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Could we have leveraged our knowledge and expertise in various technological aspects to ensure a lesser impact of the COVID-19 pandemic, especially at the community level?



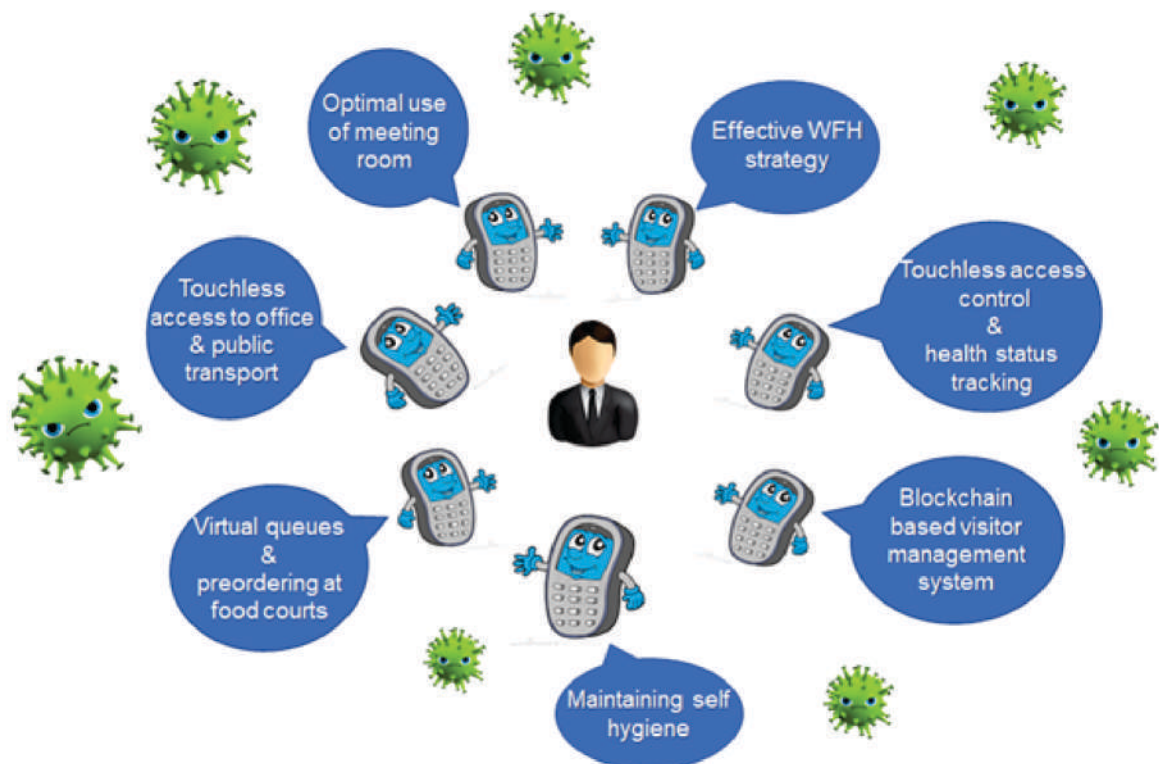
2

Could organizations have leveraged new-age technologies in a much better way to deal with scenarios like **Employee Management, Visitor Management, and Infrastructure Management**?



3

Could nations globally have invested and utilized the potential of technologies like mobile to implement the right measures at the right time to contain the spread of COVID-19?



From the Desk of The National President



Dear Members,

Greetings from National President!!

Last month of otherwise fateful year 2020 was marked by two significant events in IIMM Calendar. The signature event DISHA hosted by Mumbai Branch on virtual platform between 10th to 12th of December 20 was a thumping success so was the signature event SCALE hosted by Bangalore Branch on virtual platform on 19th December 20. The success of DISHA & SCALE has proved that virtual events can be equally popular if the Content and the format of the event is good and backed up by world class speakers, relevant and diverse subjects. This has given impetus to also hold NATCOM on virtual platform for which possibility is being explored on war footing. Several important activities are lined up in coming months related to the audit of the branches and consolidation of the accounts at the NHQ level, finalization of Balance sheet, Accounts passing meeting and AGM, both on virtual mode the scheduled dates for the same will be soon circulated. The year end semester exam is scheduled by end of February 20. Advertisement is also issued in IIMM website for Jan- June admission season. We all have to collectively make efforts to ensure good enrolment in our AICTE courses.

With news of mutated strain of COVID-19 virus pouring in, it seems like a parting shot of 2020. Government needs to be more cautious and prompt action needs to be taken to thoroughly screen the inbound passenger from the affected countries. We as a nation have so far carefully travelled the path of balancing our economic activity on one hand and restraining caution by strictly following COVID protocol on other hand. Three fold approach is required in such a situation. Firstly we should continue to strictly maintain social distancing, wear masks and frequently washing our hands with soap. Secondly we should improve our immunity by following a healthy dietary pattern, regular exercise and good sleep. Lastly our frontline workers, aged population, healthcare workers should be brought under the vaccination programme in the first phase as is being planned, which will result into development of herd immunity. We should not let off our guard till we all get vaccinated.

Year 2020 has been particularly harsh on IIMM. We lost two of our most respected colleagues – Prof. Saihjpal and Dr. Bhardwaj. Before we could reconcile the year ended with loss of another prominent member Mr. S.B.Sarkar, Ex- V.P.East and Ex-Chairman of IIMM Kolkatta Branch. I take this opportunity to pay my respect to the departed soul.

As we enter the new year with another issue of MMR, I will like to congratulate our Sr. V.P. Sh. H.K.Sharmaji for assuming the responsibility as Chief Editor of MMR. With his vast and diverse experience and Knowledge, I am sure he will add a lot of value to MMR.

My wishes to all IIMMites and their family members “A Very happy and a Prosperous New Year 2021”.

With Warm Personal Regards



MALAY MAZUMDAR

National President, IIMM

Email: Malay_mazumdar@yahoo.co.in



From the Desk of Chief Editor



Dear Members,

Supply Chain Management being lifeline not only for business entities but also for social wellbeing during the ongoing Covid 19 Crisis, is settling in to a new normal, where Supply Chain Managers have started to re-evaluate almost every aspect of their Supply Chain and switching the long-established methods which governed the entire Supply Chain.

It is of utmost Importance, to anticipate the change, which is the only constant and adapt to that change readily. Businesses must ensure that pertinent controls are maintained for smooth business activities during such crisis. During the Lockdown, every Supply chain witnessed many challenges like, limited stock availability, limited transport and courier services, limited availability of Staff, deferment of tendering/procurement processes and many other deviations from usual Supply Chain Processes.

The first order of business is to gather the necessary intelligence needed to make informed decisions regarding production plans, suppliers and customer commitment. Collection of localised information and data related to individual suppliers, market forces and other drivers that can affect the availability and scheduling of product delivery will be an added advantage to keep the supply chain active even during such crisis. This will require sophisticated analytical capability and dedicated headcount.

Businesses now require new processes, more Investment in Technological Processes, training of Workforce and commitment from them to accept the change or to accept the new normal. This will be required from all segments and verticals of life. Though availability of vaccine is now a certainty, we need a robust, flexible and new technical and innovative Supply Chain to make it available to every nook and corner of the Country and above all, we need to be prepared for impact of new strain or new disease.

Covid 19 has made thinkers to relook at the Inventory Processes. For years, it has been practiced to increase the Inventory Turnover Rates, rely on Just in Time (JIT) and other methods to maximize the Cash availability. However, when uncertainty enters in to the system, production processes can be halted for want of almost any product that becomes unavailable. May be, it is the time to think of larger Onsite Inventory.

Many of the logistical rules have now been changed like, Last Mile Truck Delivery is preferred, where, Rail deliveries were preferred. While no one can provide a specific roadmap for each business, an itinerary for the journey toward a more resilient, agile and responsive supply chain under the new normal can be developed by embracing the change and developing more anticipative & adaptive rather than reactive supply system. This is visible in the efforts of the Government towards 'Atmanirbhar Bharat' and related policy changes, particularly the revised guidelines for 'Make in India'. Corporate World has also responded in befitting manner to the changes required for New Normal in Supply Chain Management. I am sure many more success stories of effective and agile Supply Chains will be heard in India in the future.

Wishing a very happy 2021 to all of you.

(MR. H.K.SHARMA)



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SUPPLY CHAIN MANAGEMENT: GEARING UP FOR THE NEXT NORMAL

ASHOK SHARMA, FORMER PRESIDENT-IFPSM &
FORMER NATIONAL PRESIDENT, IIMM

There is no stopping of technology: what appears abnormal to a generation becomes normal to the next.

The humankind has seen so many developments since its inception. More recently, it was the steam engine invented sometimes in the seventeenth century. The engine was called the “Cart of Fire” by the pundits of that time and they cautioned, “whoever shall travel by this cart of fire will have his life shortened by many years”. Nothing of the sort happened, and steam engine gave way to Diesel Engines and Electric Engines. There is no stopping of technology: what appears abnormal to a generation becomes normal to the next and perhaps, irrelevant to the next. Stories of Wright brothers being ridiculed are many to describe. In our times, computerisation of banks is still fresh in our minds, with strikes, bandhs and go-slows greeting the development. Then, computerisation became normal and very soon a necessity. Same holds true of snail mail vs e-mail: abnormal becoming the normal. Some of these developments may happen in normal course of technological development, while others happen after a crisis. Wikipedia defines, “A new normal is a state to which an economy and society would settle down following a crisis”. Textile mills of 20th century gave way to sky scrapers of 21st Century in Mumbai.

World Economic Forum in November 2020 published a Special Report, “Top 10 Emerging Technologies” which will revolutionise industry and society.

1. Micro-needles for painless injections and Tests.
2. Sun-powered Chemistry: Visible light drives processes to convert Carbon Dioxide into common materials.
3. Virtual patients replacing humans with simulations that could make trials faster and safer.
4. Spatial Computing is the on-going convergence of physical and digital worlds.
5. Digital Medicines: These include apps that can diagnose and even treat our ailments.
6. Electrical Aviation: It will decarbonise air travel. Electric propulsion motors will eliminate direct carbon emissions- they will also reduce fuel costs

by 90%, maintenance by about 50% and noise by 70%.

7. Lower Carbon Content: This will combat climate change. Researchers have been incorporating bacteria into concrete formulations to absorb Carbon Dioxide from the air and to improve properties. Cyano bacteria are being used to build lower carbon concrete.
8. Quantum Sensing: This will enable vehicles that can “see” around corners, under-water navigation systems, earth quakes, etc. New generations of smaller, affordable sensors will open up new applications. Experts expect quantum sensors to reach the market in 3 to 5 years with initial emphasis on medical and defence applications.
9. Green Hydrogen: It is produced through electrolysis in which machines split water into Hydrogen and Oxygen, with no other products. Green hydrogen is one of the technologies to meet the goal of abating more than 10 giga-tonnes of carbon dioxide from industry- mainly construction and chemicals.
10. Whole Genome Synthesis/ Printing/ Next Level Cell Engineering: The whole genome synthesis is an extension of booming field of synthetic biology. Scientists will be able to create cell-therapies to cure almost all genetic diseases.

Each of the above developments will impact the Supply Chain discipline. Even in last 50 years, our function has had several name changes or “avatars” from Supplies & Disposals to Procurement to Purchasing to Materials Management to Integrated Materials Management to Logistics to Supply Chain Management. The pace of change will accelerate in times to come due to crisis humankind finds itself now. Our profession has given a very good account of itself and moved with changing times and tides. We are sure to gear up for the Next Normal or even the next, as we love change, know adaptation to newer environment, embrace new technologies readily, take risks and all that may be required to “Always Stay Ahead”.

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WEAK LINK IN PURCHASING?

SANJIV M. HALDANKAR
IIMM, MUMBAI – LIFE MEMBER

From market buying to supply chain management, our function has – rightly – evolved into an important one.

It now has a glamour! We are proud to work in SCM. We always like to be the strong links in the supply chain. However, as mentors, trainers, it is necessary for us to identify and strengthen the weak links. This calls for a very basic view of the chain.

Earlier, manufacturing organisations have been single plant entities. However, as the markets and organisations grew, they started having multiple manufacturing units.

It has now become an accepted purchasing practice, that product related requirements are centralized and non-product related requirements are de-centralized.

The corporate Purchasing function generally enters into contracts for product related materials and services i.e., raw materials, general and common MROs viz spares for machinery - if it is standardized, consumables viz ball bearings, v belts etc.; services viz logistics, security, audit, I/T support etc.

The procurement of remaining materials and services is the responsibility of the PPM. Looking at the job involved, the PPM is generally from engineering background; whereas the corporates buyers have proficiency in related areas and markets viz chemicals, pharmaceuticals etc.

Let us look at the various scenarios that the PPM operates in. Firstly, the position of the PPM.

He/she reports to the Works Director.

He/she reports to the Corporate Purchasing Director.

He/she reports functionally to the Purchasing Director and administratively to the Works Director.

It is very difficult to really decide the position and more important the job profile. Co-ordination is the key word, as all said and done the PPM has to work with both the directors / functions.

Next, let us look at the functional aspects. The advantages usually cited for decentralization are:

- The PPM will have a better knowledge of the needs of his particular factory or unit, of local suppliers, and of transport and storage facilities.
- He/she will be able to respond more quickly to emergency requirements, partially because of the shorter line of communication and partially because he/she will have greater awareness of local circumstances than someone sitting many miles away.

Complete centralization, on the other hand, has advantages which include:

- Economies obtained by consolidating like requirements of all units in the group, thereby improving purchasing strength in negotiation and facilitating supplier relationships;
- Avoidance of price anomalies between group units and of competition between them for materials in short supply;
- Better overall stock management and materials utilization;
- Common I/T software.

Generally speaking, the advantages of one approach are the disadvantages of the other, thus

a **combination** of both is often used to obtain the benefit from the best features of each, while avoiding disadvantages of both approaches.

- **Determining policy, standards and procedures and group specifications;** This is generally done by the Corporate Purchasing. The PPM may make some suggestions.
- **The negotiations of contracts for common large volume materials which are used by the group;** In an Engineering company, this may include some of the materials in the PPM's area. However, in case of chemical/pharma/foods and such industries, the areas are hardly overlapping.
- **Major plant and equipment and capital project contracts;** different scenarios are noticed here. A company with similar products manufactured at various locations may have the equipment purchasing at the corporate purchasing. The PPM has to merely monitor the service contracts made by the Corporate purchasing. However, if the company manufactures different products at different locations, the machinery and equipment purchasing decisions are with the plants. The PPM has a major role to play in purchasing and service contracts. Similar is the case in chemicals/pharma and such non-engineering companies.
- **Contracts for imported materials and for exports where relevant;** here the policy decisions are with the corporate purchasing but the logistics responsibility is with the PPM. Earlier with cumbersome import procedures centralization was the way to work as special skills were required in regulatory areas. However, at present, things have changed and there is no need for centralization. The PPM can take this responsibility.
- **Legal matters relating to supply;** this is normally with the corporate office and frankly, the PPM would like to stay away from this function.
- **Coordination of group inventory and control of inventory;** here, the demarcation is clear. The inventory and replenishment planning of product related materials is done by corporate

purchasing and for most of the non-product related materials is done by the PPM. A peculiar case arises when the plant is located near the raw material availability is the criterion. A copper parts manufacturing unit or petroleum products manufacturing unit would be raised at a place near the copper smelter and refinery respectively. In such cases, the PPM has the major role to play.

- **The education and development of purchasing personnel** – this is the area where all the above discussion needs to be put to practice. As mentors the seniors have to concentrate on people development. This brings us to an important question – what career development should the PPM look forward to? what is his / her next promotion / aspiration? Again, in an engineering industry, the proficiencies of the PPM and corporate purchasing are quite similar and the PPM can look forward to a promotion in the corporate function. There are reasons for aspiring to be in the corporate function. The volumes of purchases are high, value wise. At plant the number of items is very high but the value low. The top management is in close co-ordination with corporate buyers due to high values involved.

As mentioned earlier, in other industries, viz chemicals etc. the plant buyers are proficient in engineering items and markets and the corporate buyers in chemicals market. There is hardly any opportunity for the PPM to get a promotion into corporate purchasing.

The question arises whether it really is a promotion. Is a position in corporate purchasing mean a higher level? Is corporate purchasing a glamorous job and plant purchasing a lack-lustre one? If this is the case, the plant purchasing people may perceive their jobs as an inferior one – **this may lead to rusting of the link**. It is the responsibility of the top management to ensure proper oiling and maintenance of this link.

This brings us to the important question – which links can turn into the weak ones? How can we identify them and strengthen them?

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FAST PACE CHANGING SCM WORLD

KISHOR NAREWADI
MAHINDRA & MAHINDRA FES

Human resource management has important role in changing world to sustain the organization.

We live in a VUCA world. (Volatility, Uncertainty, Complexity and Ambiguity). Innovative technological changes are the causes of disruptions. CHANGE is the only constant & all things are changing frequently. In 20th century it was time when we used plastic currency like credits cards instead of money for payment & in 21st it is time to prefer e-payments.

World is changing with very fast pace. Customer demands are increasing. Consumer asking everything special and customized. Speed to market and cost to market are the buzz in economy. We carefully understand business volatilities & adopt aggregate risk mitigation strategies. Big data analysis, Data science, AI, Machine learning, Drone delivery, Robotics Process Automation, 3D Printing, Virtual / Augmented reality, Artificial intelligent, Robotic material handling, Automated warehouse, Autonomous vehicles, GPS, RFID, and many more. Many technologies are available, but we are ignorant about the use of that. It is important to understand modern technologies & be prepared for future disruptions.

As we have seen in the COVID-19 -19 pandemic situation, how the food supply chain affected across country by disrupting the demand and supply status. Human resource management has important role in changing world to sustain the organization. Learning & development dept. must play greater role in current situation. Notwithstanding Budgetary constraints on the training expense, organizations should keep on training to evolve a transformed organization.

Digital transformation is a competitive edge in supply chain management. More than three-fourths of the total organizations are in front of such changes. The supply chain plays vital role in organizational success. Management leaders are accountable for digital transformation of corporate world. The world of supply chain is changing, but supply chain planning is still largely based on decades old approach. Many processes are linear uncontrolled.

SCM consists of three verticals Procurement, Logistics, Warehouse &. for each Vertical perfect planning systems is essential. Today's supply chain is dynamic networked ecosystem. It is time to move towards customized products. Striving for accuracy is no longer enough. As one stalwart states, "Anyone in planning knows plans are never accurate" "Plan does not fail, people fail to plan". It is the time to shift towards robust supply chain planning to tackle uncertainty. Simulation software are very useful for planning in different situation. Start from raw-material planning there are many tools available for planning. But MRP in SAP is the best one. For WMS customized software's are useful. For material requirement planning it is very important to maintain accurate FG demand planning. With the help of perfect demand, we can plan accurate material requirement at right place, right Qty. & at right time. Demand is nothing but market sales order (Make to order) and proposed sale (Make to stock). Distribution of requirement among sources also plays very Important role in strategic sourcing.

Risk and Reward are equal in proportionate. To receive reward, we must take calculated risk. We must sustain business at every phase of business cycle. World is changing, so, what should we do to align this? It is needed for Business Process Reengineering - logistic processes reengineering. Our

processes are old outdated. We need to adopt some new process, eliminate some & change some process. Redefine KRA and preferential KPA. Digitization in end to end process like Operational, Commercial and Financial SCM processes is desired.

In SCM operation It is needed to change types of transportation like surface transport to multi model transportation. Railway is also performing well in some state for long distance. We can use rail / road combination for distribution & inbound logistic also. In some state good water transport facility are developed we can use multi model transportation instead of single mode of transportation. RORO model is more feasible for high volume.

Youngster's impact on traditional procurement: -In a survey 87% of participants agreed that talent should be held as one of the key indicators of driving procurement performance. Digital transformation, data-driven procurement, implementation of cloud-based technology is forcing procurement organizations to look towards younger generations. We can expect a lot more youngsters filling entry-level positions in our procurement team. There must be combination of full-grown and spanking new & senior professionals in our procurement organization. Procurement organizations have trouble for recruiting new talent. While procurement transformation it is easy to recruit some analyst, but there may be some concern for inviting young procurement professionals. Procurement is not promoted well enough. From our experience, there is no option to study the function itself. In some universities you could get some insight, but there isn't enough focus on procurement. For this reason, numerous young people don't know about it. This concern is really appealing. Especially nowadays, where everything is evolving so fast and we need everyone to be connected to the market constantly.

Specially youngster comes from a fast-food world, rooted within quick decision-making, instant gratification and a restless attitude. This can cause issues within a function. Procurement as a business function in digital transformation. The best procurement professionals and organizations are

always looking forward to diverse cutting-edge solutions. A consulting company found some of the traits, that they have been identified in the new wave of youngster's talent. Things will begin to look a bit younger in 2020. Technological change is occurring at an exponential rate. Streamlining procurement related tasks through automation and augmentation. Chabot has capability to access robust and intelligent solution to users with big data sets. **"PROCUEBOT"** will be the great tool for procurement anxieties.

Process reengineering, six sigma level of operation, savings in overheads increase speed to market & reduce cost to market Many corporates are focusing on SCM-BPR with digitization. They are moving fast with new technologies like QR code Barcode in warehousing (CD & 3PL). RFID for finish product logistic. RPA reports for MIS & DSS. Dash boards for business intelligent. Efficient GPS and control tower system can be used for logistic efficiency. With the help of 4PL/5PL consultancy services, we can draw New KPA & KRA for 3PL services. Many success studies are presented by technology and services provider. It is needed to deploy best technology with best implementation under our best personal.

Near to Market- finding cluster for FG and raw material with the help of network optimization analysis. Customization as per need by Customer places. Big organizations have the Logistics cost contribution to overall cost is equal to 8 to 10% of sales. Many companies carry 7-10 days inventory. Many use specific software to operate their Supply chain. Many software are available in market. Many of them are customized as per need. The Technology followed by Amazon (in terms of tracking consignment) helped customer satisfaction, SCM efficiency enhancement, inventory management, Cost reduction, efficient warehouse management, reduction in procurement cost & 3PL LSP's cost.

Disciplined, well trained human resource & SaaS- software as system etc. are some enablers. Digitization is the one important move of industry 4.0 revolution.

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ARTIFICIAL INTELLIGENCE FOR SMART SUPPLY CHAIN MANAGEMENT.

**DR.A.P.JAYARAMAN, NUCLEAR SCIENTIST, CHAIRMAN,
NATIONAL CENTRE FOR SCIENCE COMMUNICATORS. P
AST CHAIRMAN OF IIMM MUMBAI BRANCH.**

We are witness to the blinding brilliancy of the information explosion brighter than a hundred suns.

The world of Supply Chain Management (SCM) is awash in data. We have terabytes of supply information on safety pin to nuclear reactors to Covid 19 drugs from manufacturers, suppliers, distributors and insurers including risk reinsurers. Utilizing powerful computers, scientists have scrutinized this bounty with some modest results, but it has become clear that we can learn much more with an assist from artificial intelligence (AI). Deep-learning neural networks will transform how SC Managers look for patterns in data and how they find meaning in data sets and finally how they will attribute significance.

According to Deloitte, almost half of Chief Procurement Officers have used or piloted AI Software in 2018. The cumulative cultural evolution of SCM with assisted technologies has brought us to the interface of AI with good knowns and great unknowns.

Information Explosion

We live in an Information age alias digital age. We are witness to the blinding brilliancy of the information explosion brighter than a hundred suns. We remain informed and informed. Thermodynamically, information is described as negative entropy and entropy is defined as a measure of the disorder of the system. Thus with the negativity to disorder, we get order and orderliness with which we make sense. In SCM vocabulary, information is a commodity as it has both appropriability and evaluability. It has also perishability in the arrow of space time continuity.

Time was, when information was kept a closely guarded secret and purchasing professionals used to pride on their professional skill of reeling out suppliers list at the mere mention of an item. Computers made them dinosaurs. Information processing power and number crunching capability increased by Moore's law and later multiplied maddeningly making the brave new wonderland of AI assisted SCM in supply management.

Why

Sourcing management is the primary concern in SCM and the quality of this function decides the financial destiny of the enterprise. Getting the right material of right quality at the right time in right quantity at the right place in right sequence of course at the right price is the magic wand of an ideal SCMr. Big bang of data powered supplier substratum with supplier ratings, past proven suppliers and promising new suppliers with performance indices is sheer delight in SCM. More so for Procurement officers in the governmental sector, where the rationale for selection as well as rejection of suppliers will find it an existential aid to shield from the regulatory and investigating agencies. Strategic sourcing can be managed by cognitive sourcing software which can weigh the pros and cons of every supplier selection with the attendant consequences. Supplier risk management software absorbs every atom of information in the public domain profession, from a primarily clerical activity to a predominantly strategic function. A bit of mathematics ushered in the ubiquitous EOQ equation. An engineering mindset injected a new vitality into the profession with Operations Research which provided an analytical method of problem-solving and decision-making that is fruitful in SCM. Technology made its triumphant entry with Enterprise Resource Planning and now there is a revolution within revolution having Expert Systems, Machine Language and AI in SCM.

