Special Issue on Digital Supply Chain Management

Supply Chain 4.0-
The Next Generation Digital Supply Chain

IIMM Aurangabad Branch
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"MAT-SELECT-5" on theme -
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as on 18th June 2022 at Hotel Rama International.

*Lighting of Lamp by Dignitaries
- 5th Mat Select Program*

*Mr.H.K.Sharma National President of IIMM
Addressing to delegates of 5th Mat Select Program*

Mr. Vinayak Pol Executive Director Aurangabad
Electrical Ltd. A CIE Automotive Group Company
addressing to delegates

*Mr. Ramesh Gehaney Executive Director
COO Endurance Technologoies Ltd. Addressing to
audience of 5th Mat Select Program*

*A Souvenir Published by the Dignitaries during the
inauguration function of 5th Mat Select Program*

*Group Photo of Conference Committee with Guest
- 5th Mat Select Program*

From the Desk of Chief Editor & National President

Digital transformationsin Supply Chain is gaining momentum especially post Covid 19 Pandemic to face unexpected challenges. Supply Chain Managers are emphasizing more on developing resilient, agile, flexible and digitally integrated supply chain toreduce the cost, better coordination among buyers and sellers, real time tracking of the position of products to take corrective steps in case of any misadventure besides increased market share and to meet the rapidly changing consumer behaviors and market volatility.

A digital supply chain (DSC) helps shorten the product development cycle.It uses new technologies like Artificial Intelligence (AI), Predictive &Big Data Analytics, Block Chain, Cloud Computing, and Internet of Things (IOT)etc. to create a transparent, secure, and reliable supply chain system.These technologies bridge the gap between the digital and physical worlds thereby improving supply chain performance during abrupt and unexpected shifts in demand and supply trends.

It is imperative to note that, many of the supply chain players have started their journey of digitalizing the supply chain process, however, digitalization of supply chain is an expensive and complex process as it involves multiple stakeholders (big or small) across the supply chain and not everyone is well acquainted with such technologies nor has the financial capacity to digitalize the supply chain process. In India, many of such stakeholders are still using old conventional method of paper based documentation.

Business entities who are willing to digitalize their supply chains must focus on three key areas viz visibility across the supply chain to take preventive measures in case of deviation from pre-determined objectives, planning & execution of incorporation of technology which is suitable to existing supply chain process and determining the point of entry of that particular technology and collaboration between the business entity and other stakeholders involved in supply chain both within and outside the enterprise, is critical for increased agility and resilience.

While investing in the right technology is critical for supply-chain transformation, training of workforce with right skills and tools to extract more value out of the supply chain system is equally important for successful implementation of technology. Artificial Intelligence, Blockchain, Machine Learning, Big Data and IoT are believed to be future trends of digitalized supply chains to grasp the untapped potential of their existing capacity and achieve higher performance.

Disruptions like Covid 19 pandemic are no longer rare and unpredictable, moreover, high threat of natural disasters, political unrest and economic crises will continue, so enterprises should come hard at such surprises with better preparedness to mitigate such disruptions.

Now is the time for enterprises to assess their digital readiness and start investingor accelerating their investmentsin digital supply-chain transformation.

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MATERIALS MANAGEMENT REVIEW

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C O N T E N T S

IOT CONTRIBUTION IN SUPPLY CHAIN MANAGEMENT

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Each company defines performance in a different way based on specific indicators in line with its strategic perspectives and tactical structure. In order to enhance the Performance Indicators, companies tend towards the use of multiple Information Systems such as ERP, WMS, APS, TMS or other similar existing systems to keep their exploitation under control. Supply chain Management is the heart of the modern corporation. The Internet of Things (IoT) is a revolution in the field of Information and Communication Technologies (ICT), with the aim of extracting, transferring, storing, processing and sharing the necessary information at every logistics activity. In addition, it is important to automatically communicate and share each operation related to the logistics flows to the actors involved for a better collaboration and interoperability improvement in the Supply Chain. In this paper, we give an approach of the IoT use in the Supply Chain Management to ensure the convenience of its activities and that it is thus collaborative and communicative.

This paper concerns an approach for using the IoT in the logistics flows management to enhance performance indicators. Today, the logistics systems are identified as the core element of supply chain management, which requires improvements to existing operating practices. The importance of providing continuous traceability in the supply chain has made it difficult to identify, track and control the flows in the chain in Real Time, knowing that the SC is a complex environment where reactive decisions must be made following the occurrence of uncertain events. Therefore, The IoTs offer a new approach to collect, transfer, store and share information. So, the Supply Chain brings with better collaboration and communication between stakeholders in order to optimize the overall costs and to increase the revenue through enhancing services . In this study, we present the set of definitions related to the concepts of the Supply chain related to the IoT, also put a special focus on the main logistics performance indicators. The last section will give a model using a multi-agent and deal with the exploitation of connected objects in the management of logistics flows within the framework of a value system, we II. RELATED WORK

A. Overview of the Supply Chain Management:- the Supply Chain Management concept has appeared since 1980s , in order to abolish the old concepts - which must be put into questioned– that limited logistics in few functions (i.e. warehousing and Transport). Since, the SCM has become a crucial pillar of innovation in the management of material, financial and informational flows from supplier level to production, distribution until the final customer as shown in the figure.

The SCM's principle is to maintain cooperative relationships between stockholders by developing structured logistical links to achieve overall performance up to the end customer. This supply chain is essentially set up to efficiently and efficiently produce and make products available to end consumers by creating values throughout the whole process, based on the performance of each stakeholder, but each entity directs the supply chain to its own account in order to achieve its own goals and promote its interests - this problem and generally spread among SMEs. The second common problem in the logistical process concerns uncertainty in forecasting and planning, as each stage in the Supply chain requires a high level of stock to avoid stock-outs. Moreover, to get rid of inventory changes that are constantly going to generate over-stock, thus, this phenomenon is called "Bullwhip effect". SCM assumes the integration and collaboration of the set logistics activities, whose purposes is to plan, control and manage material or non-material flows. Thus, companies get hold of some tools, such as Enterprise Resource Planning (ERP), Advanced Planning System (APS), Warehouse Management System (WMS), and Transport Management System (TMS). Most of them are struggling and defeated by the current SC challenges (e.g. coordination and overall supply chain governance, collaboration...), these tools must deal with risk management and decision-making at the local and global level for a decentralized supply chain; which require the interoperability of logistics networks with the constraints of standards heterogeneity. Hence the necessity of using new ICTs (developed or under-development) linked to IoT. Researchers estimate that the IoT will reach billion units by 2020, and will consider all supply chain partners and linked operations, from production line and warehousing to retail and delivery. Industrial enterprises tend to invest in the IoT to set up and optimize their workflows, to reduce their

factory costs and improve supply efficiency. In the next section, we will describe in detail the concept and functioning of the IoT.

B. Internet of Things (IoT) The Internet of Things (IoT), also called the Internet of Everything or the Industrial Internet, is a new technology paradigm ideated as a global network of machines and devices able to interact with each other. Recently, the world has experienced an impressive development of the multimedia world. This is due to the technical and technological progress and major innovations that have revolutionized the world of telecommunication, IT cloud (i.e. Cloud Computing), social media, Internet of Things....

Currently connected or intelligent objects are used everywhere, while the Internet usually is not extended beyond the electronic world, the Internet of Things represents the exchange of information and data from devices present in the real world to the Internet. They invaded the world and affected our personal and professional lives. They generate billions of information that must be processed and analyzed then stored to make them usable. According to Cisco 50 to 80 billion connected devices will be in circulation worldwide in 2020. In fact, a connected object is an object whose primary purpose is not to be computing devices or web access interface but that the addition of an internet connection has added additional value in terms of features, information and interaction with its environment. Today, connected objects begin to take part in our daily lives and are translated into several and different objects in multiple fields of application.

C. Architecture of IoT Different models with various supports IoT technologies can illustrate the Internet of Things architecture. It serves to illustrate how they are interconnected in different scenarios. The figure 2 illustrates the role of the various processes of the architecture of IoT:

- Sensors to transform a physical quantity analog to a digital signal.

- Connect allows interfacing a specialized object network to a standard IP network (LAN) or consumer devices.

- Store calls made to aggregate raw data produced in real time, Meta tagged, arriving in unpredictable ways.

- Present indicates the ability to return the information in a comprehensible way by humans, while providing a means to do it and / or interact

RFID for Identification and Tracking In the literature, researchers focus on the emphasis of the RFID in the Supply chain field to increase the availability of stock in the warehouse and to optimize the overall costs that represent an important indicator for performance SC improvement. RFID technologies are emerging in areas as diverse as logistics. The incorporation of such devices into industrial products could lead to a world in which objects communicate and interact with each other and with humans, i.e "the Internet of things".
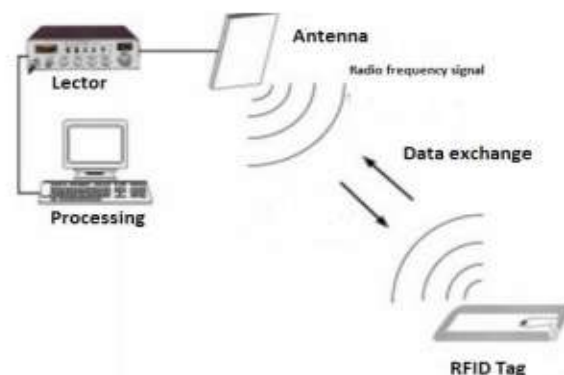
According to our literature researches, N.Mitton et al. categorize RFID tags and describe the different types of this mutant technology coming along with burning research topics with sample application. There are two types of RFID tags; Passive RFID: it is a tag that retro-modulates the wave coming from the interrogator to transmit information. It does not include RF transmitters. The passive tag generally uses the wave (magnetic or electromagnetic) coming from the interrogator to supply the on-board electronic circuit. In addition, the active RFID tags known by their autonomy and embark an RF transmitter. The communication with the interrogator in this case is peer-to-peer type. This type of tag usually has a power source and is often coupled with a temperature or humidity sensors.

Thus, the main issue of the industrial manufacturing is the high cost of the RFID tags that limits the use of this technology. While companies strive to label each product to ensure better traceability and easy inventory, and make the use of barcodes an outdated application, which opens up new avenues for research to explore. The RFID is basically used to provide solutions to problems related to Bullwhip effect mentioned in the second section, thus the benefits of using such a technology in the SCM can be summed up as : Inventory accuracy, diminishing error rate, Customer relationship management, Security, Productivity gains, Tracking enhancement and Real time visibility of the overall SC components.

According to surveys, the RFID solution has helped enterprises to increase the availability of stock in their stores, improve the efficiency of their retail and logistics platforms. For instance, Decathlon saw an 11% increase in sales from July 2014 to July 2015, and the company attributes part of that growth to the RFID deployment. In fact, Decathlon began a global rollout of an RFID solution for tracking throughout its supply chain. Today,

RFID is improving efficiencies in all Decathlon facilities with 1,030 stores and 43 warehouses. The company has tagged 1.4 billion items.

B. Logistics performance indicators Logistics performance indicators allow a clear, qualitative, and quantitative analysis of the company's processes and enable us to identify the irregularities at each level of the SC, thus propose the necessary improvements that lead us towards a continuous improvement approach.
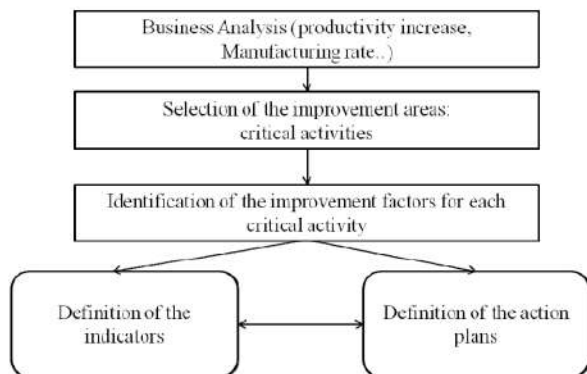
A communicative supply chain is based on a set of performance indicators (KPI) aggregated to the deployment of RFID in warehousing and management inventory, in this part we will define the different indicators related to RFID that can constitute a system of indicators (dashboard) in the logistics chain of an industry such as : -

KPI in warehousing and management inventory: Costs, Inventory level, Inventory turns, Delivery time, Good returns, Stock-out condition, Service level, Resource optimization;

KPI in production: Cost, Lead time, Quality, Productivity, Service level;

KPI in transport: Route optimization, Quality, Operating costs, Delivery time.

It is noteworthy that major issue is related to the warehousing and management inventory. Consequently, the majority of researchers in this field has focused on this weak point, thus highlighting the leading causes of its failures and the effects of using IoT to get over the inventory inaccuracy. However, this IoT technology is still facing struggles, inasmuch as a good RFID functioning, IT infrastructure must be able to deal with the huge amount of data generated by millions of transactions and transformations. The amount of information is not only huge; it is also accessible "instantly". In addition, several labels can be read simultaneously.

In addition, to measure the performance all along the Supply Chain, taking into account all the stakeholders within, we must mainly collect the measurements and data from different decision-making systems. Consequently, researches are currently oriented towards the development of an interoperability platform for the different systems aggregated to logistics objects and devices based on IoT technologies and Cloud Computing.

INTEGRATED SUPPLY CHAIN MANAGEMENT Mein-Kai Ho et al. described a centralized Supply chain management System as a system that comprises a connectivity module that electronically communicates with enterprise data Systems within one or more Supply chains. The connectivity module receives part definitions and shipment data from the various data Systems.

A data alignment module generates a mapping between the part definitions of the various enterprises, and translates electronic data received from the enterprises in accordance with the mapping. A Vendor Managed Inventory (VMI) module generates electronic orders based on the shipment data to provide automated control over inventor levels within the Supply Chain. A market analysis module generates market penetration models for the enterprises. The Figure 6 shows all components of the Integrated Supply Chain Management.
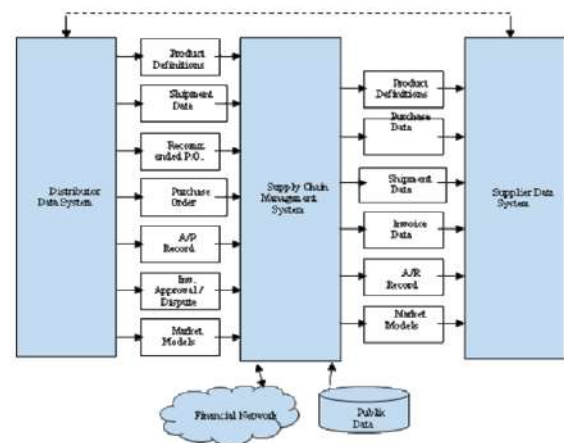
Supply Chain Management has already been achieved through a multi-agent system. Shen and Norrie present a set of platforms and achievements with agents. This is more than one of the research areas of the Enterprise Integration Laboratory at the University of Toronto. We propose their decomposition of Integrated Supply Chain Management. Several agents will intervene in this application.

● An agent Client, that places order orders, modifies them and cancels them.

● An agent Order acquisition, that receives orders from the agents Client, manages the interactions with them, and places the orders with the agent Logistics. It negotiates the constraints imposed by

the agent Client with the agent Logistics and informs the agent Customer of any delay in the delivery of his order.

- An agent Transport, that takes care of the transportation of raw materials and manufactured products between the different production lines according to the defined plan. It also ensures the delivery of the product to the customer.

