guidelines for the purchase of goods, and the Delegation of Financial Powers Rules, 1978 delegate the government's financial powers to various ministries and subordinate authorities. All government authorities delegated with the financial powers of procuring goods in public interest will be responsible to ensure efficiency, economy and transparency, fair and equitable treatment of suppliers, and the promotion of competition in public procurement. These administrative guidelines are supplemented by manuals and policies governing procurement by individual ministries/departments, such as defence, telecom and railways.

The framework is checked (for compliance) and further layered with rules by authorities including: (a) the Central Vigilance Commission tasked with increasing transparency and objectivity in public procurement; (b) the Competition Commission of India which checks anti-competitive elements; and (c) the Central Bureau of Investigation engaged for investigation and prosecution of the criminal activities in the procurement process such as probity issues.

As between the procurer and the vendor, these rules above flow down via a tender process, award and contract.

CHALLENGES AND CONCERNS

The principle underlying India's public procurement regime is the acquisition of materials and services of specified quality at the most competitive prices, in a transparent and non-arbitrary manner. Nonetheless, the absence of a central procurement regulation enabling procuring authorities with scope to tweak guidelines and contract format, leads to confusion on one hand and rigidity on the other. In fact, different agencies may even prescribe varying qualification criteria, financial terms, selection procedures etc. for similar public sector work.

Vendors supplying, directly or indirectly, to the Indian government must carefully navigate the convoluted procurement framework. Falling foul, inadvertently or otherwise, of any procurement conditions under the tender documents or the aforementioned rules and guidelines could result in the tender award being challenged / disqualified and the contract rescinded,

and the vendor being blacklisted for up to 3 years.

In addition, supplying to the government may involve some unique risks and practical concerns, as captured below.

1. PARENT GUARANTEES

- Procurement tenders typically reflect pre-specified criteria of minimum turnover, revenue, employee, size, etc. These requirements would effectively prevent a newly incorporated local subsidiary or special purpose vehicle of an overseas vendor from participation in the tender.
- In some cases, the procurer may permit participation on the basis of the financial and technical qualifications of the foreign parent, and subject to the foreign parent providing a financial and performance guarantee on behalf of the contracting entity.
- However, this may open up the overseas entity to financial and legal risks (mainly back to back liability for breach of performance) that may not have been contemplated when assessing whether to participate in the tender.
- Further, performance guarantees may also be sought from foreign suppliers who do not have a presence or track record of supply in India.

Flag: Evaluate carefully before exposing the global entity to financial and legal risks via back to back liability and performance obligations.

2. SUB-CONTRACTING – LIABILITY FLOW DOWN

- It is not uncommon for overseas vendors to enter into sub-contracting or reseller arrangements with an Indian entity to avoid having to incorporate a local entity and/or to comply with sector-specific foreign investment restrictions. In such case, the main or prime contractor is the Indian partner.
- However, this arrangement may not successfully avoid liability flow down issues (including financial exposure) from the main contract with the end customer (i.e. government authority).
- While contractual risk can be apportioned inter se between the Indian prime contractor and the overseas sub-contractor, this will have limited bearing on the bid and the contract with the end customer. Further, in the event of breach by the prime contractor, the effectiveness of contractual and tortious recourse would ultimately depend on prime contractor's financial ability to make reparations to the overseas sub-contractor.
- Under some bid terms, the overseas sub-contractor has had to undertake a deed of joint and several

liability co-extensive with the prime contractor, effectively exposing it to unlimited liability and direct recourse from the end customer under the main contract.

- Specific commercial requirements such as technical qualifications, timelines for production, escrow etc. will be specified under the tender terms, and these will flow down to the overseas sub-contractor on a back to back basis.
- Letters of comfort and/or corporate guarantees (resulting in direct recourse) may also be required from the overseas vendor assuring availability of after sales support, warranty fulfillment and spares.

Flag: Your scope of work and liability for breach may not necessarily be balanced vis-à-vis the end customer, even if you are the sub-contractor. Your liability exposure may be for the entire scope (and not just your share) of work.

3. Transfer of Technology

- The ability of a vendor to retain control over its intellectual property ("IP") will depend on the extent of transfer of technology ("ToT") mandated under the tender documents and sector-specific guidelines.
- For instance, the requirement for "comprehensive ToT", or a stipulation that Indian entities must have "complete control" over technology transferred, may limit the vendor's ability to include restrictive conditions, ringfencing, end-use restrictions etc. under the ToT or licensing agreement.
- Even where restrictions on use, disclosure etc. are contractually mandated, contraventions of terms of use of IP / enforcement of IP rights in India can be difficult and costly.
- It is not uncommon for the procurer to require key technology blue prints or other documentation to be placed in escrow.
- Some bid terms may even entitle the customer (i.e. the government) to take over the assembly line where the supplier ceases manufacturing the relevant part.
- At an extreme (and though not commonly exercised) the government may, for sensitive sectors such as defence, also have "march-in rights" to take control over the IP for national safety and security considerations.