The Death of the Sales man is known in SCM but what about the death of SCM itself? The single critical variable for the success of a company is its SCM and SCMs fight fiercely for the bottom line and those with Darwinian fitness will survive. To make the best decisions, SCMr's need access to real-time data about their supply chains,. New digital technologies have the fatal potential to take over SCM entirely disrupting traditional ways and identifies risk condition in real time.

Vulnerability and risk assessment are integral parts of sourcing decisions. Contract life cycle management software scans the small prints in contracts and gives output in natural language! Often described as the meeting of the minds, contractual obligations can turn

sour and AI can deliver all scenarios and guide to the optimal one. Small and petty purchases for office operations will be just a smart click away with virtual purchasing assistant at hand thus liberating from the clutches of formal approval from hierarchy. The strongest support comes from spend analysis. Nothing is more exciting than the avatar of standard taxonomies from spend analysis data. Impressions and knee jerk intuitive decisions are replaced by arguments from cold data.

Buyer Beware

From the simple transaction of buying, to the complex functions of purchasing, procurement, Materials Management, Material Management and SCM, there has been a progressive development of the way of working. Within 5-10 years, SCM may be obsolete, replaced by a seamlessly running, self-regulating utility that optimally manages end-to-end work flows and requires very little human intervention! Cumulative cultural evolution appears to validate this prognosis!! Machines, Machine learning will decimate jobs at the lower and middle-skilled end of the employment spectrum involving operational and even tactical levels hopefully sparing strategy to the human brain.

Inventory management

Inventory as well as its absence is at once the nightmare of SCM. Inventory is a notoriously queer thing. Having too much of it is a certain burden wasting capital on rent, maintenance, and other costs related to storage space. Recall the Rupee-Day product. An inventory valued at Rs 10,000 remaining in warehouse for 100 days is a liability of million rupee-days! Having too little storage space means current inventory is going unsold and there is no room for items that might be better for the business. The key is to have the right amount of inventory space so as not to hinder the ability to fulfil customer needs, but not so much as to undermine the bottom line. By keeping both a helicopter view and a granular view of inventory data, SCM will be better able to take full advantage of inventory and storage assets.

Accurate inventory management can ensure the right flow of items in and out of a warehouse. There is a welter of inventory-centric variables like order processing, picking and packing, and this could be time-consuming and error prone. Strategic inventory management can prevent overstocking, inadequate stock and unexpected stock-outs all of which will pinch the bottom-line. With its innate ability to handle massive data, AI can be highly effective in inventory management analysing and interpreting huge datasets swiftly, providing timely guidance on forecasting supply and demand. The intelligent algorithms can also predict

and discover new consumer trends and forecast seasonal demand besides anticipating future customer demand trends. Minimization of the costs of overstocking unwanted inventory is another input to the bottom-line.

Warehouse management

Warehouse is the front and back end of SCM. AI can solve messes, difficulties and problems in warehouse quickly and accurately than humans can hope to do. It can simplify complex procedures and accelerate the work and minimize the number of employees engaged in routine non value add duties. Smart planning, organizing, executing and monitoring of goods and services based on AI can eliminate hazards and increase safety and decrease accidents. Data related to workplace safety in warehouse are analysed to recognize, evaluate and control hazards and preventive measures are positioned.

Autonomous mobile robots will be a familiar sight in warehouses in next five years with massive automation of streamline picking and packing processes. Robotic technology will increasingly displace storekeeper both in effectiveness and efficiency. AI can create a huge gap between market leaders and their less agile competitors because self-driving trucks dramatically improve efficiency. Shipping becomes simpler and faster while helping to reduce the workforce to the bare minimum. A fully autonomous trucking market would cut operating costs by 45%, saving carrier companies around \$ 100 billion annually.

Integration, Integration.

A seamless flow of materials, services and information is the irreducible minimum of good SCM. Integrating this into the business body social is what AI can do and is doing across all operations. AI assisted SCM is in the centre stage in the C-suite on the screen of the CEO. Integrating demand forecasting into schedule marketing promotions and enhancing sales approaches by focusing on fulfilment speed and efficiency data. CEOs might witness a tectonic shift in SCM landscape from numerous supply chains shift from global flows of offerings to national, regional, and local networks.

SCM is undergoing a transmutation in the crucible of AI and consulting firms have taken up the grand challenge and are offering integrated solutions for SC Transformation, blending totipotent competencies such as advanced technology, big data analytics, risk management with diligent concern for increased revenue growth with optimal working capital.

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SCM - NEW PARADIGM THROUGH NETWORKING FOR “MAKE IN INDIA”

Automation, Digitization and IOT in Manufacturing and Services Operations and Supply Chains

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Modern organizations, government, public sector and private enterprises worldwide, are facing challenges due to increasing Volatility, Uncertainty, Complexity and Ambiguity (VUCA). Technology and automation has played a key role in growth and progress of manufacturing and services processes. Manufacturing has come a long way from mechanical looms in 18th century, to electrically powered production and division of labor in 19th century, to use of PLCs in 1969 and now Industry 4.0 based on cyber-Physical System (see exhibit I).

Technology has taken the center space in defining future of Manufacturing and Services Operations and Supply Chains, through gradual move towards automation, digitization, and extensive application of Internet of Things (IOT) for automating data collection processes, operations and strategic decisions supported by big data analytics.

The Industry 4.0 initiative started as one part of a 10-point high-tech German strategic plan created in 2006. On 14 July 2010, the German cabinet decided to continue the strategy by introducing the High-Tech Strategy 2020 initiative focusing the country's research and innovation policy on selected forward-looking projects related to scientific and technological developments over ten to fifteen years. Industry 4.0 is a vision of integrated industry implemented by leveraging computing, software, and Internet technologies. The 4.0 refers to the idea of a fourth industrial revolution. One of 10 “Future Projects” identified by the German government as part of its High-Tech Strategy 2020 Action Plan, the INDUSTRIE 4.0 project represents a major opportunity for Germany to establish itself as an integrated industry lead market and provider¹. :

- First: production mechanization using water and steam power
- Second: mass production (Henry Ford often cited as the innovator)
- Third: digital revolution (e.g., machine tool numerical control, programmable logic controllers, direct digital control, and enterprise resource planning)
- Fourth: Industry 4.0 leveraging cyber-physical systems, embedded computing, Internet of Things technologies

Smart manufacturing / industry 4.0 is driven by evolution of internet of things IOT, M2M (machine to machine) communication, smart devices and data analytics. Leading companies now are integrating shop floor to top management through use of collaboration and smart integrated hardware and software systems².

India has to compete not only with emerging markets but with the global supply chains. India has just entered the 1st stage of Growth phase, a little ahead of the emerging economies; however, it has to catch up with the 2nd phase of growth and finally the developed world which is at mature stage of supply

chain operations.

India has seen a phase of high growth for past 2 decades. Some of the salient features of Indian economy, now repackaged under ‘Make in India initiative’, have been (see exhibit III):

- An increase in manufacturing sector growth to 12-14% per annum over the medium term.
- An increase in the share of manufacturing in the country's Gross Domestic Product from 16% to 25% by 2022.
- To create 100 million additional jobs by 2022 in manufacturing sector.
- Creation of appropriate skill sets among rural migrants and the urban poor for inclusive growth.
- An increase in domestic value addition and technological depth in manufacturing.
- Enhancing the global competitiveness of the Indian manufacturing sector.
- Ensuring sustainability of growth, particularly with regard to environment

Indian Supply Chain managers need to get ready for this change which is catching up fast beginning with large companies, MNCs and would eventually percolate to Tier I, Tier II and Tier III suppliers. Technology can enable transformation of manufacturing operations and supply chain from suppliers to end customers (refer to exhibit IV). Clearly all stakeholders in manufacturing and service supply chain need to upgrade their processes and systems or even come up with new processes and systems through continuous innovative ideas (refer to exhibit V).

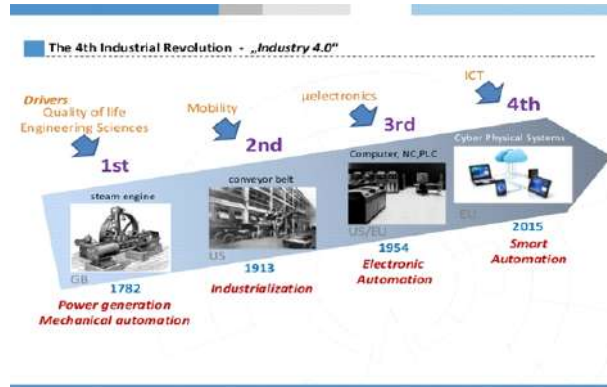
What our supply chain managers need to do to keep adding value to their organisations :

1. Upgrade your knowledge about automation and Internet of Things which are fast entering our workplace.
2. Visit companies that have already begun to embrace the new technology and new software collaborative tools.
3. Some of our Logistics partners have already started using smart technologies for managing their operations more efficiently and effectively using RFID / Bar Codes, GPS for keeping track of vehicles.
4. Technology suppliers for automating your operations.
5. Getting retrained to use automation and IOT enabled technologies.
6. Get exposed to potential benefit of big data analytics to your business operations and supply chain.

One of the very important aspects of learning is unlearning.

Biggest danger is that what we have learnt over our professional life is suddenly becoming redundant and obsolete. It is important for all of us to embrace the change which has already overtaken all aspects of our daily life through extensive use of Smart phones and internet based applications. The opportunities for Materials and Supply Chain professionals are endless and we can choose to be a part of any of the initiatives in the coming decades (refer to exhibit VI). As a seasoned professional, however, we need to take the steps with a lot of caution and ensure one of the soft spot of globally connected internet world, security, is taken care by putting adequate firewalls and other safeguards in place.

Exhibit I: Evolution of Industry 4.0



Source : <http://www.slideshare.net/jayeshcpai/india-industry-40> Accessed on October 1, 2016

Exhibit II: Industry 4.0



Source: <https://www.isa.org/intech/20160601/> Accessed on October 22, 2016

Exhibit III: Make in India Vision

Introduction
Make in India - Vision

A Major New National Program. Designed To Facilitate Investment. Foster Innovation. Enhance Skill Development. Protect Intellectual Property. And Build Best-in-Class Manufacturing Infrastructure

- An increase in manufacturing sector growth to 12-14% per annum over the medium term.
- An increase in the share of manufacturing in the country's Gross Domestic Product from 16% to 25% by 2022.
- To create 100 million additional jobs by 2022 in manufacturing sector.
- Creation of appropriate skill sets among rural migrants and the urban poor for inclusive growth.
- An increase in domestic value addition and technological depth in manufacturing.
- Enhancing the global competitiveness of the Indian manufacturing sector.
- Ensuring sustainability of growth, particularly with regard to environment

Sectors: Auto, Auto Components, Aviation, Bio Technology, Chemicals, Construction, Defence Mfg, Electrical Mch, Elec Systems, Food Processing, IT & BPM, Leather, Media & Ent, Mining, Oil & Gas, Pharma, Ports, Railways, Renewable Energy, Roads Highways, Space, Textiles Garments, Thermal Power, Tourism Hospitality, Wellness



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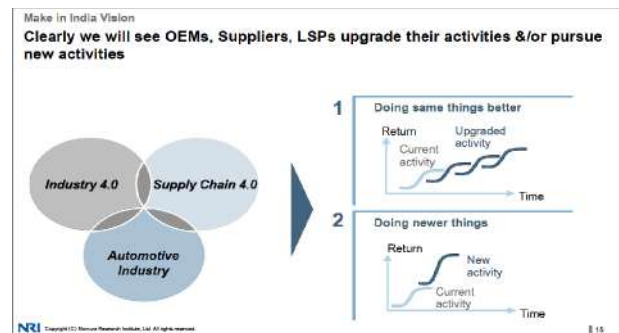
Source : http://automotive.logistics.media/wp-content/uploads/2016/01/151210_ALI_RajivBajaj_V3.0.pdf, accessed on October 22, 2016

Exhibit IV: Technology can enable transformation of manufacturing operations and supply chain from suppliers to end customers



Source : Presentation by Rajiv Bajaj, CEO, Nomura Research Institute India Pvt. Ltd., at CII conference on Oct 19, 2016 at New Delhi

Exhibit V: OEMs, Suppliers, LSPs upgrade their activities of pursue new activities



Source : http://automotive.logistics.media/wp-content/uploads/2016/01/151210_ALI_RajivBajaj_V3.0.pdf, accessed on October 22, 2016

Exhibit VI: Opportunities of Industry 4.0

Opportunities of Industry 4.0: Based on cyber-physical systems and the Internet of Things



Source: <http://www.slideshare.net/jayeshcpai/india-industry-40> Accessed on October 1, 2016

(Footnotes)

¹ https://www.gtai.de/GTAI/Content/EN/Invest/_SharedDocs/Downloads/GTAI/Brochures/Industries/industrie4.0-smart-manufacturing-for-the-future-en.pdf Accessed on October 23, 2016

² Source : Comments by Rajiv Bajaj, CEO, Nomura Research Institute India Pvt. Ltd., at CII conference on Oct 19, 2016 at New Delhi

THE BIRTH OF A SPARE PART OF AN EQUIPMENT

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INTRODUCTION : It is only apt to begin this article with clear understanding of what are meant by an Equipment and its Parts. Oxford Dictionary defines Equipment as "The necessary items for a particular purpose" and Machine as "An apparatus using mechanical power and having several parts, each with a definite function and together performing a particular task". Hence it is only logical to use Equipment and Machine interchangeably as both are designed and built to perform particular tasks or for particular purposes. In this article, Equipment stands for both Equipment and Machine. Part is described as "A manufactured object assembled with others to make a machine; a component" by Oxford Dictionary. Again Oxford Dictionary explains Component as "A part or element of a larger whole, especially a part of a machine or vehicle". The above statements make it appropriate to use Part and Component as synonyms and hence Part or Component represents both of them in this article.

An Equipment is made by assembling different Parts. In this context, it is only proper to mention about System also. System means "A set of things working together as parts of a mechanism or an interconnecting network; a complex whole" (Oxford Dictionary). Businessdictionary.com defines System as "An organized, purposeful structure that consists of interrelated and interdependent elements (components, entities, factors, members, parts etc.)". Another definition is "System: Purposefully organized set of components whose interconnections and inner workings are known or apparent". So it is established that Parts are constituents of a physical System also. In this article, a Part of a physical System (production facility for example) is treated at par with that of an Equipment. In other words, **Part** stands for Part of an Equipment as well as that of a System.

2. CLASSIFICATION OF PART TYPES

According to provenance, Equipment Parts can be classified into three categories, namely Captive Parts, Standard Parts and Commercial Parts. Generally both the Equipment and the System are made up of any combination of these three types of Parts as required by the particular design parameters.

2.1. CAPTIVE PART (MANUFACTURER-SPECIFIC PART – OEM PART)

We will define Captive Part as that part of an equipment, designed, developed and manufactured by

the Equipment Manufacturer itself for **the sole use** of making it as an integral part of the various types of Equipment designed, developed and manufactured by the organization. Nowadays Razor blade is a Captive Part of the specially designed Razor set (in this case an equipment) and both are made by the same Manufacturer. No substitute product is created or offered for Captive Part by the Equipment manufacturer. Captive Parts are occasionally protected by patent or other rights by the manufacturer.

In a very rare case, the Equipment Manufacturer may give license to third party under special agreement to make the Captive part, for want of specialized production facility and manufacturing expertise. Economic consideration is also a major criterion, in this case. The special agreement shall include clauses such as Non-disclosure of design to third parties and Prevention of sale of the Part directly to any third parties. An example is a modified unique Mechanical Seal manufactured by the Seal Manufacturer on behalf of the Pump Manufacturer for a particular type and model of Pump to be used for a special application.

Thus Captive part is an unique one as it is Manufacturer-specific and can be used to form an integral part of any equipment made by the particular Equipment Manufacturer. In this context it is a Non-standard part (refer 2.2. for Standard Part). In this condition, the Equipment Manufacturer is "One and only one source that possesses an unique product having singular characteristics or performance capability" (businessdictionary.com). Hence the Part is also known as a **sole-source item**. So it is only judicious for the End User to purchase the replacement part for the damaged Captive one, solely from the Equipment Manufacturer or from its authorized resellers. Hence, it is best known as an **OEM Part** (refer 3.1.).

2.2. STANDARD PART (OCM PART)

Standard Part is the one that is made according to a **STANDARD**. Douglas K. Orsburn and Joseph D. Patton Jr. define it as "Part, component, material, subassembly, assembly, or equipment that is identified or described accurately by a company, industry, or federal or military standard document or drawing".

In this context it is only befitting to describe the word Standard. Oxford Dictionary gives the meaning as "something used as a measure, norm, or model in comparative evaluations." Cambridge Dictionary states

that in Business English usage it means “a level of quality that people expect and generally accept as normal”. “Universally or widely accepted, agreed upon, or established means of determining what something should be” is part of the definition given by businessdictionary.com.

Based on FAA (Federal Aviation Administration, USA) documents, Standard Part is defined as a part manufactured in complete compliance with an established industry or Government specification which includes design, manufacturing, test and acceptance criteria, and uniform identification requirements; or for a type of part which the Administrator has found demonstrates conformity based solely on meeting performance criteria, is in complete compliance with an established industry or Government specification which contains performance criteria, test and acceptance criteria, and uniform identification requirements. The specification must include all information necessary to produce and conform the part and be published so that **any party may manufacture the part**. Examples of recognized bodies publishing Standards include, but are not limited to, Society of Automotive Engineers (SAE), American National Standards Institute (ANSI), International Standards Organization (ISO) etc.

The above definition of the Standard Part can well be applied across industries in general. And a good example of a Standard Part is a common anti friction ball bearing denoted by ISO designation – say 6205. This particular standard part will carry the same identification marking engraved on it, irrespective of its manufacturer. Thus it is termed as **multi-source item**. And the ISO marking ensures the quality prescribed by the standard in toto. The End User can purchase the standard part from any manufacturer or its authorized vendors selected as per the company policy. Also it may be supplied with a Certificate of Conformity by the Manufacturer, a Mark indicating that it has been produced in accordance with the Specification requirements and also to facilitate traceability. And it can be rightly termed **OCM Part** (refer 3.1).

2.3. COMMERCIAL PART (OCM PART)

The third type of Equipment Part is called Commercial Part. The failure of the commercial part as installed in the equipment, would not degrade the level of safety of the equipment’s operation. Therefore, the part must not be critical, required, or essential to the safe operation of the equipment and the plant. And in general, the commercial part cannot fail, in a manner that would cause damage to the equipment or cause injury to Operators and or Environment. Businessdictionary.com defines it as “Non-essential component or peripheral item not subject to any particular standard or quality control (other than the manufacturer’s unique specifications) and offered for sale with other similar items”.

FAA based definition: Commercial part is defined as an article (part, component or possibly appliance depending on appliance, but not a material or process) manufactured under Manufacturer’s Unique specifications only and is marked only with the manufacturer’s markings. Thus it is not regulated by any Government agency or any other Professional or recognized body. Also the part is not subject to any particular quality control beyond the manufacturer’s voluntary internal control system.

General Hardware items, Electrical accessories etc. are examples of Commercial Parts. Also a Commercial Part is a **multi-source item** and thus it can be purchased from any reputed and reliable manufacturer or its authorized resellers as per End User policy. This also can be termed **OCM Part** (refer 3.1.).

3. DEFINITIONS OF SOME TERMS USED IN THIS ARTICLE

Definitions of a few terms are given in ensuing sections for easy understanding.

3.1. ORIGINAL EQUIPMENT MANUFACTURER (OEM) AND ORIGINAL COMPONENT MANUFACTURER (OCM)

The Manufacturer who designs, develops and makes an equipment using Captive Parts and Bought-in Parts (Standard Parts and Commercial Parts) and markets under its own name and Markings is known as Original Equipment Manufacturer (OEM). OEM purchases the Standard and Commercial Parts from the manufacturers of these parts and assembles them to form integral parts of its equipment. The Captive Parts manufactured by OEM are known as **OEM Parts**.

Original Component Manufacturer (OCM) is the one who manufactures Components (Parts) which are purchased by OEMs to form integral parts of Equipment manufactured by OEMs. Components are items which collectively make up equipment or system. They can be in the form of individual Part, Assembly, Subassembly, accessories etc. They can be sold to OEMs, Resellers and actual End Users by the OCMs. Parts manufactured by OCM and used to manufacture Equipment by OEM, are known as **OCM Parts**.

The Manufacturing organization gets the name OEM or OCM depending on the product being produced. If Equipment is produced it is known as OEM. If the product is Component (Part), it will be called OCM. So the same organization can be classified as both OEM and OCM based on individual products being produced and marketed.

3.2. END USER (EU)

End User is the actual user of the Equipment or System. EU can buy Equipment and Components from OEMs, OCMs and or their authorized resellers.

3.3. BOUGHT-IN GOODS (BG) : “Goods from an outside supplier. Also components and sub-assemblies that are

purchased from an outside supplier rather than being made within the organization" (businessdictionary.com). Standard and Commercial Parts are thus Bought-in Goods (BG) with respect to OEMs.

3.4. PRIME PART

Any Part (Captive or Standard or Commercial) installed in an Equipment or a System **in Service**, is termed **Prime Part**, the replacement of which is done by a **Spare Part** (refer 4.4. & 5.).

4. JOURNEY OF PARTS OF AN EQUIPMENT FROM OEM / OCM TO END USER

4.1. ROUTES OF THE JOURNEY

The figure 4.1.a. below shows the routes taken by a typical Equipment Part from OEM / OCM to the End User. In the context of this article, Part stands for any part which forms an integral part of the equipment such as Captive Part (OEM Part), Standard Part (OCM Part) or Commercial Part (OCM Part) as the case may be.

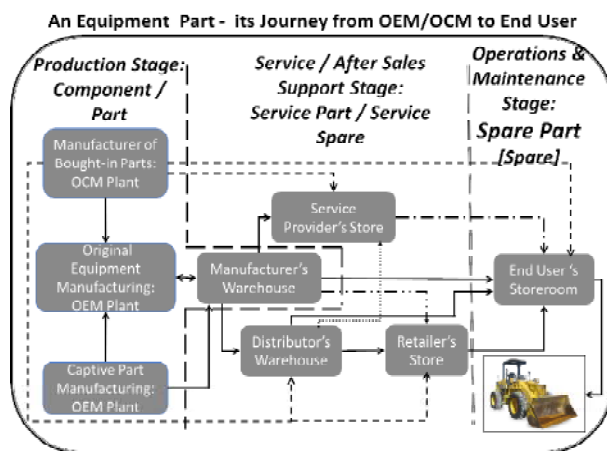


Figure 4.1.a.

There are three distinct stages in this journey and several organizations are involved in the process.

4.2. PRODUCTION STAGE

There are four organizations in this stage:

a) Equipment Manufacturing Plant '!' In this plant various types of Equipment are made / assembled as per the required quantities which include Forecast and Actual requirements. These are stocked in Manufacturer's Warehouse. Selling of Equipment is not included in this article.

b) Captive Part Manufacturing Plant '!' Captive Parts are made in this plant. The quantity of a Part is determined based on the forecast quantity of Equipment (MRP Processing) plus the individual forecast quantity and confirmed order quantity of the Part for captive use and selling as Service / Spare Part.

c) Manufacturer of Bought-in Parts '!' Bought-in Parts include both the Standard and Commercial Parts. These may be purchased from relevant Manufacturers or their authorized Distributors or Retailers for captive use as well as for sales as required.

d) Manufacturer's Warehouse '!' Captive Parts as well as Bought-in Parts are stored in Manufacturer's Warehouse. These Parts are issued to Production and Sales as per demand.

The movement of Parts are shown in figure 4.1.a. In this stage, the Part is called Component or Part itself.

4.3. AFTER SALES SUPPORT STAGE (AFTER MARKET SUPPORT STAGE)

The three organizations involved in this stage are Service Provider, Distributor and Retailer. Service providers buy and stock the Parts for providing Maintenance Service including Parts, to End Users as per contracts. Distributors and Retailers are stocking the Parts for Sales to their customers. The Parts' travel paths are drawn in figure 4.1.a. Here the Part is known as **Service Part** or **Service Spare**.