- An agent Scheduler, that defines the product's production plan and indicates to agent Logistics if the constraints on the delivery of the product are acceptable or not. This plan is able to vary if the agent Dispatcher or agent Resource indicates that there are problems or delays causing the plan to be updated.

- An agent Resource in charge of the factory supply and the supplier relationship.

- An agent Dispatcher that distributes the tasks to the agents Worker based on the scheduling that has been done by the agent Scheduler and informs it if a production delay is expected.

- An agent Worker that performs the production orders of the agent Dispatcher. If a problem occurs on his machine, it informs the agent Dispatcher.

- An agent Provider that provides the raw materials necessary for the manufacture of the products. It negotiates with the agent Resource, the cost and the delivery time. The agent Provider is actually an agent Order acquisition from another company.
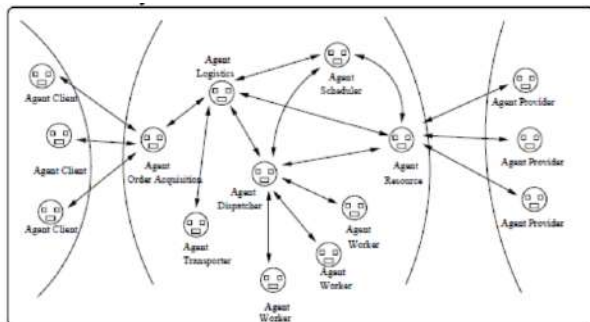
A NEW APPROACH OF LOGISTIC MANAGEMENT An enhanced Real-Time visibility into the product physical flows is a crucial step to ensure a proper Business Management. From this necessity derives the idea to design new applications able to ensure and enhance the tracking function and to avoid stock-out and over-stock generated by increasing swings in inventory i.e. using RFID tags or GSM tags. Nowadays, firms are trying to make their processes intelligent by improving the inventory function in order to avoid stopping the activities of the warehouse when the quantities in stocks can be obtained directly by census of the number of products present in a perimeter. This technology is already widely deployed in several industries (e.g.

Decathlon and Amazon). The figure 4 shows an example of the overall architecture of the solution where RFID technology is used to ensure the tracking in the SC of a wine wholesaler. This section presents the main components of the platform and related technologies. Indeed, we will focus on the main functions such as RFID entification, tracking and labelling, communication, transmission and data sharing.

The model bellow is an IoT based wine bottles routing inventory and SCM information sharing system that involves: RFID tags, position, handled readers and other similar kind of devices. The installed database has the central position in the divided system, it can insure the communication between suppliers and distributors whereby loading and inventory workers. As we can see the RFID helps the company to optimize pick-up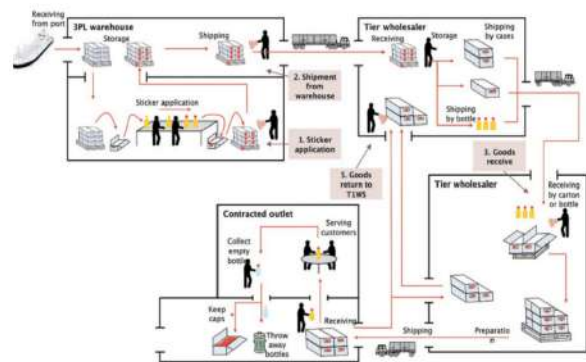 and delivery routes between delivery workshops and warehouses. It also optimizes the resources of the handling by determining the most appropriate equipment, and aim to reverse logistics as well.

Today, logistics is an integrative philosophy of flows management technologies. Indeed, Supply Chain Management is an important part of the scope of new technologies and concepts related to IoT. However, firms have a lot of challenges and struggles in terms of privacy, security, data explosion, integration and sharing on Cloud platforms.

It is the era of Big Data. Therefore, the IoT uses sensors and devices that generate massive amount of data that need to be processed and stored as well. Consequently, researchers and practitioners aim today to improve the performance of networks in terms of throughput and energy consumption to convey data from sensors as well as the improvement of algorithms in the processing of large volumes and heterogeneous data.

This research is contributing to the improvement of logistics performance by using the new technologies aggregated into the Internet of Things, which present today a new trend in the architecture of the information systems whose standards and protocols of communication is subjected to the voluminous mass and diversity of data sources.

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DIGITAL IQ

**GORDON DONOVON,
SAP AUSTRALIA**

Background : The Oxford English Dictionary (OED) traces the first uses of the terms 'digitization' and 'digitalization' in conjunction with computers to the mid-1950s. In the OED, digitization refers to "the action or process of digitizing; the conversion of analogue data (esp. in later use images, video, and text) into digital form." Digitalization, by contrast, refers to "the adoption or increase in use of digital or computer technology by an organization, industry, country, etc."

Early references to Digitalisation for procurement which has been a hot topic in the wider business world for a number of years first appeared around 2014/5. I first became aware of the broader topic from various SAP Ariba reports from around that time but gained further traction in the 2016 Deloitte CPO survey, and also in the below

In a 2016 PWC article

https://www.strategyand.pwc.com/gx/en/insights/procurement-4-digital-revolution.html

A 2017 Accenture report

https://www.accenture.com/_acnmedia/pdf-63/accenture-next-generation-digital-procurement-pov.pdf

A 2017 Hackett research report

https://www.thehackettgroup.com/key-issues-pro-procurious-1701

In a 2019 CIPS Survey, the researchers identified that "the industrial revolutions can be characterized by four distinct phases of maturity and emphasis. These are mechanization (Industry 1.0), electrical (Industry 2.0), computerization (Industry 3.0) and now phase 4 is digitalisation (Industry 4.0). " and that organisations are now starting to move beyond Industry 3.0 (an era of computer and the Internet) toward a more fully digitalised environment, referred to as Industry 4.0

So we have identified the background of where and when digital procurement has come from and to a degree what it means, next we need to consider how Procurement is doing

Status : According to a BCG report despite the promise of digital, many procurement functions still live in the analogue past, performing tasks manually, making decisions without a comprehensive understanding of data, and lacking visibility into the sources of supply.

Therefore they are missing out on digital's key benefits: incremental cost savings of 5% to 10%, productivity increases of 30% to 50%, and substantial improvements in innovation, quality, speed, and risk management. The same BCG report identifies that value is generated in three interrelated ways

Insights and Informed Decisions : Big data and advanced analytics—increasingly important weaponry in procurement arsenals—help create transparency across massive amounts of data, enhancing insights, decision making, and ultimately, performance.

Automated Processes : Robotic process automation (RPA), one of the most widely used automation technologies, automates and accelerates the completion of transactional tasks while enhancing accuracy and contract compliance. Artificial intelligence (AI), a more advanced technology, can augment high-value cognitive activities, improving speed, and productivity.

What automating processes does is release people who previously were taken up by repetitive tasks to people who can interact effectively with individuals with different areas of expertise, communicate about complex issues, recognize large-scale patterns, solve multilayered problems, and come up with new ideas.

Collaboration : Combinations of digital technologies make it possible to conduct procurement work in real time with other functions, business units, and regions in the organization, as well as with external partners. For example, these technologies provide a better window into demand across the supply chain, allowing companies to avoid excessive inventories and inventory holding costs. They also are a real help to product development because they allow organisations to incorporate suppliers' ideas into new products at a time when shorter product cycles demand ever-faster innovation. It is therefore a key for building supplier relationships.

So how does procurement aim to leverage these three areas of value?

Skills Evolution : Much has been written about the changing needs for procurement skills in the various CPO reports mentioned earlier as well as the current Deloitte CPO report and various industry bodies such as CIPS, and ISMbut in summary in order to take advantage of the value that digitisation can deliver then the current and future levels of procurement functional maturity needs to synch up.

The below image from the BCG report shows what this could look like.

ref<https://www.bcg.com/en-au/publications/2018/delivering-digital-procurement-promise.aspx>

But in order to achieve the value of Digital, we need to look broader to the functional and organisational capabilities of organisations

The DiQ : So, we have all heard of IQ (Intelligence Quotient), which is an attempt to measure intelligence via a series of standardised tests, and then there is , EI (Emotional intelligence), the capacity to be aware of, control, and express one's emotions, and to handle interpersonal relationships judiciously and empathetically, which can be applied to EQ The level of a person's emotional intelligence, the logical next thing to measure will be DiQ(Digital Intelligence Quotient); a collection of

social, emotional and cognitive abilities that help someone deal with the demands of living a digital life.

A simple definition of Digital intelligence is "the ability to acquire and apply new knowledge and skills related to digital technologies" It is more than the ability to use digital tools, but rather the ability to know why, what, how and when of digital technology to improve effectiveness and outcomes. Digital Intelligence is fundamentally about our relationship with technology, just as Emotional Intelligence is about our relationship with others. Building our DiQ will be central to achieving the skills changes needed to get the most advantage of the digital transformation that will be, is, or has happened, indeed it may be the key to realising the promised value if you have already started on the journey

There are a number of really good articles and research reports that identify these skills, a great report from Mckinsey called raising your Digital Quotient suggests that success can be attributed to 4 main factors

- Think carefully about the digital strategy available to them
- Success depends on the ability to invest in relevant digital capabilities that are well aligned with strategy
- A strong and adaptive culture can help make up for a lack of technical capability
- Align their organizational structures, talent development, funding mechanisms, and key performance indicators with the digital strategy they've chosen

The report goes into more detail about all of these, buts it's a really interesting read, and suggests that the journey to digital maturity requires a whole-hearted commitment from an organisations leadership and a sustained investment in people, capabilities, technology, and cultural change.

PWC conduct a regular survey on Digital IQ and their 2018 suggest that it is mindset, rather than time or resources, that is proving the stumbling block to success, some key takeaways from this report include

- 91% of top financial performers have an executive in charge of employee experience.
- 54% of top financial performers say their leadership is digitally savvy and helps the workforce think in a new way, compared with 41% of others.
- 64% of top financial performers say their business faces a serious threat from disruption, compared with 27% of others.
- 28% of top financial performers say they lack a strategic focus on training, compared with 47% of others.

They go onto suggest that four categories of aspiration for digital businesses –
- Efficiency seekers, - Focused on doing business smarter and faster, and use technology to achieve that
- Modernisers - want to create new capabilities, not just get the best out of their existing set up, and as such, they have invested in recruiting a more digitally-savvy workforce and encourage innovation at all levels
- Redefiners, - This group can see that disrupting from within, changing and redefining business models, should drive success.
- Industry explorers - Not content with improving or disrupting their own businesses, they want to go further, find new lands to conquer in a disruptive environment.

The report concludes that organsiations that are merely pretending to face a digital reality still have time to address their ways, meet their aspirational goals and maximise the potential to drive business

Looking at these two reports it is clear that there is a need to ensure our organisations' (and our function - procurement) Digital IQ is ready to meet the challenge, so how to get ready? Well to start with here are my thoughts

Action Plan : Link business, digital and procurement strategies together

Having a high Digital IQ is about making digital investments that deliver sustainable value. The only digital investments you should make are those that fit well with your organization strategically, something may be state of the art but if it doesn't help achieve a business objective then it's not a priority. According to a Forrester report, "Digital transformation goes much further, fundamentally reshaping the way you create value for your customers and drive revenue growth."

Road mapping and planning : Facilitate the discussion between IT, Business and Procurement together to achieve a goal of identifying gaps so that you can prioritize action in your digital strategy that will complement the business strategy.

Build digital relationships : Build relationships where disruption is happening, it's a great way to identify what may happen, and also to identify new ways that you can internally disrupt

Build internal relationships : This is an organisational wide initiative so we must bring our internal leadership along with us. A Gartner report stated that "Digital transformation will fail without a willing, informed, equipped and engaged workforce". We need to engage internally to understand the broader organisation and employee needs from Digital which will therefore raise our IQ.

Focus on the experience : Consider customer and employee interactions, how do you deliver digital initiatives and impact culture through adoption and contribute to continual learning and development. A differentForrester report also suggested that Digital fundamentally changes your relationship with your customers. You can't address this change with a bolt-on digital strategy that adds an app here or a site there. To remain competitive, you must re-engineer how your business creates value for your customers in the digital age. The same is true for procurement, we need to see how we create value for our customers AND our suppliers and ultimately the organsiations end customers.

Technology investment : Your roadmap identified gaps, both for current and also for future requirements. Make sure you budget for these

Summary

Justin Trudeau at Davos said "The pace of change has never been this fast, yet it will never be this slow again"

Technology continues to speed up and we must devote more resources to increasing our Digital IQs or they will soon fall further behind leaving procurement at a disadvantage in the market and maybe even extinct.

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POWER OF ROBOTIC PROCESS AUTOMATION AND ARTIFICIAL INTELLIGENCE IN MANUFACTURING INDUSTRY

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

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

Source:https://www.pm365.tk/ProductDetail.aspx?iid=181825786&pr=41.88
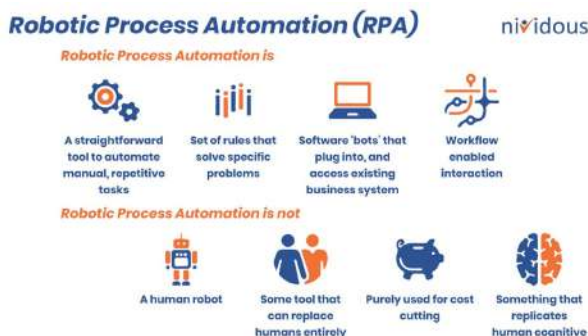
Benefits of implementing RPA in the Manufacturing Industry:

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

- **Increased focus and efficiency:-**the manufacturers in maximizing efficiency by cutting down on errors.
- **Enhance bank office operations**:-executing RPA, manufacturers can oust their traditional systems which have more chances of errors with more dependable digital ones.

Manufacturing Business Area	RPA Use cases	Examples
Finance & accounting	• Invoice payment • AP automation • Freight rating and payment • Auditing	**Invoice Processing** RPA helps to scan invoices of different types and templates from various suppliers and automate enter details in accounting systems like SAP
Operations	• Product administration • Inventory re-ordering • SKU updates • Inventory, AP, sales pipeline and pricing report creation • MES integration	**Administration** RPA in the administration will help the industry to get all the reports of their production and all other work in their business
Customer Service	• Front office support • Quote creation • Order correction • Product registration • Approval	**Front Office Support** When deploying RPA in front office, employees can access multiple stored data at one place and serve customers better

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

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

Source:https://www.w2ssolutions.com/blog/rpa-2021-trends-and-predictions/
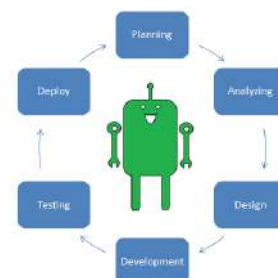
RPA and AI: Artificial intelligence debate the machines that are designed to simulate human reactions, judgement and behaviour. AI software is a combination of cognitive automation with machine learning, language processing,hypothesis generation, analysis and algorithm mutation to produce analytics and insights to match with the human's ability or to surpass beyond. RPA is a "doer" but AI is a "thinker".RPA is a robot that only imitates human functions and will do only what it is told to do but AI analyses data and processes on its own.In a business process, RPA is perfect for filling the data into forms but AI will differentiate which data needs to go where on the form.
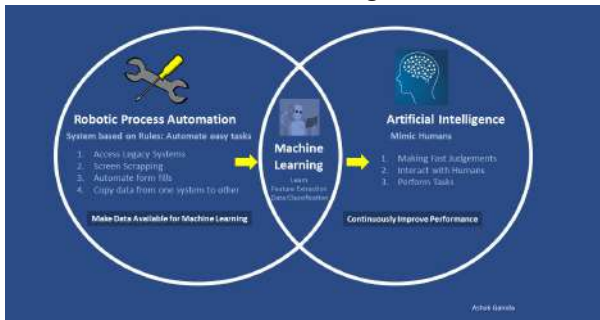
Source:https://medium.com/@ashok.gairola/robotic-process-automation-rpa-vs-artificial-intelligence-8af3c26803be

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

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

- **Machine learning, computer vision, text analytics and Natural language processing:-** process unstructured data, automate tasks that require judgement and detect and adapt to constant change.