Flag: Ensure that your ToT agreement has sophisticated and detailed IP clauses that clearly delineate the scope of IP involved and set out all necessary rights and obligations (including provisions for jointly developed IP) to avoid any disputes in the

future.

4. BOTTLENECKS IN THE PROCUREMENT PROCESS

Tender Process

- The tender process for certain sectors, such as defence, railways and telecom, is slow and complex. This stems in large part from prior procurements being challenged for impropriety and mis-tendering, resulting in lengthy and convoluted bid terms and multiple layers of scrutiny and protocols.
- Because of the risk of scrutiny, officers running the tender insist on following the convoluted tender process by the book. This means multiple exchanges of requests for deviations, clarifications and recorded meetings, all of which become a part of the tender documentation.

Flag: A dedicated team may be required in India to follow the tender process and see it through to its conclusion. Quite often, the most successful firms are those with the endurance to follow the tender process through.

Delayed Decision-making

- Given the multitude of stakeholders involved, it is not unusual for decisions to be held up at more than one level. For instance, decisions pertaining to defence tenders may go through the relevant Armed Forces Wing, User Services Agency, Quality Control Agency, Maintenance Agency, Defence Finance etc.
- As above, the reluctance of government personnel running the project to deviate from tender terms and conditions (even where they are not fit for purpose) may often be at the cost of speedy and efficient decision-making.

Flag: The average time between the initial release of a request for proposal and the final contract award could take several months and in some cases (defence) years.

Limited Scope for Negotiation

- Upon the award of a tender, vendors are likely to have very limited scope for negotiating contractual terms.
- Post-tender negotiations are specifically discouraged under the CVC guidelines, and even negotiations with the lowest cost bidder (L1) can only be undertaken for reasons to be recorded in writing.
- This is problematic because there is often a disconnect between the experts who draft government contracts and those who are accountable for implementing the procurement

project / program. The contract may focus on plugging financial leakages and securing aggressive warranty terms, and, upon implementation, may be found to be ambiguous, commercially unviable and onerous on the vendor.

- Further, any deviation by the vendor from the tender terms may be considered a breach, attracting penalties, blacklisting and potentially years of arbitration / litigation.

Flag: Most terms may have to be factored in as cost of business. Negotiations happen during the submission stage as clarifications or deviations.

5. USE OF AGENTS

- Given the complexities inherent in public procurement, local representatives or agents who are familiar with the process as well as with the customs and culture of India can play a role in assisting vendors in navigating it.
- However, permitted use of agents should not be automatically assumed. Vendors should carefully consult the tender documents as well as the procurement manual (if any) of the procuring authority to confirm any restrictions or requirements (such as registration) attaching to the engagement of agents.
- At the minimum, vigilance and integrity pact requirements may mandate disclosure of engagement and fees payable to the agent.
- Typically, the nature of functions undertaken by the agent would dictate the legality of their role:

Back end support

Agency functions

Influence peddling

- Assisting the bidder in understanding the process
- **Support in answering queries**
- Support in approaching the right departments for clarifications etc.
- Front-ending bid submissions
- **Participating in contract negotiations etc.**
- Influencing the procurement process in any manner other than via the tender submission

Legal

Legal, subject to certain conditions and compliances

Illegal

- That said, agents have been embroiled in a number of bribery prosecutions in India and as such their engagement may still carry negative connotations, regardless of their tasks. For regulatory and perception risk management, when appointing agents:
 - undertake a thorough diligence of the proposed

agent; and

- include strict payment terms that are not linked to the award of the tender and specifically exclude transacting with an offshore account (to avoid allegations of corruption and investigations relating to foreign exchange violations).

Flag: Structure your consultant / agent relationship carefully, and include strict compliance and monitoring mechanisms in the agency contract to avoid illegal or unethical acts from being undertaken ostensibly on your behalf.