4.4. OPERATIONS AND MAINTENANCE STAGE : In this last stage, End User of the Equipment buys and stocks the Parts for replacing the damaged Prime Parts of the Equipment or System in service. Now the **Stocked Part** gets the name **Spare Part** and thus, the journey of the Equipment Part from OEM / OCM culminates in the birth of a **Spare Part**.

5. SPARE PART - A DEFINITION : Oxford Dictionary defines **Spare Part** as: "A duplicate part to replace a lost or damaged part of a machine". However the author proposes the following as a comprehensive definition: **Spare Part** is an End User stocked Equipment Part that is **Identical** to and **Form, Fit and Function** interchangeable with the corresponding Prime Part for direct replacement without any modification, on account of Prime Part's random failure (breakdown) and or owing to the requirement of Time based or Operation based or Condition based scheduled replacement of Prime Part. In this context, Spare Part can be a component or subassembly or assembly or any functional unit of the equipment or the equipment itself. Once the Spare Part is installed in the equipment during maintenance for the restoration of the equipment, its name is automatically changed to Prime Part (3.4.).

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2021-TIME TO SUCCESSFULLY MAKE A CAREER CHANGE INTO SUPPLY CHAIN MANAGEMENT- A GOOD CAREER CHOICE (THOUGHTS & INSIGHTS)

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BEGINNING THOUGHTS: In present pandemic situation, Total World is looking to SCM Domain spread, development, improvements, to meet all targets in respective Road maps/ action plans prepared. The first task is to have in their fold full strength of SCM and Finance professionals, supporting executives. Through this, the attempt is to explore ways and means to attract man power to select Supply Chain career, or to that matter, to make a career change in to Supply Chain Management/ to make career growth in SCM. Switching to supply chain will be a great and good option. The field is broad enough to fit people with a variety of technical and soft skills. It's also a growing industry, with new workforce being added in a planned way suiting to timelines and needs. Following are few thoughts-

- Inspiration for a Career switch might be very closer, than anybody think.
- Skills, experience, knowledge from previous job can pave the way to a Supply Chain Career.
- The shift/ switch from engineering to Supply Chain as natural fit.
- Education in MM field and a strong professional support system will be added help to overcome the "Learning Curve".
- Selecting/ choosing a Supply Chain Career path will prepare to work with whole organization, an excellent opportunity.

The most surprising aspect of working in supply chain is, how SCM team gets interconnected to different departments and gives an opportunity to work with technical, operational teams, IT, accounting, finance, HR etc. SCM Team, has to be very communicative and influential to succeed in the field. Not just communicating with people within company but also with partners, suppliers and customers.

Working in supply chain gives, a unique bird's-eye view on the entire business operation. Leads the way for understanding the current state of the company's

primary suppliers and their functions, allows to get/ to feel the basic, big picture view of the business strategy, requirements and areas of improvement.

Although the way customers purchase – and even receive – their supplies and services has changed drastically, just in the course of 2020, and continues to evolve as more work, events and purchases take place online, the need for knowledgeable supply chain professionals to oversee the intricacies of moving a product or service from inception to purchaser/ customer, has not abated and will only grow more complex.

Supply chain management could be/will be a good career choice, reasons are many/ multifold, herein dealt few of them-

1. Supply Chain Management (SCM) Career Variety

Supply Chain Management, as known, is a broad umbrella term that includes many roles and functional areas, including operations, purchasing, warehousing, distribution and logistics. That means a career in supply chain management can lead, down to a variety of different career paths. The needs and diversity of roles will depend on the industry, as every industry is a little different when it comes to the day-to-day responsibilities of a SCM professional. Planning takes upper birth to be a successful SCM manager/executive. Job titles, which are many, are created by companies to fall in line with national/international SCM domain. Variety of job titles and roles means a variety of daily job responsibilities, types of tasks to execute by applying skills and knowledge on the assigned job(s)

2. Supply Chain Management Job Growth/ career growth

"If inventory is the lifeblood of supply chains, labor is the nervous system," as said by Patrick Burnson in Logistic management. Seeing into 2020, the overall labor market was positive, with low unemployment and an increase in median wage and job creation has been concentrated in low- to mid-paying jobs and labor force participation is relatively low.

Then, once again, there is the impact of 2020 itself on the economy. Forces like the COVID-19 crisis, ongoing technological advances, responses to climate change, globalization and the shifts in global power and influence impacting trade and commerce all have “implications for the entire planet, as the world faced/ experienced the 2020 with the greatest upheaval in international relationships since World War Two,” as assessed by many researchers for “Transformation age- Shaping Future”, study.

It is also a fact that “mega trends and game-changing events” within the global marketplace have the potential to ignite supply chain transformation and “create a pathway for opportunity,” particularly “for material handling and logistics as market trends generate increased demand for both domestic and international supply chain enhancements...” there by taking upwards the need for SCM professionals.

One, analyst said- “What the pandemic has reminded us is how critical supply chain and logistics are at the foundational level. While the growth of digital business holds the promise of innovation, optimization, and new products and services, physical goods and services cannot reach destinations without physical assets to get them there...logistics has become a strategic differentiator. “Which aspect again sounds for more intakes of Logistics managers.

3. Supply Chain Management Wages/salaries

As these new opportunities are created and the role of supply chain and logistics becomes ever more critical, the demand and competition for top talent to serve as strategic leaders is likely to increase, resulting in competitive salaries/wages, especially in roles at the manager-and-higher levels. Reports revealed that logistics salaries for early 2020 increased very steeply over 2019 figures. Similar outlook is seen, in different surveys, in case of supply chain salaries pattern. Therefore, earnings potential in supply chain increases as anybody ascend the professional ladder.

4. Supply Chain Management Career Advancement:

Within the supply chain, there are ample opportunities to move from entry level roles, to management, to Director-level positions. At larger organizations, there may also be opportunities for VP-level roles or specific product line ownership.

Entry level supply chain jobs often allow early-career professionals to survey the company and industry as they work with many departments, including finance, sales, research and development, marketing, engineering, and quality in entry level roles like planners, buyers or supply chain analysts.

When it comes to taking the steps needed for career advancement, studies revealed that many felt/ realized that, continuing their education, has been the most important steps in advancing their career. Advancing in education results in career advancing.

With a variety of areas and specialties in which to pursue a career, and opportunities for advancement and career growth, supply chain management is an area poised to evolve and transform with the challenges of these unprecedented times.

BENEFITS : Having dealt the reasons as to why SCM will be a good career choice, it is pertinent to visualize the benefits to progress with SCM education an inbuilt activity to prosper/ to grow in SCM career. There are large number of benefits and hereunder selected few which are very relevant. By studying supply chain management, it helps to gain a comprehensive understanding of how businesses operate and processes within an organization and between them.

1. Master the main objectives of a successful supply chain manager
2. Learn how to develop a more effective supply chain to improve profitability
3. Foster an understanding of supply chain management's major challenges and trends
4. Learn how to use logistics while making decisions
5. Become comfortable with the main supply chain manager systems for proper implementation

MAIN OBJECTIVES: Education courses will cover the main objectives of supply chain managers in detail. The key goal in this employment field is to fulfill customer demands, improve an organization's responsiveness, develop value for the customer, and create network resiliency and achieve financial success. Because building and maintaining a supply chain network involves more than one organization, the task is complex. To work in the career area successfully, need to develop strategies, form relationships and align processes. It will help, to implement new technologies or work with others to improve their skills.

IMPROVING PROFITABILITY: The employment space of supply chain management will look for organization's financial success. SCM personnel need to work on cost efficiencies, maintain the proper inventory levels and decrease labor expenses and unprofitable overheads. When a company hires/ recruits the supply chain manager, upper management will expect to find ways to increase sales infiltrate new markets and enhance differentiation, to establish a competitive advantage and increase shareholder value.

CHALLENGES AND TRENDS: By studying supply chain management, one will learn how to handle the industry's challenges and trends. In this line of work, balance is a major challenge. Need to juggle customers who want their products delivered fast with the task of calculating an organization's books. In today's business world, better technology is always a trend. When it comes to supply chain management, essentially need to keep an eye on advancements that provide better communication between organization and its customers as well as its vendors. Will help to determine, about level of comfortable working in an ever-changing environment.

LOGISTICS AND DECISION MAKING: Because the business world is constantly experiencing change, global supply chains are becoming dated. This is causing them to struggle when they need to adapt to manufacturing location changes or generate large product volumes using cost-effective techniques. The business world is demanding skilled supply managers who have training in logistics because they need decision makers who are able to spot complications and provide effective and desired solutions.

PROPER SYSTEM IMPLEMENTATION: Supply chain management requires those in the field to be comfortable working with and around technology. Put in all efforts to implement new technology into an organization's current operations. Because advancements often work to reduce costs and streamline supply chains, hence to decide/ select systems that are capable of improving organization's operations. System so chosen shall integrate well with the company's existing practices and policies.

CONCLUDING INSIGHTS -ADVICE TO FUTURE SUPPLY CHAIN PROFESSIONALS

- To be successful in SCM ,one must have patience, humility and respect. Patience to accept that one does not always have the right answer. Humility to learn something from everyone and respect for the difference in cultures and people around the World. Mentorship is key, when making the career switch.
- Do not have the mindset that –"we know all"
- Do a lot of study/ research before a career switch thought comes to mind. SCM is definitely a good career that most do not undersatand and it is looked at, in a very traditional manner but study/ research on the field generates better understanding of it.

(Reference: Net working discussions out comes, research results/opinions/observations etc etc.)



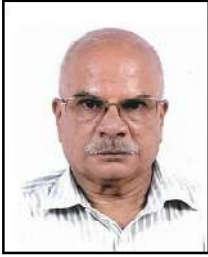
CONDOLENCE MESSAGE OF S.B. SARKAR OBITUARY



Members and Staff of IIMM, Kolkata Branch express profound grief at the **sad demise of Mr. S.B. Sarkar**, a Distinguished Member, Past National Vice-President (East), 1992-93 of IIMM and Past Chairman, IIMM, Kolkata Branch for 1989-91, who passed away at his Kolkata resident on 26th December, 2020 morning at around 10:00 a.m. He was one of the pioneer leader of IIMM, Kolkata Branch. His involvement in various activities at Kolkata Branch and National level of IIMM for several years immensely influenced and helped the growth and development of IIMM and Materials Management Profession as a whole. His simplicity, modesty and professional acumen made him an un-parallel personality.

The IIMM family condoles his death and expresses profound sympathy to the bereaved family and also resolves that heartfelt condolences be conveyed to the bereaved family of Late S.B. Sarkar

Chairman & Executive Committee
Members IIMM, Kolkata Branch



SENSE & PIVOT SUPPLY CHAIN

PALLIKKARA VISWANATHAN

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Sense and Pivot supply chain is the future of the turning of possibilities, into realities, guided by imperative, (essential or urgent) digital, physical, human beings, sensing, seeking better ways to decide in supply chain. Demands in supply chain are increasing, as organization; deliver more products, with better lead time, lower cost, unexpected execution conditions, with continuous disruption, operational performance, in supply chain.

Transformation of value chain in supply chain, require attachments of digital, physical aspects as it will certainly apply to such scrum (a frame work for project management, emphasizing team work, accountability, progress toward a well defined goal, also the main aspects are the transparency, inspection, adaption) or design of thinking of the problems being physical, so it is necessary to seamlessly bring the digital, physical Sense and Pivot means into supply chain. Supply chain humans focus on potential, which can explore, create Robots that interact with human beings, life of the labors, its counterparts by re-organizing, reacting with the social media, in supply chain, instead focusing on machine learning, automation, demand forecasting, as the system has been designed to more frictionless work, on upstream, downstream of Sense and Pivot in supply chain.

Supply chain must Sense and Pivot as most digitally advanced supply chains, try to predict, that is to happen, optimize, the performance, plan, as supply chain is not predictable, uncertain, as operation across various supply chain have never been articulated (having two or more sections connected by flexible joint) as the change, uncertainty in supply chain, in digitalization, as competition, challenges have the advantage, respond, execution, against any uncertainty in supply chain.

Supply chain has challenges in most organization, and supply chain is sometimes not predictable, as supplier fails to deliver the products, as costs increase, but supplier has committed, also there has to be continuity in supply, as demand increases to meet the desire of the consumer or customer for perfection of the services, at the specified time, at the same cost in supply chain, but due to all the consequences, supply chain is liable to predict, then optimize, the performance the plan in supply chain.

Supply chain in future will be liable for networks, in Sense and Pivot with strategic sourcing, with core capabilities, network, with compulsory strategic sourcing, with compulsory core capabilities, coordination, with digitalization will be controlled to reduce communication, coordination, cost, as organization may find it easier to be more efficient, to secure external solution, rather inventing solution,

with organization. Organization will increase the challenges in internal supply chain, competencies emerging with digitalization, techniques with a range of Internet of Things to sophisticated artificial intelligence in supply chain.

Effective management of supply chain require coordination approaches to data transparency, frictionless that are targeted at present in collaboration, in supply chain. Data accuracy should be transparent, with Sense and Pivot for effective collaboration, coordination in supply chain, as track of transparency may be liable to lose, trust confidence in supply chain. Supply chain competition forces retailers, manufactures to get close to customers without abandoning the relationship, by building collaboration in supply chain.

In Supply chain the Global Positioning System in Sense and Pivot try to gather data, as per the conditions, on the planned routes, as Global Positioning System, is an embedded intelligence which offer the best solutions, options, with alternatives, so that navigation can bring an adverse progress conditions, that may also try to slow the progress in supply chain. Supply chain Global Positioning System, can account to risk, disruption, unplanned variables, as it may not be able to Sense and Pivot, if such digitalization are bound to bring in limitation in supply chain, as the active improvement, speed, efficiency, does not coincide in supply chain, is amply not built to adapt certain circumstances prevailing in supply chain.

Supply chain cannot be built by modifying the current state of affairs, but they have to be set fundamentally to continue to bring better forecast understanding on the happenings, to Sense and Pivot to the response in supply chain, as the technological operations, can take up to build a response in supply chain.

Supply chain must also continually prepare to Sense and Pivot in response to changing conditions, unforeseen, enforceable variable conditions in supply chain. Supply chain increases the unpredictable environment with sharp increase in complexity, customer demands, sustainable competitions, edge which can be achieved by making supply chain highly attuned, adaptable to changing demands, reliability in supply chain.

In supply chain Sense and Pivot, the Omni-channel, Direct-to-Consumer, retailers, are part of the future planning in supply chain, providing the level of product choice, service flexibility, as considering increasingly represent the traditional, the retail industry, economical operation in supply chain, as it places enormous demand in physical supply chain stages, managing smaller inventory to customer requirement, also anticipating changes, preferences for competition,

conditions real-time, in requirement of supply chain.

Supply chain Sense and Pivot acting quickly, timely can minimize risk, disruption, as considering to the digitalization, manufacturing can ensure a scale, of reliability, in supply chain, with better lead time, enabling organization, to adapt quickly to demands, unforeseen conditions, in supply chain, becomes fully digitalized process with accuracy provided with completed manufacturing activities with the speed of differences, especially when factor of total cost, of ownership along with supply chain, with the concept of distribution of products to be shipped to containers with the total cost applicable in supply chain.

Supply chain in Sense and Pivot should consider, the cost of transparency, as cost, that can be reduced, by stream-lining, distribution, transportation, when manufacturers, retailers, create cost that are likely to be a new insight(to create an understanding of something) in supply chain. Supply chain has more cost-saving opportunities, cost-to-price strategies, as raw materials, packaging, manufacturing cost-to-price strategies, of raw-materials, packaging, and manufacturing, represent a fall in prices in supply chain. Supply chain product development process from manufacturer, retailer, provides opportunities, not to reduce cost, but to increase in growth in supply chain.

Supply chain transparency in the flow of goods in Sense and Pivot, is important in manufacturing, warehouse, distribution, stores, in an integrated distribution, as inventory is considered to be important, as demand removes variables to improve forecast accuracy, as manufacturing can be considered to be flexible, to move the product, that optimizes the inventory system cost, which result in replenishment of less inventory in supply chain.

Sense and Pivot in supply chain helps to identify the unknown areas, prevent from knowing the real facts, time, conditions, demand from an anticipated point of view in supply chain, so also able to identify the inflexibility in decision making, process assets, also constrain the supply chain capacity, in order to change the course to any unexpected activities in supply chain.

Supply chain Sense and Pivot activities of view of planning, supply, manufacturing, delivery, service, through a broader concept, before any new opportunities, are liable to come up, is also to make sure that supply chain performs at an unprecedented (never done before), levels in supply chain.

Supply chain uncertainty in Sense and Pivot design of making progress, in which decisions, makers do not know exactly what to decide, due to lack of transparency, of the supply chain, the possibility of necessary action is to be taken in supply chain. Supply chain uncertainty can be that the management uses the Enterprise Resource Planning, data, capabilities as well as an update implementation of software technique, such as warehouse management, transportation management, and supplier relationship management in supply chain.

Supply chain in Sense and Pivot during the period of emergency, disruption, were in search of alternative suppliers, but since the lack of integrity, contact barriers, are in a way to find competent suppliers, until the disruption in supply chain turns to normalcy, having

to organize to reach the right decisions, or alternative good reliable suppliers becomes a task in supply chain.

Supply chain Sense and Pivot uncertainty, in resilience, agility, have never been considered important, as many organization, are focusing on cost savings, adapted to speed, reduction, sustainability, in supply chain. Supply chain organization adapting flexible, sourcing, distribution, strategic, is to shifting to suppliers closer to supply chain, as organization, will continue to track, the manufacturing operations, in supply chain. Organization will also realign, the operations, activities, come to a new reality, secure support good orders, engage with customers a very vertical way, with good order fulfillment, helping to provide alternative unforeseen conditions in supply chain.

Supply chain Sense and Pivot is true to be trusted sustainable, intelligent, optimizing, the operations, utilizing, the intelligent application, with the help of sensors, internet of things, artificial intelligence, network, to create an autonomous supply chain, so as to help high quality customers, experience, outcomes in supply chain. Supply chain Sense and Pivot monitor to such intelligence to supply chain, should create an awareness, with future in order to evaluate the current status of affairs to convergence, sustainability in supply chain, as supply were not built to accommodate multiple sources of data, but they are built to follow materials, product in supply chain, as the design can result in excess materials, lack of customer products in supply chain.

Supply chain big data with uncertainty in procurement, operation, with different contract data, spend data, project management, performance management, vendor management services, with better data management, involving information technology, procurement in supply chain. Big data enables organization to implement manage measure forecast, savings, cost avoidance, change in the amount of spend to advantage of opportunities, while factoring risk, tolerance, in supply chain. Supply chain should combine report, analyze, Big Data leverage internal, external market information, able to track manage Sense and Pivot that will have transformed effect in organization, that can build Big Data awareness capability, in supply chain. Big data will introduce planning predicative analysis, forecasting competencies, in procurement as this will gain momentum in supply chain.

Supply chain buying during uncertainty period, of emergency as consumer behavior changes, to panic buying, will be of more long-term level, the retail supply should prevent shortage of future development in supply chain. Supply chain panic buying in Sense and Pivot is of course short term, with uncertainty, as supply shortage is liable to incur, as situations may not continue for the near future in supply chain. Supply chain however will experience, some steep rise in price increase, as retailers seeks to make profit during short term in supply chain. Supply chain pressure to rapidly source, manufacture distribute fulfill, raw-materials, finished goods, becomes an input in supply chain. Supply chain during the panic buying will have to add additional labor in order to produce any shortages, getting the product in warehouse or stores at the levels in supply chain.

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BLOCKCHAIN TECHNOLOGY AND SUPPLY CHAIN MANAGEMENT

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Abstract : Blockchain technology is the new –age, disruptive digital technology that is bringing paradigm shift in business models across all sectors world over. In this paper, the author focused on understanding the blockchain technology and its relevance to supply chain management. The author has highlighted the core properties of blockchain technology, enabling areas in supply chain management, disrupting SCM with Blockchain Technology, benefits of blockchain technology and few use cases. Secondary data was used in this paper. In this paper, it is concluded with expert opinions and initiatives by the union government and the state governments.

Keywords: Blockchain technology, disruptive technologies, supply chain management, smart contracts

Introduction : The 2008 financial crisis caused a lot of people to lose trust in banks as trusted third parties. Many questioned whether banks were the best guardians of the global financial system. Bad investment decisions by major banks had proved catastrophic, with rippling consequences. Bitcoin — also proposed in 2008 — presented an alternative. Bitcoin made digital transactions possible without a “trusted intermediary.” The technology allowed this to happen at scale, globally, with cryptography doing what institutions like commercial banks, financial regulators, and central banks used to do:

Blockchain technology have the great potential drive cost-saving efficiencies and to enhance the consumer experience through traceability, transparency and tradability (3Ts). Improving supply chain management and taking it to another level happens to be one of the best use cases of blockchain technology. A block is a digital record of transactions. Individual records are called as Blocks, these blocks are linked together in single list, called a chain. A blockchain is a time-stamped series of an immutable record of data that is managed by a cluster of computers not owned by any single entity. Each of these blocks of data (i.e block) are secured and bound to each other using cryptographic principles (chain). Blockchain is a shared, distributed ledger. Three types of ledgers are used in blockchain. i.e centralized ledger, private block chain ledger and public blockchain ledger. Blockchain works based on

shared, immutable visibility, smart contracts, trust / consensus. It converts the plain text to hashed text by using hashing algorithm.

There are three core properties that make the blockchain unique (Rajarishi Mitra, 2019):

- i. Decentralization
- ii. Immutable
- iii. Transparency

Decentralization : Legacy organizations and systems have a centralized architecture. However, blockchain allows one to one exercise the principles of decentralization in its operational architecture. This enables to store the data inside the blockchain, everyone owns it. This helps to break down the concept of silos. Figure 1 describes the decentralized ledger concept adopted in blockchain technology.

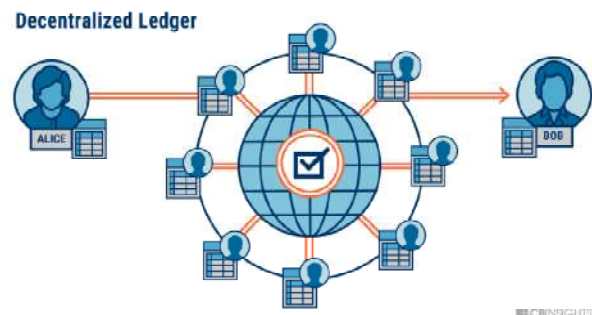


Figure 1 Decentralized Ledger Concept adopted in Blockchain Technology

Immutability : Immutability means non-tamper able. This is achieved via the integration of cryptographic hash functions. It is difficult to pay more or less to the suppliers once they have entered the data inside the block. Recently, a case has been reported that payments made to three suppliers without any bill and supplies to an amount of Rs.8 crores. This case is under investigation by CBI. Blockchain helps to such fraudulent practices / transactions.

Transparency : Blockchain like Bitcoin and Ethereum are pseudonymous by nature. The public addresses of the companies are captured at all the transactions they have engaged in. This forces them to be honest,

something that they have never had to deal with before.

Key benefits of Blockchain : Blockchain technology gives lots of benefits to the businesses. The key benefits of blockchain are:

Table 1 Benefits of Blockchain

Key benefits	Key benefits
Transparency	Real time tracking
Process Integrity	No single point of failure
Empowered uses	Security
High data quality	Reduce cost
Trustee challenge	Trusted transactions
No third party involvement	Unalterable

Figure 2 shows the importance of blockchain.

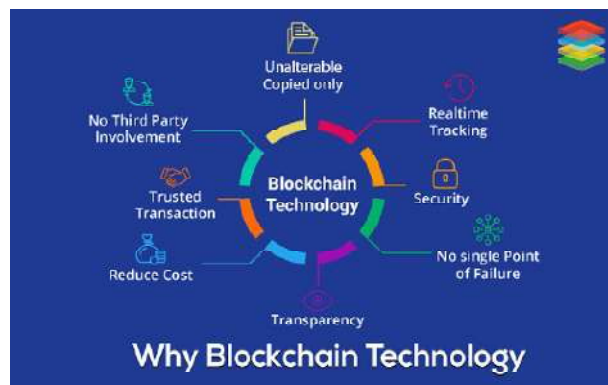


Figure 2 Importance of Blockchain Technology

Blockchain Technology and SCM : Blockchain technology is used in sourcing & procurement, logistics, tracking & shipment in logistics and maintaining the temperature & humidity in cold chain operations. Blockchain is also used in entering into smart contracts. The pain points in SCM are shown in table 2.