- **Predictive and prescriptive analytics:-** help leaders plan resources and set achievable KPIs,plus ensure optimal operational results.

- **Self-managing, self-healing robots**- handle exceptions and reduce bot management

Application of RPA in Manufacturing Industry: Manufacturing companies are changing their production unit from human resources to physical industry robots for their products to assemble, checking the quality and packaging it. Though these robots help to repair the assembly line,the manufacturing companies are still struggling to manage their operational process and back office works. They started implementing manufacturing automation with the help

of RPA to reduce human errors and reduce human resources and the ability to increase productivity. Using RPA technologies in their back-end operations, they can attain **up to 40%** cost savings in various areas of work.

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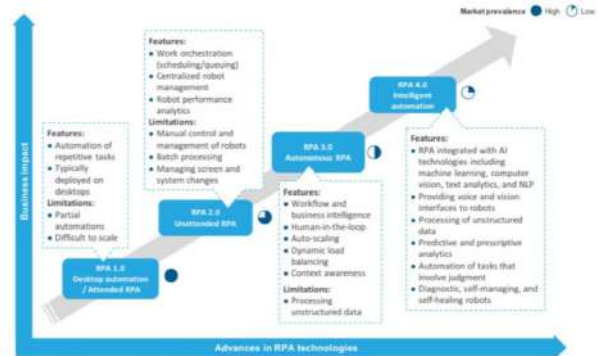
Bill of Materials: (BOM) : The most important object in the manufacturing process is the Bill of Materials (BoM). It includes the various raw materials, components, and sub-components that go into the manufacturing of a specific product. These documents/objects are necessary so employees know which items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

- Eliminate spreadsheets to manage BoM systems and reduce the need for paper

- Set up automatic alerts for changes in the system for digitized communication

- Strengthen supply chain procedures

- Enhance regulatory compliance

- Access real-time process monitoring and analytics

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

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

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

Invoice processing: Invoice processing is an exhausting, manual, time-consuming process because it involves multiple procedures by different people to check and

approve items. This makes the process prone to mistakes due to accidental misclicks, inaccuracy, or inattentiveness.

Logistics data automation:

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

- Automate shipment scheduling and tracking:- Automate manual shipping tasks

- Eliminate manual process for capturing loads and rate look ups:- Automatically perform rate look-ups from multimodal carriers and 3PLs.

- Speed invoicing by integrating systems with customer portals:- Automatically extract shipping data, attach scanned purchase orders and invoices, and update customer portals in seconds, rather than days.

- Enhance customer responsiveness with automated order/inventory tracking

- Gain insights to improve forecasting and logistics planning

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

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

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

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

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

Benefits of RPA in Inventory management:

- **Smooth communication:-**Custom RPA bots, paired with ERP solutions can help you know the accurate inventory levels, and the future demand and supply forecast.

- **Seamless integration with legacy systems**:- A well-planned RPA application can seamlessly integrate with any device or existing system while making your work efficient and cost-effective.

- **Automated inventory management**:- A well-configured custom inventory management software, with the capabilities of RPA and AI, can help you automate all the big and small tasks of your inventory management, thereby saving much of your time and cost.

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

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

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(Footnotes)

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HOW BLOCKCHAIN IS RESHAPING SCM?

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Supply chains are having a moment!!!

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

Interesting facts about blockchain

1. It sounds simple , but very complex to understand.

2. Blockchain in 2020s is like internet in 1990s, although they are two fundamentally different technologies, but there are similarities in their technical adoption. According to Forbes, Right now, we're at a point with blockchain technology that's about equal to where we were with the internet in the early 1990s [1]. This was before Google, and even beforeAmazon. We knew that the "world wide web" existed, but few people understood how it worked, and people couldn't do much on it.

3. Block chain is not a use case of internet, like e-commerce or social networking or emails, which are the use cases of internet. Blockchain is also called as the new internet as something parallel to internet[2].

4. Block chain introduced a revolutionary change to the future of money. The future of money is programmable. When we combine software and currency, money becomes more than just a static unit of value. Programmable money brings democracy in money, and because of this, things are going to change and unfold in ways that we can't even predict.

5. Blockchain technology is relatively new, but it relates to human sentiments, and that is ass humans, we are comfortable to exchange values when there is low uncertainty.

Block chain is an exponential technology

The overall size of the blockchain market as per neutral market research firm is 3.67 billion in 2020 [3]. This is not a very large number, so why is this important? There is a concept called **exponential technologies.** Exponential technology is something which states that a few years the growth is almost stagnant or zero and therefore you believe that something doesn't have potential because you know you don't see it growing or expanding rapidly. And then suddenly when there is the movement that technology doubles in power or processing every year, while their cost halves or reduces. For example, Internet was there since late 1960s but its exponential application started in 2000. It is expected that Blockchain will be adopted by majority by 2028.

What is blockchain and how it works :

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

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

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

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

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

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

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

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

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

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

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

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

How blockchain is reshaping SCM?

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

Recent supply chain history

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

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

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

The power of blockchain

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

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

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

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

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CPO DIALOGUE

IIMM MUMBAI BRANCH

The third edition of CPO Dialogues was hosted by IIMM, Mumbai Branch in association with SAP India, at Hotel The Lalit Mumbai on 10 June 2022. More than 15 CPOs participated in the free-wheeling discussions centered aroundResilient, Profitable and Sustainable Supply Chain.

The event was a brainchild of Mr. Bala Iyer, Former National President and Convener CPO Dialogues.He led the event from the front.

Mr. Surendra Deodhar, National Secretary and Treasurer, anchored the event.

Mr. Ashwani Narang, VP and Country Head, Intelligent Spend and Business Network, SAP Indian Subcontinent; in his opening talk set the tone by expressing the current high risk - global scenario and the prominence of IT to infuse resilience in Supply Chains. IT investments have further accelerated during pandemic. Organizations are deploying solutions for increasing internal visibility in own spend as well as through Supply Chain. It is also helping to smoothen the processes such as creating internal marketplace. These facts are also supported by the joint survey conducted by IIMM and SAP. He also highlighted that the procurement professionals can make a difference in respect of 10 out of 17 UN defined Sustainability Goals, and appealed to the CPO to procure with a purpose.

Mr. Bala Iyer then facilitated group discussion involving all the CPOs.

CPOs brought out different aspects in response to the question of strategies adopted by organizations to stay ahead of the competition.

Mr. Sathia Raj, CPO, Aditya Birla Group explained how the long term partnership with suppliers helped limiting deliveries during lockdown, to the 55 manufacturing locations to help cash conservation, and also supported upturn in demand post lockdown. He shared how new suppliers for packaging materials were identified near manufacturing locations, to de-risk supplies. Earlier they were moving these materials across India.

Mr. Umesh Mitbawkar, CPO, HDFC Standard Life, shared how the organizations already implemented digitalization helped continuation of service. And optimizing the risk of picking risky business during Covid-19.

Mr. Bala Iyer, shared that Bayer India, paid suppliers ahead of the due dates to keep their cash cycle going.

Mr. Nimit Jain, CFO, SCHUCO India Private Ltd. shared how they helped customers as well as suppliers to manage their working capital during the crisis.

Mr. Bala Iyer, narrated how withdrawal of the rule 9 related waste disposal for chemical plants, almost forced chemicals manufacturers to stop manufacturing. And how procurement joined hands with suppliers to represent their grievances to the Government. Also highlighted the need for digitalization to improve visibility at each tier of Supply Chain. Typically visibility drops from 48% at tier 1, to 21% at tier 2 and 2% at tier 3. Added how friendly sourcing is being adopted by organizations as strategy to de-risk.

Mr. Surendra Deodhar, shared his thoughts about digitalization

Mr. Nilesh Jha, CPO, Huntsman India shared that their digitalization started 5 years back. Majority of the suppliers are digitally connected. All Procurement laptop enabled. Assessment is also digital. Have achieved online visibility across India – all warehouse, all vehicles. It came in handy during Covid. Hazardous chemical tankers stranded at different locations could be located. Additional support to park at safer location / provide cash for fuel / food could be provided. They also have yearly ESHS audits of all A Class vendors to assess and improve their ESHS performance.

Mr. Animesh Shah, Sr. GM Lupin Ltd, Chairman IIMM Mumbai, explained how pharmaceutical manufacturers are de-risking China by promoting API and KSM manufacturing within India. Suppliers with good capabilities are supported / financed.

Mr. A. Rao, CPO, Tata Capital, shared how deeply digitalization, de-risking is operating even for small spend like stationary. Earlier one vendor, printing at one location, but now a digital copy is distributed for printing at local level all across.

Mr. Rajiv Gaur, VP – Global Procurement and Logistics, LanxessIndia, highlighted the need to have multiple sources, have ears to the ground and when there is a problem, get into suppliers' supply chain to ensure that they get their materials.

Mr. Sathia Raj, CPO, Aditya Birla Group, explained how the Global Cement Association is working towards becoming carbon neutral by 2050 and shared examples of waste heat recovery systems, use of phosphorous gypsum in cement manufacturing.

Mr. Rajeev Gaur, Lanxess shared with the group that six large global chemicals companies started pursuing a common sustainability agenda. They have shared costs of supplier audits. Now 37 organizations with USD 350 bn global spend have joined hands.

Mr. Chodankar, CPO, DBS Bank (Ex Unilever / Ex Abbott), explained that DBS Bank started digitalization in 1995. Complications in operations enhanced after taking over Laxmi Vilas Bank. Branches suddenly went up from 35 to 600.Currently implementing catalogue based buying solution.

Mr. Swapnil Dubey, Senior President, Yes Bank, shared how a completely paper based Procure to Pay system 3 years back was getting digitally transformed. Highlighted a major challenge in terms of Change Management. Also shared that the Head Office is Green Powered, top 70% suppliers representing 80% spend get surveyed for ESG.

Mr. A. Rao, Tata Capital shared that they have introduced Charbots for internal customers, now extending to external customers.

Mr. Ramesh Kalantri, VP Finance, ICICI Prudential informed that they have created a single digital platform.

Mr. Rajesh Srivastava, Head - Indirect Spend, Lupin Ltd and Mr. Trehan, Director Adeka also shared their views.

The concluding talk was Mr. Ravindra Sharma, Director, Procurement Adoption, SAP

He summarized the learnings, and added that resilient and green supply chains will be one of the biggest investment areas in near future, as per a Goldman Sachs report. For being future ready, planning for talent will be a key area.

The event was another milestone is facilitating knowledge and networking among the CPOs.

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EMERGING TRENDS IN DIGITAL SUPPLY CHAIN

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Introduction : An inefficient and poorly functioning supply chain can negatively impact every aspect of an organization. As companies increasingly use their supply chain to compete and gain market share, they increase spending to maintain their leadership. Technology and process upgrades by forward-thinking companies clearly show that supply chain excellence is more widely accepted as an element of overall business strategy aligned with increasing value to customers.

In 2020, a bigger push is expected on more short-term payback and investing in supply chain capabilities to drive commercial growth. Cost will always be an important factor for supply chains, but today's commercial organizations need new capabilities from their supply chain to support their growth strategies: things like quicker response times, higher service levels and the ability to effectively serve new channels, such as e-commerce, while delivering a more diverse product portfolio.

For decades, many supply chains have pushed toward consolidation in order to optimize efficiency and scale, but the economics have been changing. Rising taxes and duties that come from operating globally are causing uncertainty, and managing an increasingly complex portfolio with long supply chains is getting too difficult and costly and hence shortening the overall supply chain is a way forward. Furthermore, digital innovations and rising labor costs in traditionally low cost countries, like China, are changing the economic equation. Alternatively, many companies will decision in favour of shifting production locations closer to demand.

In 2020, supply chains must support global and sustainable operations while at the same time providing responsiveness to a diverse set of customers. To accomplish this daunting task, supply chain leaders will keep their eye on several trends:

● Pragmatic use of automation across the end to end supply chain to drive scalable efficiencies.
● Increased use of machine learning and AI to accelerate and improve decision making.
● Use of the cloud to increase speed of implementation and lower upgrade costs.
● Re-design of supply chain competency models and approaches to finding, acquiring and retaining talent.

Looking forward, there's also the economy to consider, as its performance has a direct effect on supply chain trends. While economic performance has been good, there are signs that 2020 will be somewhat bumpy. Apparently, the trade war is heating up and the automotive industry is slowing down. The indicators will undoubtedly have an impact on supply chain innovation, speeding up some initiatives while slowing others. Against this backdrop, top supply chain trends in 2020 have been discussed below.

1. Digitization : Digitization of the supply chain, encompassing all efforts to integrate corporate systems into unified whole as well as implementing new digital technologies, will continue to be a priority. The goal of digitization is a smart, efficient supply chain ecosystem that demolishes silos, creates transparency and enhances responsiveness. It envisages a digital environment that eliminates manual processes and provides a single view of the organization by creating paperless systems right through to techniques for modeling supply chain networks.

2. Move to the Cloud : While many organizations still rely on legacy on-premise supply chain software, the future is in the cloud. Available in many forms, including Software as a Service (SaaS), Infrastructure as a Service (IaaS) and Platform as a Service (PaaS), supply chain cloud computing offers flexibility, scalability and a global reach while doing away with the need to maintain extensive, expensive on-premise computing infrastructure. Research shows that cloud specific spending in 2020 will grow six-times faster than other IT expenditures. On-premise supply chain software, cloud-based supply chain applications offer a better user experience, greater functionality and easy access to new features and releases.

3. Omnichannel to be the Norm : In response to customer demand, businesses will make big strides towards offering a true omnichannel buying experience. Allowing customers to seamlessly shop online or in brick-and-mortar stores, omnichannel supply chains place greater demands on logistic and supply chains with the simultaneous requirements of supplying individual customer orders as well as replenishing stock at retail outlets. The switch from single- and multi-channel supply to omnichannel supply requires a complete rethink of supply chain logistics.

4. Sustainability : Sustainability has become one of the key global supply chain trends, with customers demanding green products and sustainable practices. People are looking torwards the importance of eco-friendly supply chain practices, such as switching from plastic to cardboard packaging and using smaller packaging. Organizations also need to be aware of their carbon footprint and should take steps to become carbon neutral and include sustainability as part of their supply chain planning.

5. Growth in Circular Supply Chains : There's a move

away from the traditional linear supply chain to the circular supply chain where manufacturers reuse and rework discarded and worn out products through refurbishment or by recycling components into raw materials. Apart from regulatory requirements for the safe disposal and reuse of discarded products, there's a clear indication that customers favor businesses that recycle materials, and many leading companies are discovering additional value through circular supply chains.