6. LOCAL PREFERENCE AND INDIGENISATION

- In its efforts to attract foreign investment and boost the flow of capital and technology into domestic manufacturing, the government has adopted measures to give procurement preference to locally produced goods and services.
- Certain manuals of ministries and public sector units (PSUs) may mandate local presence by obligating foreign suppliers to enter into the tender contract and supply via a local (Indian) entity.
- The Public Procurement (Preference to Make in India) Order, 2017 seeks to promote local production of good and services by granting purchase preference to local suppliers if they match the winning bid of a foreign supplier within a certain margin above the lowest bid price.
- The push for local preference is particularly evident in sensitive sectors such as railways and defence where procurement requires a minimum amount of indigenous (or local) content, greatest procurement priority is allocated to tender submissions with the highest percentage of indigenous content and technology transfer and/or offsets may be mandated under tender terms.
- These measures may mean supplying via a locally incorporated entity (such as a joint venture, consortium or subsidiary) or entering into re-seller, assembly, licensed manufacturing etc. arrangements with a local Indian partner.
- The structuring route ultimately adopted will depend on sector-specific restrictions (such as 49% cap on foreign investment in telecom and defence entities) and the vendor's commercial objectives and sensitivities (such as retaining complete control over IP, leading contractual negotiations, boosting company "brand" through local presence etc.).

Flag: Structure carefully, and evaluate structuring options prior to making bid submissions or responding to EOIs.

7. ADDITIONAL CONSIDERATIONS

- **Continuing Obligations:** Certain long term procurement contracts may have continuing obligations in the form of transfer of technology and warranty support from vendors. This could mean vendors are on the hook for supplying spares as well as technology upgrades / modifications (typically, free of cost) for the lifetime of the equipment.
- **Competition:** Vendors must ensure that transactions and supply chain pricing are undertaken on an arm's length basis, and that there are no vertical or horizontal agreements undertaken that may constitute violation of anti-cartel provisions.
- **Barriers to Innovation:** In the 2-part bid system typically followed for public tenders, once technical specifications are met, the contract is awarded to the lowest cost bidder (L1). However, this process does not give enough weightage to costs inherent in innovation (particularly relevant for contracts pertaining to state of the art technology).
- **Imports:** Sub-contracting arrangements, where a part / component of the product is supplied to the Indian partner from overseas (and support services such as after sales), will be viewed as an import of goods and services into India and duties will be levied accordingly. Generally, import of goods and services is a cumbersome and time consuming process and will need close supervision by the importer on record (which should be the Indian partner). We recommend that a complete import controls analysis be completed by specialist customs advisors prior to finalising an import-based structure.

CONCLUDING THOUGHTS

While vast opportunity exists for overseas entities looking to bid for Indian procurement projects, vendors should be mindful of the challenges inherent in public sector exposure.

Planning and evaluating structuring options in advance of bid submission is essential. Build in lead times, and be realistic about potential risks and financial exposure. Be extremely cautious when engaging agents – use them effectively, but only for the purposes allowed under the various regulations and guidelines. Finally, identify, and focus on, critical factors. Unlike private contractual arrangements, it may not be possible to check every internal "ideal position" box. Use the flags identified above to help organize key thoughts.

SOURCE: LEGAL 500

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THE CHALLENGES OF SMART MANUFACTURING

Big data is transforming a variety of sectors, ushering them into the era of Industry 4.0. However, having access to raw data and knowing what to do with it are at completely different ends of the digitalization spectrum.



To help manufacturers understand, and overcome, some of the challenges associated with smart manufacturing, Martin Thunman, CEO and Co-Founder of leading low-code platform for streaming analytics, automation and integration for industrial IoT, Crosser shares his insight.

Before we examine the challenges of digital manufacturing, let's reflect on industry's journey. If we consider Industry 1.0 and 2.0 — when mechanization and steam power, followed by the mass use of electrical power came into play — we're looking at a totally different era of manufacturing. Then the previous revolution, Industry 3.0, began to introduce automated production, IT systems and robotics to the factory floor.

All the previous revolutions have a common connection: their technologies all produced data, of some description. But now, as we enter the Fourth Industrial Revolution, autonomous systems, the IoT and machine learning are equipping manufacturers with the ability to take this data, and make plants more productive, leaner and more cost-efficient.

Possibilities

Having access to data, and more importantly to data analytics, creates a wealth of use cases that can help manufacturers drive value across their business. The starting point for many businesses is getting hold of this data and sending it to a cloud system or data centre for analytics.

The second use case involves factory floor integration, or taking this data and putting it to use. Indicators such as machine health can help form a work order that can be integrated into an enterprise resource planning (ERP) system, equipment health and efficiency can be monitored within the DCS or SCADA system, or machine to machine integration can be used for production optimization, as some examples.