Table 2 Pain Points in SCM

SCM pain points	Traceability	Compliance	Flexibility	Stakeholder management
Capacities	Audit ability	Immutability	Smart contracts	Disinter median

(Source: Krishan K Batra, 2020)

Blockchain has many applications in supply chain management. Table 3 shows the enabling areas in the supply chain management.

Table 3 Enabling areas in SCM

Supplier	Producer	Distributor	3PL	Retailer
RFID	QR Code	Customer delivery data	Origin & destination generation	Merchandising/ leasing

(Source: Krishan K Batra, 2020)

Blockchain technology can be used in public procurement, which amounts to 15% of world's GDP. In India, it amounts to 20% of India's GDP. Therefore, lot of scope is there in this domain to improve

transparency and efficiency.

Another, important application of blockchain technology is to track food items from farm to fork (F2F). Tracking is possible from farm to package house, then to transport, border crossing, processing to distribution centre (DC) and to store.

Blockchain can be applied in smart contracts. Smart contracts are pre-programmed contracts consisting of chain of events, wherein execution & value transfer and settlement are taking place. Blockchain 2.0 contracts deals with protocols that facilitate verify, enforce the negotiation or performance of a contract, or that make contractual clause unnecessary.

Disrupting SCM with Blockchain Technology :

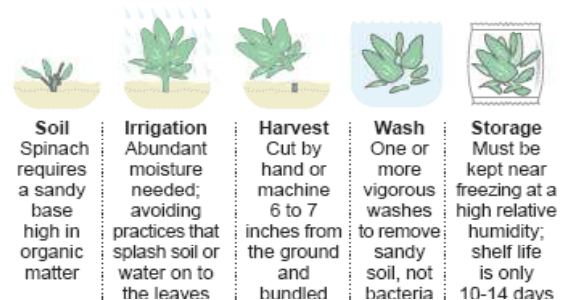
Technology plays a vital role in progress of a country and corporate. Evolution of technology includes, advanced robots & sensors, 3D printing , IoT, AI & ML, AR & VR, big data, intelligent & distributed production systems and blockchain technology. Every time a product changes hands, the transaction could be documented in the blockchain, creating a permanent history of a product, from manufacture to sale. So it reduces time delays, human error and added costs. In that way blockchain technology is an evolutionary technology. Even subjects expert say that like mobile phones, blockchain technology is going to change the business models.

Use Case 1: The Food Industry : On October 6, 2006, multiple states in the US suffered a major E-Coli outbreak due to spoiled Spinach. This has resulted around 199 people were affected of whom 22 were children under 5 years old. 31 of the 199 developed a type of kidney failure called hemolytic-uremic syndrome, and, unfortunately, 3 of them passed away.

Source of E. coli outbreak narrowing

Reasons for an E. coli outbreak linked to fresh spinach are still unknown. Authorities say possible sources of the bacteria include contaminated irrigation water – a problem in California's Salinas Valley where much of the the U.S. spinach crop is grown.

From field to market



SOURCES: Food and Drug Administration; Oregon State University

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This is because of one supplier, one farm and one lot. That one farm locked up an entire industry for 2 weeks. For that period, farmers whose entire livelihood depended on spinach were left broke and penniless. All this would have been avoided if there was a better way

to trace and track down the defective spinach lot.

To prevent this from ever happening again, big companies like Walmart have teamed up with IBM to incorporate their "Food Trust System" blockchain in their supply management system.

Walmart has already done two test runs with IBM, one with Chinese pork and the other with Mexican mangoes. Walmart and IBM used the "Hyperledger Fabric", a blockchain originally built by IBM and now housed under the Linux Foundation's Hyperledger group for these tests.

Use Case 2: Transportation of Ice Creams: Goods transporting company was engaged by an Ice cream manufacturing for transporting of their ice cream products to their retail outlets located in the city. While delivering the products, they found that the packets are not frozen. This is the allegations made by the transporter, but the manufacturer claims that they have done everything correctly. There is a dispute and mistrust. In these scenarios, blockchain technology provides the solution, i.e gives real time temperature and humidity data of products inside the vehicle..

Use Case 3: Food Poisoning at Restaurant : Family members have visited a star hotel restaurant for their dinner in a major city in India. They had vegetarian food and returned back home. After some time, they have started vomiting, and loose motions. They went to a Doctor nearby and the Doctor told them that due to food poisoning may be reason. Finally, they have reached the restaurant and reported the problems, which, they had faced. The Food & Beverages Manager told them that within few hours, the causes for the problem will be known. This hotel restaurant has already implemented blockchain technology in their supply chain, so they were able to pin the cause and

solved the issues.

Conclusion : Blockchain chain can bring a huge potential in Fintech space in transactions, payments, and KYC type of services that will unlock great value to India. India can create up to \$ 1 trillion of economic value from the digital economy in 2025. India is the second-fastest digitizing economy amongst 17 leading economies of the world. Thirty digital themes can be scaled up nationally to accelerate progress in 9 priority areas by MEITY. According to Blockchain Report 2019 by NASSCOM, the adoption of blockchain technology in India is experiencing rapid growth and investments in blockchain –based projects have touched over \$20 billion across various industries. The report further states that many Indian state governments such as those of Tamilnadu, Telangana, Kerala, Karnataka, Andhra Pradesh, Gujarat, UP and Maharastra are supporting blockchain startups and projects. Mainly, they have done some of the blockchain technology based projects in land registration, e-Governance etc. Gartner research and advisory firm predicts that the blockchain's businesses value will surpass US\$ 3 trillion by 2030 (The IEI, 2020). Further, experts are also highlighting the need for implementing in public procurements to improve transparency and efficiency.

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COMMODITY INDEX

Commodities	Days's Index	Prev. Index	Week Ago	Month Ago
Index	3134.9	3129.8	3114.1	3040.1
Bullion	7888.4	7910.1	7808.2	7379.1
Cement	2463.7	2463.7	2463.7	2463.7
Chemicals	1494.3	1494.3	1494.3	1502.9
Edible Oil	2591.0	2599.4	2496.9	2475.5
Foodgrains	2258.3	2258.3	2272.1	2247.9
Fuel	3008.3	3008.3	3008.3	2943.7
Indl Metals	1919.4	1919.4	1919.3	1919.3
Other Agricom	2184.1	2163.9	2202.5	2202.9
Plastics	1738.1	1642.9	1568.0	1568.0

Source: ETIG Database dated 30 December, 2020

SUPPLY CHAIN & OPERATIONS METRICS

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Supply chain and operations management metrics and improvements contribute towards optimization of revenues, costs and margins. Some of the relevant metrics and improvement possibilities have been analyzed and presented here in this article. Since the main problems faced now across industries are lower returns on investments, longer lead times and delays, business and supply chain risks creating adverse impacts, technical and commercial issues, force majeure delays etc. these supply chain metrics can be put in place and monitored regularly to drive up performances and results.

Product design and development metrics:

Time to market: The lead time required for development of new product or service as per customer requirements is an indication of availability of efficient design and manufacturing processes and methodologies and this time cannot be very long for companies that want to be responsive and agile in the markets.

Number of design errors and changes: Error free designs or minimized design changes in subsequent stages help to compress time – to-market and design and engineering management tools like Design & Process FMEA, CFD, CAE, CAD, QFD and Concurrent engineering etc. might help in this area.

Cost metrics:

Procurement or Contracts ROI: The ratio of total cost savings realized per year to procurement and / or contracts department operating costs needs to be on higher side to prove that procurement processes and software tools deployed by a company are functioning well and returns on investment are adequate. Strategic Sourcing techniques, Commodity management, Supply risk mitigation, Contractor & Supplier pre-qualifications and other such techniques are helpful in this area.

Spend under management control : All major spend areas including CAPEX and direct plus indirect materials and services are to be covered adequately to eliminate contract revenue leakages and improve compliance to asset and project cost plans and schedules.

Quality costs: Quality costs including appraisal/ inspection, prevention/audit and failure costs are to be tracked and monitored for continuous quality improvements and improvements in customer satisfaction levels. Quality tools and techniques like SPC/SQC, TQM & 6 Sigma can contribute in this area.

Stock turnover ratio: STR i.e. Stock turnover ratio is cost of goods sold divided by average inventory in same period and indicates how fast a company is converting its products into sales and this ratio needs to be adequate for each product segment depending on margins & customer demand.

Quality metrics:

Supply defect rates: This metric captures percentage of defective lots supplied i.e. Number of defective lots from a supplier per month that required rectification or rework divided by total number of lots or batches received from same supplier per month. This metric can be extended to each major supplier or all the batches received from all suppliers per month or it could be extended to only one critical commodity category say valves or pumps.

Supply Invoice compliance percentage : High number of defect free supplier invoices to total number of invoices reflects well on quality of invoicing instructions carried in purchase orders and contracts and that overbilling, double billing, computational errors and time-sheets for no-show of people or equipment are minimized.

Customer returns percentage: Product returns from customer need to be improved to 6 sigma levels in the long term and companies may have year – on – year improvement goals and targets in this key area that improve customer confidence in company and product or service reliability plus performance.

Delivery metrics:

Supply lead times: Supply lead times of products and materials from global and local sources need to match customer requirements and promise dates minimizing supply disruptions, transport delays, outward logistics failures and so on. Carriers and transportation service providers with reliable facilities / equipment and information infrastructure can contribute in this area.

Supply contract development times: Bidding and proposal preparation & evaluation lead times need to be optimized to compress or optimize contract development and negotiation timeframes and this helps to get on-time supplies and services and move towards JIT levels and more reliable order fulfillment and distribution processes and activities.

Service response times : Time elapsed between time when customer complaint or service request is received and time when service is completed or complaint rectified can be captured as a metric for different categories of customer service and year – on – year goals fixed to improve operational and supply chain performance. These above-mentioned metrics are in no way exhaustive or all-inclusive and similar company or sector specific goals and improvement targets can always be developed and deployed in specific situations to further improve and sustain supply chain and financial performance in terms of ROI and RONA improvements, ensuring better value returns for investments.

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DATA MANAGEMENT IN THE SUPPLY CHAIN

SUNIL BHARDWAJ

Overview : Given the enormous challenges that current supply chains face both on the demand as well as the supply front, it has become all the more essential to take steps and adopt suitable measures to enhance visibility and transparency across the chain to enable risk mitigation and to become more resilient in the medium to long term. Companies across all sectors related to both 'Discretionary' as well as 'Non-Discretionary' spending have realized the need for efficient data management across the chain.

Data Management : Data management comprises aspects related to data creation, data extraction, data transformation, data cleaning, data manipulation and analysis, visual analytics and reporting, performance monitoring, data dissemination, master data management, application of data science and operations research tools, supply chain analytics, data security and data governance. Let's dig deeper into some of these elements in brief. I shall touch upon five key areas.



Data Management Elements

Data Creation : Transactional and operational data spanning the entire supply chain – both upstream and downstream could be created in various ways. Company systems (standalone and ERP) as well as external systems (syndicated data) could be potential sources. Data obtained could be used for decision making directly or would need to be extracted, transformed and then loaded onto other systems for further processing.

In the case of supply chains, relevant data would include but not limited to supplier data, inventory data (RM, WIP and FG), customer data, pricing data, logistics service provider data, point of sale data, distribution data etc. All of the above data sources and types would be governed primarily by the data architecture of an organization. Moreover, the data utility and value are correlated to the 3Vs – Volume, Velocity and Veracity of data flows across the internal and extended supply chain networks.

Master Data Management : Although this aspect of data management and control looks fairly well established and well defined, the core and critical challenges emanate from this foundational layer of data management. If a company's master data structures are not well defined and managed, it could lead to erroneous analysis, business interpretations and outputs that could negatively impact strategic, tactical and operational decisions.

For example – an SKU that has been incorrectly grouped and classified in the inventory master could lead to excess stocks or stock-outs due to consequent demand and supply planning

errors in the case of an automated system. Therefore, the central control of master data elements in the ERP system could be the first step to ensure that the subsequent journey and transformation of the core data points result in desirable decision making.

Data Storage : Data could be stored in data warehouses or data lakes or even in the cloud. Clearly defined procedures and policies related to data storage need to be followed so that there is uniformity across the organization's departments, teams and business functions. Data access too needs to be clearly defined and mapped in order to prevent any misuse. Several other forms of data storage are available. The key point is to enable uniform rules across the organization.

Data Security and Cyber Risk : The Covid-19 pandemic has accelerated the discussion and deployment of various risk mapping and resiliency tools and technologies. Needless to say that cyber risk and supply chain data theft are serious concerns that companies with a local and global supply and demand footprint continue to grapple with. Given this scenario, potential threats related to data secrecy, security and theft need to be mapped and corrective and preventive action plans need to be documented and shared across the organization through collaboration and on-going training and development.

This area is by far the most complicated and requires the combined expertise of various private, governmental and non-governmental bodies to devise practical and workable policies and procedures. These would need to be audited from time to time and would need refinement to align with global trends and developments. Data security and cyber risk plans should form an integral part of Business Continuity Plans (BCP).

Data Analytics and Optimization : There is sufficient expertise and knowledge available in this domain. Moreover, academic papers, case studies and literature discuss and highlight the applications and benefits that would arise from the adoption, deployment and use of various digitalization and automations tools, techniques and technologies across the end to end supply chain. I shall not get into the details of the scope and applications of current technologies impacting the supply and demand side of the chain. However, unless the previous elements related to data management and architecture are addressed, the use of a sophisticated tool or technology would have limited operational and financial benefits to say the least.

Conclusion : Everything that I have touched upon or covered in this article is well known and well documented. I still felt it would be necessary and pertinent to provide a quick recap and reiteration of critical areas related to data management that need to be prioritized so that supply chains can function smoothly and risks could be mitigated. Finally, 'Data Governance' structures and mechanisms form the 'core and the nerve centre' and would set the tone and direction for frameworks, policies, procedures and processes related to data management as a whole.

It's an ongoing journey. There is no start and end date for continual refinement and learning.

Source: sourcingandsupplychain.com

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DR K KASTURIRANGAN SAYS INDIA'S NEW EDUCATION POLICY 2020 PROVIDES END-TO-END EDUCATIONAL ROADMAP FOR THE COUNTRY

MEGHA REDDY

While speaking at Bengaluru Tech Summit 2020, eminent scientist Dr K Kasturirangan explained how NEP 2020 could bring transformatory changes in India's education system. He said it would align the country's education system with the needs of the 21st century while remaining rooted to India's value.

In July 2020, the National Education Policy 2020 (NEP 2020) was approved by the Union Cabinet of India. The future-looking NEP 2020 has replaced the 34-year-old National Policy on Education, which was framed in 1986, and aims to transform India's education system. It offers a comprehensive framework for elementary education to higher education, and includes a whole host of transformatory changes, such as a new 5+3+3+4 structure, introduction of vocational education training at younger levels and calls out the need for furthering a culture of innovation, and a highly skilled workforce.

Dr. K Kasturirangan, an eminent scientist who steered the Indian space programme as chairman of the Indian Space Research Organisation (ISRO) for nine years, was the Chairman of the Committee for Draft National Education Policy.

At the Bengaluru Tech Summit 2020, Dr. Kasturirangan explained how the policy could bring transformatory changes in India's education system. He noted that NEP 2020 would align the country's education system with the needs of the 21st century while remaining rooted to India's value system.

In his keynote, he briefly outlined the foundational elements of the New Education Policy 2020 encompassing school education, higher education including professional and vocational education.

"India, over the next decade, will have the highest young population in the world, with more than 50 percent of the population below the age of 35 aspiring for high quality education. The demographic dividend has to be taken advantage of. To do so, it calls for a need to enable them to acquire new skills, one that will help them to learn how to learn."

He noted the changes in the knowledge landscape, especially in science and technology like Big Data,

Analytics, Machine Learning, Data Science, Artificial Intelligence, all demand skilled workforce with multi-disciplinary abilities across science and technology, social sciences and humanities.

Sign up for our exclusive newsletters. Subscribe to check out our popular newsletters. "The education of the future needs to be reconfigured in order to meet the goals of the global education development agenda - the fourth goal of the United Nations' sustainable development goals that seek to ensure inclusion and equitable quality education and promote lifelong learning opportunity for all."

NEP 2020 offers an integrated and flexible approach to education and provides an end-to-end educational roadmap for the country, noted Dr. Kasturirangan. He highlighted that NEP lays special emphasis on kindling the innovative potential of each individual, and gives them enough flexibility for students to make choices.

The policy has recommended transformative changes in the way school education needs to be reconfigured, which includes the shift from the 10+2 design to 5+3+3+4 structure. "The new structure is based on our better understanding of the scientific insights on the learning trajectory. Within the age of 3-14, children gradually transition from perceptual learning to conceptual learning, then moving on to prescriptive learning and abstraction. This aligns with the children's learning abilities. The education is holistic and there is no distinction between curricular, co-curricular or extra-curricular " He explained that the four-year learning stage, which is the higher secondary education from the age of 15 to 18 is designed to enable students explore their interests and strengths.

"It is at this stage that the policy calls for exposure to vocational education so that students are fully prepared to decide whether they will pursue vocational education or higher education. The policy recommends mastery of at least one vocational subject during this period." According to him, the policy aims to build a schooling system that respects the natural development phases of children and will prepare them far better for professional or vocational careers.

Dr Kasturirangan highlighted that the policy recognises teachers as the torch-bearers of change. "While we are all aware of the importance of child-centric education, we cannot achieve it without having teachers at the center. The policy takes a comprehensive view to restore teachers to their rightful high stature in society." He added that the policy calls for a complete overhaul of the teacher education system and recommends making school teacher education a part of higher education. "This can provide school teachers with a knowledge base broad and deep enough to strengthen the schooling system and places the profession at par with other professions."

In his address, the eminent scientist highlighted how the NEP's focus on interdisciplinary graduate programmes could be a game-changer for India. He drew attention to the importance of knowledge related to arts, crafts, architecture, and aesthetics as an important part of science and engineering education.

"As a crucial step to lead India into the fourth industrial revolution, multidisciplinary education is vital. Even engineering schools such as IITs will move towards more holistic multidisciplinary education with more arts and humanities; while arts and humanities students will need to learn more science. And this will be compounded with an effort to include more vocational subjects and soft skills."

Dr Kasturirangan noted that there is a search for well-rounded individuals who can take on complex challenges, and job-seekers have often faced demands that go beyond deep technical expertise in a particular technology. "Thus, the notion of liberal arts is being brought back to Indian education, because it is exactly the kind of education that is required for the 21st century."

He said that the policy takes these aspects into consideration and provides multiple options at the four-year programme level. "The four-year programme will provide students with opportunities to fully experience the impact of a holistic and multidisciplinary aspect of undergraduate education, thereby enabling them to develop aesthetic, social, physical, emotional and moral capacities and go just beyond intellectual development." He added that the policy takes a firm view that vocational education must be integrated into the curriculum at the under-graduate as this opens the door to the real world of work.

"So far, we have had a very narrow understanding of vocational education and thus have been undervalued. With advances in technologies such as Augmented Reality, we will see an increased number of hybrid jobs where a human's vocational skills will complement the

capabilities of advanced technology."

He also pointed to the relevance of promoting a strong research and development (R&D) ecosystem as India continues to grow to become a vibrant economy. "The present inadequacy in this area is very evident in the low number of researchers in India. That's why the policy highlights the importance to better manage research at all levels - right from applied research, translational research, and research to address specific needs of the industry, social problems, strategic demands and other requirements."

The NEP 2020 policy thus aims to develop universities into full-fledged research centres of excellence and has thus recommended the creation of National Research Foundation (NRF) to provide adequate funding, mentoring, and careful monitoring for both public and private funded education institutions sans distinction. NRF, he said, will promote research in the area of arts, social sciences, engineering and technology including educational technology among others. He said that research in educational technology could not only play a vital role in furthering the goals of NEP but also improve the resilience to disruptions such as the one we are facing today due to the pandemic. He said the National Education Technology Forum, a new autonomous entity that the policy recommends, could play a key role in facilitating dialogue between the educators and education technology entrepreneurs.

Dr Kasturirangan shared that India has lost 220 languages over the last 50 years since they didn't receive due attention and care. And that's why the NEP emphasises the promotion of local languages, and learning and teaching of Indian languages in schools and higher educational institutes.

"The three-language formula outlined in the NEP promotes multi-linguism and recommends more experiential language learning and hiring of local artists." The policy supports creation of strong programmes and departments in Indian languages such as creative writing, arts, philosophy etc. "The policy encourages more programmes in higher education to use the mother tongue or the local language as a medium of instruction."

He said while the government has offered to support the implementation of NEP 2020, it calls for individual and collective effort to ensure that India's journey to re-establish itself as a knowledge power house is smooth and rapid.

Source: Yourstory.com

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ONLY PERSON WHO BORNE INCIDENCE OF DUTIES/ TAXES, IS ENTITLED TO CLAIM REFUND

BIMAL JAIN

The Hon'ble Madras High Court in the case of **M/s. Chennai Petroleum Company Ltd. (CPCL) v. Commissioner of GST & Central Excise [C.M.A.Nos.4298, 4299 and 4301 of 2019 dated, October 28, 2020]** rejected the refund of excise duty under Section 11B of the Central Excise Act, 1944 (**Central Excise Act**) on the basis of credit notes issued, and held that the facts could not indicate, that M/s. CPCL has borne the incidence of Excise Duty which in law, could not be charged from it and it is a settled legal position under Section 11B of the Central Excise Act that it is only the person who has borne the incidence of Excise Duty who is entitled to claim refund.

Facts: M/s. Chennai Petroleum Company Limited ("**Appellant Company/ M/s. CPCL**") is an oil refinery and is manufacturer of petroleum products which are sold at the instance of or on the purchase orders placed by their marketing company M/s. Indian Oil Company Ltd., ("**M/s. IOCL**") to yet another Government Company M/s. PPN Power Generating Company Ltd., ("**M/s. PPN**") which manufactures power, out of the raw naptha, which is manufactured by M/s. CPCL and sold to M/s. PPN on the basis of purchase orders placed by their marketing company M/s. IOCL. The Appellant Company raises invoice including Excise Duty component on its marketing company M/s. IOCL, which in turn raises its own invoice on the purchasing company M/s. PPN.

The Appellant Company had a Running Account with the marketing company M/s. IOCL. Due to some reduction in price, M/s. IOCL informed the Appellant Company that excess price has been charged by the Appellant Company from M/s. PPN and accordingly it has issued Credit Notes to M/s. PPN.

Accordingly, refund claims were made by the Appellant Company with the Excise Department ("**Respondent**"), which were rejected on the basis of the impugned Show Cause Notice ("**SCN**") issued to the Appellant Company on July 19, 2002, which further resulted in adverse orders against the Appellant Company, being Order in Original on November 29, 2002 and order passed by the Commissioner of Appeals dated April 11, 2018 and impugned order passed by the learned CESTAT on May 10, 2019.

Issue: Whether questions of law arise from the order of the CESTAT rejecting the claim of refund of Excise Duty to the Appellant Company?

Held: The Hon'ble Madras High Court in **W.P. No. 38488 of 2015, dated September 2, 2020** held as under:

- The scheme of the Central Excise Act, contained in Section 11B read with its other relevant provisions, as it then prevailed before the introduction of GST

regime, with regard to refunds is very clear that it is only the person who has borne the incidence of Excise Duty, which was not leviable in law, is entitled to claim refund of the same, subject to his locus standi and the limitation prescribed in Section 11B of the Central Excise Act.

- Observed that, merely because M/s. IOCL issued a credit note to the buyer M/s. PPN, it cannot be said that the incidence of Excise Duty was not passed on to the purchaser M/s. PPN. The Appellant Company, cannot be said to have borne any incidence of Excise Duty illegally levied and therefore, the right of the Appellant Company to claim any refund cannot arise.
- Relied on the case of **Mafatlal Industries Ltd., vs. UOI [1997(89) ELT 247 (SC) dated December 19, 1996]** and stated that, the law in this regard of unjust enrichment has been settled, propounded beyond the pale of doubt by the Constitution Bench of the Hon'ble Supreme Court and the said judgment has been correctly applied, with great respects, by the Hon'ble Supreme Court in the case of **Commissioner of Central Excise, Madras vs. M/s. Addison and Co. Ltd., [2016(339) ELT 177 (SC) (dated, August 29, 2016)]**. There is hardly any doubt on facts in the present case, where, admittedly, the invoice of the Appellant Company for the supply of raw naptha which is a dutiable product, was raised by the Appellant Company on its marketing company M/s. IOCL, which is a separate company, who in turn raised invoice on the purchaser or buyer of the said raw naptha M/s. PPN, who in turn, manufactured power by use of such raw naptha and other raw materials. If at all, duty can be said to have been collected in excess on account of over valuation of the supplies, it is the consumer of the said raw material/raw naptha, viz., M/s. PPN who could have claimed the refund of Excise Duty as per the settled legal position.
- Held that, the facts before the Court were clear and undisputed and there was no material or facts available on record which even prima facie could indicate that the Appellant Company has borne the incidence of Excise Duty, which in law could not be charged from it. The moment it raised the invoice on M/s. IOCL and M/s. IOCL issued Invoice on M/s. PPN, the incidence of Excise Duty is definitely passed on to the buyer or consumer of raw naptha, viz., M/s. PPN. Therefore, the right to claim refund by the Appellant Company is completely lost. Further, the Court did not find any question of law arising in the present appeals, which were required to be considered afresh or outside the scope of the binding precedents.