6. Agility : To effectively compete, supply chains need to be flexible and agile, as well as able to respond to changes on short notice. This is a radical departure from traditional supply chain thinking that focuses on reliability, consistency and low cost. One of the notable supply chain management trends is a switch from off-shore manufacture to local or near-shore supply. Advantages of this include shorter delivery times and lower shipping costs. With less money tied up in stock, organizations can respond more quickly to changes in demand.

7. Internet of Things : The digital transformation of supply chains will only accelerate. Increased use of advanced analytics, machine learning and AI will proactively detect trends and insights on a path to a self-learning supply chain. Increased use of IoT and smart sensors enabling "in the moment" visibility and decision-support will drive further convergence of planning and execution across sales, procurement, manufacturing and logistics.

IoT allows organizations to monitor inventory, automate stock reordering and keep track of deliveries, all in real time. Sensors can predict wear and tear on equipment, allowing timely ordering of spare parts. IoT increases supply chain transparency.

8. Big Data Analytics : Big Data is here, thanks to the digitization of the supply chain, the growth in IoT, and the greater availability of customer data. Companies today have access to enormous amounts of data and are using this to generate business intelligence ranging from understanding past performances to predicting future trends. Using Big Data, it's possible to determine customer preferences and market trends, as well as redefine the supply chain.

9. Artificial Intelligence and Machine Learning : Currently, companies are taking decisions in favour of infusion of AI in decision-making, automation and improvements in workforce training. The challenge for supply chain leaders will be to balance delivering short-term value while not losing sight of the longer-term innovations that can create bigger, step-function improvements down the road.

With greater access to Big Data, more organizations are turning to AI and machine learning to simplify tasks and automate procedures. Predictive analytics and machine learning algorithms are being used to improve planning and decision support systems, identify purchasing patterns, automate tedious warehousing processes and manage inventory. Many organizations are using artificial intelligence to replace humans performing repetitive supply tasks and to perform complex supply chain calculations.

10. Prescriptive Analytics : The new concept of prescriptive analytics is being increasingly used as a supply chain decision-making tool. While other forms of analytics, such as diagnostic and predictive analytics, focus on past and future trends, providing useful insights, they share a common failing: They don't provide information needed to make informed decisions. More recent research suggests faster growth of the prescriptive analytics market.

11. Robotics and Automation in Logistics : Robotic Process Automation (RPA) will increasingly be used to automate repetitive tasks and support "no regret" actions and decisions. Automation will continue to increase. Labor shortages are accelerating the adoption of robots and cobots in factories and warehouses. RPA will increasingly be used to automate repetitive tasks and support "no regret" actions and decisions.

Workforce management innovation and engagement is critical. As technologies and tools become more sophisticated and ubiquitous, digitally upskilling the existing workforce will be pivotal to effectively operate in this environment and stay competitive. This involves training on digital enablers and fostering an environment of "grass roots," citizen-led innovation that is smartly directed toward business-led imperatives.

As companies respond to the conflicting demands of omnichannel supply chains, especially with regard to the need for flexibility and agility, many are turning to robotics to speed up labor-intensive tasks. Robots are ideal for repetitive tasks such as sorting, counting and even for fetching and carrying products in the warehouse.

12. Warehousing - As e-commerce demands intensify alongside growing warehouse automation, the fight to find and retain warehouse workers could intensify ever further. Ever-shorter consumer deliveries. Next-day delivery of items in local DCs is already typical in many major metropolitan areas, occasionally at a modest premium and often at no premium. The next hurdle will be same-day delivery, which will necessitate alternative stocking strategies and intra-day runs to accommodate orders as they are received.

Way forward : Emerging Trends Digital Supply Chain would be more aligned towards Artificial Intelligence, Internet of Things, Omnichennel and advanced analytics etc. Further, the new focus on sustainability and circular supply chains as customers flex their muscles regarding waste and the environment. Agility and omnichannel supply chains are becoming the norm, while the increased availability of Big Data means organizations are now able to close the loop with prescriptive analytics and make informed supply chain decisions.

Technology integration may accelerate and become more strategic. The next hurdle will be same-day delivery, which will necessitate alternative stocking strategies and intra-day runs to accommodate orders as they are received. Global changes will result in supply chain disruptions. Many exciting things are happening due to response to changes arising from the availability of Big Data, supply chain digitization and omni-channel marketing, to name just a few.

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HARNESSING NEW TECHNOLOGIES TO TRANSFORM LOGISTICS

New technologies such as drones, driverless vehicles and 3D printing could revolutionize delivery methods.

Even now, in the aftermath of the digital revolution and the early years of the Information Age, the need to move physical goods from A to B endures. Delivery methods, however, are starting to change, with the plummeting cost of key technologies contributing to innovation (see Figure 1).

In this theme – delivery capabilities – we look at how the trend of crowdsourcing and innovations in manufacturing (3D printing) and technology (drones, autonomous trucks) have widened the range of options and opened up logistics markets to new players.

Delivery capabilities is one of five themes that we believe will be central to the digitization of the logistics industry over the next decade. The other themes we examine are information services, logistics services, circular economy and shared logistics capabilities.

Drones : Once the stuff of science fiction, unmanned aerial vehicles (UAVs) have some exciting applications in logistics. Capable of making fast, cheap deliveries – 30-minute turnaround times are already possible – delivery drones might encourage consumers to keep their fridges less fully stocked. Able to offer perishables on demand, home deliverers could well see a jump in purchasing volumes, raising revenues for logistics operators. With the right geolocation data, drones could even deliver direct to consumers outside the home.

Although drones still have a number of regulatory hoops to fly through, it seems likely that they will mainly replace last-mile delivery vehicles such as vans. Shorter delivery times and increased purchasing flexibility would appeal to consumers, while the ditching of bigger vehicles would shrink operators' carbon footprint.

Logistics could be a significant part of an overall commercial UAV market worth a projected $6.4 billion by 2020.[1]

Case study : Amazon and DHL : Amazon is now working on a ninth-generation drone prototype which it says can carry payloads of up to 2.3kg at up to 80kph.[2] The largest e-tailer in the United States hopes its UAVs will eventually locate delivery recipients using data from their smartphones, perhaps making up to 400 million such deliveries a year.[3] DHL, meanwhile, has deployed autonomous quadcopters to deliver small packages to the sandbar island of Juist, 12km off the German coast in the North Sea.t

Drones can allow logistics companies to provide faster, cheaper (about 25%), and lower emission (about 90%) deliveries through avoidance of road traffic in last-mile delivery. However, drones today account for less than 0.5% of all logistics deliveries globally. As technology improves and regulation changes, companies stand to benefit from premiums for faster/same-day deliveries. We estimate this could be worth as much as $20 billion in operating profits over the next decade. The use of drones can also benefit society. It could lead to a reduction of 15 million metric tons in emissions, and prevent up to 4,000 deaths from road accidents.

Autonomous trucks : Self-driving passenger cars have generated more hype recently, but autonomous trucks offer similar reductions in road accidents and carbon dioxide (CO_2) emissions, while also promising to significantly boost business bottom lines.u

The volume of freight on the road will almost quadruple between 2010 and 2050, according to the International Transport Forum.v The rollout of autonomous trucks is likely to happen in phases, with the benefits expected to accrue first to companies in B2B logistics.

Convoy trucking marks the start of the process of automating truck deliveries and will see drivers take responsibility for two or more vehicles. Moving in convoys, autonomous trucks avoid unnecessary overtaking and, by using the slipstream of the vehicle in front and optimizing accelerations and decelerations, they can reduce fuel consumption. Truck drivers who are relieved from paying attention to the road could be more productive behind the wheel, handling logistics and maintenance issues that would otherwise create a dangerous distraction while driving.

Eventually, truck drivers will no longer need to pay attention to the road and can be more productive, handling logistics and maintenance issues that would otherwise create a dangerous distraction while driving.

Case study

Daimler

Germany-based automotive giant Daimler recently tested its autonomous Freightliner Inspiration Truck on roads in the US state of Nevada.w The Inspiration is the first autonomous truck to be licensed to drive on public roads.

Autonomous trucking convoys offer a range of benefits to the industry. They are fuel-efficient and save up to 12% of the fuel consumed by traditional trucks. These convoys also save on employee costs. A convoy of three or four trucks can be controlled by just one driver. Additionally, autonomous trucks have 14% lower maintenance costs. In total, we estimate $30 billion can be saved in operating costs from autonomous trucks. The shift toward autonomous trucks can also benefit society. It could lead to a reduction of 25 million metric tons in emissions, and prevent up to 400 deaths from road accidents.

3D printing: Additive layer manufacturing (ALM), also known as 3D printing, creates three-dimensional solid objects from digital blueprint files.x On average, ALM generates 5 to 10% waste material (which can be recycled and reused), instead of the 90 to 95% typical of machining techniques that create a part by cutting away a solid block of material, rather than building it up layer by layer.

At first glance, 3D printing would appear to pose a great threat to the logistics industry, with objects printed on location, reducing demand for shipments. However, opportunities exist for logistics providers to expand their range of services – for instance, by refashioning themselves as printers, shippers and installers of 3D-printed objects.

Case study : Airbus : Aerospace giant Airbus recently concluded that 3D printing plane parts could reduce waste during the manufacturing process and lighten the final weight of its planes, which would reduce fuel costs and carbon emissions on flights.y Airbus is looking to increase the workload of its 3D printers, especially in the area of spare parts which, if they can be produced on demand, do not need to take up storage space for long periods.

Crowdsourcing : Crowdsourcing is about getting what one needs from an undefined group of people – typically an online community – instead of from traditional sources (say, employees or suppliers). Everyone involved makes a small contribution that, in combination with everyone else's, should deliver the final result desired. In logistics, crowdsourcing can reduce environmental footprints by helping industry players make more efficient use of available capacity and thus reduce total driven miles.

Case study : Keychain Logistics

Keychain Logistics is a software marketplace, covering medium- and long-range trucking services. It eliminates brokers – and their fees – by connecting companies shipping products directly to independent semi-truck owner-operators. In giving truckers an opportunity to deliver multiple orders in one journey and raise asset fill rates, Keychain anticipates a shift from large trucking fleets toward decentralized, flexible and smaller truck fleets that operate independently.

The largest impact of digitalization to the logistics industry is likely to come from crowdsourcing. Crowdsourcing platforms could allow newer entities from outside the industry to grab a share of the market from existing players, generating estimated operating profits of up to $160 billion to 2025. The crowdsourced platforms would offer better rates, convenience and real-time tracking, and this could lead to savings of approximately $800 billion for the customers. On the flip side, major trucking companies could be at a risk of losing $310 billion of operating profits to players enrolled on these platforms. Crowdsourcing would lead to improved utilization rates, leading to estimated savings of 3.6 billion metric tons in emissions.

Footnotes:

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Source: weforum.org

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A DIGITAL SUPPLY CHAIN CAN BE A GAME CHANGER FOR THE SME SECTOR IN INDIA

SUDHIR GUPTA

The implementation of a digital supply chain calls for an agile approach and requires two key enablers – capabilities and environment.

Technology evangelist and mentor

- Beating the 6 main challenges of managing a remote team
- The new normal: The 'phygital' customer engagement
- Business Intelligence: Utilizing a Data-driven approach for improving the MSME industry
- Supply chain financing can help early-stage startups optimise working capital
- Russia-Ukraine conflict and it's impact on Indian economy

The pandemic and more recently the Russia Ukraine war has disrupted supply chains across the world and has brought unprecedented attention to this topic. Therefore, all businesses are focusing on long term strategies to improve the resilience and efficiency of their supply chains.

Industry 4.0 disruptions require companies to rethink the way that they design their supply chains. Several technologies have emerged that are altering the traditional ways of working. On top of this, mega trends and customer expectations have changed the game as well. Besides the need to adapt, supply chains also have the opportunity to improve their operational effectiveness, to leverage emerging digital supply chain business models, and to transform the company that they are a part of.

From a technology perspective this means that using advanced technologies, such as the Internet of Things (IoT), big data analytics, and autonomous robotics, is transforming the model of supply chain management from a linear one, in which instructions flow from supplier to producer to distributor to consumer and back, to a more integrated model in which information flows in an omnidirectional manner. As a technology evangelist I find this truly exciting.

While large corporates have the wherewithal to undertake this transformation, in my experience, the SME sector is hamstrung by a lack of resources at multiple levels. But the creative use of low-cost technology solutions does provide the SME sector with an opportunity to start this journey. I have seen several examples of this, and the purpose of this article is to share some insights that can be helpful in this task.

Supply chain maturity levels : It is helpful to visualise supply chain maturity in terms of the four-level model.

Level 1: Reactive supply chain management. Paper based and manual.

Level 2: Internal supply chain integration with planned buffers. Stand-alone digitization.

Level 3: Collaboration across the extended supply chain network. Full digital integration including partners.

Level 4: Dynamic supply chain adaptation and flexibility. Use of advanced digital technologies.

Business advantages : I have seen that many times businesses make the mistake of approaching a transformation exercise purely from a technology perspective. However, it is important that any transformation effort must, first and foremost, be guided by clear business needs. An example will help illustrate this point better. As recently as February 2018, supply chain problems caused two-thirds of the 900 Kentucky Fried Chicken restaurants in the United Kingdom to close because they had run out of chicken. Another example, which is my favourite in the Indian context, is that of Asian Paints. They supply directly to dealers and do not have any distributor in between. This allows them to keep 97% of the MRP as compared to their competitors who are able to get only 60% of the MRP because they rely on distributors. So, it is important to understand the business benefits that must be attained. Here is a framework to evaluate this.

The digitisation of the supply chain enables companies to address the new requirements of the customers and the challenges on the supply side as well as facilitating them to work towards efficiency improvement in the following ways,

Speed : New approaches to product distribution can reduce the delivery time to a few hours. This can be achieved by using advanced forecasting and predictive analytics of demand based on factors like market trends, weather, school vacations, festivals etc. Forecasts are not carried out on a monthly basis, but are done so on a weekly one, and for the very fast-moving products, even every day. In the future we will see predictive shipping, for which Amazon holds a patent – products are shipped before the customer places an order. The customer order is later matched

with a shipment that is already in the logistics network (being transported towards the customer region) and the shipment is rerouted to the exact customer destination.

Flexibility

Ad hoc and real-time planning allows a flexible reaction to changing demand or supply situations. Planning cycles and frozen periods are minimized, and planning becomes a continuous process that is able to react dynamically to changing requirements or constraints (e.g., real-time production capacity feedback from machines). Once the products are sent, increased flexibility in the delivery processes allows customers to reroute shipments as needed.

Business models

New business models, such as Supply Chain as a Service for supply chain planning functions or transport management, increase the flexibility in the supply chain organization. Supply chain can be bought as a service and paid for on a usage basis instead of having the resources and capabilities in-house. The specialization and focus of service providers allow them to create economies of scale. We will see an "Uberization" of transport, a crowd-sourced and flexible transport capacity, which will lead to a significant increase in the agility of distribution networks. Also, new transport concepts such as drone delivery, allow companies to manage the last mile efficiently for single and high-value dense packages.

Customisation

The demand of customers for more and more individualised products is continuously increasing. This will mean a move towards micro segmentation and mass customization. Customers are managed in much more granular clusters and a broad spectrum of products will be offered.

Performance management

The next generation of performance management systems will provide real-time, end-to-end transparency throughout the supply chain. The span of information will encompass the synthesized top-level KPIs, such as the overall service level, to the very granular process data, such as the exact position of the trucks in the network. This range of data provides a joint information basis for all levels of seniority and functions in the supply chain. The integration of the data of the suppliers, the service providers, etc. in a "supply chain cloud" ensures that all the stakeholders can steer and decide based on the same facts.