Industry 4.0 technologies are also a driver for advanced automation. Moving beyond previous, more rigid systems of automation, new technologies allow machine to machine automation to take place, in a faster and much more data-driven manner.

The fourth case involves understanding activities along a production line, and creating goals for a machine, process or a complete plant based on data insights. The final use case is the leveraging of machine data for processes beyond the factory floor. For example, supply chain, sales and finance could all benefit from data analytics — it isn't all about machine health and operations on the shop floor.

The challenges

But there are challenges, and making these use cases a reality can seem difficult to realize — especially if an organization doesn't have software developers onsite.

According to Actify.com, 33 percent of all data

could be useful when analyzed. However, companies only process 0.5 per cent of all data. By incorporating an enterprise data strategy, companies can ensure they are processing useful data and that time is not wasted on the rest.

However, knowing how to manage raw machines can be difficult. It's important to think of a data plan as the foundation for success — hyped-up technologies like machine learning and artificial intelligence (AI) will come after. Manufacturers should follow three key principles when building a data strategy. Firstly, the strategy needs to be practical and easy to implement across the organization. It also needs to be relevant and specifically tailored to the company's goals as well as evolutionary and adaptable, to keep up with current trends. Finally, the strategy must be universally applied across the business and easy to update when necessary.

The second challenge is complexity, which comes in multiple layers. Legacy machines standing next to brand new robots, multiple generations of protocols and programmable logic controllers (PLCs), fragmented operational technology (OT) systems and segmented networks are just some of the drivers of complexity that create a large volume of varying data. How do you manage this data flood?

Managing data is hard for many manufacturers, but when combined with a lack of digital resources, there are further challenges to overcome. A report by the National Skills Coalition found that more than one-third of the manufacturers it surveyed have limited or no digital skills, while just 29 per cent possess the advanced skills necessary to be most adaptable to changing technology.

Currently, there are over 1.3 million openings for software roles on LinkedIn — illustrating a burgeoning demand that isn't being filled. Companies might believe that their IoT challenges can be solved by hiring a developer, but they'll struggle to make this happen overnight.

The solution

Instead, empowering the existing team is critical. At Crosser, we believe smart tools are key to supporting existing teams and helping them to

innovate. Our response to the aforementioned challenges is built around three key principles.

The first is self-service simplicity, which is enabled by an approach that we refer to as "low-code". This method is trending across industry, to facilitate innovation without reliance on software developers. With pre-built modules, which can be dragged and dropped to develop specific use cases, and visual design flows that facilitate IT/OT collaboration, teams without software development skills can work together to bring Industry 4.0 into their facilities.

The Crosser library features pre-built building blocks designed for any request or ambition. By selecting relevant analytics modules and enterprise connectors, companies can collect their data, attach meaning to it, apply intelligent logic and create clear workflow actions.

Just having a means of processing data isn't enough. Businesses also need an architecture that addresses the entire data lifecycle. Integration platforms have evolved from the old and slow enterprise service bus (ESB) solutions through integration platform as a service (iPaaS) models to the next generation platforms, often referred to as hybrid integrations.

Having a hybrid architecture delivers full flexibility to deploy processing and integration nodes either on-premise, on the edge, in a cloud or data center. Offering the best of both worlds, businesses can deploy low-code solutions anywhere, but are still able to handle them on a single platform.

Deployment of Industry 4.0 technologies may be growing, but that doesn't mean it's without challenges. Having the right people, knowledge and infrastructure to make data management a reality can seem out of reach. But implementing a single, reliable and user-friendly Edge Analytics Platform can bring the latest technologies to any facility — with or without software developers.

The content & opinions in this article are the author's and do not necessarily represent the views of ManufacturingTomorrow

Source: www.manufacturingtomorrow.com



BRANCH NEWS

BANGALORE BRANCH

19th September 2021 – Annual General Body Meeting

Annual General Body Meeting of Bangalore Branch was conducted on 19th September 2021(Sunday) at Hotel Ajantha, M.G. Road, Bangalore from 10.00 am to 1.00 pm followed by Lunch. The meeting commenced with a formal invocation rendered by Mr. Bhaskar and Mrs. Bhaskar. Mr. A.V.ShamSundar, Honorary Secretary confirmed the Coram and Mr. B.Jayaraman, Branch Chairman welcomed the members and their family and gave details of achievement during the tenure 2020-2021



AGM on 19.09.2021 - A view of members present



Executive Committee 21-23



Mr. K.S. Mohan Kumar Returning Officer Addressing Gathering on 19.09.2021 -AGM

Mr. A.V. Sham Sundar, Honorary Secretary presented the Annual Report for the year 2020-21 the report was proposed for adoption by Mr. Sugurappa and seconded by Mr. M.B. Venkatesh. The report was unanimously adopted.