Comments: The above principle that only the person who has borne the incidence of duties/ taxes, is entitled to claim refund, is also applicable in the GST law and the person claiming refund is required to pass the test of unjust enrichment. 'Unjust enrichment' means retention of a benefit by a person that is unjust or inequitable. Hence, the 'doctrine of unjust enrichment', therefore, is that no person can be allowed to enrich inequitably at the expense of another.

Owing to above, Section 54(5) of the **CGST Act, 2017 ("CGST Act")** states that if, on receipt of any such application, the proper officer is satisfied that the whole or part of the amount claimed as refund is refundable, he may make an order accordingly and the amount so determined shall be credited to the Consumer Welfare Fund ("**the Fund**"). However, Section 54(8) of the CGST Act lists down following scenarios where the doctrine of unjust enrichment is not applicable, i.e., the refundable amount shall, instead of being credited to the Fund, be paid to the applicant:

- (a) refund of tax paid on **export*** of goods or services or both or on inputs or input services used in making such exports*;
- (b) refund of **unutilised input tax credit** under Section 54(3);
- (c) refund of tax paid on a supply which is not provided, either wholly or partially, and for which invoice has not been issued, or where a **refund voucher** has been issued;
- (d) refund of tax in pursuance of **Section 77** (i.e. tax wrongfully collected and paid to Central Government or State Government);
- (e) the tax and interest, if any, or any other amount paid by the applicant, **if he had not passed on the incidence of such tax and interest to any other person**; or
- (f) the tax or interest borne by such other class of applicants as the Government may, on the recommendations of the Council, by **notification**, specify.

Thus, the GST law makes the test of unjust enrichment inapplicable only in above cases. In all other cases, the test of unjust enrichment needs to be satisfied for the refund claim to be paid to the applicant. Meaning thereby, if unjust enrichment cannot be proved, then the amount of refund sanctioned will be credited to the Fund.

*It is to be noted that vide **Central Goods and Services Tax (Amendment) Act, 2018 w.e.f. February 1, 2019**, clause (a) of Section 54(8) of the CGST Act was amended to substitute the words "zero-rated supplies" with "export" and "exports", thereby making the principle of unjust enrichment applicable in case of refund claims arising out of supplies of goods or services or both made to a SEZ unit or developer.

Relevant provision:

Section 11B of the Central Excise Act:

"Claim for refund of duty and interest, if any, paid on such duty. —

(1) Any person claiming refund of any duty of excise and interest, if any, paid on such duty may make an application for refund of such duty and interest, if any, paid on such duty to the Assistant Commissioner of Central Excise or Deputy Commissioner of Central Excise before the expiry of one year from the relevant date in such form and manner as may be prescribed and the application shall be accompanied by such documentary or other evidence (including the documents referred to in section 12A) as the applicant may furnish to establish that the amount of duty of excise and interest, if any, paid on such duty in relation to which such refund is claimed was collected from, or paid by, him and the incidence of such duty and interest, if any, paid on such duty had not been passed on by him to any other person :

Provided that where an application for refund has been made before the commencement of the Central Excises and Customs Laws (Amendment) Act, 1991, such application shall be deemed to have been made under this sub-section as amended by the said Act and the same shall be dealt with in accordance with the provisions of sub-section (2) substituted by that Act :

Provided further that the limitation of one year shall not apply where any duty and interest, if any, paid on such duty has been paid under protest.

(2) If, on receipt of any such application, the Assistant Commissioner of Central Excise or Deputy Commissioner of Central Excise is satisfied that the whole or any part of the duty of excise and interest, if any, paid on such duty paid by the applicant is refundable, he may make an order accordingly and the amount so determined shall be credited to the Fund :

Provided that the amount of duty of excise and interest, if any, paid on such duty as determined by the Assistant Commissioner of Central Excise or Deputy Commissioner of Central Excise under the foregoing provisions of this sub-section shall, instead of being credited to the Fund, be paid to the applicant, if such amount is relatable to –

- (a) rebate of duty of excise on excisable goods exported out of India or on excisable materials used in the manufacture of goods which are exported out of India;
- (b) unspent advance deposits lying in balance in the applicant's account current maintained with the Principal Commissioner of Central Excise or Commissioner of Central Excise;
- (c) refund of credit of duty paid on excisable goods used as inputs in accordance with the rules made, or any notification issued, under this Act;
- (d) the duty of excise and interest, if any, paid on such duty paid by the manufacturer, if he had not passed on the incidence of such duty and interest, if any, paid on such duty to any other person;
- (e) the duty of excise and interest, if any, paid on such

duty borne by the buyer, if he had not passed on the incidence of such duty and interest, if any, paid on such duty to any other person;

- (f) the duty of excise and interest, if any, paid on such duty borne by any other such class of applicants as the Central Government may, by notification in the Official Gazette, specify :

Provided further that no notification under clause (f) of the first proviso shall be issued unless in the opinion of the Central Government the incidence of duty and interest, if any, paid on such duty has not been passed on by the persons concerned to any other person.

(3) Notwithstanding anything to the contrary contained in any judgment, decree, order or direction of the Appellate Tribunal or any Court or in any other provision of this Act or the rules made thereunder or any other law for the time being in force, no refund shall be made except as provided in sub-section (2).

(4) Every notification under clause (f) of the first proviso to sub-section (2) shall be laid before each House of Parliament, if it is sitting, as soon as may be after the issue of the notification, and, if it is not sitting, within seven days of its re-assembly, and the Central Government shall seek the approval of Parliament to the notification by a resolution moved within a period of fifteen days beginning with the day on which the notification is so laid before the House of the People and if Parliament makes any modification in the notification or directs that the notification should cease to have effect, the notification shall thereafter have effect only in such modified form or be of no effect, as the case may be, but without prejudice to the validity of anything previously done thereunder.

(5) For the removal of doubts, it is hereby declared that any notification issued under clause (f) of the first proviso to sub-section (2), including any such notification approved or modified under sub-section (4), may be rescinded by the Central Government at any time by notification in the Official Gazette.

Explanation. — For the purposes of this section, —

(A) “refund” includes rebate of duty of excise on excisable goods exported out of India or on excisable materials used in the manufacture of goods which are exported out of India;

(B) “relevant date” means, —

- (a) in the case of goods exported out of India where a refund of excise duty paid is available in respect of the goods themselves or, as the case may be, the excisable materials used in the manufacture of such goods, —
- (i) if the goods are exported by sea or air, the date on which the ship or the aircraft in which such goods are loaded, leaves India, or
- (ii) if the goods are exported by land, the date on which such goods pass the frontier, or
- (iii) if the goods are exported by post, the date of

despatch of goods by the Post Office concerned to a place outside India;

- (b) in the case of goods returned for being remade, refined, reconditioned, or subjected to any other similar process, in any factory, the date of entry into the factory for the purposes aforesaid;
- (c) in the case of goods to which banderols are required to be affixed if removed for home consumption but not so required when exported outside India, if returned to a factory after having been removed from such factory for export out of India, the date of entry into the factory;
- (d) in a case where a manufacturer is required to pay a sum, for a certain period, on the basis of the rate fixed by the Central Government by notification in the Official Gazette in full discharge of his liability for the duty leviable on his production of certain goods, if after the manufacturer has made the payment on the basis of such rate for any period but before the expiry of that period such rate is reduced, the date of such reduction;
- (e) in the case of a person, other than the manufacturer, the date of purchase of the goods by such person;
- (ea) in the case of goods which are exempt from payment of duty by a special order issued under sub-section (2) of section 5A, the date of issue of such order
- (eb) in case where duty of excise is paid provisionally under this Act or the rules made thereunder, the date of adjustment of duty after the final assessment thereof;
- (ec) in case where the duty becomes refundable as a consequence of judgment, decree, order or direction of appellate authority, Appellate Tribunal or any court, the date of such judgment, decree, order or direction;
- (f) in any other case, the date of payment of duty.”

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CHANGE INITIATED PROJECTS & CHANGE MANAGEMENT MODELS

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Change Drives Projects to Conceive and Projects Deliver Positive Change Outcomes or Results. Change is Essential to many aspects of business for remaining relevant in your business area and is imperative for companies for ever growing and adapting to different circumstances; important to keep Creative Ideas fresh & implemented and moving forward; Adopt New Technology and more Efficient and Economical Methods to perform work; Bridge Performance Gaps & increase its Business Competitiveness. Changes are also taken up because of government regulations, Improve shareholders value, changes in markets, and other factors in the organization's business environment.

Generally, Projects are Conceived to bring in Change that encourages Innovation, Transformation, Develop Competitive Edge and leads to many positive aspects like Improvement, Progress, Growth, move to Grab Opportunity or Overcome Obstacles or Problems. **Project-based works are like Propelling Engines that turns Ideas into Reality and generates major Changes & Accomplishments.**

Why Changes are Initiated:

While change may be Difficult & make us Uncomfortable many a times and despite facing Daunting Challenges, it can also be tremendously beneficial to business and Positively affect Profits, Productivity, Growth and Quality of Work. In business, no change happens without there being some business factor or benefit that would be gained by the organization.

Expectation from Change are Multi-fold, depends on the Organisational Objectives, Structure, Necessity, Nature of Change & It's situation etc. However commonly Changes are initiated for Improving Productivity / Efficiency; Better Deliverables to Reach the Customers like Speed & without Defects; Launching New Product or Entering into New Market to Market Share; Improve Customer & Employee Satisfaction; Reduce Costs; Improve Financial Gains like Improved ROI, EBITDA etc.



Projects are undertaken to Drive Change on the other hand Project Success in fact largely depends on how Change is Implemented.

In a perpetually changing world, businesses must constantly reinvent themselves if they want to stay competitive. Change management is a very broad field, and approaches to managing change vary widely, from organization to organization and from project to project. Change management has become one of the most critical success factors for any Project and therefore **"Change Management is key to the Project Success."** In order to ensure a smooth transition from the current state to the desired state of business, you need the correct change management tools and resources at hand. Change Management is a systematic approach towards dealing with change. It's a structured way of applying tools, knowledge, and resources to effectively drive and ensuring that changes are thoroughly and smoothly implemented, and that the lasting benefits of change are achieved.

Change Management Models :

There are different change management methodologies that have been developed and deployed, such as the **Kotter's 8 Step Change Model**, the **Lewin Change Theory Model**, **ADKAR Analysis**,

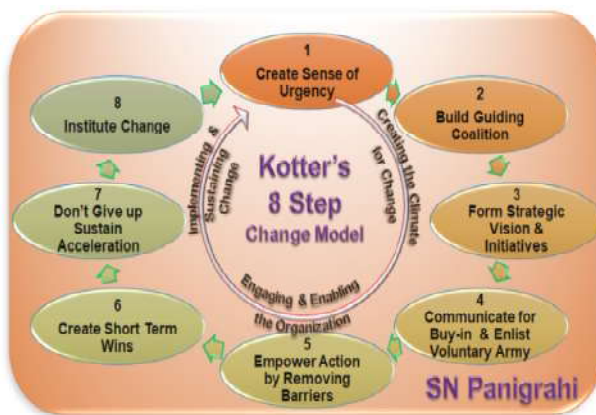
Force Field Analysis, McKinsey 7S Framework, Beckhard and Harris's Change Model, PDCA Model. In the context of organizational change, the current state of a company is defined as a problem which needs a solution. These Models follows broadly four steps : **Identifying Need for Change; Create Climate for Change; Engage People; Implement & Sustain Change.**

Change Management mostly focuses on **People, Process & Technology** and these Three Pillars of Change ensures change thoroughly, smoothly and lastingly implemented and Determines Success. All have worthwhile attributes that should be evaluated and executed in a structured fashion in order to deliver project success.

Let's now briefly discuss these Methods.

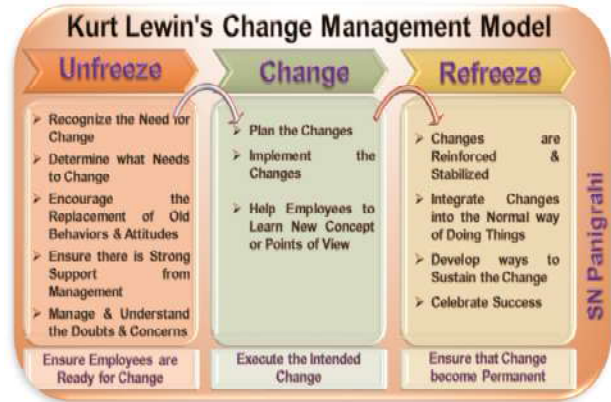
Kotter's 8 Step Change Model :

John Kotter (1996), a Harvard Business School Professor and a renowned change expert, in his book "Leading Change", introduced **8 Step Model of Change** which he developed on the basis of research of 100 organizations which were going through a process of change. The 8 Step Change Model is designed to bring lasting change to an organisation. The Model Described as below:



Lewin's Change Management Model

Kurt Lewin developed a change model involving three steps: **unfreezing, changing** and **refreezing**. The model represents a very simple and practical model for understanding the change process. For Lewin, the process of change entails creating the perception that a change is needed, then moving toward the new, desired level of behaviour and finally, solidifying that new behaviour as the norm. The model is still widely used and serves as the basis for many modern change models.



ADKAR® Model

The ADKAR® Model of change is a well-known and widely used tool that helps you analyse your change and better understand it. The ADKAR model is a 5-step framework that helps deal with the people-aspect of change management. The methodology was developed by Jeffery Hiatt, a best-selling author and the founder of Prosci. The five **ADKAR** elements—**Awareness, Desire, Knowledge, Ability, and Reinforcement**—are the building blocks for creating change from the human perspective.

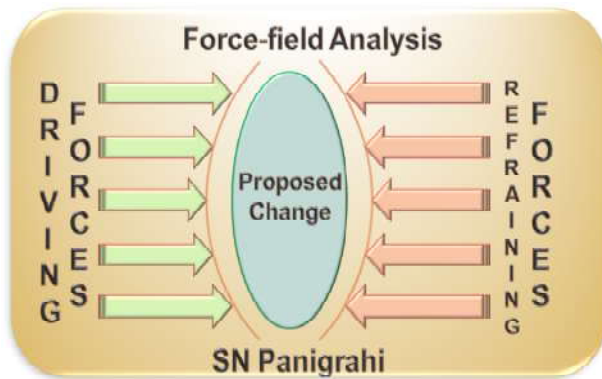


Force-field Analysis

Force Field Analysis was created by Kurt Lewin in the 1940s. Lewin originally used it in his work as a social psychologist. Today, however, it is also used in business, for making and communicating go / no-go decisions'

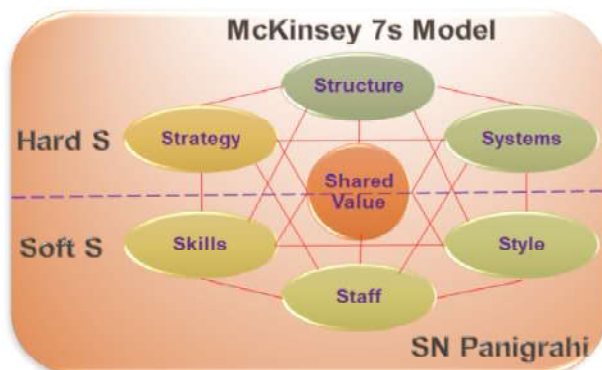
It provides a framework for looking at the factors (forces) that influence a situation, originally social situations. It looks at forces that are **either driving movement toward a goal (helping forces) or blocking movement toward a goal (hindering forces).**

Force field analysis is a basic tool for root cause analysis that can help you take action once the root cause has been identified. The technique is based on the assumption that any situation is the result of forces for and against the current state being in equilibrium.



McKinsey 7S Framework

The McKinsey 7S Framework is a management model developed by business consultants Robert H. Waterman, Jr. and Tom Peters in the 1980s. McKinsey 7s model is a tool that analyses firm's organizational design by looking at 7 Ss that are structure, strategy, systems, skills, style, staff and shared values in order to identify if they are effectively aligned and allow organization to achieve its objectives and understand the Relationship between Seven "Hard" and "Soft" aspects of Organizations.



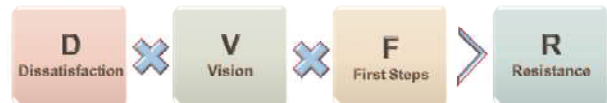
Beckhard and Harris's Change Model

Giving another perspective on change, this describes how change initiatives require the pre-requisites of real dissatisfaction with the current state, a vision of why the new state will be better, and clear first steps towards getting there, to be successful.

Devised in the 1960s by David Gleicher then refined

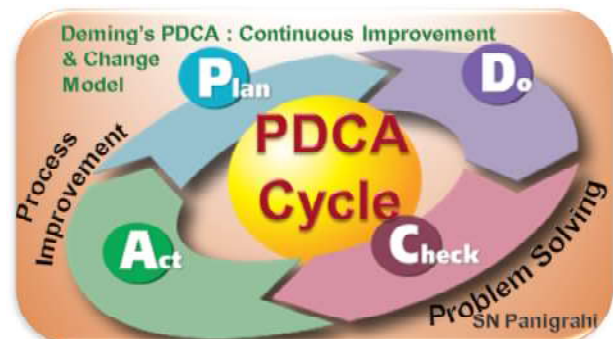
in the 1980s by Kathie Dannemiller, the formula for change was truly popularised by **Richard Beckhard and Reuben T. Harris** in 1987 in their book entitled "**Organizational Transitions: Managing Complex Change**".

The formula offers a simplified analysis of the conditions governing the potential success or failure of a given change initiative as follows:

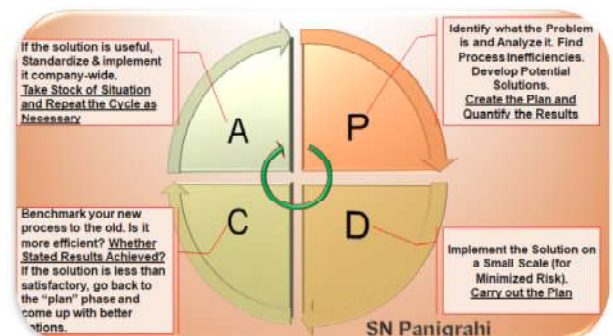


The aim of the formula is to help those running transformation projects to take stock of the exact situation, in order to then make the right decisions in keeping with the final objective. In fact, the assessment made of the first three variables should be sufficiently accurate to ensure resistance to change is overcome, otherwise the success of any transformation project will be in jeopardy.

PDCA / PDSA Continuous Improvement & Change Model



The PDCA/PDSA cycle is a continuous loop of planning, doing, checking (or studying), and acting. It provides a simple and effective approach for solving problems and managing change. The model is useful for testing improvement measures on a small scale before updating procedures and working practices.



Failure to Change mostly stem from Factors like: Fear of the unknown, People's Natural Preference for Inertia or Resistance for Change, Non Acceptance of Change by the Stakeholders; Vested Interests putting Stumbling Blocks to Change, Job Insecurity, Lack of Preparation or Immature Attempts, Lack of Direction, Commitment & Proper Communication; Technological Mismatch or Unsuitability to Requirements.

Tips for Successfully Bring in Change

Typically, these will cover:

1. **Drive from Top:** ensuring there is active sponsorship for the change at a senior management level within the organization, and engaging this sponsorship to achieve the desired results.
2. **Understand & Align Your Priorities:** Understanding and aligning your priorities will help your team understand the impact of concurrent changes.
3. **Define Success:** Define key performance indicators for change management success before Launching the Initiative.
4. **Understand Your Stakeholders :** Organize internal and external stakeholders into groups based on the way the change is impacting them. Consider whether they will support, oppose or be neutral to the change. Also measure their respective levels of influence.
5. **Gain Consensus:** gaining buy-in for the changes from those involved and affected, directly or indirectly.
6. **Involve Concerned Stakeholders:** involving the right people in the design and implementation of changes, to make sure the right changes are made. Cross-functional teams are a powerful way to engage stakeholders from various departments and levels in the organization in leading change.
7. **Understand Impact:** assessing and addressing how the changes will affect people.
8. **Communicate :** Telling everyone who's affected about the changes.
9. **Readiness:** Getting people ready to adapt to the

changes, by ensuring they have the right information, training and help.

10. **Project Post-Mortems:** Ultimately, when the project runs its course and transitions into daily operational function, invest the time with the project team and key stakeholders to review what worked well and what could be improved.

The Performance is Measured in terms of

Ø **Whether intended Results are Achieved?**

Ø **Whether Implementation is Completed?**

Ø **Are Your Stakeholders are Satisfied?**

Taking a multi-dimensional and graduated approach to assessing change performance, Organizations shift how they evaluate success each time they start implementing a new strategy or change initiative.

When your organization undertakes projects or initiatives to improve performance, seize opportunities or address key issues, they often require changes; **To Bring in Change Projects need to be Initiated** on the other hand **Projects use Different Types of Change Management Models.**

Change Management provides a structured approach for supporting organizations to move from their own current states to their own future states. When change management is integrated into the project management steps, the efforts to manage the people side of change can identify and mitigate risks in a more proactive manner, address anticipated obstacles and resistance and build commitment and buy-in for the change.

Successful implementation of Change Management lead to Fruitful Completion of Projects which Delivers Change in the Organization.

For More Details on Project Mgt., Lean Six Sigma etc Subscribe to my YouTube Chanel @ below Link

https://www.youtube.com/channel/UCVZScNa_IeR8XbYINEwTFwQ/videos

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STRATEGIES FOR INTERNATIONAL SUPPLY CHAIN DISRUPTIONS

SUMIT WADHAWAN

This article was written in pre-covid times with the intention to device strategies against the major Supply Chain disruptions happened internationally. Ironically when you will go through the same, you will find it so relevant and perhaps this is the best prescriptive strategy to contain Covid19 disruption as well. Let's check it out.

In 2011, four major hurricanes made way across the Atlantic, causing disruption to supply chains. In Egypt's Alexandria and Damietta ports, cargo operations came to a virtual standstill during a period of civil unrest that forced their president out of power. Japan's historic 2011 earthquake and subsequent tsunami caused a major ripple effect in supply chains that transported approximately 22% of the world's silicon wafer supply and 60% of the world's critical auto parts.

Supply chain disruptions are inevitable after large-scale disasters and political unrest. While they're unavoidable, the more companies can do to improve their supply chain visibility and agility, the better prepared they are to mitigate the impact of the disaster as well as navigate around the daily disruptions, such as market fluctuations in capacity and pricing.

Below are a few key steps to prepare your company for events that disrupt the chain:

Change the mindset from Supply Chain Management to Exceptions-Based Management

In the world of logistics where supply chain visibility reigns, it's important to ask yourself why you need visibility. It's not enough to know that data is being integrated up and down the supply chain; what's valuable is how the data is used. Supply chain visibility gives companies access to data that can be used for tracking key performance indicators and other metrics. If there's an unexpected event that takes place along the supply chain, it's going to show in the numbers. Exceptions-based management takes advantage of the visible supply chain and uses the data to identify a problem and make fast, accurate

decisions based on this data.

Determine Visibility Levels

Another key step to event preparedness is to identify the key players or partners in the supply chain that need visibility and what level of visibility is needed. A nimble supply chain is reflective of the ease at which data is accessible. For a supply chain with many partners and ERP systems, this can be very complex. For example, the accounting department might require access to data that is used to determine the value of the perpetual inventory — or the inventory that is currently being transported. Or, suppliers at the point of origin might need access to the TMS in order to input the original booking data that follows that shipment all the way through the supply chain. By analyzing all the departments, partners, and ERP systems that can be integrated across the supply chain and by providing the various levels of access needed, these companies have fast access to data when needed in order to react quickly to supply chain disruptions.

Work with a provider with Strong Technology Integration Expertise

A supply chain is only as strong as the information pipeline that serves as its foundation. A robust transportation management system that is integrated with multiple data repositories is going to have more information that can be accessed and shared throughout the system. For this reason, it's important to think of logistics partners as technology partners first, as it takes skill and knowledge to integrate with multiple ERP systems across multiple borders.