In digital performance management systems, clean-sheet models for warehousing, transport, or inventory are used to set targets automatically. To keep the aspiration of targets intact in case of supply chain disruptions, the systems will automatically adjust the targets that cannot be achieved anymore to a realistic aspiration level. We will see performance management systems that will "learn" to automatically identify risks or exceptions and will change the supply chain parameters in a closed loop learning approach to mitigate them. That enables the automatic performance management control tower to handle a broad spectrum of exceptions without human involvement and to only leverage the human planner for the disruptive new events.

Efficiency

Efficiency in the supply chain is boosted by the automation of both physical tasks and planning. Robots handle the material completely automatically along the warehouse process – from receiving/unloading to putting away to pick, pack, and ship. Autonomous trucks transport the products within the network. To optimize truck utilization and increase transport flexibility, cross-company transport optimization is applied to share capacities between companies. The network setup itself is continuously optimized to ensure an optimal fit to business requirements. Ideas like special offers for delivery time slots with low truck utilization will be tried out.

I have personally observed the amazing success of Grey Orange and Addverb in the warehouse automation space in India.

Business benefits

In financial terms, the business advantages of a digital supply chain can be expected to result in significant business benefits. Up to 30 percent lower operational costs and a reduction of 75 percent in lost sales while decreasing inventories by up to 75 percent are the expected benefits. Another benefit that will accrue from this is the significant increase in the agility of the supply chains.

Implementation

The implementation of a digital supply chain calls for an agile approach and requires two key enablers – capabilities and environment. This means building a strong team with the right skill sets and providing them with the appropriate environment. This also calls for a high degree of organizational freedom and flexibility as well as state-of-the-art IT systems to enable rapid cycles of the development, testing, and implementation of solutions. The fast realization of pilots to get immediate business feedback on the suitability and impact of the solutions, to create excitement and trust in the innovations, is also required. I cannot over stress the importance of an agile approach in today's rapidly changing business and technology environment.

I have experienced first-hand the travails, tribulations and rewards of businesses in their digital transformation journeys, and I do hope that this article provides some useful pointers in this regard.

Source: smefutures.com

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DIGITAL SUPPLY CHAIN: DRIVING THE FUTURE OF INDIAN COMPANIES

ANJAMI NAYYAR

Digital technologies are bringing a new era to supply chain management where suppliers and customers come together in a new way. The fourth industrial revolution is creating a disruption that is forcing companies to think about the ways they are designing their supply chain management. Emerging technologies are replacing the old and traditional methods.

Moreover, new trends, customer expectations, and the need for transparency at every level are driving the change. Digital technologies are bringing a new era to supply chain management where suppliers and customers come together in a new way. Transportation of goods via road, rail, and sea has had its challenges, and delay in product movement has been a routine phenomenon affecting every company, either in manufacturing or delivering, from online grocery companies, automakers to big pharma companies.

Businesses today make it necessary to respond instantly, which can happen only when the whole supply chain network is at your fingertips with real-time updates.

India's supply chain needs to be ready for this next leap for a more agile, responsive, and transparent network that can readily adjust to unknown variables across the industry, such as availability of resources, modification of orders, shortage or excess inventory, and so on.

In the past few decades, the complex network of logistics at various levels — from sales or manufacturing and ensuring the supply of production lines and delivery to customers — has shifted to an independent supply chain management function led by a Chief Supply Chain Officer (CSO) in many companies. In the past couple of years, this focus has been changing very fast. Technological disruptions like Big Data and analytics, machine-to-machine connectivity and human-to-machine interaction, 3-D printing, automation, AI, and AR are causing a radical digital transformation at every level of the supply chain, which promises to reduce inefficiencies, lower costs and make it more flexible.

A completely digitised supply chain relies on intelligent and integrated solutions instead of manual inputs. But most companies do not really understand what a digitised supply chain is. It is not just a supply chain where you change outdated technology with the latest and best technological platforms.

It is about creating a whole new way for the company to operate its supply chain management strategies — procurement of raw material to production to the customer, a system of networks that communicate with each other along with redefining the entire supply chain management for optimization of processes, restructuring planning and even production strategies. A digital supply chain helps companies enjoy the benefits of interconnected supply chain partners. It reduces information delay to near-real-time levels, stops miscommunication and is cost-effective. Let us look at the many benefits of a digital supply chain:

Lead times minimised: Reduce the lead time for procuring raw material or identifying the productive capacity so that orders get executed much faster.

Just-in-time (JIT): JIT has become accessible. With JIT manufacturing, now, every enterprise can adopt and enjoy digital supply chain by ensuring critical decisions and pushing last-minute deliveries, thus optimising decision-making and saving costs.

Forward-looking supply chains: With more shared and analysed data, digital supply chains help companies predict future requirements instead of operating reactively.

Eliminate glitches: Out-of-stock products lead to a loss of revenue. A digital supply chain ensures your company is never out of stock, nor overstocked — leading to heavy discounting in the long run.

Improved financials: Low lead times and a JIT approach in the digital supply chain not only helps reduce capital requirements, but also improves cash flow because less money is tied up to keep excess warehouse stocks.

Accessible data: All day-to-day data points are collected and recorded for future use. The use of cloud technology, IoT, and Big Data methods help optimise business processes.

Making change happen : It is quite clear that a digital supply chain is efficient as well as cost-effective. And, to kick off the digitising process of the supply chain, the C-level staff of an enterprise should first learn about the benefits of digital transformation.

They should analyse the existing supply chain process and identify the segments that need improvements on a priority basis. An experienced digital supply chain partner can ensure that the transformation process is managed in a way that brings in the maximum benefits. According to management consulting firm McKinsey, transformation into a digital supply chain requires two key enablers — capabilities and environment. Digitisation capabilities need to be built in the organisation, but typically also requires targeted recruiting of specialist profiles.

The second prerequisite is the implementation of a two-speed architecture/organization. It means, while the organisation and the IT landscape are established, an innovation environment with a start-up culture must be created. This 'incubator' needs to provide a high degree of organisational freedom and flexibility, besides state-of-the-art IT systems to enable rapid cycles of development, testing, and implementation of solutions.

Edited by Megha Reddy

(Disclaimer: The views and opinions expressed in this article are those of the author and do not necessarily reflect the views of Your Story)

Source: yourstory.com

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DIGITIZATION AND SCM

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The conversion of text, picture or sound into digital form that can be processed by computer is known as digitisation.

The SCM is the nothing but managing the flow of goods and services which includes all business processes that transforms raw materials into final products.

The objective is to involve the active streamlining of a business on supply side activities to maximise customer value and gain competitive advantage.

The following business flow includes text, pictures and sometimes sounds also.
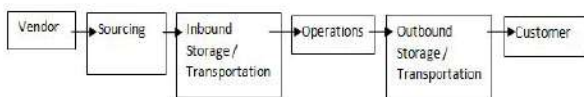
1. Material flow is from Vendor to Consumer
2. Information flow from Vendor to Consumer and Consumer to Vendor
3. Money flow from Consumer to Vendor

Earlier Business process needed automation only for step 2, but now all processes need automation.

Digitization is one of the tool for automation.

Digitization changes analog data / information to digital form.

Simple example of digitization is scanning of a document. After scanning, we might see and find it on the screen / monitor.

Supply chain digitization is achieved with software. It may be out of box or Custom made or combination of both. It needs to be focused on automation and business intelligence. The digitization of SCM business processes need to integrate with other technologies like ERP, Data warehousing, data mining , Business intelligence, Block Chain and Artificial Intelligence.

The advantages of Supply chain digitization are
1. Automation opportunity
    i.   It reduces manual task and minimizes administrative work.
    ii. It reduces human error, which means gaining back revenue lost from fixing these errors
    iii. It speeds up business processes.
2. Keeping things integrated and connected
    i.   Connecting disparate system
    ii. Enabling communication across the entire organization

iii. Creating a single source of truth for information.
3. Leveraging data for decision making
    i.   Transportation and Logistic industry decision need to be made immediately and agility is important.
    ii. It gathers and analyze massive amount of data with far less effort and far less time than with analog systems.
    iii. It helps in building strategies and plan for any scenario.

According to a benchmark study 79% of companies revealed that their business was impacted by supply chain disruptions, losing 4% or more of their total revenue in past 3 years. Over 150 supply chain executives were surveyed to understand the unique challenges they face as well as some insights into the best practices to avoid catastrophic disruptions.

By digitizing procurement and supply chain workflows, business can easily reroute parts through multiple sources, find components with low inventory levels and replace them with crosses, or confirm the lifecycle to ensure the part will be available for years to come.

So the modern science of management recommends using digitisation in Supply Chain Management.

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CORRIGENDUM/CLARIFICATION

Interview of Mr. Swapn Malpani-Joint President and Global Head Supply Chain – Cipla with the title "Procurement Trailblazer –Managing Resilience in Pharma Supply Chain" in June 2022 issue of MMR was done by Mr. B.V. Iyer, Past President IIMM. The photograph alongside the title of article, is of Mr. Swapn Malpani and not of Mr. B.V. Iyer

Article on page no. 21 of June 2022 issue of MMR on Sustainable Supply Chain and responsible sourcing was written by ITC India not by Mr. B.V. Iyer.

The error is regretted.

SUPPLY CHAIN DIGITAL TRANSFORMATION: HOW AND WHY IT MATTERS TO YOUR ORGANIZATION?

SAURABH SINGH, MENTOR & DIRECTOR
APPINVENTIV

Digitization has touched upon all aspects of businesses, including supply chains. Technologies such as embedded sensors, GPS, and RFID have helped companies transform their existing traditional (a mix of paper-based and IT-supported processes) supply chain structures into more agile, flexible, open, and collaborative digital models.

Digital transformation in supply chain management enables organizational flexibility, business process automation and accelerates innovation in supply chain management. In order to take maximum advantage of digitized supply chain models, it is important that companies make it an integral part of the overall business model and organizational structure.

In a Mckinsey survey of supply chain executives, 93 percent reported that they are planning to take steps to make their supply chains more resilient, including nearshoring and regionalizing their supply chains.

There's no denying that organizations are willing to digitize their supply chain management from the traditional approach to improve agility, efficiency, and visibility. On that note, let's dive into the meaning of digital supply chain management and understand how it is different from a traditional supply chain.

What is a digital supply chain?

In a typical supply chain, the flow of goods and services involves sourcing and procuring raw materials and parts, designing and making a product, estimating the demand, arranging sales channels and logistics, and then providing customers with visibility into their orders.

A digital supply chain, in contrast, provides significantly more visibility into the workings of the chain. It is the process of integrating and applying advanced digital technologies into supply chain operations, from procurement data, inventory management to transportation and distribution. For instance, Bluetooth Low Energy (BLE) asset tracking can provide instant updates on location, including when cargo is in transit.

The ultimate goal of supply chain digitization is to enable insights for greater efficiency and facilitate greater profits. Companies with digital supply chain transformation can better move their resources, people, assets, and inventory to where they are needed at any given time to reduce costs by responding proactively to transportation and manufacturing risks.

The potential payoffs of a fully-realized digital supply chain include saving in every area, including time, resources, money, and reduced environmental footprint.

Traditional vs digital supply chains : Traditional supply chains function on rules based on historical transactional inputs, while supply chains integrated with digital technologies function in real-time. While digital supply chains are networks, traditional supply chains are linear.

In digital supply chain management, information from IT and operational technology systems are integrated, while traditional supply chains often rely on standalone systems. Traditional supply chains require a lot of legwork when it comes to spotting possible problems and predicting likely risks.

With supply chain digitization, in contrast, shared quality and control data can enable companies to anticipate issues and take immediate precautionary measures. Above all, in digital supply chains, machines are driving the decisions with human oversight, while in traditional supply chains, humans are making decisions based on machine inputs.

Why does digital transformation matter in supply chain management?

Digitization in supply chain management empowers your planning, sourcing, and logistics teams to collaborate, automate and effectively leverage analytics. It has also proven to drive growth, mitigate risk, and optimize costs.

Digital Supply Chain Benefits

1 Accelerates innovation

2 Better decision making

3 End-to-end customer engagement

4 Organizational flexibility

5 Increases automation

Here are a few other supply chain digitization benefits, so let's dive in!

Organizational flexibility: With a digital operating model, management has greater freedom to choose the appropriate degree of centralization needed to

support specialization or minimize process costs given different local labor costs and productivity levels across locations. A major benefit for an organization when it centralizes certain specific functions is higher value through better quality and productivity.

Better decision making: Once your supply chain is integrated with digital technologies, you will make faster and informed decisions for each specific function. Also, you can measure performance accurately and efficiently by aggregating transactions and available information at the macro level, thereby making appropriate decisions to avoid distortions created by average costing.

For instance, BASF, a German multinational chemical corporation, is using AI and machine learning-based technologies to accurately predict when the product stock is running low and what is the optimal time to replenish supply and minimize disruptions. This has led to increased visibility into inventory levels, which supports smarter replenishment planning, more efficient decision making, and, ultimately, better service to customers. The recent tech development in digital twin technology for businesses has also brought a model-driven decision making approach into the picture for sustainability and feasibility.

Increases automation: An end-to-end digital platform creates efficiency, improves data accuracy, and increases supply chain efficiency by automating many labor-extensive processes and facilitating decision-making at multiple stages in the lifecycle. Automation also determines the most appropriate shipping mode, carrier, and schedule while considering time, speed, priority, and other elements.

For instance, alerts are generated automatically when purchase orders are in danger of delays or complications. This helps companies to take precautionary measures and be better prepared to handle customers.

Accelerates innovation: All digital transformation processes are aimed towards a single goal – innovation. This improvement over the conventional way of supply chain management will help strengthen the company's business model and, at the same time, help build relationships with not only suppliers but also customers.

End-to-end customer engagement: Digital transformation in supply chain management will increase customer engagement in his journey. For example, after placing an order, a customer will stay updated with his order details until receiving it with the help of the supplier's automated tracking system. This will ensure that customers have more control, feel more secure, and appreciate their experience when buying that brand.

Farmer Connect is one such company that uses technologies like Blockchain to connect coffee growers with the consumers they serve. They have launched a mobile application 'Thank My Farmer' that allows coffee lovers to trace the quality and origin of their coffee, and even support the farmer who grew the beans. The app connects the user to farmers, traders, roasters, and brands.

Top tech trends in supply chain digital transformation : In this section, you will learn about different supply chain trends you must optimize in 2022 and beyond to improve your organization's overall productivity and performance. So, let's begin!

eCommerce integration

Blockchain

Internet of Things (IoT)

Artificial intelligence

Supply chain digital twins

eCommerce integration: Modern-day technology in supply chain management allows B2B sellers to identify and resolve any inefficiencies within their supply chain models.

Connected systems make it possible for them to offer seamless customer experiences and run efficient operations. Thus, companies are starting to utilize the benefits of interconnected supply chains for their eCommerce operations, enabling a free flow of information across departments.

Artificial intelligence: Artificial intelligence (AI) in the supply chain consists of a toolbox of technology options that help companies understand complex content, enhance human performance, and take over routine tasks.

Currently, AI and analytics help supply chain leaders solve long-standing data silos and governance challenges. Its capabilities allow for more integration and visibility across networks of stakeholders that were previously remote or disparate.