Mr. M.R. Achyuth Rao, Honorary Treasurer presented the Income & Expenditure and Balance Sheet for the year 2020-21, which was proposed for adoption by Mr. Satish P.S. and Mr. Sundar T.N and it was adopted unanimously.

It was resolved to appoint, Mr. A.N. Sriram, CMA Association, as internal Auditor of IIMM Bangalore Branch and Chandabhoy and Jassoobhoy Chartered Accountants - Mumbai as Statutory Auditors as nominated by National Headquarters for the year 2021-2022.

Election was conducted for Executive Committee 2021-23 in a smooth and befitting manner by Mr. K.S. Mohan Kumar, Returning Officer and his team. After completion of Election formalities and counting Mr. Mohan Kumar, returning officer announced Elected EC for 2021-2023. Mr. P. Sengottaiyan, Vice Chairman, proposed vote of thanks.

IIMM Bangalore Branch - ELECTED - EXECUTIVE COMMITTEE FOR 2021-23

Name	Designation
Mr. Sengottaiyan P	Branch Chairman
Mr. Sham Sundar A.V.	Branch Vice Chairman
Mr. Achyutha Rao M.R.	Hon. Secretary
Mr. Kapanipathi B.G	Hon. Secretary
Mr. P.M. Biddapa	National Council Member
Mr. Paul George	National Council Member
Mr. Jayakumar M.	National Council Member
Mr. Balachandran T.S.	National Council Member
Mr. Vijaya Vittala M	National Council Member
Mr. Denzil T Morris	Exe. Committee Member
Mr. Niranjana V. R	Exe. Committee Member
Mr. Shekar H.K.	Exe. Committee Member
Mrs. Uma Maheswari	Exe. Committee Member
Mr. Utpal Anand Vatsa	Exe. Committee Member
Mr. Vaidyanathan K.	Exe. Committee Member

6th October 2021 to 9th October 2021 - Workshop: IIMM Bangalore Branch organized a live – Online Certification workshop on Enabling Effectiveness of Procurement activities through Driven Decisions- Supply Chain Analytics in association with ISME. 44 delegates from different organizations attended and received excellent feedback.

29th October 2021 Webinar / Panel Discussion : IIMM Bangalore Branch organized a Webinar / Panel Discussion on World Class Manufacturing in Association with WTC,Bangalore, Kochi and Chennai. About 230

participants attended in the Webinar / Panel Discussion. Mr. P. Sengottaiyan, Branch Chairman welcome the Speakers and members/participants. Mr. Paul George, N.C. Member coordinated the program.

12th November – IIMM BANGALORE BRANCH SIGNATURE EVENT -SCALE 2021

21st Edition of the Annual Signature Event - the **Virtual Edition - Scale 2021** organized by IIMM, Bangalore Branch on Saturday, the 12th November 2021, on the Theme: **“Managing SCM in Industrial Sector during turbulent Pandemic Period”**



SCALE 2021 - A View of Speakers

We, at IIMM, are happy and proud that the event lived up to the expectations of the participants and professional community, even in these difficult times, created by the Covid 19 pandemic.

Mr. P. Sengottaiyan, Branch Chairman, welcome the gathering of SCALE 2021. Inaugural addressed by Mr. Malay Chand Mazumadar, National President. Dr. P. Balasubramanian, Founder and CEO Theme Work, was the Chief Guest, Mr. Raghu G.S. SCM Consultant was the Key Note Speaker. Technical speakers: Mr. L. Santhanam, Member Tech Alum Study Centre, Mr. Hemanth Gupta, Founder CEO, Navigdata. Panel Speakers: Mr. Karthi Baskar, Dy Managing Director, KWE (Moderator -SCALE 2021), Mr. Siva Ramachandran, Vice President, APAC Leader, Genpact, Mr. S.N. Panigrahi, National Councilor, IIMM Hyderabad, Dr. M.H. Kori, IETE Vice President, Consultant -Telecom Standards. Proposed vote of Thanks by Mr. Paul George M.C. SCALE 2021 and National Councilor IIMM Bangalore.

The feedback received from the participants on the program was excellent. About 210 members, Students and Invitees -SCM/MM Professional from all sectors (Public and Private Sectors) including the organizers, participated in the event and the feedback received was graded at 'Excellent to Very Good' from the delegates. As a 21st Addition this time SCALE 2021 conducted in virtual and It was free program.