Integration of ERP and purchase order systems into a global TMS system to give clients visibility all the way down to their purchase order and SKU levels. By having access to this depth of information, companies are able to rate their suppliers' performance regarding on-time shipping or categorize purchase orders and shipments based on inventory needs. This dynamic

environment for data management is only possible if the logistics company has the technological expertise and a transportation management system that is scalable to the complexity of the integration.

Incorporate Compliance Intelligence and Proactive Notifications into the System

A key to exception-based management is defining those exceptions and building the logic into the global transportation management system that can flag the data and build intelligence to proactively manage this information. There's a tremendous amount of power in the ability to get notifications on exceptions. If, for example, you're moving a significant amount of volume and experience a disruption, you don't have to sift through data to find the issue and manage the volume. The data is being pushed to you via proactive notifications. Proactive notifications should also define the trigger or response to specific types of exceptions, whether it's a late departure or a compliance issue for an export. The contingency should be built into the logic, so some of the decision-making has been pre-determined prior to the exception taking place.

This proactive intelligence emphasizes the power of the data, which is much more dynamic than a simple track-and-trace mentality that is often defined by visibility.

Use timely and accurate data as Upstream as possible

Another way to mitigate disruption or risk is to promote access to data that provides real upstream visibility. View the beginning point of the supply chain at the point of the purchase order issuance, which takes place long before the actual shipment. For example, ask customers to give access to their purchase orders long before shipments embark. This data is used to communicate to shipping lines the expected capacity needed three to five months down the road. This data is important for managing allocation plans, volume, and origins.

By accessing data sooner in the supply chain, such as booking details, volume, and origins, you can pre-plan to avoid some of the disruptive events that can happen in the marketplace related to capacity and pricing. Supply chain visibility is something that most companies can achieve, but what makes a supply chain resilient is real, upstream visibility of highly accurate data.

Identify important Key Metrics for Score Carding and Analysis

Score carding and tracking of key performance indicators are also important in identifying exceptions and circumventing disruption. For example, a comparison of actual shipping dates to planned shipping dates can be used to analyze performance levels of origin suppliers. Measuring carrier accuracy and carrier performance are also crucial to determining capacity and timeliness. The challenge in looking at these metrics is being able to access repositories of data when working with multiple carriers, especially with international shipments that can cross multiple countries through a variety of modes.

It's important to ask logistics providers about relationships they have with organizations like INTTRA, which provides a web-based portal and data warehouse for shipping carriers. Some additional key metrics to consider are the landed cost of the product, down to the SKU, versus the standing cost of the product. This helps to identify the purchase price variance. To access this granular level requires integration with the company's accounting systems and understanding the accounting practices. Measuring transit times is also critical to supply chain best practices. Transit time is dependent on multiple factors, like the rate agreement based on capacity, level of standing with the carrier, speed of the transit, and comparisons to current price indexes. By managing a multitude of metrics, when an exception or severe disruption occurs, this data gives companies the agility to make alternate choices as needed.

Access to the right data gives companies the ability to make fast, accurate decisions based on evidence that can be used not only to manage events but to also circumvent disruptions on a daily basis that can be very costly to a company. The key success factor is having a mindset about supply chain management that is designed to identify the exceptions.

Real-time, upstream view of data, as well as access to historical data and forecasts, are an important combination in using supply chain visibility to proactively manage events that can quickly interrupt the supply chain.

Source: sourcingandsupplychain.com

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WHY THE 2030 SUSTAINABLE DEVELOPMENT GOALS MATTER TO PACKAGING PROFESSIONALS

EDITORIAL STAFF

In September, the United Nations adopted a final roadmap for the 2030 Sustainable Development Goals (SDGs). Broadly speaking, SDGs are targets for governments, communities and institutions to further international development. The 2030 agenda builds on the Millennium Development Goals set in 2000 and includes 17 goals touching on a variety of social, environmental and economic issues ranging from gender equality to accessible and affordable clean energy. But do the 2030 SDGs have any impact on the work of packaging professionals? Yes and it's a renewed opportunity for the packaging industry to be part of the global solution.

Packaging plays a critical role in enabling development it helps food last longer, it can transport water to water-scarce areas and it dispenses medications to help people live healthier lives...just to name a few. These are some of the necessities that form the foundation of a quality life, and packaging is the tool that delivers and protects those basic needs. While packaging solutions can enable a better world, we need to be mindful that packaging doesn't disappear into a vacuum. When packaging and products are sent to markets around the world, they are released into the hands of consumers.

Particularly in expanding markets such as India, China and Brazil social and economic transformations in cities result in increased consumer waste production. The World Bank reports that "more than 50 percent of the world's population lives in cities, and the rate of urbanization is increasing quickly." With limited space and high population density, waste management is a huge challenge that comes with urbanization. Without external, legislative requirements or economic drivers controlling the recovery of packaging, those materials often up as litter or buried in a landfill.

Many developing or underdeveloped areas still struggle with establishing a waste management infrastructure to recapture consumer waste and packaging materials. In response, the World Bank posits that "citizens and corporations will likely need to assume more responsibility for waste generation and disposal, specifically product design and waste separation." Companies and packaging professionals are poised to take the lead on sustainable development by focusing on a few key 2030 SDG goals, including Goal 11, Goal 12, Goal 14 and Goal 17.

Goal 11 aims to "make cities inclusive, safe, resilient, and sustainable." One of the key targets specifies to "reduce the adverse per capita environmental impact of cities by paying special attention to air quality and municipal and other waste management."

In a similar vein to urban waste management challenges, Goal 14 aims to "prevent and significantly reduce marine pollution of all kinds, in particular from land-based activities, including marine debris and nutrient pollution." These two targets are directly tied to waste management and litter control—tasks we often view as municipal or government responsibilities

beyond the control of industry. But we're beginning to see the tide turning as more and more packaging professionals become interested in improving recovery rates of their packaging.

The Ocean Conservancy recently released a collective action plan to curb the leakage of plastics into the oceans involving a coordinated effort between industry, non-governmental organizations (NGOs) and government. In its report, the Ocean Conservancy found that a significant portion of marine debris comes from emerging markets and that most marine debris consists of low-grade and low-desirability plastic and plastic films that are not picked up by waste collectors due to their low market value and demand. Simply put, without a demand for these materials, they're tossed aside.

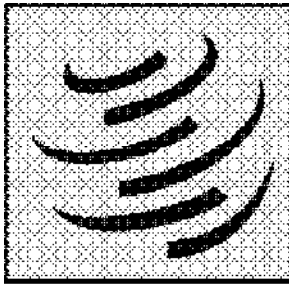
The collective action plan aims to bring together industry, NGOs and government because the solution to pervasive pollution needs to be multidimensional and involve cooperation from all parties and influencers throughout the supply chain. Packaging professionals in particular are in an advantageous position to make critical design choices that increase recovery of their products, such as structural integrity (flexible pouches that don't require tearing off an opening) and material preference (using a widely recyclable plastic).

Goal 12 speaks more intimately to the everyday work of the packaging industry. Goal 12 aims to "ensure sustainable consumption and production patterns" by "encouraging industries, businesses and consumers to recycle and reduce waste" and "supporting developing countries to move towards more sustainable patterns of consumption by 2030." The packaging industry can encourage sustainable production and consumption patterns by reducing unnecessary packaging and designing for sustainable end-of-life disposal options. This can take on a number of forms, ranging from designing for compostability, using widely recyclable materials, incorporating more recycled content, creating producer take-back programs, and encouraging packaging reuse or repurposing.

For the packaging industry, the 2030 SDGs and the UN are not key drivers that impact day-to-day work, but we're seeing a shift where sustainability is woven into the foundational ethos, the bottom line and future growth goals to drive business forward. With COP21 underway this December, 2015 has become a critical year for determining a path forward on global environmental sustainability. No singular entity can enact these measures alone, and that brings us to our last applicable goal: Goal 17, which aims to revitalize the global partnership for sustainable development with collaboration from governments, civil society and the private sector—packaging professionals included

Source: supplychainminded.com

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WTO UPDATE

ADVANCED GLOBAL E-WORKSHOP ON THE PLURILATERAL WTO AGREEMENT ON GOVERNMENT PROCUREMENT (GPA)

REMARKS BY DDG YI

Distinguished participants, ladies and gentlemen,

It is my pleasure to welcome you to this year's Advanced Global Workshop on Government Procurement. The COVID-19 pandemic has raised difficult new challenges for our lives and work. This workshop is no exception: Travel restrictions make it unfeasible for us to have face-to-face discussions in Geneva. Unfortunately, therefore, we are compelled to shift to virtual format and adjust the programme to that format. We thank you all in advance for your understanding for the inevitable limitations that this imposes on the conduct of this activity.

We have been fortunate to be able to select you from a large pool of candidates. It is gratifying to have so many senior officials among our participants. Therefore, we are all the more grateful that you have expressed an interest in our activity. We are delighted that you have been able to set aside the time to join us online.

We here at the WTO who take an interest in government procurement are all very fond of this workshop. It is our annual "flagship" activity and a wonderful opportunity to disseminate information, deepen participants' knowledge, and foster dialogue on various aspects of trade and government procurement.

All of you are already quite aware of the importance of government procurement and its relationship with trade, good governance, economic growth and prosperity. However, let me highlight a few key points:

- First, government procurement is a key economic activity representing 15 to 20 percent of GDP in most economies. It can have significantly positive implications for economic growth.
- Second, government procurement is vital for building infrastructure and delivering essential public services for the benefit of citizens, including health, education and national defence, therefore has a significant development dimension.
- Third, effective rules and procedures for the conduct of government procurement are central to promoting good governance and preventing corruption.
- And finally, international trade agreements covering government procurement can offer

valuable opportunities to exporters for accessing foreign procurement markets. And such agreements can help countries to attract inbound foreign direct investment.

The WTO Agreement on Government Procurement — the "GPA" — is, of course, one of these international trade agreements covering procurement. What, then, is so special about it that we dedicate a workshop to it?

- Well, to begin with, the GPA is the "gold standard" for these agreements. Indeed, the text of the GPA and the structure of its coverage schedules serve as the template for procurement chapters in free trade agreements around the world. The GPA thus provides a valuable point of reference and contributes to regulatory coherence;
- The current GPA, was revised, modernized and improved not too long ago, in 2012. The text of the revised GPA now reflects recent international best practices in government procurement;
- The revised GPA provides legally assured market access to covered foreign government procurement markets that have been valued at over 1.7 trillion US dollars annually. Future accessions, including those of China, Russia and Brazil, are expected greatly to expand this value;
- From the perspective of good governance, the revised GPA also expressly recognizes the importance of "carrying out procurements in a transparent and impartial manner and of avoiding conflicts of interest and corrupt practices". With its emphasis on good governance, and as an agreement reflecting international best practices, the revised GPA has become an essential policy benchmark for reform of national procurement systems, and a bulwark of the global struggle against corruption;
- The revised GPA also reflects the growing international interest in and importance of sustainable development. In particular, the revised GPA explicitly recognizes that government procurement may be used as a tool to promote the conservation of natural resources and the protection of the environment. It also set up a

dedicated work programme on sustainable government procurement. Six years later, the work programme is still being pursued by GPA Parties in small-group discussions, currently with a focus on socially sustainable procurement.

For all these reasons, more and more WTO Members have been seeking GPA membership or observership in recent years. Several have already succeeded in this regard. As a result, the membership and observership of the Agreement have become ever more geographically diverse.

Currently, the GPA comprises 20 parties covering 48 WTO Members. Since the entry into force of the revised GPA in 2014, five WTO Members have acceded to the Agreement, including Australia, the Republic of Moldova, Montenegro, New Zealand and Ukraine.

12 other WTO Members are seeking to participate in the Agreement as full Parties. And 36 Members have obtained observer status under the Agreement, which enables them to learn more about the Agreement and the Government Procurement Committee, and about current issues in government procurement policies and practices.

The recent developments around GPA member- and observership, and the increased diversity in this respect, underline the growing relevance of the revised GPA for today's global economy, economic development, sustainability, and good governance.

Dear participants, I have read the programme of this workshop and find it well designed and practically useful. It covers both legal and economic dimensions of the GPA, with a focus on issues related to accession to and the implementation of the Agreement. The speakers include not only WTO Secretariat staff, but also prestigious experts and academic scholars from around the world. Most importantly, you are all senior officials with considerable expertise and experience in the area of government procurement who can contribute to the success of the workshop by sharing your views and questions. I am confident that all these positive elements together will make this workshop a useful opportunity for exchanging views on this significant topic.

In concluding, let me wish you all an interesting and successful workshop. I hope that your respective governments can benefit from it, and that you can share some of the knowledge that you will acquire with your colleagues in your capitals.

Thank you for your attention, and I wish everyone good health and all the best for their professional endeavours.

Source : WTO Website

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Indian Institute of Materials Management

MISSION

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

OBJECTIVE

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

CODE OF ETHICS

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

BLOCKCHAIN'S CRITICAL ROLE IN SUPPLY-CHAIN TRANSPARENCY

ROBERT GALARZA
SCB CONTRIBUTOR

As global markets have expanded, supply chains have become increasingly complicated. Even the most basic ones involve numerous moving parts, each tied to specific times and locations.

Managing these complex systems is an art unto itself, but it all comes down to one fundamental principle: transparency, or being able to see exactly where an item in the supply chain is currently located, where it came from, and where it's going. And in the world of advancing technologies, there's no better tool for achieving this than blockchain.

Blockchain technology is best known for its role in support of cryptocurrencies like Bitcoin, functioning as a ledger that records and tracks transactions. But unlike a traditional ledger, blockchain exists on a distributed network that makes it instantly accessible by anyone in the network with the right permissions. And, most importantly, because blockchain transactions must be agreed to be made on each ledger across the network, they cannot be altered, hidden, or otherwise tampered with. In an era where shared reality can be hard to come by, blockchain represents an important example of indisputable truth. Here's how these qualities make it uniquely suitable for supply-chain applications.

Transparency and Trust

Blockchain creates a unique record for every transaction within a supply chain. This solves one of the biggest weaknesses in today's enterprise resource planning systems. As information and inventory flows are codified and recorded in the blockchain ledger, supply-chain managers gain complete visibility into the transactional history between retailers and suppliers.

This also eliminates many blind spots that exist in traditional record keeping, and provides a level of visibility that improves coordination between parties. Back-and-forth communications are reduced, because there's a single source of truth that each party can refer to. Instead of calling a distributor to see whether a shipment is on its way, the ledger provides dynamic access to that

information. Moreover, blockchain adds the vital factor of reliability to the equation. By their very nature, blockchain ledgers can't be altered unilaterally. They record any and all changes made, and require consensus among the network to make them, so even if an item is deleted, there will be a record of when it happened and who removed it.

Real-Time Visibility and Reporting

Immaculate record keeping gives blockchain the ability to combat one of the biggest pitfalls in supply-chain management: execution errors. Inventory mistakes, duplicate payments, lost shipments — all of these can be difficult to detect and even more difficult to track down after the fact.

Blockchain provides an identifying element to every step within a supply chain, and it does it in real time. This makes it possible to see mistakes when they happen, and to adjust instantly as necessary, whether it's correcting misinformation or updating schedules. This sort of early detection can avoid costly problem-solving later on.

Of course, some problems can only be discovered after the fact. If a shipment of lettuce is discovered to be contaminated by E. coli after it hits the market, a blockchain ledger will make it relatively easy to trace that contaminated sample's history all the way back to the farm that it came from. You'll be able to cross-reference everything it came into contact with, and begin your recall efforts with pinpoint accuracy. A blockchain ledger allows you to track recalls as they happen, providing full confidence that end consumers, as well as the brand's reputation, are being protected.

Blockchain's ability to provide unique identifiers for every step of a complex process sets it apart as the tool of choice for supply-chain managers. Imagine every transaction recorded with absolute certainty, and each item tracked accurately throughout the entire supply process. That's what blockchain gives you the capability to do, and no other technology comes close to providing that same level of trust and transparency.

While it may have come to prominence as a method of securing cryptocurrency transactions, blockchain is well-suited for use in supply-chain management and a host of other areas as well. It's only a matter of time before this cutting-edge technology becomes the industry standard, and "full visibility" goes from being a supply-chain manager's dream to everyday reality.

Robert Galarza is CEO of TruTrace Technologies (<https://trutrace.co/>), developer of a blockchain platform that tracks intellectual property for the cannabis industry.

Source : Bloomberg

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CARBON CAPTURE TECHNOLOGY NOT ON TRACK TO REDUCE CO2 EMISSIONS

VINAY TRIVEDI

CCS technology aims to capture 400 million tonnes of carbon dioxide emissions a year by 2025, but that is unlikely to be met, according to International Energy Agency report.

Global progress on the development of carbon capture and storage (CCS) technology from 2010-2020 was not on track to effectively control greenhouse gas (GHG) emissions and achieve net zero emissions to keep global warming below 1.5 degrees Celsius by 2050. CCS technology's target to restrict global warming to 2°C aims to capture 400 million tonnes of carbon dioxide (CO₂) emissions a year by 2025, but it is unlikely to be met, according to a report by International Energy Agency (IEA).

What is carbon capture utilisation and storage (CCUS)?

CCUS technology is designed to capture CO₂ emissions from combustion of fossil fuels. It can absorb 85-95 per cent of CO₂ emissions in the atmosphere. The process starts with the capture of generated CO₂, which undergoes a compression process to form a dense fluid. This eases the transport and storage of the captured CO₂. The dense fluid is transported via pipelines and then injected into an underground storage facility. Captured CO₂ can also be used as a raw material in other industrial processes such as bicarbonates.

Why is CCS crucial

- The United Nations Intergovernmental Panel on Climate Change's (IPCC) Special Report on Global Warming presents four scenarios for limiting global temperature rise to 1.5 degrees Celsius: All require CO₂ removal and three involve major use of CCS.
- The cement, iron and steel and chemical sectors emit carbon due to the nature of their industrial processes and high-temperature requirements. They are among the hardest to decarbonise. CCS can facilitate a just transition by allowing industries to make sustained contributions to local economies while moving toward net-zero.
- Enabling the production of low-carbon hydrogen at scale coal or natural gas with CCS is the cheapest way to produce low-carbon hydrogen.

Global progress on CCS : CCS is absent from intended nationally determined contributions of most countries. Thus, it is clear that national policies have not accepted CCS as a promising technology. As of 2020, there were only 26 operational CCS facilities capturing around 36-40 million tonnes of carbon per year, according to the latest report by Global CCS Institute, an international think tank. Out of the 26 facilities having CCS worldwide, 24 were in the industries and two were coal-based power plants

The cost on storage and transportation is one of the major

bottlenecks for implementation of CCS. Looking at the importance of CCS in tackling climate change, experts are quite hopeful for the rapid development of the technology in the coming years. Policy support, however, will be crucial to bring the investment.

CCS in India : Commercial availability of CCS in India depends largely on successful implementation of the technology in industrialised countries, which is currently shoddy. The most crucial requirement of a long-term CCS strategy for coal-based power in India is a reliable CO₂ storage capacity assessment for the country. At the moment, CCS technologies are not economically feasible.

Industries, especially steel and cement, have been proactively pursuing CCS as part of their emissions reduction ambitions. In September 2020, an 'Industry Charter' for near zero emissions by 2050 was agreed to by six Indian companies that will explore different decarbonisation measures including carbon sequestration.

Industries need to bring global experience to India: Industries need to collaborate to bring down the cost and push such projects in India. Tata Steel in IJmuiden, Netherlands, has launched plans for a project to capture CO₂ from its blast furnaces and transport it for storage in empty gas fields under the North Sea.

The project is expected to lead to a 30 per cent reduction of CO₂ from the steelmaking site. It aims to complete the project by 2027. It could lead to the reduction of three million tonnes of CO₂ a year in the first phase, equivalent to 1.5 million tonnes of CO₂-free steel every year or 1.3 million cars per year made from climate-neutral steel.

Indigenous innovation need support: A small-scale CCS plant is already operational in India. A plant at the industrial port of Thoothukudi is capturing CO₂ from its own coal-powered boiler and using it to make baking soda. It will lock up 60,000 tonnes of CO₂ a year. The technology runs without subsidy or any other government policy support in India. Such projects bring hope for CCS for small industries.

Government initiative: India's Department of Science and Technology has established a national programme on CO₂ storage research and, in August 2020, made a call for proposals to support CCS research, development, pilot and demonstration projects.

This is part of the accelerating CCS technologies (ACT) initiative, for which India has committed one million euros to support Indian participants. At least 16 countries, regions and provinces are working together in ACT to fund research and development that can lead to a safe and cost-effective CCUS technology.

Source: www.downtoearth.org.in

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COVID-19: COLD CHAIN LOGISTICS WILL BE BIG CHALLENGE IN VACCINATING 135 CRORE INDIANS

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"Prioritising the Covid vaccine for frontline workers would run the risk of allowing the coronavirus to mutate against the vaccine," said Pawanexh Kohli, former CEO and chief advisor, National Centre for Cold Chain Development (NCCD).

With a handful of manufacturers nearing the end of late-stage clinical trials of Covid-19 vaccine candidates in India, the next challenge that awaits the government lies in finding the requisite workforce to administer the shots to such a humongous population and **cold chain logistics for their last-mile distribution** in such a vast, hot country.

While India has a **28,000-unit cold storage network** that is used for the government's universal immunisation programme, experts and logistics firms [indianexpress.com](https://www.indianexpress.com) spoke to highlight that no company had the capability or capacity to transport vaccines colder than -25 degrees Celsius.

Thus, **distributing vaccines like that of Pfizer's mRNA candidate**, which has been found to be more than 90 per cent effective in preventing Covid-19 but needs to be stored at -75 degrees Celsius, will be challenging for India. However, the vaccines undergoing trials in India need to be kept between 2 and 8 degrees Celsius, while in transport and storage until delivery. "Covid vaccines at -25 degrees can be handled in the country as we have the requisite infrastructure in terms of storage and distribution. None of the third-party logistics operators in the country are equipped with -70 degrees cold storage facilities," Sanjay Sharma, Vice-President, Coldman Logistics, told [indianexpress.com](https://www.indianexpress.com).

Seconding him, Pawanexh Kohli, former CEO and chief advisor, National Centre for Cold Chain Development (NCCD), said the problem could be effectively tackled through extensive use of dry ice. "Dry ice in a designated box can retain temperatures at -70 degrees for 24-48 hours," he said. Sharma said Coldman has been approached by top Covid-19 vaccine manufacturers to prepare a plug-in kind of solution for storage at -25 degrees, suggesting that the candidates being developed in India wouldn't require "ultra-cold" temperatures.

"We have certain smaller cold rooms that can store a million doses at -40 degrees also but not in a huge volume. Since the government will have a continuous vaccination programme, so once in a fortnight those one million doses can be rotated. So probably in a month, two million doses can be handled at -30 to -40 degrees," he said. With a subgroup formed by India's expert group on vaccine administration already mapping cold storage facilities across the country, **private cold chain logistics firms have begun preparing** capacities for storing vaccines. For instance, Siro Clinpharm has set aside three state-of-the-art deep freezers of -20 degrees Celsius for storage of approved vaccines.

"For cold and frozen storage, the temperatures can be monitored through data monitors and integrated softwares. Vaccines being developed by Bharat Biotech, Johnson and Johnson and AstraZeneca-Oxford that have a storage requirement of 2-8 degrees can be handled by Siro," Akshay Daftary, director of business development, SIRO Clinpharm,

told [indianexpress.com](https://www.indianexpress.com).

Besides private players, the food cold-chain is also expected to be roped in since it has the maximum reach, with an extensive last mile connectivity, said Kohli, who is also part of the CARUNA platform, which is assisting the government in its Covid-19 efforts. However, Kohli asserted that the major challenge was not cold storage but multiplying the delivery points of the vaccine, ranging from local pharmaceutical shops to even hamburger and pizzeria outlets having functional cold rooms.

"For example, if we consider that a vaccine giver can administer a dose every five minutes and work 10 hours a day, then one can dose 120 others per day. Thus, two vaccine givers per vaccination centre can serve 5,000 people in 21 days. Now, Delhi, with about 20 million residents, will require 4,000 vaccination sites with 8,000 vaccinators if the exercise needs to be completed in 21 days. Moreover, 85 per cent of our villages have below 5,000 population. My concern is that this identification of centres is not happening fast," said Kohli, who has served in an advisory role for several cold chain logistics firms.

Batting for a **mass cluster-based vaccination approach**, he said prioritising the vaccine for frontline workers would run the risk of allowing the novel coronavirus to mutate against the vaccine. "The biggest fear is that the vaccine may prove ineffective against a future strain of the virus. Therefore, the deployment of the vaccine should be extensive and expansive," Kohli said.