Internet of Things (IoT): IoT is a network of physical objects connected to the internet. The IoT already plays a significant role in the supply chain, but it will likely continue to grow in importance with increasingly diverse applications. In just a few years, 50% of companies could be using other advanced technologies to support supply chain operations.

IoT in manufacturing and supply chain can also be used to improve warehouse management, fleet tracking, inventory control, and even technological and mechanical maintenance. It could be even used to create entirely smart warehouses and fleets, increasing the efficiency.

Blockchain: Blockchain has been incredibly beneficial for businesses to minimize supply chain disruption and improve customer service. By 2024, the global spending

on blockchain solutions is projected to reach almost 19 billion U.S. dollars. Over the past few years, this technology trend has integrated different business streams such as carriers, shipping lines, and logistic providers into a single platform.
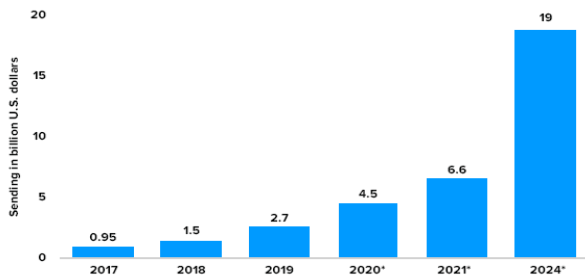
Blockchain also allows logistics business operations to process data by cutting out waste efficiently. The transparency offered by blockchain technology helps identify issues even before they occur.

Supply chain digital twins: It is a virtual representation of the supply chain that consists of hundreds of warehouses, inventory, assets, and logistics positions. Using AI and advanced analytics, the digital twin simulates the supply chain's performance, including all the complexities that drive risks and vulnerabilities. A digital twin also increases visibility and helps your workforce to take advantage of opportunities, particularly in complex supply chains.

Five steps to a digital supply chain : Moving from a traditional supply chain to a digital supply chain is a complex process, but taking the first step is essential if you want to reap the maximum benefits of digital transformation. Here are the steps that will help you prepare for digital transformation in your supply chains.

1. Define a vision: The first step for implementing digital transformation in the supply chain is to define a clear vision. Make sure that the vision is aligned with your enterprise goals. These goals can be related to your business objectives, such as better and faster decision making, automated operations, and improved supply chain visibility.

- **Assess resources and existing systems:** Identify what capabilities you'll need to achieve your transformation goals and determine the gaps. Look for:

- **Legacy systems:** Ensure that your existing systems use technology that can support your new goals. Is the technology used by you aligned with your business objectives? Identify digital solutions that will help achieve the desired business outcomes.

- **Data collection and analysis:** Assess the capabilities of existing systems to generate, collect and analyze data. Check if the data can be accessed easily to draw actionable insights.

- **Workforce skills:** Determine if your team has the necessary skills to work with and adapt to the new business model.

2. Unify data and processes: Use a unified platform to gain complete, end-to-end supply chain visibility. Utilize the enhanced transparency for streamlining core functions, including inventory management, warehouse management, demand forecasting, and logistics. The main objective is to increase visibility for every role and process across the extended supply chain.

3. Automate the planning process: With automated planning, you can simplify tasks and derive meaning from large volumes of data. Replace routine or recurring tasks with automated processes. But do not automate processes that involve complex situations or require collaboration between planners.

4. Use data and analytics: Supply chain leaders need access to real-time data to make informed decisions. It also helps them deal effectively with partners, suppliers, and other related functions. Real-time data also helps identify potential disruptions and increases visibility across the supply chain.

Moreover, you can use AI-powered analytical tools to improve planning processes and draw actionable insights. For instance, using analytics, you can help prevent an out-of-stock situation and adjust inventory accordingly.

5. Align people with processes: Even if you shift to a digital supply chain, it would be futile if your team members were not aligned with the new techniques and processes.

This shift should integrate technologies with processes, people, and management. Without such integration, teams may not be able to achieve the desired results in the new business model.

Final thoughts

The quickly changing technological landscape and heightened customer expectations are causing organizations to revisit how they do business. Integrating the supply chain with digital technologies can lead to greater efficiency, flexibility and build resilience.

For businesses re-evaluating their supply chains, now is the best time to start putting their plans into action. Digital transformation in supply chain today is one of the most effective and safest ways to build a resilient business.

We are a trusted brand that offers digital transformation solutions to help you get acquainted with changes through the shortest learnability curve. We have served digital transformation company across the globe, making it easier during your transformation journey.

Source: appinventiv.com

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ESG AND SUSTAINABILITY: SHAPING A DIGITIZED, ENVIRONMENT-FRIENDLY PROCUREMENT VALUE CHAIN

ASHWANI NARANG, VICE PRESIDENT AND COUNTRY HEAD – INTELLIGENT SPEND GROUP, SAP INDIAN SUBCONTINENT

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The turn of the new decade saw the rise of ambitious sustainability goals. Products with sustainability labels received increased traction. Around the same time, the social media influencers were voicing their support for ethical work practices and security for front line supply chain workers. As a result, sustainable procurement became a priority in enterprise strategic agendas. But in 2020, when COVID-19 rocked the world economy, new challenges emerged.

The impact of the pandemic on supply chains was disruptive. Many feared that the crisis would dampen the growing enthusiasm to invest in sustainableprocurement practices. But it did the just the opposite.

After an initial slump, sustainable procurement was back on the radar. In our recent survey, the majority of respondents ranked sustainability as a top procurement priority in the next two years. This collective confidence to drive supply chain sustainability initiatives is a direct result of several recentevents and developments. For example, weather disasters in 2020 saw businesses around the world suffer losses in the billions.This, in turn, brought climate change issues to the forefront of sustainability discussions.

On the regulatory side of things too, 2020 proved to be definitive year for the sustainability movement. New regulation surged organizations to look at procurement from the sustainability perspective. In one such recent example, SEBI published a circular on Business Responsibility and Sustainability Reporting (BRSR) for India's top 1000 companies by market capitalization. The circular is as a welcome change from the erstwhile Business Responsibility Reporting (BRR) regime which had several gaps in reporting requirements. The BRSR will help regulatory authorities create a single source of sustainability data that shareholders, investors, and the public can use.

Towards Green Procurement – How Can Technology Create the Difference?

With 2021 adding greater momentum to sustainability targets, the future will likely bring more investments in green procurement. Pressure from stakeholders on companies to deliver on their sustainability agendasis also expected to increase. To meet these demands, companies must increase supply chain transparency. This includes provide disclosure of their procurement activities and practices.

As supply chain sustainability gains traction, more procurement professionals will have to rise to the occasion as sustainability champions. To help drive progress, they will need to create more anti-fragile and greener supply chains. And this is where technology can help them create a difference.

Technology provides an opportunity to advance and empower, a company's sustainability agenda. Emerging tech such as AI, IoT, cloud, and roboticsplay a critical role in ensuring a sustainable supply chain. They enable seamless data transfer, real-time supplier visibility, and sustainability forecasts.Here are a few examples of how technology can drive a sustainability revolution in procurement:

E-Procurement : Healthy supply chains rely on seamless flow of information. And cloud and analytics-driven e-procurement can help provide supply chain professionals with the right information, at the right time. An e-procurement platformprovides end-users with the liberty to request for any service or item

from catalogues. In this model, the onus lies on the procurement teams to ensure that catalogues are always updated with information on product component, sourcing methods used, and green ratings. In India,the government and several public sector enterprises have started digitalizing supply chains with e-procurement applications. This includes using solutions for e-procurement, e-tendering, e-billing, e-payments, and e-receipts to:

· Collect supplier information

· Evaluate supplier performance

· Track supplier development

· Manage and mitigate supplier risk

· Vet and qualify suppliers

Besides helping companies streamline procurement as a process, e-procurement solutions such as e-invoicing can help companies reduce paperwork which directly enhances carbon footprintreduction and helps in environmental conservation.

Digital Contract Management

Sustainability-related risks are scattered across the supply chain, and they are often difficult to identify. In such a situation, businesses must rate the sustainability practices of their supply chains by monitoring individual suppliers across industries and geographies for better risk management and supply chain resilience.Moreover, language barriers, regional regulations and industry certifications further complicate accurate sustainability reporting.

Advanced contract management solution can help implement mandatory supply chain sustainability and ESG clauses in the contract. Such a solution can also allow companies to track the sustainability milestones associated with the contract. For instance, with a contract management solution, a company can implement a standard code of conduct for its entire supplier base. This code of conduct can include reporting data such as impact of materials procured, working conditions for suppliers, and sourcing information.This information can be verifiedto provide remedial guidance for suppliers that do not meet the code. Suppliers continuously breaching the code can also be removed, if required.

Digital Sourcing

Our survey highlights that companies in India consider key parameters like supplier performance and sustainability while evaluating procurement functions. To negotiate best-value sourcing agreements and drive sustainable procurement savings, companies need to create a healthy strategic sourcing environment. Here, digital sourcing is key.

It can help companies create a network of suppliers with a strong focus towards ESG, sustainability and diversity with the right tools and information. With digital sourcing, companies can leverage cloud-based collaboration platforms to increase spend and work seamlessly with multiple tiers of diverse suppliers and drive efficiencies across supply chain planning and execution processes. For instance:

● Share information related to order forecasts, quality requirements and inventory with suppliers and capture their response in real-time

● Predict and address supply assurance issues with collaboration dashboards that notify about demand-supply gaps

● Seamlessly onboard suppliers with proper sustainability due diligence and approval

There's a saying that an organization is only strong as its supply chain. And its high time that sustainability is brought into this equation as well. Technology can be a boon for companies looking to create sustainable and resilient supply chains. But only if it is embraced incrementally through change management. As a sustainability enabler, technology can allow companies leverage information, enforce ESG compliance through policy making, track spend for visibility and drive sustainable business outcomes.

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SUPPLY CHAIN DIGITALISATION IS A JOURNEY, NOT A DESTINATION

SEAN ASHCROFT

Amy Shortman of Overhaul and Burt White of Slync.io on why so many vitally important digital transformation programmes fail to get off the ground

Pre-pandemic, businesses already had a heightened interest in advanced analytics, so it was hardly a shock that COVID-19 should be the catalyst for widespread end-to-end digitalisation of supply-chain processes.

According to a 2020 McKinsey report into how COVID has shaped supply chains, almost every company is either planning to invest in full-scale digitalisation or already is, with construction the only sector not embracing digital transformation en masse.

Today's ongoing digitalisation programmes mostly focus on visibility, as companies strive for a better picture of the real-time performance of their supply chains.

Here, we get the views of two logistics tech professionals on what digital transformation of the supply chain means for them.

One is Amy Shortman (AS), VP Product Marketing, Overhaul, a supply chain risk management software company.

The other is Burt White (BW), Head of Marketing at Slync.io, which is transforming the logistics industry with solutions built to eliminate wasted time, effort, and data.

What are the biggest barriers to digitalisation?

AS: The most complex issue is standardisation of processes across the globe. Global supply chains involve multiple stakeholders, and they often use different systems. Some still use paper-based documentation and tools such as Excel to manage complex tasks that it was never designed for.

Others who are further along the digital transformation journey can find themselves using disparate systems or solutions that are not a fit for their business goals.

We're finding that, at the moment within the industry, many companies focusing on their digital journey often don't know where to start or select the wrong vendors, and this leads to disillusionment.

BW: In general, the biggest barrier to digitalization is sheer complexity. One of the hardest decisions is choosing where to start in order to be successful. Secondly, there's not just one tool or system that can completely digitalize your operations. It usually involves layering on top of an existing system and working within existing processes.

How can digital transformation barriers be overcome?

AS: Those who succeed know what problems they are looking to solve and have a clear vision of how technology will support them, adding value to the bottom line. To extract value, a business needs to convert its process to digital and adapt business operations to extract the possibilities that stem from digitalisation.

It's critical to have clearly defined objectives and goals and ensure change-management methods are used in the implementation of digitalisation technology. A systematic approach to the transition or transformation of the organisation's process is required to support the change, control the change, and help people adapt to the change.

BW: To work through these barriers, start small and simple, focusing on areas that are within your control and are likely to have high user adoption. Consider focusing your digitalisation efforts inter-department, inter-partner, or inter-silos. Forego pilots and proof of concepts and instead use a phased

implementation approach.

Take a single business process—such as transportation, warehousing, or planning—and then roll it out from there, demonstrating success and capturing the lessons learned at each phase. Do not be afraid of failing and making mistakes as digitalizing the supply chain is an iterative process. Tackle more complex processes like order management with an outside partner that has additional experience and expertise.

Is collaboration key for digitalisation programmes?

AS: Data sharing and transparency are essential to maintain supply chain flows. Supply chain software solutions should be able to ingest data in various forms, including digital. For example, a delay notification so the warehouse can manage inventory expectations from production and communicate proactively. The digitalisation of the data can be transformative, providing data-driven insights to supply chain stakeholders of the information that matter most to them.

If a firm can digitalise in just one area, what would you recommend?

AS: After the past few years, we have all felt the impact at a consumer level of supply chain disruptions. I would start with supply chain risk management and use the insights to communicate status updates up and downstream proactively.

Leveraging data for transparency, visibility, situational risk-management - and incorporating these things using real-time data - will reduce risk in the supply chain, which is what we're trying to do - whether that's the risk of theft or a failure of temperature control. The ultimate goal is to deliver safe and effective products.

BW: Choose an area where all parties have a vested interest in being connected. A more mature function like transportation or warehousing is often a good place to start. Then follow that in order of increasing complexity to eventually tackle areas like order management, forecasting and planning.

Which area of/ supply/ chain is most difficult to digitalise?

AS: Any area where there are multiple parties involved, because every company has a different way of operating. In ocean shipping for example, each carrier, location, or party has a different way of booking a shipping order and confirming freight will be loaded onto a vessel.

Because of this, operators have to sift through hundreds of emails each day, review non-standardised documentation, and assess which steps they need to take to ensure the right cargo goes to the right place at the right time. Meanwhile, it's hard to predict exactly when a supplier will have cargo ready for a shipment, whether the right equipment is available to them, and what steps need to be taken in order for it to reach its destination. All of this makes for a complex process that very few people or systems are well equipped to manage. Because so much data exists in many different places or forms of communication, the process remains fairly archaic by today's standards.

BW: The backend of the supply chain, from raw materials to sourcing and manufacturing, is typically harder to digitalise since there are so many different players with varying degrees of maturity.

For example, you could have a vendor that is very reliable in terms of quality and cost but they still use spreadsheets to manage shipment schedules. It would be harder in terms of implementation and adoption to digitalize processes with a vendor like this as compared to a more mature contract manufacturer.

What is the biggest benefit of digitalisation?

AS: Transparency. Digital transformation creates the opportunity to make better business decisions. It creates more efficient workflows, increases data security, improves customer service, and brings information into a central location where it can be accessed, analysed, and the value extracted.