23rd November 2021 – Inhouse Training Program:

IIMM Bangalore Branch organized Inhouse training Program on Purchasing Management & Vendor Managed Inventory for the Executives of MechAero Components Pvt Ltd. This program was 30 Hours and two months Program, started from 23rd November 2021 onwards. Senior Faculty of IIMM – Bangalore Branch are handling the session.

Indian Institute of Materials Management		
304, 305& 307, A Wing, 11 Floor, Mittal Tower, Noida, M.C. Road, Bangalore - 560 001 Tel: 9502795192 / Mobile: 9892441455		
scale 2021		
Date: November 12th Time: 5:00 PM - 7:00 PM		
Registration: Mandatory. To Register for the Virtual Event, click on the link below: https://bit.ly/3u5wQa1		
TIME	PROGRAM	DIGNITARIES
17.00 - 17.05 hrs	Welcome Address	Mr. P. Sengottaiyan, Chairman, IIMM, Bangalore
17.05 - 17.10 hrs	Inaugural Address	Mr. Malay Mazumdar, National President IIMM, Mumbai
17.10 - 17.20 hrs	Address by Chief Guest	Dr. P. Balasubramanian, Founder & CEO, Theme Work
17.20 - 17.40 hrs	Keynote Address	Mr. Raghu G.S., SCM Consultant, Bangalore
17.40 - 18.00 hrs	Technical Session -1 Topic - "SCM Strategies during pandemic"	Mr. L. Santhanam, Member, Tech Alum Study Circle
18.00 - 18.20 hrs	Technical Session -2 Topic-"How Pandemic has influenced and changed Supply Chain Dynamics"	Mr. Hemant Gupta, Founder CEO, Navigdata
18.20 - 18.25 hrs	SCM - Case Study Video	Mr. Paul George, M.C., National Councilor, IIMM, Bangalore
18.25 - 18.55 hrs	Power Panel Discussion	Moderator: Mr. Karthi Baskar, Dy Managing Director, KWE
Topic-Managing SCM in Industrial Sector during turbulent Pandemic Period"		Mr. Siva Ramachandran, Vice President, APAC Leader, Genpact
		Mr. S.N. Panigrahi, National Councilor, IIMM Hyderabad
		Dr. M.H. Kori, IETE Vice President, Consultant - Telecom Standards
18.55 - 19.00 hrs	Vote of Thanks	Mr. Paul George M.C., National Councilor, IIMM, Bangalore
Technical support by WORLD TRADE CENTER		

Time Program Dignitaries

17.00 - 17.05 Hrs Welcome Address Dr. P. Sengottaiyan, Branch Chairman -IIMM
17.05 - 17.10 hrs Inaugural Address Mr. Malay Mazumdar, National President - IIMM
17.10 - 17.20 hrs Address by Chief Guest Dr. P. Balasubramanian, Founder & CEO, Theme Work Analytics Pvt Ltd.
17.20 - 17.40 hrs Keynote Address Mr. Raghu G.S. - SCM
17.40 - 18.00 hrs Technical Session -1
Topic -"SCM Strategies during pandemic"
Mr. L. Santhanam, Member, Tech Alum Study Circle, Ex Senior Vice President & HOD, Purchase, Reliance Industries
18.00 - 18.20 hrs Technical Session -2
Topic-"How Pandemic has influenced and changed Supply Chain Dynamics" Mr. Hemant Gupta -Founder CEO of Navigdata
18.20 - 18.25 hrs SCM - Case Study Video
18.25 - 18.55 hrs Power Panel Discussion: Moderator: Mr. Karthi Baskar, Dy Managing Director- KWE
Topic -"Managing SCM in Industrial Sector during turbulent Pandemic Period"
Mr. Siva Ramachandran, Vice President and APAC Leader -Genpact

Mr. S.N. Panigrahi - National Councillor, IIMM Hyderabad
 Dr. M.H. Kori, IETE Vice President
 Contact Person: Dr. P. Sengottaiyan – Branch Chairman
 IIMM, Ph: 9611707070 Mr. Nagaraj S.M. – Senior
 Manager -Admin, Ph: 9

CHANDIGARH BRANCH

IIMM Chd branch celebrated its 36 Annual day, and Award Ceremony on 11 December 2021 at Hotel K. C cross road Panchkula. Mr Junaya Yamanishi MD and CEO of SML ISUZU was chief Guest and Mr N. K. Sharma MLA Dera Bassi was Guest of Honor. Various technical papers were presented by eminent speakers on Smart city and Smart SCM, innovative development of packaging for Green Purchasing, Power of Social media and GEM etc. Awards were given to BEL Panchkula, Godrej, Sh A. K. Sabharwal in Innovative research and Joy Ahuja of SML ISUZU in different categories. Delegates from TBRL, Cdec, BEL, Godrej, SML ISUZU, Hero Cycles, NTC Tiles and MG Construction etc participated.