Another crucial aspect of the supply chain is monitoring of the vaccine all through its transit until it is dosed. GS1 India, a standards organisation set up by the Ministry of Commerce, said tracking each of the vaccines as it moves across the supply chain is important as patient safety is the key driver for adopting these standards.

So far, GS1 has reached out to Serum institute of India, Bharat Biotech, Dr. Reddy's laboratories and Zydus Cadila for vaccine traceability. "At the manufacturing point itself, there needs to be an IT-enabled mechanism. Besides, unique global product identifier (GTIN), date of expiry, batch number needs to be captured at the secondary packaging level and unique carton code (serial shipping container code) at the tertiary packaging level," GS1 India COO, S Swaminathan, told [indianexpress.com](https://www.indianexpress.com)

"There are several temperature data logger/IOT devices that can be used to monitor temperature at storage and at time of transportation. This information can be linked to shipment details (unique carton code) for effective monitoring," Swaminathan said, adding that GS1 had already apprised the country's drug regulator on the measures required. The Centre expects to receive and utilise 400-500 million doses and cover approximately 20-25 crore people by July 2021

Source: [indianexpress.com](https://www.indianexpress.com)

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PHARMA COLD CHAIN SPEND HEATS UP, WITH A TREND TOWARD TEMPERATURE-TRACKING SENSORS

Dive Brief:

- Global spending on pharmaceutical cold chain is expected to grow nearly 24% between 2020 and 2024 to reach \$21.3 billion, according to an annual forecast in the Biopharma Cold Chain Sourcebook published this year.
- About \$5 billion of the \$17.5 billion spent on pharmaceutical cold chain in 2020 will go toward packaging costs, and there's a growing trend of tracking shipments with temperature sensors, according to a summary of the report.
- The report's data collection took place prior to the pandemic, but it notes that the vaccine rollout will mean "the cold chain logistics market will be positively impacted." The last few months have seen this play out, as logistics companies invest in cold storage and large freezer farms to help transport and store vaccines.

Dive Insight:

The cold chain is at the forefront of vaccine logistics. The coronavirus vaccines have strict temperature requirements that must be maintained throughout the supply chain. An important part of adhering to the requirements is monitoring, ensuring the temperature doesn't get too high or too low. This is where sensors and temperature monitoring technology are vital.

The technology required for monitoring the pharmaceutical cold chain has improved in recent years to include highly automated networks of sensors and servers that send out alerts when temperature diversions occur, according to Paul Daniel, a senior regulatory expert at Vaisala, which creates sensors for monitoring the weather and environment. (Vaisala's sensors have even landed on Mars as part of the Curiosity Rover.)

"We're now collecting data all the time," Daniel said of the modern cold chain.

The latest on-premise, cold-chain-monitoring structures have evolved to a point where there is a good amount of standardization in the industry, he said.

The applications run on one or multiple servers that communicate with sensors in the locations that need to be monitored.

A location will probably have "multiple [sensors] throughout your warehouse, probably one in each incubator, refrigerator or freezer," Daniel said. "And that data gets aggregated into a database, so that you can report on it."

Daniel noted that Vaisala uses data loggers to collect temperature information at the point of measurements. This ensures data isn't lost if there are network connectivity issues, allowing data to be sent later if failures occur.

The monitoring system that Vaisala provides has dashboards to allow users to track raw data over time and see key metrics, but Daniel said users shouldn't have to look at these if the system is functioning well.

"If it's doing its job, you don't need to interact with it," he said. "Because you've set it up to be automated. ... It sends you an alarm notification through SMS or by email."

But data on temperature usually isn't available through the entire logistics journey of a pharmaceutical product. A warehouse might not share data with a logistics company, and packaging might have simple temperature tracking that changes color when diversions occur rather than tracking temperature over the entire trip. But this has changed with Pfizer's coronavirus vaccine.

Pfizer is shipping its vaccine straight from its manufacturing facility to the point of inoculation, and multiple sensors track its temperature along the way. This tracking led to multiple shipments being turned around after becoming too cold earlier this month.

"And because their packaged product always stays in the same thermal shipper from start to end, they have the unique ability to track the temperatures with a GPS-enabled device that sends the temperature data wirelessly," Daniel wrote in an email to Supply Chain Dive. "So for this product alone, there is a chance you might see that holy grail of unbroken temperature data over the life of a shipment, but you likely won't find it anywhere else in the pharmaceutical cold-chain."

Source: This story was first published in our weekly newsletter, Supply Chain Dive: Operations.

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7 BEST TIPS TO CUT LOGISTICS COST IN THE YEAR 2020

Poor logistical planning can result in increased costs, damaged goods, or missed deadlines. All these are no-go scenarios for any company. If reducing logistics costs is among your top priorities, you need good logistics cost reduction ideas. And that is exactly what we will discuss in this article.

1. Automate Logistics : One way to cut costs like warehouse costs is by automating the logistics. Regulate, automate, and optimize the manual logistics processes as much as possible. Automation will reduce staff requirements and centralize production operations. It makes the shipping process accurate and quick, regardless of the shipment volume.

Cloud technology has made automation of logistics affordable and easier. Automation is also linked to higher customer satisfaction. It reduces the per order cost of logistics support, which enables you to lower the price of the product. This will make your customers happy. You can spread out the cost of logistics support over a greater number of orders per customer.

2. Identify Fixed and Variable Costs : You must have a clear understanding of fixed costs and variable costs. Variable costs are those that fluctuate with volumes such as labor, fuel charges, or packaging. Fixed costs are those that do not vary with volume. The costs of electricity and management are mostly fixed unless there is a variable component like an extra shift. When you know exactly how much money is being spent on each area, you can decide which variable or fixed cost you can cut.

3. Team Up with Other Shippers : Do you frequently have less-than-truckload (LTL) shipments? If yes, that would translate to higher logistics as well as transportation costs. One way to reduce these costs is by teaming up with other shippers.

Consider collaborating your loads with shippers that are moving their loads to the same locations or customers. This will turn your LTL shipment to low-cost, full truckload shipment. This tactic will help you cut road, rail, or air freight costs.

4. Outsource Parts of Supply Chain: Do you outsource any part of your supply chain? Outsourcing even a portion of your supply chain like storage and transportation will reduce costs. It will also help in increasing efficiency and reducing logistics costs. Moreover, you would know that professionals are handling your logistics and supply chain processes. This would minimize any kind of stress on your end. Before outsourcing, ensure that both you and your logistics provider are on the same page. Discuss the size and frequency of shipment, product handling, temperature and pressure control, etc. This will ensure smoother operations.

5. Improve Inventory Accuracy : Are there more goods in the inventory than required? Or you don't have enough to meet customer demands? In both cases, you would lose money. Keeping out-of-stock goods will cut into your profits. Contrarily, paying for inventory space and transportation for low inventory will impact your costs. Make sure you have the right size of inventory to prevent losses.

Another way to improve inventory accuracy is by using industrial scales like floor weighing scales. These weighing scale systems provide reliable and repeatable weighing of goods. This ensures precise billing and inventory records.

Implement scales like counting scales, warehouse scales, forklift scales, and bench scales in your facility.

6. Consolidate Shipments : When you ship your products, the shipping charges will depend on factors like weight and distance. One way to reduce your transportation costs is by consolidating shipments. In simple words, consolidating shipments means placing smaller packages into one big box. This will result in fewer trips, thus saving your money. Weight management is also important while packaging because the higher the weight, the higher the shipping cost. Hence, scales play an important role in consolidating shipments. Use industrial scales like floor weighing scales to weigh consolidated shipments. Accurate weighing means you will be charged accurately for all your shipments. This is one of the most effective freight cost reduction ideas.

7. Provide Transparency : Increasing supply chain transparency will build trust with your customers and stakeholders. You get better visibility in all aspects of the supply chain, which will enable you to drive improvements. You will also be able to react faster if any problem occurs. And when you react to problems before they get worse, you will save money. Imagine how much you could lose just because you couldn't spot a problem at the right time! Implement tools like warehouse and inventory management and logistics management software and apps. These tools won't just save money but also enable you to plan your operations efficiently.

Let's Wrap Up : It is possible to cut down logistics costs by making some tweaks in the logistics processes. The right tools and technologies like industrial weighing scales will save you money. Identify the areas where you can make the necessary changes and implement them. This article is authored by Kevin Hill. He is the content editor and online marketing manager at Quality Scales Unlimited. Kevin combines his technical knowledge with content marketing in creative ways to give Quality Scales Unlimited a competitive edge.

Source: logisticsinsider.in

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DIGITAL INDIA NOW A WAY OF LIFE, SAYS MODI

Our local tech solutions have the potential to go global, he says.

Digital India mission, launched five years ago, was not being seen as any regular government initiative and had now become a way of life, especially for the poor and marginalised and those in the government, Prime Minister Narendra Modi said on Thursday. He asserted that 'technology first' was their governance model.

"India is uniquely positioned to leap ahead in the information era. We have the best minds as well as the biggest market. Our local tech solutions have the potential to go global... It is time for tech solutions that are designed in India but deployed for the world," he said in a virtual address to Bengaluru Tech Summit 2020.

Addressing the summit, Australian Prime Minister Scott Morrison said India and Australia have unlimited possibilities of working together in space research, critical minerals, 5G, Artificial Intelligence, quantum computing and much more.

Mr. Modi claimed that at the peak of the **COVID-19 (coronavirus)** lockdown, it was technology that ensured that the poor received proper and quick assistance. "It is technology that gave confidence that we could vaccinate our large population in a short period of time. Technology has also played a vital role in the success of world's largest healthcare scheme **Ayushman Bharat**", he said.

Talking of the government's **Swamitva scheme**, he observed that it was an ambitious scheme to give land titles to millions of people in rural areas and would be achieved through technology like drones. "This will not only bring to an end many disputes but will also empower people. Once property rights are given, technology solutions can ensure prosperity."

Cybersecurity solutions :

With rapid increase of tech use, data protection as well as cybersecurity became very important, the Prime Minister pointed out. He called on the youth to play a big role in devising robust cybersecurity solutions which, he noted, could effectively "vaccinate digital products against cyber attacks and viruses."

He said, "We are in the middle of information era and change was 'disruptive and big'. Achievements of the industrial era are in the rear view mirror, and now, we are in the middle of information era. Future is coming sooner than anticipated." The government had taken measures to ease the compliance burden on the IT industry.

Highlighting the differences between the industrial age and the information age, he said that in the information era, the first mover did not matter; the best mover did, and "anyone can make a product any time that disrupts all existing equations of the market." In the industrial era, boundaries mattered but the information era was "all about going beyond boundaries."

Technology was also setting the pace for the defence sector to evolve, Mr. Modi said adding that from software to drones to UAVs, technology was redefining the defence sector.

India-Australia partnership

Mr. Morrison said they would soon launch the Australia-India cyber and critical technologies partnership grant programme. "The relationship between India and Australia is going from strength to strength; we share a deep desire to succeed and see our region prosper in peace and safety, as ultimately that is all our technology ambition is all about, the prosperity and safety of us all".

The two countries were working together for an open, free, safe and secure Internet. They have signed the landmark Australia-India Technology Framework on cyber and cyber-enabled technology, Mr. Morrison stated.

Australia believed that technology held the key to new science, medical research, reduction of carbon emission and tackling of global climate change, and it was now at the forefront of foreign policy, security and defence. "It is pushing us to new frontiers in civil liberties and law, in data privacy and protection. That is why the countries like Australia and India are coming together to work on the new technology challenges and opportunities," Mr. Morrison added.

Source: The Hindu

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AN INDUSTRIAL MANUFACTURER BLENDS DEDICATED FLEETS AND COMMON CARRIERS TO BALANCE FREIGHT MARKET INSTABILITY

A driver shortage and increased federal regulations make it increasingly difficult for companies to deliver products on time. With instability in the freight market, one global industrial manufacturing company looked to Chainalytics to help them create an optimal transportation strategy that balanced contract carriers and dedicated fleets to improve service and reduce costs.

The freight capacity market is always fluctuating. A driver shortage, increased shipping volumes, or lower margins can tighten capacity and impact a company's ability to meet its service goals. To offset freight market swings and eliminate margin pressure, many companies choose to employ a dedicated fleet. Dedicated fleets guarantee a predetermined number of trucks and drivers every week on a particular lane of service, regardless of market conditions. While many firms employ dedicated carriers to manage the supply imbalance, others use them to gain control of their service levels or to ship unique products that require specialized equipment. Today, most large companies have some form of dedicated or private fleet, even if it is limited to a particular region or product.

Evaluating Capacity Across Divisional Lines

Chainalytics understands that an optimal transportation strategy includes evaluating all transportation modes and carriers, including the evaluation of a private fleet. When done correctly, companies can reduce the impact of market fluctuations due to capacity shortfalls or driver shortages.

Chainalytics recently helped one such company evaluate their logistics network. A

global industrial manufacturer with three divisions across North and Latin America engaged us to help optimize their transportation network and evaluate their for-hire and dedicated fleet. The company had found success employing a dedicated fleet in the US and believed there were opportunities to improve global transportation operations through dedicated capacity. Convinced a dedicated fleet would improve service and reduce costs, the company sought Chainalytics' help to evaluate carriage options and identify the potential cost savings associated within each division.

Our Methodology

Providing expert talent, proven methodologies, and investment-grade modeling tools, Chainalytics' transportation mode and fleet analysis allows each client to evaluate their existing operations, factor in ever-increasing service demands, and design a high performance transportation network to improve competitiveness. This service combines Chainalytics' deep domain expertise with powerful advanced decision sciences technology to formulate an improved transportation strategy that optimizes modal mix, fleet size, territory alignment, and equipment mix. Using our unbiased approach, we identify the optimal transportation operations to help our clients reduce overall costs, take advantage of mode shifts or consolidation strategies, optimize dedicated and common carriers, plan for seasonality, and improve overall load efficiency.

Creating the Optimal Transportation Plan Requires a Unique Strategy

Chainalytics worked with key stakeholders, teammates, and supplier partners to understand the company's logistics challenges and create a versatile fleet management strategy that optimized resources, reduced costs, and improved service levels.

Initially, Chainalytics helped the client build a baseline transportation model to identify strategies that would reduce overall costs and maintain targeted service levels. Once this was in place, we helped the client evaluate dedicated, common carriers, and private fleet alternatives. By introducing a proxy fleet, the client could consider the optimal size, lane-specific routes, and domicile locations of a dedicated fleet. Where a dedicated fleet was determined to be optimal, we helped the client decide which lanes could most benefit from freight consolidation and reduced empty miles. As a course, the client was also able to evaluate fleet synergies across all of their global divisions to increase asset utilization.

Using this transportation model the client realized they were misaligned on how they were deploying their current dedicated fleet. In addition, they realized the 28 different types of delivery vehicles they currently deployed minimized their ability to capitalize on continuous moves and return lane optimization. By eliminating some specialized equipment, the company could open up more capacity for shared trailer pulls and enhance the advantages of a dedicated fleet.

It became clear that one strategy across each division would not work. Using phantom models to analyze optimal fleet sizes, we created a plan that would save one division millions annually through dedicated operations. Chainalytics' analysis proved this strategy would not work across all divisions. The company's Latin American division would only reap a dedicated capacity benefit on less than 2% of its lanes. As the company saw potential for a dedicated fleet where it had large dry-van short-haul shipments, we worked with the company to establish target rates and

optimal lane strategies.

Dry Van Long-Haul Primed for Dedicated Carriers

Chainalytics helped the manufacturer create a transportation strategy that factored country-specific constraints as well as implemented best practices for managing relationships, routes, and equipment. Overall, the fleet optimization analysis identified a potential of \$7.6 to \$10.7 million in annual transportation cost savings. The Chainalytics team helped the company to exceed its goals, as explained here by the company's head of procurement:

We selected to go with Chainalytics after a thorough bidding process for our transportation optimization project that encompassed all our business units in both the U.S. and Mexico. Although the project was very complex as it entailed different types of specialized equipment that needed optimization, the expertise and the resources that Chainalytics used made a great difference to the results of the project as in a matter of a couple of months, they were able to meticulously analyze our information and came up with an optimal scenario that yielded interesting savings to our bottom-line. We wouldn't have been able to achieve these results without Chainalytics as again their analysis and expertise were second to none. The Chainalytics team was always open to work at our pace and to generate the least amount of disruption from our day to day chores. Kudos to the Chainalytics team.

The company plans to establish stronger relationships with partners and roll out their new strategy with confidence. Through improved freight relationships and streamlined best practice contracts, the company will more optimally tender loads, leverage volume, and reduce partner mileage penalties.

Source: www.chainalytics.com





VUCA – THE BASICS OF DYNAMIC GLOBAL MINDSET

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Introduction : Throughout the past decades, we find numerous terms in the popular business and social world that refer to an increasing inability to grasp the world and deal with the things happening around us. Examples include uncertainty, turbulence, rapid change, dynamism, disruption, complexity, hyper-competition, high-velocity markets and flux. For a couple of years, the notion of “VUCA” is gaining popularity as a term to cover the various dimensions of this ‘uncontrollable’ environment. Do you aware what the VUCA means?

History of VUCA : VUCA is an acronym – first used in 1987, to describe or to reflect on the accelerating rate of change (volatility), the lack of predictability (uncertainty), the interconnectedness, of cause-and-effect forces (complexity) and the strong potential for misreads (ambiguity) of general conditions and situations. Thereafter, VUCA was coined by the U.S. Army in the 1990s to describe the post-Cold War world.

The deeper meaning of each element of VUCA helps to foresee the behaviour of groups or individuals in organizations. It explains systemic failures and behavioural failures, which are characteristic of organisational failure.

- V = Volatility reflects the nature and dynamics of change, the speed and turbulence of change.
- U = Uncertainty means the lack of predictability, the prospects for surprise, and the sense of awareness and understanding of issues and events.
- C = Complexity indicates the multiplex of forces and vastness of interdependencies in globally connected economies and societies.
- A = Ambiguity conveys the multitude of options and potential outcomes resulting from them.

The idea of VUCA has since been embraced by leaders in all sectors of society to describe the nature of the world in which they operate. The particular meaning and relevance of VUCA often relate to how people view the conditions under which they make decisions, plan forward, manage risks, foster change and solve problems. In general, the premises of VUCA tend to shape an organization's capacity to:

1. Anticipate the Issues that Shape
2. Understand the Consequences of Issues and Actions
3. Appreciate the Interdependence of Variables
4. Prepare for Alternative Realities and Challenges

5. Interpret and Address Relevant Opportunities

For most organizations – a business, the military, education, government and others – VUCA is a practical code for awareness and readiness. Beyond the simple acronym is a body of knowledge that deals with learning models for VUCA preparedness, anticipation, evolution and intervention.

However, VUCA types of factors are not new. They have always been integral to scenario planning and in PESTLE analysis (Political, Economic, Social, Technological, Legal and Environmental) of the external environment in issue management.

Volatility : Volatility is the “V” component of VUCA. It refers to the speed of the change in an industry, market or the world. It is associated with fluctuations in demand and turbulence in the market. The more volatile the world is, the more and faster things change. Everybody is aware of the same, but the question is what leads to such volatility in the demand even though markets/buyers/people/socio-economic conditions are almost same which were there while such marketing plan/production plan/social plan designed by an organization/company/society or Government?

It is due to the tendency of human which acts differently in different situations. People respond differently to different social or environmental situations. The same way people perceive such acts differently and respond differently which generates Volatility. The dynamics can change due to any shift in a situation, whether it is social, technical, biological or anything of the like.

Let's understand Volatility at the personal level. So, what does volatility look like in your life? I am giving my real-life example. I went to work with a well-thought-out list of ten things which I had to accomplish. The emails and phone calls I received prior finishing my first cup of tea that morning were so urgent and so unconnected, yet influential on each other, that I struggled to find five minutes to eat “lunch” and had to seat late night in the office. When I left my office near 09.00 pm, I had accomplished no tasks accomplished from the list I made and accumulated 5 additional ones. Volatility can leave us feeling overwhelmed, alone, and utterly unprepared to lead effectively. In today's economy, that makes your volatility as severe as mine.

Characteristics : Relatively unstable change. The challenge is unexpected and may be of unknown duration, but it is not necessarily hard to understand; knowledge about it is often available.

Business example : Prices fluctuate after a natural disaster, such as when a fire, high water tide or drought affect the entire supply chain.

Business approach : Conduct risk analysis, build in spare capacity and allocate resources to preparedness – for instance, stockpile inventory or overbuy talent. These steps are typically costly and therefore management should only commit where the cost is justified by the downside.

Uncertainty : Uncertainty is the “U” component of VUCA. Uncertainty is a grey area when the availability or predictability of information in events is unknown. Uncertainty often occurs in volatile environments that are complex in structure involving unanticipated interactions that are significant in uncertainty. It happens when people don’t have clear information and their predictions are based on assumptions and opinions. It is also known as social categorization and it may be for gender (A Nurse always assumed as female and not male) and race (A Basketball player assumed to be black and golf player assumed to be white due origination and popularity of the particular game in particular region/race). But, in reality, is not the case, it is just a lack of proper information which leads to assumption and its outcome is uncertain.

Such uncertainty hinders our ability to conceptualize the threats and challenges facing the organizations we lead. A typical mistake during uncertainty is we thought we had a lot more time than we actually have and mitigation plan fails due to the same.

It is human nature to see every challenge as something similar to what we’ve encountered before. That’s how our brains work and for good reason; if we had to assess every situation as the novel we wouldn’t be as efficient as we need to be. However, relying too heavily on them might lead to the faulty assumption that yesterday’s solution to a seemingly similar challenge today is appropriate.

Characteristics : Lack of knowledge. Nevertheless, the situation’s basic cause and effect are known.

Business example : A competitor’s expected product launch can change the future of the business and the market.

Business approach : Increase business intelligence activities. Collect, interpret and share relevant information. Engage in serious boundary-spanning collaboration.

Complexity : Complexity is the “C” component of VUCA **framework** that refers to the number of factors that needs to take into account, their variety and the relationships between them. The more factors, the greater their variety and the more they are interconnected, the more complex an environment is. Under high complexity, it is impossible to fully analyse the environment and come to rational conclusions. The more complex the world is, the harder it is to analyse.

Complexity refers to the conditions which demand a perspective to analyse the situation as a whole and beyond the viewing threats and opportunities as a

collectively and interactively. It required joint efforts of entire organizational infrastructure and outside environment to get the desired outcomes. In complex environments, actions and results are interlinked and affect each other that required a detailed action plan and work allocation. It is like Rubik’s cube, wherein if you focus on a single colour and single side to match all yellow colours squares on one side, you cannot solve the same forever. One has to see all aspects and dimensions at the same time to solve the same.

Complexity can leave us frustrated, feeling solely responsible for success or failure, while at the same time feeling alive in the critical moment.

Characteristics : Complexity variables are the easiest of the 4 factors to understand, but managers or leaders can’t know what they don’t know, which compounds the complexity of the situation. Managers may know the likely outcomes but not the unintended consequences of complexity factors. For instance, writing a new computer code may open up the further complexity of unforeseen security risks. Some information is available or can be predicted, but the volume or nature of it can be overwhelming.

Business example : The company operates in many countries, each of which has its own regulatory environment, tariffs and cultural values.

Business approach : Restructure, bring in or develop specialists and increase resources adequate to address the complexity.

Ambiguity : A lack of clarity to interpret something is called Ambiguity. A piece of incomplete information which sounds contradicting or too inaccurate to draw clear conclusions leads to an ambiguous situation. It is also called as vagueness in ideas. The more ambiguous the world is, the harder it is to interpret.

Ambiguity is the “A” component of VUCA. Ambiguity is different than Uncertainty, however many people cannot differentiate both clearly. Uncertainty is when relevant information is unavailable and unknown, and ambiguity where relevant information is available but the overall meaning is still unknown.

Ambiguity provokes one to assume answers based on available information and complete the link. For example, unless a person is open about their own sexual orientation, people will automatically assume that they are heterosexual. But if a man possesses feminine qualities or a female possesses masculine qualities then they might be portrayed as either gay or lesbian. Ambiguity leads to the categorization of people without further important details that could lead to untrue conclusions.

Ambiguity cannot diagnose from a single perspective and cause inability to accurately conceptualize threats and opportunities before they become lethal.

Leaders must provide clarity so that work assignments and goals are not as ambiguous as the environment. Ambiguity doesn’t paralyze workers; it makes them insecure and stirs them up. Competent employees, when faced with ambiguity, will do what they are most

comfortable doing in order to feel as if they are contributing something appropriate. Doing something, whether it's helpful or not, makes us feel good. A leader must provide clear direction and synchronize the efforts of others while continually communicating any adjustments.