SOURCE: supplychaindigital.com

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DIGITAL SUPPLY CHAIN QUIZ

Digital Supply Chain Quiz

1) A term NOT related to digital supply chain
   a) Control Tower
   b) Digital Twin
   c) Big Data
   d) Bottleneck subordination

2) Factor which is NOT a catalyst to the evolution of digital supply chain (DSC) is
   a) Risk mitigation
   b) Outsourcing
   c) Resilience
   d) Visibility

3) All are related to a digital supply chain EXCEPT
   a) DSC is a set of processes that use conventional technologies
   b) DSC provides better insights into the functions of each stakeholder along the chain
   c) DCS integrates legacy supply chain management technologies
   d) DSC provides more visibility into its workings

4) Which of the following statement about traditional supply chain and DSC is NOT true?
   a) Traditional supply chain is static while DSC is dynamic
   b) Traditional supply chain works on rule based transactional inputs while DSC works on real time
   c) Traditional supply chain needs laborious preplanning while DSC anticipates issues and proactively respond
   d) In traditional supply chain humans make decisions based on machine inputs while in DSC machines are taking decisions without human intervention

5) Devices that connect to the internet and share data with each other is collectively known as
   a) Artificial intelligence
   b) Robotics
   c) Internet of Things
   d) Blockchain

6) An artificial intelligence with humans out of the loop is called
   a) Autonomous intelligence
   b) Assisted intelligence
   c) Augmented intelligence
   d) Aggressive intelligence

7) Computer vision makes it possible to control the work of the conveyor belt and predict when it is going to get blocked. The machine learning technique used here is
   a. Supervised learning
   b. Unsupervised learning
   c. Deep learning
   d. Reinforcement learning

8) Which of the following is NOT true about blockchain?
   a) Transactional ledger
   b) Digital
   c) Consensus driven
   d) Centralized

9) "Predictive shipping" is a concept patented by
   a) Amazon
   b) Walmart
   c) SAP ARIBA
   d) McKinsey

10) All of the following are digital waste EXCEPT
   a) Manual data handling and its updation frequency
   b) Information handling in silos and manual intervention
   c) Physical process execution
   d) Advanced forecasting techniques

SUSTAINABILITY QUIZ ANSWERS	
1.	a
2.	b
3.	c
4.	a
5.	a
6.	b
7.	c
8.	b
9.	a
10.	b

2022: FUTURE TECH IN SUPPLY CHAINS

GEORGIA WILSON

Leading consultants weigh in on the future global technology trends that will define the advancement of supply chains in 2022

Experiencing no shortage of shocks to supply chains, most disruptions outside of COVID-19 and the global financial crisis have been industry specific. "We've seen flooding disrupt the electronic components supply chain, hurricanes disrupting the chemicals industry, or earthquakes disrupting the automotive sector just to name a few. Global production networks that took shape to optimise costs and efficiency often contain hidden vulnerabilities—and external shocks exploit those weaknesses," reflects Knut Alicke, Partner at McKinsey & Co.

Global events such as COVID-19 have exposed existing challenges across business operations and pushed organisations' ability to adapt to dramatic shifts in supply and demand. "All of this is occurring against a backdrop of changing cost structures across countries and growing adoption of revolutionary digital technologies in global manufacturing," adds Alicke.

With most companies, before the pandemic, accelerating the digital transformation of their customer journeys and value chains, McKinsey & Co,. "expects digital technologies to be at the core of the next normal, enabling organisations to better meet the needs of their customers, and improving the agility and responsiveness of operations without increasing their costs," says Alicke.

"During the crisis, many companies have been able to overcome staff shortages by automating processes or developing self-service systems for customers. These approaches can accelerate workflows and reduce errors—and customers often prefer them. Digital approaches can transform customer experience and significantly boost enterprise value when applied end to end.

"Companies are also taking a closer look at the suppliers in their value chain in order to gain a better understanding of their production footprint and financial stability. In fact, in a McKinsey survey of supply chain executives, two-thirds of respondents reported asking key suppliers whether they have business continuity plans in place, and an overwhelming 93% reported that they plan to take steps to make their supply chains more resilient, including building in redundancy across suppliers, nearshoring, reducing the number of unique parts, and regionalising their supply chains," adds Alicke.

The Pace of Digital Transformation in Supply Chains :
With recent events exposing the complexity and inherent vulnerabilities in global supply chains, "the scale and pace of change was unprecedented, for example online grocery deliveries increased more in the first 10 weeks of lockdown than in the previous 10 years," says Matthew Burton, Supply Chain & Operations Leader, EY EMEIA.

"Supply chain has since become a boardroom priority for many companies. This has triggered a new wave of technology investment focusing on building supply chain intelligence, resilience and agility to better respond to events, risks and opportunities."

Adding to Burton's comments, Brian Houck, Partner and Mark Hermans, Managing Director Operations Consulting at PwC explains that the industry is "at a significant crossroad in the adoption of supply chain technology. With the growth in cloud technology, artificial intelligence (AI) and machine learning (ML), we are seeing a shift from the supply chain tech approach with discrete applications (e.g. Transportation Management System (TMS), Warehouse Management System (WMS), Demand Planning) to an evolving platform approach.

"Old approaches of black box and on-premise software can't keep the pace of our clients' businesses. Organisations must raise the bar on supply chain efficiency, agility, and resilience to meet customer demands in the most cost-effective manner, and supporting technology needs to adapt with the same agility."

With the pace of digital transformation accelerating for nearly every organisation, "technology is more strategically important than ever before for businesses," adds Steve Davenport, Global Technology Lead for Supply Chain & Operations at Accenture. "In fact, our research shows that 64% of supply chain executives report the pace of digital transformation for their organisation is accelerating. As a result of the rapid digital transformation, we've seen growing investments in data, AI and digital twin technologies to power supply chains.

"In the coming months, businesses will be able to prioritise the idea of learning from the future. New sources of data and AI driven models can be applied across companies' product development, supply chain, and sales lifecycles to give them greater confidence, knowing they are on the right path to growth. Ultimately, learning from the future can help companies prepare for risks."

2022: Future Tech in Supply Chains

"Over the past 18 months, leading organisations have developed the ability to rapidly adapt business models and supply chain ecosystems to live with a high degree of volatility and disruption. In many cases, driven by necessity, companies used this period to increase overall investment in digital supply chain technologies and replace legacy platforms in order to gain end-to-

end visibility and bring risks under control," says Burton.

"Moving into 2022, we expect to see companies move from 'survive' to 'thrive', with priorities moving away from managing risk and disruption and towards exploiting future growth. To accelerate this growth, innovation and investment will target winning in the market with new products, service offerings and consumption models. This will require digital technology to build new capability around (1) designing for consumer perceived value (both product and experience), (2) driving scale and efficiency through new distribution models including direct to consumer, click and collect and subscription, and (3) harnessing the power of the full supply chain ecosystem by improving interconnectivity across customers, partners and suppliers," Burton continues.

Adding to Burton's comments, Chris Andrews, Supply Chain Transformation Leader, EY UK says "in 2022, we expect businesses to continue investing in building the 'intelligent foundation', improve end-to-end visibility and better enable risk management and decision making when it comes to their supply chains. There is a recognition that the volatility and disruption witnessed in recent years will continue to be facts of life, requiring businesses to have the ability to ingest, process and make sense of billions of data points to stay ahead and remain competitive."

As companies continue to build out their existing supply chain technology capabilities, Andrews expects to see "further investment in (a) **advanced planning solutions** to better sense changes in demand and supply and accelerate the ability to respond, (b) **end-to-end control tower** to enable real-time visibility of supply chain performance, risks, opportunities and events and allow leadership teams to make better informed end-to-end decisions, (c) **cognitive automation** platforms to make real-time recommendations, predict outcomes and make supply chain decisions autonomously within the context of agreed boundaries and business rules, creating the self-driving supply chain."

Agreeing with Andrews, Alicke adds, "the next generation of supply chains is based on advanced technologies, like AI, Internet of Things (IoT), and robot process automation (RPA), and has the potential to transform manual repetitive tasks with superior performance. However, these approaches will only be successful if the right roles are embedded in an appropriate organisation structure. In the supply chain organisation of the future, we will find new organisational units supporting end-to-end supply chain management: predictive demand management, end-to-end supply planning and execution, no-touch order management, operational logistics, advanced network and configuration, and data mastery."

"In 2022 companies will begin to realise that the original use for AI/ML is not returning the expected value and results due to weaknesses in underlying data and hesitancy to fully trust these engines. This will not stop investment in AI/ML, but will result in a repositioning of where and how to apply the technology. We believe that the concept of 'self-healing' supply chain data will

emerge, shifting focus on AI/ML to help identify and correct data issues in real-time. This will enable supply chain leaders to spend less time debating the quality of the data and more time driving actions. As a result, these innovations will pave a path for AI to become a standard by 2023/2024 for front-end technologies," adds Houck and Hermans.

Emerging from the pandemic, companies are already moving to provide value and building the foundations to scale and drive the next level of intelligence and automation, "we expect three new technology trends to continue to emerge. **First** is technologies related to improving visibility and collaboration around sustainability in the extended supply chain. This is largely driven by the increased commitments companies are making in driving towards net zero carbon emissions and the extension of this commitment to Scope 3, which includes their external suppliers and their respective value chains," says Gustav Mauer, Consumer Products Supply Chain Leader at EY UK.

"**Second** is a renewed interest in revitalising product lifecycle management (PLM) technologies to support the volume and rate of innovation ramp-up required to meet the ever-increasing consumer need for new products and services. The **third** technology trend is in the area of risk and cybersecurity where companies will really push hard to bring cyber security beyond just their corporate IT systems into their factories and warehouses' operational technology (OT) environments. This trend is driven by the increased number of cyber attacks and the significant vulnerability of these physical environments due to their increased level of reliance on technology," adds Mauer. Other priority technologies expected for 2022 include cloud, digital twins, and augmented reality (AR) technologies.

"Cloud is a top-priority technology for supply chain executives, cited by 42% of executives surveyed by Accenture earlier this year. The fact is, the pandemic opened the eyes of enterprises to a new reality and cloud is now at the core of the company, not just the periphery. The hyperscalers will start to be seen by customers as strategic supply chain ecosystem partners, providing innovative capabilities and services well beyond cloud hosting of traditional supply chain vendor software. Technology is no longer just one vehicle for success—it's the vehicle all possible success depends on," says Davenport.

"In addition to cloud, we believe more businesses will implement digital twin technology. This will allow for businesses to gather, visualise, and contextualise data from across their physical assets and projects, bridging their physical operations and digital capabilities. This new and improved line-of-sight across business operations is critical for businesses to remain agile in the ever-changing global environment. Technologies like augmented realities (AR) will also continue to gain traction, as AR provides access to data and digital systems enabling businesses to in turn be more efficient, accurate and safer," concludes Davenport.

Source:supplychaindigital.com

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ARTIFICIAL INTELLIGENCE FOR SMART SUPPLY CHAIN MANAGEMENT

Artificial Intelligence for Smart Supply Chain Management

DR.A.P.JAYARAMAN, NUCLEAR SCIENTIST, PRESENTLY CHAIRMAN, NATIONAL CENTRE FOR SCIENCE COMMUNICATORS AND A PAST CHAIRMAN OF IIMM MUMBAI BRANCH. drap.jayaraman@gmail.com

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 informated. Thermodynamically, information is described as negative entropy and entroy 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 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 cols data.

Buyer Beware : From the simple transaction of buying, to the complex functions of purchasing, procurement, Materials Management, Materiel Management and SCM, there has been a progressive development of the 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, SCMrs 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 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 decimates 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 : 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 overall 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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BLOCKCHAIN OFFERS NEXT-GENERATION TRACEABILITY SOLUTIONS FOR SUPPLY CHAIN MANAGEMENT

Blockchain is the new buzzword we are all aware of. Bitcoin and cryptocurrency are the most talked-about applications of blockchain that have raised many eyebrows in the financial sector. But beyond that, blockchain has wide applications in different fields. Supply chain management is one of them. Before going into the details of how blockchain based traceability is revolutionizing supply chain, let us understand what blockchain is and how it works.

Blockchain is an encrypted ledger of digital data that is continuously authenticated with every new change by linking transactions in the form of a chain. The entire process is automated and hence transparency and efficiency are ensured for various parties involved including – dealers, distributors, suppliers, and third parties. The information or data is stored digitally in blocks, spread over thousands or millions of computers through an integrated network having algorithms to authorise/ check the authenticity of transactions.

With each scan, a new block gets added to the chain, automatically updating the information in the distributed ledger network spread across multiple stakeholders. Hence, you don't have to manually add information, worry about manipulation or falsified information, plan against the bullwhip effect, or stand in the queue for information updates from other parties.

With this clarity on how blockchain works, let us see what it has to offer in supply chain management (SCM). The Council of Supply Chain Management Professionals (CSCMP) defines SCM as planning and management of sourcing, procurement, conversion/production, and management of logistics activities. It includes collaboration and coordination with multiple parties such as suppliers, distributors, stockists, other intermediaries, third-party service providers, and customers. With supply chain management becoming more complex due to globalization, competitiveness, increased number of SKUs, quality standards, etc., traceability is gaining traction.

With the help of GS1 standards and GS1 India's traceability solution, DataKartTrace, you can determine information of product in the supply chain, such as its location, source, destination, manufacturing details, expiry date or shelf life left, etc. GS1 is a trusted and authorized body founded by the Ministry of Commerce & Industry, along with apex trade bodies, to help Indian manufacturers adopt global barcoding standards. GS1 India's DataKartTrace enables continuous monitoring of a product as it moves from one node of the supply chain to another, and thus, helps in taking tactical, strategic, and real-time operational decisions. Having visibility helps make the system flexible and agile. It helps reduce time and effort by removing activities like manual recording, inaccurate pickups, inaccurate deliveries, etc., thus making the entire process much more accurate and faster.

In 2013, as per the Deloitte Global Supply Chain Risk survey, companies highlighted issues of low visibility with respect to their extended supply chains. Without traceability, one can encounter numerous challenges, such as difficulty in gathering product information, lack of product history, difficulty in complying with Regulatory norms, unstandardized information, etc. GS1 traceability standards when used along with blockchain technology help you record transactions faster and enables instant authentication.
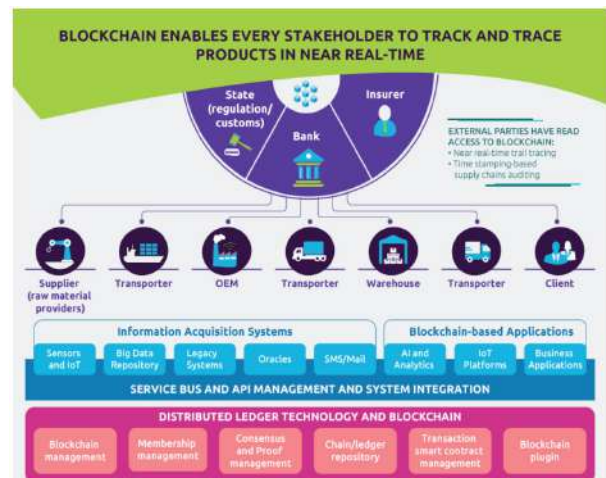
Traceability using blockchain alone does not ensure a fool-proof solution to SCM problems. For example, if the data ingested is inaccurately fed by the user, then the results will be of no use. GS1 standards can enable automatic data capture using AIDC technology and hence, making the data capture accurate. They allow users to ingest incorrect information through a simple scan. Barcodes capture unique identification of products/consignments and links the same with relevant data, such as location, temperature, etc., for effortless sharing.

Ecosystem Interoperability
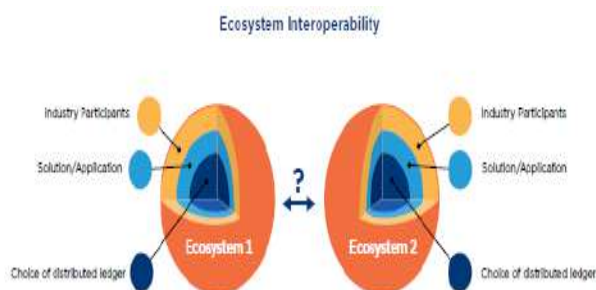
Blockchain provides a distributed ledger that catalogues transactions in an immutable, time-ordered manner whereas GS1 standards record and share the accurate data in a structured format, enabling interoperability between systems.