पंचकूला भास्कर 12-12-2021

ल, इंजीनियर, नर्सज, पुलिस, शिक्षक, चैम्बर ऑफ कॉमर्स

भारतीय सामग्री प्रबंधन संस्थान ने मनाया वार्षिक सम्मेलन



पंचकूला। भारतीय सामग्री प्रबंधन संस्थान का 36वां वार्षिक सम्मेलन शनिवार को सेक्टर-10 में संपन्न हुआ। इसमें एसएमएल इश्यूज के प्रबंध निदेशक जय्या यमनशी ने मुख्य अतिथि व डेराबस्सी विधायक एनके शर्मा विशिष्ट अतिथि और बी.ई.एल, गोदरेज, हीरो साइकिल, एम.जी.कंस्ट्रक्शन, टी.वी.आर.एल, एस.एम.एल इश्यूज जैसी विभिन्न कंपनियों के उच्च अधिकारियों ने भाग लिया।





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Hyderabad branch of IIMM Shifted to New Premises with Grihapraves ceremony held on Auspicious day on 26th Dec'2021 at 11 AM with New Hopes to Start a New Beginning.



Mr M Subburam, from Hyderabad Branch, Who Stood Second Rank in GDMM & Recipient of National President's Silver Medal has been Facilitated.



The Branch Conducted a Program on **GST for Supply Chain Professionals on 21st Nov'2021**. The Session was taken by **SN Panigrahi**, International Business Consultant & Trainer, National Council & Life Member, IIMM – Hyderabad. Subject Material Link can be found @ below:

<https://www.slideshare.net/SNPanigrahiPMP/gst-for-supply-chain-professionals-webinar-of-iimm-hyderabad>

A webinar **"A Practical Approach To Supply Chain Risk & Resilience Management"** was Conducted on **27th Nov'2021**. Speaker **Ashish Mendiratta**, B.Tech Kharagpur, Founder at **SIMSA**.



The Hyderabad Branch also Conducted Contact Classes for 1st Semester Students on 18th, 21st, 24th, 25th & 26th Nov'2021.



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EXECUTIVE HEALTH

COVID-19: FAQs ON SARS-COV-2 VARIANT OMICRON

A new variant named Omicron (B.1.1.529) was reported by researchers in South Africa on November 24, 2021, and designated a 'variant of concern' by the World Health Organisation two days later.

The Union health ministry on Thursday informed that two cases of Omicron variant were detected in Karnataka. In the wake of the new variant of coronavirus, the Central government on Friday issued a document mentioning FAQs on SARS-CoV-2 variant-Omicron.

Here's all you need to know about this new variant:

You have successfully cast your vote

What is Omicron and what makes it a variant of concern (VoC)?

It is a new variant of SARS-CoV-2 that has recently been reported from South Africa on 24th November 2021 called as B.1.1.529 or Omicron (based on Greek alphabets like Alpha, Beta, Delta etc). This variant has shown a very large number of mutations, especially more than 30 on the viral spike protein, which is the key target of the immune response. Given the collection of mutations in Omicron, which earlier individually have been associated with increased infectivity and/or immune evasion, and the sudden rise in number of positive cases in South Africa, World Health Organization has declared Omicron as a Variant of Concern (VoC).

Can the currently used diagnostics methods, detect Omicron?

The most accepted and commonly used method of diagnostic for SARS-CoV2 Variant is RT-PCR method. This method detects speci-

genes in the virus, such as Spike (S), Enveloped (E) and Nucleocapsid (N) etc to confirm the presence of virus.

However, in case of Omicron, as the S gene is heavily mutated, some of the primers may lead to results indicating absence of the S gene (called as S gene drop out). This particular S gene drop out along with the detection of other viral genes could be used a diagnostic feature of Omicron. However, for final confirmation of the omicron variant genomic sequencing is required.

How concerned should we be about the new VoC?