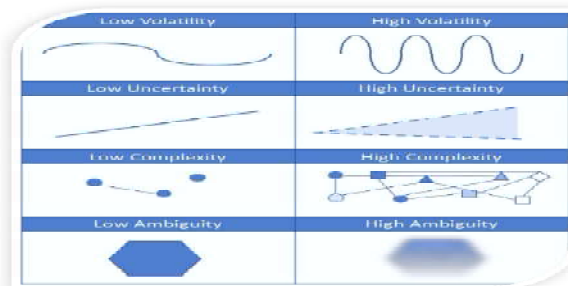
On a positive note, ambiguity boosts learning opportunities and employees become more vigilant, active and efficient.

Characteristics : Causal relationships are completely unclear. No precedents exist; management faces "unknown unknowns."

Business example : The company decides to move into developing markets or to launch new types of products that are outside its previous experience.

Business approach : Companies need to be prepared to take on risk, perhaps initially in trial markets, to evaluate outcomes. Lessons learnt can be applied progressively over time to other markets.

All 4 elements details : We have understood all 4 terms individually along with what measures are required in the individual condition. But, the division in the individual element is just for the sake of understanding the concept. In practice, the four terms are inter-related and shall be considered and applied at the same time. The more complex and volatile an industry is, the harder to predict and therefore more uncertain it will be that creates more ambiguity. Yet, all four represent distinct elements that make our environment - the world, a market, an industry – which is difficult to understand and to deal with. The distinct nature of these four elements can be further clarified by visualizing them:



Although the leadership challenges in an increasingly VUCA world are significant, they're not impossible to achieve for those who are willing to look beyond old thinking and approaches. Here's some pragmatic guidance to craft a strategy:

VUCA doesn't mean that everything is unpredictable. Following are the major predictions in the VUCA world to be taken care of by all leaders.

- **Urban concentrations:** Population concentration in the cities is the trend of the last century and the same will continue to increase in this century as well. Developing world's big cities are growing at a very fast pace whereas the developed world's largest cities are already developed and no more scope of development. Hence, by mid of the century, most of the top 10 mega-cities in the world

will be in the developing world. With urbanization generally come longer life expectancies, lower birth rates, and greater economic prospects.

- **Climate changes:** While the debate continues over the exact timing and consequences of climate change, but the truth is human activity has already started altering the climate. We are already witnessing rising sea levels, extreme weather conditions and natural calamities, raining and water resources are depleting and agricultural production will be less reliable.
- **Demographic shifts:** Globally, the North and West are getting older, and the greatest concentrations of youth will be in the South and East. Tensions are likely to rise as the bulk of economic wealth and opportunity remain beyond the reach of many people.
- **Technology advances:** 21st Century is indeed the era of Technology and with the inventions of Artificial Intelligence (AI), Internet of Things (IoT), Industry 4.0, Smart Factories, we will be ever-more connected by devices that are smaller, faster, and less expensive. Hence this era would be surely of Technology disruption.

Conclusion : Thus, we live in a VUCA world wherein Business has a very challenging landscape wherein

- 1) Technology is changing at a pace which was there never before i.e. Rise of Android OS fails the Cell phone giant Nokia who stitches to Symbian OS and later on shifted to Window OS, but measurably failed. Rise of AI, IoT and Industry 4.0 has changed all rules of the games.
- 2) Redefining Business models i.e. AirBNB is the largest hotel providing company without owning any property and Uber is the largest taxi provider without owning a single taxi at a global level. Such out of box ideas and their implementation may help to stand your company growing in this VUCA world.
- 3) Change in the perspective to measure the value of the product i.e. Customer's conscience has been shifted from cost-effective value for money family cars to luxurious premium sedans and SUVs.
- 4) Cutting Edge innovation: More and more players are coming with innovative technology and solutions by changing the complete span and horizons of the particular sector. The automotive sector has never thought of the launch of "Cybertruck" by Elon Musk's Tesla which has started a very new competition of innovation with a premium tag.

VUCA can be conquered with VUCA only. Confused?

Volatility, Uncertainty, Complexity and Ambiguity can be conquered with Vision, Understanding, Courage and Adaptability.

What's your VUCA (Vision, Understanding, Courage and Adaptability) to conquer the VUCA world?

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DIGITIZATION “A KEY TO SUCCESS IN SUPPLY CHAIN MANAGEMENT”

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Supply Chain is typically seen as a cost center. Digitization allows for a paradigm shift making supply chains a differentiator and a strategic pillar of new business models.

Digitization can enhance the customer experience, improve efficiencies by eliminating manual processes, and foster new operating or business models. The supply chain exists to streamline the processes involved in procurement and as a way of increasing efficiencies business-wide. Not only will efficiency remain at the heart of the supply chain, but with digitalization enabling high levels of connectivity, we'll see greater transparency and collaboration across different departments. In addition to ensuring the security of valuable information assets, companies also have the challenge of achieving an appropriate level of sustainability, while pioneering and advancing the digital supply chain overall.

One way to reduce costs is through a digital supply chain platform. The digitization of data and the application of collaboration, automation, and analytics technology presents the opportunity to drive business value throughout the global supply chain. A digital supply chain will help to reduce risk, improve agility, and reduce costs in many areas of company's operation. According to IDC estimates, by 2020, digitally-mature companies will achieve \$430 billion in productivity gains.

In Today's price competitive market, every company tries to keep their cost at minimum level by optimizing inventory levels to ensure more full-price sales. Digitization eliminates barriers to supply chain productivity by application of digital capabilities to processes, products, and assets to improve efficiency, enhance customer value, manage risk, and uncover new monetization opportunities.

Benefits of digital transformation supply chain management

There are many benefits as companies digitize their supply chain processes with modern SCM systems. Below are main of them

Ø **just-in-time' Techniques** : Just-in-time (JIT) becomes accessible. JIT manufacturing has been a cornerstone of a few vast enterprises for decades, but the technology backing it was inaccessibly expensive. Now, every enterprise can enjoy a digital supply chain that ensures that critical decisions and deliveries are pushed to the last minute. Doing so optimizes decision making and saves costs.

Just-in-time (JIT) especially in Fashion/Fabrics industry, fashion brands can postpone critical decisions on style adoption, product quantities, etc., until the last possible

minute — allowing them to design styles much closer to final delivery date and to take advantage of the latest trends.

- Ø **Improve cash flow** : With lower lead times and a JIT approach a digital supply chain reduces capital requirements and improves cash flow as less money is tied up in keeping excess stock in a warehouse. Supply chain data becomes accessible. The faster the supply chain moves, the less capital is tied up in the supply chain — a crucial benefit of digitizing your supply chain management processes. Cost of working capital will substantially reduce mainly due to timely delivery of products and it turns to speedy recovery from customer.
- Ø **Optimize supply chain lead times** : These include factors such as the lead time for raw materials, reserving production capacity to ensure factory availability at the right time, and distribution planning.
- Ø **Enable a demand-driven supply chain** : A demand-driven supply chain is the crux of supply chain management; without a digital system, though, it's impossible. Digitization allows companies to adjust products in the supply chain based upon demand for those products using real-time sales information, allowing them to accelerate production of best-sellers.
- Ø **Out of Stock** : Supply chains become forward-looking. Instead of operating on a reactive basis, digital supply chains allow companies to predict future requirements as more data is collected, analyzed, shared and eliminate supply chain glitches. Products that are out of stock implies a loss in revenue for a business. A digital supply chain can ensure that your company never runs out of stock, nor orders too much stock — which eventually leads to high discounting. Further, adopting JIT techniques, optimizing lead times and responding to consumer demand greatly increase the likelihood that companies can have the right product mix and to attract consumers helping in minimizing markdowns and out-of-stocks. Mark downs are dollar-for-dollar profit reducers, while out-of-stocks result in missed sales altogether.

Conclusion : Supply chains involve multiple parties that need to interact on a frequent basis. Smoothing out these interactions is the predominant goal of a digital supply chain. A digital supply chain can eliminate manual processes and instead connect enterprise digital systems into a single, fluent communications channel. Needless to say that a cost effective digital supply chain serves as a key to success in supply chain management.

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INTEGRATING WMS WITH PRODUCTION PLANNING AND SCHEDULING

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Introduction : In supply chain and manufacturing, space and time are expenses. There's one point where products stop & move, and they consume both, that's where warehouse lies in a supply chain.

Optimising operations in warehouse and using it to trigger & control manufacturing at preceding stations could be a powerful step to control OTiF and stocks. This could work better with a WMS setup installed and possibly even include changeover intervals.



Elements of a supply chain: Efficiency of a Supply Chain is highly dependent on its product distribution, space utilisation and overall flow within the system. Warehousing has been in around since long. It dates back to centuries before where they were used to store grains and elementally has been evolving over ages.

By 2006, as SaaS (Software-as-a-Service) platforms developed the management of warehouses & distribution centres in software via cloud, ERPs, Warehouse Management Systems.

A Warehouse Management System software tracks inventory, stores data, monitors inbound and outbound shipping, picking etc... With data collected a WMS generates reports of picklist for purchase orders, inventory or stock data, aging reports, daily dispatch reports and more. These reports are primarily used for Planning, Scheduling picks & picklists, Staffing and Reporting. Use of WMS has had a profound impact on Supply Chain functionalities by providing milestones, providing reports & performance analysis helping teams solve problems in timely way.

But that's about WMS and its benefits, going back to the concern over time and space, an integrated platform of WMS and use of models on scheduling can further optimise space requirements and project changeovers and quantity per lot at preceding operations as per stock levels.

The objective of this paper is to explore potential in integrating WMS with production planning and scheduling. As for models in use, we're using EPEI (Every part every interval),

Changeover frequencies and Re-order Levels to optimise the Stock Quantity, Runner/repeater models and potentially even raise tickets. Integration of these models to WMS Software would help companies control their inventory while keeping substantial measures for delivery and plan changeovers in advance.

Functions of the models in use:

- **Re-order Level:** To identify the minimum stock quantity that can be kept for a particular SKU and its consumption in association to other SKUs. At re-order level of stock WMS will notify admin of replenishment order.
- **EPEI:** Is a model to identify optimum run quantities post one changeover. In our case, the EPEI model will identify the same for the preceding operation and further be used to optimise the number of changeovers at the station.
- **A, B, C Class:** The classification of SKUs as per their consumption rate. The part with 60% of demand being runner, 20% repeater & 20% stranger. For an overall stock level of (say) 15 days, runner will hold 10 days of stock, repeated of 15 days & stranger of 30 days. The same principle to be used for guiding changeover frequencies of respective SKUs.

1. Flow of materials and information:

Depicted below is a map of material flow within a system of WMS installed at a glass factory:



Glass RM > Glass Factory > Furnace > Annealing > Barcoding > Warehouse > Pick & scan > Process & pack > Ship to PD

The preceding operation here is of a furnace. Change of mould is taken as changeover, and the annealed glass from furnace is stored (SFG) for a month. This curing period is given so that sorting team can identify and remove broken glasses which would appear normal in the heated state.

This one-month period gets tricky to manage for every bundle stored and hence its likely or suggested that they have a WMS which identifies & stores information of each bundles separately and allocates point of storage and date of forming/spinning in furnace.

Basic process flow of WMS:

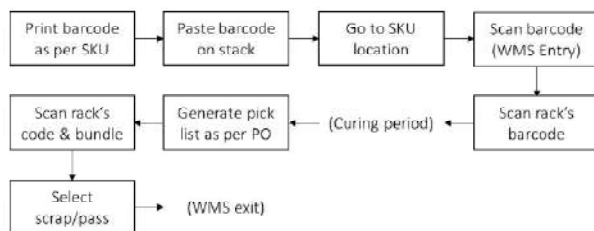
WMS comes in demand when the inflow and outflow of material from a warehouse becomes difficult through spreadsheets. A WMS usually receives orders from an overlying host (ERP) and acts as a bridge between the physical warehouse and ERP itself. Data is transferred to ERP via push/pull or export to other documents.

Having a complete warehouse management solution could help the company with many minor/secondary functions like receiving, inspection & acceptance (keeping record of rejects), put-away, internal replenishments, pick positions, order assembly on shipping dock, documentations (Purchase & Sales Order, Dispatch documents) and shipping.

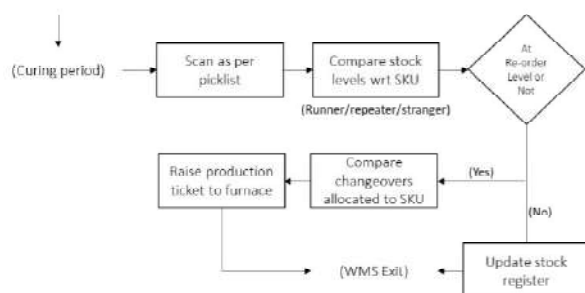
And a basic WMS could serve the major functions like tracking storage and retrieval of goods in the physical warehouse.

Many means could be adopted for tracking the same. There are companies adopting RFID tags which automatically feed data into the software as goods pass through the gates, then there are companies that use barcode which demands a stop at entry and exit points to scan these goods being passed to next station.

Irrespective of technology adopted and the complexity of software, the generic flow of the WMS remains the same and that's more or less the same as shown below. Rest of the options are served from what happens at the backend in the software –



Back end bit of activity will be like block figure below, that shows interaction of WMS with EPEI in either of suites installed:



A WMS software could either be a standalone software or a part of ERP Installed with the company. If its ERP or some part of supply chain suite, we get two benefits over standalone, one being directly able to pull other data and keeping all models dynamic. And other benefit

of not having to update manually to the other standalone softwares that the company already has or incorporates as they move forward.

In case of a standalone type, the software will need to be pre-fed with SKU category, replenishment level and programmed with maximum changeovers possible in the system. It also should be able to select the appropriate sequence of changeover from matrix.

2. Variables in use & calculations:

To ensure the quantity stored in warehouse is optimised, we're following trigger mechanisms to raise production orders to preceding station and to understand when to trigger these tickets to preceding stations we're using the models that were defined earlier.

Now, let's understand how to arrive at these numbers of available changeovers and economic production quantities per run and re-order levels as per SKUs.

Step 1: List down all parts to be stored in warehouse with their sales quantity over (say) last 6 month/put the demand forecasted for (say) next 3 months

The interval taken is only indicating acceptable range, overall the objective is only to understand the volume of storage quantity required per SKU, and with an estimate of lead time from furnace to be used under replenishment stage.

Estimate using arbitrary figures:

SNo.	Part Name ()	Demand Months Pcs	Conversion ratio Wt	Demand Month	Vol %	SKU Type
1	AR125	672048	0.45	100807	29%	A
2	BM240	612000	0.45	91800	27%	A
3	CR5120	551040	0.24	41323	13%	B
4	...	576000	0.13	24960	7%	B
5	...	207000	0.24	16560	5%	B
6	...	156024	0.175	9101	3%	C
7	...	9900	0.5	1650	0%	C
8	...	144000	0.4	19200	6%	C
9	...	299448	0.17	16969	5%	C
10	IR400	299448	0.17	16969	5%	C

Total storage quantity required (for AR125):

Lead time: 18 Hours + 1 day = 42 hours Consumption/day: 3360 Kg/day

Re-order Level: Lead time consumption + Safety Stock = 5880 + 500 = 6380 Kgs

**Re-order level can also be set as per Kanban calculations provided EPQ is calculated. No of bins = Lead time consumption (LTC) ÷ Economic production

quantity (EPQ)

If 2 Bins, Bin Quantity = Roundup ((LTC-EPQ) ÷ Pack Size), 0) * Pack Size
If N Bins, Bin Quantity = EPQ

Step 2: Estimate the total available changeovers for the set demand and calculate the available time

Once the above calculation is done, we know the replenishment level. Now, to limit the number of changeovers we need to identify interval between two changeovers. The total available changeovers are to be estimated based on EPEI model:

EPEI example:

SNo.	Part Name ()	Changeover time
1	AR125	33
2	BM240	34
3	CRS120	33

$EPEI = (\text{Sum of total changeover time/day}) \div (\text{Available time for changeovers/day}) = 100/75 = 1.33 \text{ Days}$

This number indicates the minimum period between two changeovers. And total available time for changeovers is directly derived with amount of time available after supplying to demand and accounting to some percentages for breakdown and management losses.

But this amount of quantity produced during 1.33 days may not supply to complete order, if that be the case. Another step is added to prevent short supply of part.

Step 3: Categorise the parts to runner repeater strangers to allocate the scheduling bucket allowed i.e., (If Runner 10 days, Repeater 15 Days, Stranger 30 Days)

Now once we know the materials that are at re-order levels and minimum amount to be run for minimum demanded uptime, we need to further understand whether the taken quantity is sufficient to the orders already placed by customer.

That means output of required quantity will be larger number calculated from Step 2 & Step 3.

Let's take the following container plan sheet to understand how the orders will be allocated for production sequence –

Part Description			Orders				
SNo.	Part Name ()	Category	Week 1	Week 2	Week 3	Week 4	Week 5
1	AR125	Runner			1		1
2	BM240	Runner		1	1		
3	CRS120	Repeater	1			1	
4	..	Repeater		1			
5	..	Repeater					
6	..	Stranger		1			1
7	..	Stranger					

Which material to be taken into production, for that WMS will be interacting with the container plan sheet or the sales order sheet directly to prioritize the production sequence.

Here, the shaded region indicates the articles that could be taken into planning, and by following the model as per runner repeater & stranger sequence as shown above, we're ensuring that we're taking inventory batch size as per part category.

Here, for ex. though replenishment levels have reached for article 1 & 2, order will be triggered for 3rd first and then 4th and 6th. Post which in next cycle, order will be triggered for 2nd and then 1st in the next cycle.

**Strangers do not have replenishment levels, hence it'll be taken directly if order is within 30 days.

Step 4: Use the data to simulate the actual production possible and prepare MPS

The above steps will give us the production sequence for replenishments and compares the order quantity to customer orders placed. Also, EPEI ensures, that changeover request is not raised for shorter run time than required run.

EPEI is not integrated to re-order level to keep it dynamic on monthly demands.

4th step is manual intervention by us, where we simulate and project the actual production quantity for week/month and re-order the sequence. It may depend on any urgent order you may need to process sooner or a trial that needs to be conducted...

Note: For a better estimate at the production quantity that's possible, we'll need to first prepare a changeover matrix too, that indicates the changeover time between two arbitrary parts. The need of such a step is possibility on difference in changeover times for "A part" to "B part" and "A part" to "C part".

3. Conclusion:

Integrating WMS for management of inward / outward and to reduce search time of articles is done by many groups. The initiative is mostly taken forward because of having to manage a large sized warehouse or number of SKUs or mismatch found in stock taking activity lead by accounts. But, then again, warehouse being a powerful and costly element in supply chain it has to be used for planning and scheduling bit.

Integrating the above models or other models with EPQ itself could help us achieve beyond the original problem of over flowing stocks which is more often overlooked while going for WMS.

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EXECUTIVE HEALTH

SALT COULD BE COMPROMISING YOUR IMMUNE SYSTEM

WELLNESS EDITOR

Are you always reaching for the salt shaker at mealtime? Do you eat fast food or processed food? Do you eat out? If you answered yes, then you are likely one of the 90% of Americans who consume too much salt in their diet. 90% of us! So that's most of us. But at Wellness we're concerned about this because new research shows that while those delicious crystals might ramp up the flavor, they can have an extremely detrimental effect on the immune system. We're sharing the truth about salt today to help you stay safe.

How Much Salt is Too Much Salt?

Most of us are overdoing it with salt (sodium chloride). In fact, the American Heart Association (AHA) says that 9 out of 10 Americans consume well over the recommended daily intake almost every single day. The thing is that it seems so innocuous, right? It makes the food taste better and how could something so small have such a big impact? But it really does and the impact is a little shocking.

Salt Intake Recommendations : The Department of Health and Human Services (DHS) puts out dietary guidelines on this very important issue precisely because of the system-wide impact that our salt intake has. They recommend eating no more than 2,300 mg of sodium per day. That's about the amount of plain salt that fits into a level teaspoon. But most people consume around twice that amount every day.

This recommendation is important for a number of reasons. First, there is evidence that excess salt can raise blood pressure. Which most people handily ignore but hypertension directly contributes to our risk for stroke and heart disease.

New Research on Salt and the Immune System :

As if that weren't enough, new research published in Science Translational Medicine also suggests that too much salt can have a harmful effect on the immune system. The research indicates that salt inhibits the body's ability to destroy bacteria within organs, which could make it harder to fight off infection. Another study from the University Hospital of Bonn in Germany revealed a similar conclusion. Researchers worked with mice who had active E. coli infections of the kidney, feeding them a high-sodium diet. Immune response to the infection was significantly worse in comparison to healthy mice who ate just enough salt.

To find out whether these results were just a local effect on the kidneys, researchers also infected the mice with Listeria. They discovered that the full-body infection also worsened when the animals took in too much salt. Study leaders were surprised since earlier research indicated that excess salt actually resulted in faster healing for laboratory mice infected with skin parasites. Previous studies showed that macrophages (immune cells that attack and eat parasites) were highly active in the presence of salt. This led to the conclusion that salt has an immune-enhancing effect, but this new research calls that broad assumption into question. This is an important finding, but let's talk a bit about what it means.

Salt Intake and Immune Function in Humans :

Researchers at the University of Bonn didn't just test their theory on mice. They also confirmed their results in a human study. They put volunteers on a diet consisting of 6 g of additional salt on top of their regular daily intake. That's about the equivalent of giving participants two fast food meals every day. At the end of one week, the volunteers eating the extra salt had increased

levels of glucocorticoids. These naturally-occurring steroids have many functions, such as the inhibition of inflammation. They also help our bodies respond to stress, as well as process sugar and fat. Glucocorticoids are also known for their immunosuppressant properties.

In fact, a similar substance called cortisone is often used in medicine to treat certain health conditions, such as autoimmune arthritis. In addition to the raised glucocorticoid levels, scientists found something else. They extracted neutrophils from the blood of the participants and found that they were less effective at killing bacteria in the presence of a high salt diet.

While more research is needed to confirm these results, scientists are now speculating that reducing salt in our diets might help to fight bacterial infections. This may be especially important for anyone who is immunocompromised or suffering from chronic kidney infections. Salt intake has been questioned by leading doctors of nutrition for some time. But as the research catches up with observational studies, we're starting to see more and more that we all need to watch our salt intake more carefully, and for reasons far beyond what we previously believed.

Allergies May Help Us Avoid COVID-19 : Allergies can make breathing difficult, so it's safe to assume they might make upper respiratory infections even more severe. But if that's the case then why is it that allergy sufferers appear even less likely to experience extreme COVID-19 symptoms? The answer could be as simple as it is surprising.

Effects of Allergies on the Body : Allergies are the result of mistakes the immune system makes, flagging pollen or other particles as invaders and sending histamines to hold and attack them. According to Mayo Clinic, we can have these responses for several reasons, but the results all lead to increased risks for asthma, sinusitis, ear infections and, in some extreme cases, anaphylaxis.

The Asthma and Allergy Foundation of America adds that people in this risk group are more likely to suffer serious complications with the flu. People

who have both allergies and asthma may be at the highest risk. But, and this is the important thing to note: COVID-19 is nothing like the flu.

Allergies May Provide COVID-19 Protection : It would be reasonable to assume allergies make people more prone to all respiratory infections, but this may not always be the case. Studies have found that allergies can, for some people, lead to less severe symptoms when exposed to common-cold rhinoviruses. Though experts had struggled to pinpoint the reason. It turns out that rhinoviruses and coronaviruses have something in common: They use the same entry points into the body, and allergies can affect how those work.

Allergies and COVID-19 : A new article published in The Journal of Allergy and Clinical Immunology, which used the coronavirus that causes COVID-19 in its study, may have finally nailed the specifics. According to the findings, one of the effects of allergies is having reduced numbers of a type of cell receptor called ACE2. This lowered cell count makes the respiratory tract less vulnerable to this viral infection because the viral invaders in COVID-19 use ACE2 like a doorway into cells, so the fewer of these receptors an organ is expressing, the fewer places the virus has to get in.

Allergies are Not Guaranteed Protection Against COVID-19 : Having allergies may offer some protection against COVID-19 and a few other infections, but it can't prevent any of them. Having fewer ACE2 receptors isn't the same as having zero. The doorways are still available, even if there aren't as many of them—and it really only takes one. No one should assume immunity against this virus. Even those who have already had it.

Allergy sufferers might have some good news, but it's not time to celebrate quite yet. Until COVID-19 retires to a horse ranch somewhere, none of us can breathe easy. It's up to each of us to do our part to reduce the spread and save lives. By which we mean, please wear a mask and maintain social distance—let's all take care of each other.

Source: Wellness.com



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