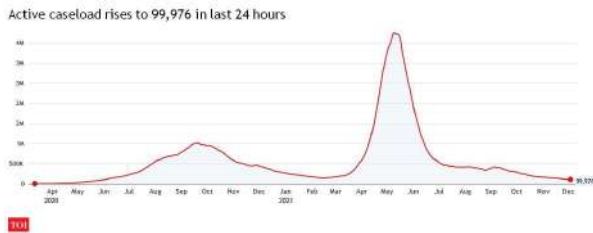
WHO declares a variant as a VoC after assessment when there is increase in transmissibility or detrimental change in Covid-19 epidemiology; OR increase in virulence or change in clinical disease presentation; OR decrease in effectiveness of public health and social measures or available diagnostics, vaccines, therapeutics. It is important to highlight that Omicron has been declared VoC based on the observed mutations, their predicted features of increased transmission and immune evasion, and preliminary evidence of detrimental change in Covid-19 epidemiology, such as increased reinfections. The definitive evidence for increased remission and immune evasion is awaited.

What precautions should we take?

The precautions and steps to be taken remain same as before. It is essential to mask yourself properly, take both doses of vaccines (if not yet vaccinated), maintain social distancing and maintain good ventilation to the maximum possible.

lakh in the country. The active cases comprise 0.29 per cent of the total infections, the lowest since March 2020, while the national Covid-19 recovery rates stand at 98.35 per cent.

Active caseload rises to 99,976 in last 24 hours



The daily positivity rate is recorded at 0.80 per cent. It has been less than two per cent for last 60 days. The weekly positivity rate was also recorded at 0.84 per cent. It has been below one per cent for the last 19 days.

Will there be a third wave?

Omicron cases are increasingly being reported from countries outside of South Africa and given its characteristics, it is likely to spread to more countries including India. However, the scale and magnitude of rise in cases and most importantly the severity of disease that will be caused is still not clear. Further, given the fast pace of vaccination in India and high exposure to Delta variant as evidenced by high seropositivity, the severity of the disease is anticipated to be low. However, scientific evidence is still evolving.

What is the vaccination status in India?

The cumulative doses administered in the country so far under the nationwide Covid-19 vaccination drive has exceeded 125.75 crore. 85 per cent of the beneficiaries have received the first dose, while 50 per cent have been fully vaccinated, the government has said. A total of 12.5 crore people are due for second dose of Covid-19 vaccine after completion of the stipulated dosage interval as on November 30. A decision on booster dose and Covid jabs

for children will be taken on the basis of scientific guidance from experts, Health Minister Mansukh Mandaviya said on Friday even as India stepped up surveillance for Omicron variant of the coronavirus.

Will the existing vaccines work against Omicron?

While, there is no evidence to suggest that existing vaccines do not work on Omicron, some of the mutations reported on Spike gene may decrease the efficacy of existing vaccines. However, vaccine protection is also by antibodies as well as by cellular immunity, which is expected to be relatively better preserved. Hence vaccines are expected to still offer protection against severe disease and, vaccination with the available vaccines is crucial. If eligible, but not vaccinated, one should get vaccinated.

How is India responding?

Indian government is monitoring the situation closely and is issuing suitable guidelines from time to time. Meanwhile, the scientific and medical community is geared up for developing and deploying diagnostics, carrying out genomic surveillance, generating evidence about viral and epidemiologic characteristics, and development of therapeutics.

Why do variants occur?

Variants are normal part of evolution and as long as the virus is able to infect, replicate and transmit, they will continue to evolve. Further, not all variants are dangerous and most often than not, we don't notice them. Only when they are more infectious, or can reinfect people etc they gain prominence. The most important step to avoid generation of variants is to reduce the number of infections.

Source: WHO & ministry of health & family welfare

●●●

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/09415752999 LUDHIANA 0161-5212268/9815549987 MUMBAI 022-26863376/9820393639 MUNDRA
098687660068 MYSORE 0821-4282124/9342112303 MANAGALORE 0824-2882203 NAGPUR 0712-
2229446/9423074072 NALCONAGAR 09437081126 NASIK 0253-2314206/9850730029 NEW DELHI 011-
41354969 / 9810830427 / 9818664267 PUNE 07276010854 /9404734210 RAE BARELI 09451077744 RANCHI
0651-2360716/08987788599 ROURKELA 08260711943 SURAT 0261-2802682 TRIVANDRUM 8086011015
UDAIPUR 9829041733/8107283099 VADODARA 7802053410 VAPI -09879569350 VISAKHAPATNAM
7093802468/09010556099V U NAGAR 09825028050

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Contact Us

Ph: 022-27571022

www.iimm.org

iimmedu@iimm.co.in

IIMM - National Headquarters

(Education Wing)

CBD Relapur,

Navi Mumbai-400614