Blockchain and Identify, Capture and Share
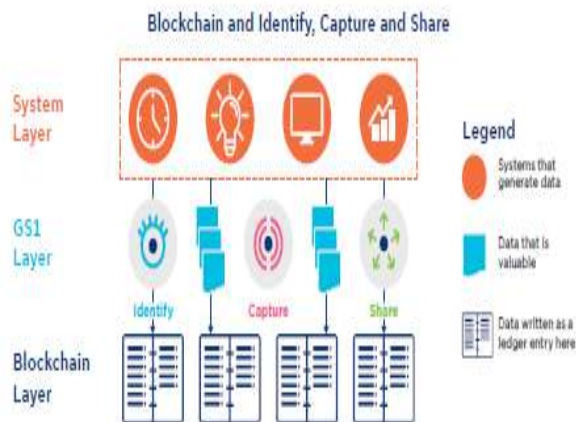
GS1 standards for identification and structured data enable blockchain users to have scalability and integrity in their supply chain. GTINs, coded into barcodes, also enable the linking of additional product information in shared/ individual systems, which can be stored securely and shared anytime.

The foundation of blockchain-enabled supply chains governed by GS1 standards promises success in the product journey from supplier to customer.

Recently, UNDP Accelerator Lab India, along with GS1 India and Spices Board have joined hands to develop a Blockchain-based Traceability, Quality Assurance, and Trading System for Indian Spices. This will enhance eSpice Bazaar platform by ensuring food safety and improved quality. The project is supported by the Cabinet Office of Japan under the Japan SDGs Innovation Challenge 2020 .

During the pilot, farms and crops are being identified uniquely using GS1 identification and capture standards. The project is aimed at providing visibility to farmers in the spices value chain and their direct access to potential buyers, which will enhance their bargaining power and profits.
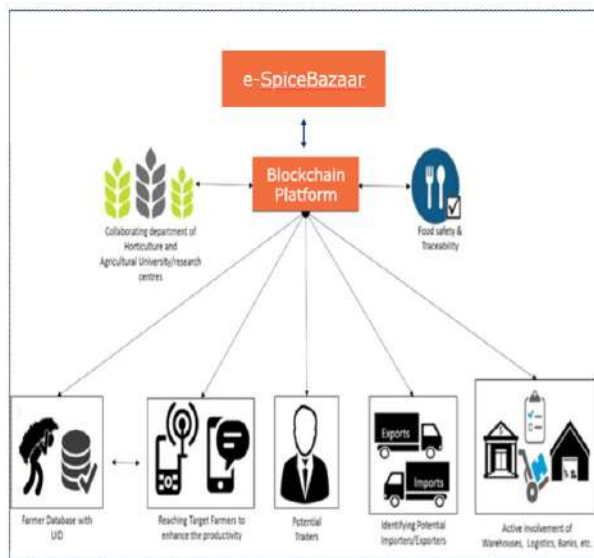
In another project, GS1 India has worked with NITI Aayog, the apex policy think-tank and change catalyst of the Government, on its pilot project that is aimed at ensuring the authenticity of pharmaceuticals using blockchain technology. The technology is used with unique identification standards of GS1.

The scope of the project enabled track and trace beyond traditional methods by allowing users to verify whether prescribed conditions for the transportation of drugs were maintained throughout the journey or not (through IoT sensors), and status was made available to stakeholders through a mobile application.

The project report titled: 'Blockchain: The India Strategy –Towards Enabling Ease of Business, Ease of Living and Ease of Governance' analyses the value of blockchain in facilitating trust in government and private sector interactions, followed by considerations for evaluating the blockchain use case for implementation. It also highlights possible challenges and lessons from NITI Aayog's experiences in blockchain implementation and showcases potential use cases that the ecosystem may consider.

Source:GS1 India

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BLOCKCHAIN TECHNOLOGY FOR SUPPLY CHAIN

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Covid-19 pandemic is the term of the year 2020 and the most widely used word across all content starting from articles, publications, podcasts, videos, and webinars. It has challenged all conventional best practices of the world. The entire world's resources mainly manpower was locked in-home quarantine and everybody understood the need for digitalization rather we can say there is a serious hype of Digitalization across industries in the entire world. Now, we are in 2021 – A year of hope for a fresh start of industries and business in the new normal and also check out a few possibilities of adopting digitalization technologies on a larger level rather than a smaller elite group of companies.

So, where to start? Let's check out which is the most susceptible function that requires immediate digitalization? Every industry or business has better control over internal processes but a very limited influence on the operations which are dependent on outside stakeholders. i.e. Supply Chan Function for movement of materials and finished products from upstream to downstream. So, Supply Chain is the most important segment where we need digitalization on top-priority to have better control and encryption.

Digitalization of the Supply Chain is possible by using a combination of technologies like Artificial Intelligence (AI), Machine Learning (ML), the Internet of Things (IoT), Industry 4.0, and Blockchain Technology. Let's check out the most revolutionary Blockchain technology which empowers the most popular crypto-currency namely Bitcoin. But, being a Supply Chain folk, do you know what is Blockchain?

It's a data structure that contains transactional records with complete security and transparency at a decentralized level (Block Level). It is a chain of immutable blocks and cannot be controlled by a single authority. It is an amend-only, distributed, and decentralized ledger technology that is operated by a peer-to-peer network mechanism that records and validates data by retroactively referencing a list of previous records using hash functions. You may find complete details on Blockchain in our previous article "Blockchain – The next of Everything!!!"

You can understand the basics of how the temper-proof and secured Blockchain transaction happens in the below picture.

Source : McKinsey.com

Without going into further details, let's check out the current challenges in traditional Supply Chain function irrespective of pre-post pandemic situations.

- Missing Latest Management Tools.
- Data Management Function Efficiency – How to share and manage information between entities decide the efficiencies in the operations.
- Lack of Visibility in SCM Operations
- Inadequate and delayed information flow
- The trust deficit between Buyers and Suppliers
- Fraudulent activities
- Logistics and Transportation Optimization – Addressing the same is a key variable to efficient supply chain management.
- Final Customer Feedback on Quality Improvement
- Building Long-term Stability

Blockchain brings the following native key benefits to any industry where it is implemented correctly and customized properly as per the need of the particular functions.

Supply Chain is also not an exception and can be highly benefitted by customization of Blockchain technology and use in combination with existing systems as well as ERP systems. Blockchain can be useful in the following ways for Supply Chain.

Fast and Reliable Transactions Processing : Blockchain is a distributed ledger and accessible to all stakeholders directly, hence eliminates any middle-level layer, and improves the speed and reliability of the process. It gives visibility to all stakeholders for complete transactions and there will not be any duplication of work as every stake-holder is responsible to make its entry. It also provides a facility to carry out a transaction with anonymity and privacy, to prevent any data breaching.

Further, it is self-regulated and doesn't rely on a central point of governance. It's completely automatic due to

consensus mechanisms are self-governed, and smart contracts follow the same principle, blockchain itself is capable of automating transactions that take place within supply chain processes.

Low Cost : Blockchain uses internet and mining capabilities for making a transaction, however, it is under complete digital setup and reduces dependency on manpower as well as eliminates middle level agents/banks which reduces the chain of levels that directly affects the costing of transaction. Further, any interruptions or extra charges will not be deducted from the transfer.

Transparency and Audits : Blockchain being a distributed ledger and accessible to all stakeholders in the Supply Chain gives visibility to all stakeholders about the complete transaction. Further, it's an append-only and non-editable secured process, so it creates trust amongst all stakeholders and end-consumers as well. In case of any disputes, any stakeholder can track its origin and journey. It creates trust and reputation amongst the stakeholders. It applies to both public and private Blockchain. Further, auditing will become very easy and convenient due to real-time transaction and inventory data available throughout the chain. A Digital ledger consolidates data from all parties and saves resource costs with automated audits

It's immutable and secure because it is appended only, this means data recorded on a ledger cannot be erased, changed, or falsified once it's entered.

Tracking : Multinational Supply Chains use sensors, IoTs, RFID tags, and barcodes to keep close monitoring and conditioning of the consignment throughout the Supply Chain. Real-time traceability and tracking of history are the most important parameters particularly in the B2C market where the lack of transparency leads to cost and customer relations issues which ultimately dilutes the brand name. It facilitates the tracking of purchase orders, detailed specifications, PO amendments, Materials or service receipts, shipment notifications, and other trade-related documents throughout the Supply Chain.

Smart Contracts : Smart Contracts management is considered as Blockchain 2.0. It enables the automation of the purchasing process as well as ensuring the quality, authenticity, and availability of goods. It can be used at any process like Procure to Pay (P to P), Source to Pay (S to P), or Logistics order fulfillment with pre-defined logics and detailed terms and conditions programming where automatic action triggers based on event happens.

Smart Contracts can handle all tactical and transactional levels of activities ranging from receipt of PO, dispatch of materials, materials movement, and fund transfer based on predefined specifications match and commercial conditions fulfillment which was written under a smart contract.

Such smart contracts will help to simplify the transactions and reduce working capital by establishing transparent Procure to Pay transactions. Smart Contracts also allow promoting dynamic efficient pricing based on certain conditions. Smart contracts can manage micro metering and micro monetization as well which can run a gigantic scale structure like Amazon Fulfilment services. It enables access to a diverse population and locations

Fraud/Theft Elimination

Blockchain's public ledger technology offers transparency and allows tracking of the ownership history of various precious items. i.e. Diamonds By this, it can prevent any unauthorized, illegal, or fraudulent transactions.

A single ledger version is shared with all parties. Any manipulation is red-flagged or marked as suspicious and documented which establishes "Single Version of Truth" and avoids any fraudulent activity. Further, it removes intermediaries for conducting transactions as blocks are immutable and directly connected without limiting by any boundaries of countries, currencies, banks, etc.

Data-driven outcomes

Blockchain enables the collection of real-time data across the entire supply chain which helps for better forecasts and control inventories at all levels of the Supply Chain.

Highly Customizablility

Another notable feature of blockchain that appeals to supply chain enterprise systems is the ability to integrate into existing technologies. It can work along with existing Supply Chain Systems as well as ERP systems to provide better control and enables automation in transactions. It also allows keeping the system public and open or private and restricted based on the need of the organization.

Based on the above features, E&Y has defined the following blockchain opportunities across Supply Chain Ecosystem in their E&Y Global Blockchain Summit.

Blockchain opportunities across the Supply Chain Ecosystem

"With Blockchain, there shall not be two versions of Truth" which generates trust and reliability in the Supply Chain.

Looking to its effective and efficient applications with a wide range of industries, leading Supply Chain Consulting Firms proposes Blockchain in Supply Chain Design, Rewamp, and Optimization Projects.

Source: sourcingandsupplychain.com

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THE FOUR TECHNOLOGIES SHAPING NEXT-GEN SUPPLY CHAINS

DANNY SHIELDS, VICE PRESIDENT OF INDUSTRY RELATIONS AT AVETTA, A PROVIDER OF CLOUD-BASED SUPPLY CHAIN RISK MANAGEMENT TECHNOLOGY AND SCB CONTRIBUTOR

Uncertainty is the only certainty there is," mathematician John Allen Paulos once wrote. The procurement and supply chain management industries are no exception, but next-generation technology provides trends worth watching.

With time, the supply chain has shifted from the back-office function it once was to a strategic driver of business growth. Contemporary business models, technological advancements and innovative processes have made supply chains efficient and agile.

Supply chains will become more complex and internationally dispersed. Procurement leaders need to build on newer capabilities to help them navigate the changing business landscape and adapt quickly.

At this rate, what will supply chains look like in the year 2030? Big data, cloud computing, artificial intelligence (AI), robotic process automation (RPA) and the internet of things (IoT) will help procurement leaders, contractors and supply chain managers meet future demand.

While big data in logistics is still in its infancy, it's the foundation on which AI, cloud computing and RPA become more accurate and effective in simplifying tasks and relegating them to automated systems. Big data expands the dataset for analysis beyond the traditional internal data in supply chain management systems and software. It also applies statistical processes to new and existing data sources. Now, most companies lack the tools and knowledge to explore and utilize big data in their supply chains. In the future, these tools will be more accessible.

Cloud Computing and AI : Supply chains generate big data, and cloud-based AI turns that data into insights. Cloud computing coupled with AI has transformed how supply chains operate, and its abilities will only increase in complexity over the next 10 years. Through predictive analytics, cloud and AI systems can use past trends and market indicators to facilitate the following processes:

- powering process automation
- informing supplier selection
- improving customer support
- streamlining supplier onboarding and automating supplier management
- providing real-time information on shipments
- analyzing carrier performance
- anticipating trends in operational issues

Progressive companies already utilize supply chain knowledge management systems to respond to supply chain difficulties in real-time. With a cloud-based, mobile-enabled solution, supervisors input information from the worksite, immediately notifying operators.

Companies can build transparent supplier relationships by automating the information exchange between an organization and its suppliers and contractors. Organizations can easily manage their vendors down to each individual worker across geographically dispersed worksites. Workers can complete site-specific orientation and training online before they set foot on site. Operators can track the completion status of the training curriculum and assess knowledge retention through online evaluations.

Analytics can help companies monitor supplier/vendor capabilities and track data on a supplier's compliance or performance. Traditionally, different departments compiled this information through paper records. Decision-makers had to sift through piles of papers or electronic files to find this information. Today, advanced analytics allows operators to define supplier attributes to categorize them into logical profile sections. Detailed supplier profiles make it easier for operators to quickly retrieve, process and validate supplier information in a matter of seconds.

Once a new supplier is onboarded, collecting, verifying and storing supplier data will ensure responsible supplier risk management. A high-end analytics engine can analyze this data to generate supplier performance insights in real-time. Such insights empower sourcing professionals to easily monitor the supplier and vendor pool, their credentials such as certificates of insurance (COIs) and their compliance status.

Delivering tangible cost savings has always been a critical task for procurement and will continue to be a high priority in the next decade. Considering this,

procurement leaders will have to look for newer ways to achieve cost efficiency. One way is through supplier analysis. Critical supplier information is often trapped in varying data management systems. Consolidating that data into one common repository helps operators get better visibility into spending across the entire value chain. A centralized data framework, complemented by an analytics engine, for example, can help decision-makers identify expensive or low-performing suppliers. A new central data management system can be seamlessly integrated with the legacy system through application programming interfaces (APIs).

Robotic Process Automation : Robots are expected to see "strong growth over the next five years, particularly within supply chain operations that include lower-value, potentially dangerous or high-risk tasks," according to Deloitte. With the massive growth in e-commerce, this should not surprise anyone in the logistics world. Robotic technology applications include automated vehicles like drones, trucks and trains, last-mile deliveries and storage and retrieval systems (ASRS).

The increased usage of autonomous robots can achieve the following objectives:

● increase efficiency and productivity

● reduce re-work and risk rates

● improve employee safety

● perform mundane tasks so humans can work more strategic efforts

● increase revenue by improving order fulfillment and delivery speed, leaving customers satisfied

New pricing structures will enable companies to invest in automation, making the leap into robotics much more feasible. Using a RaaS-type model (Robotics as a Service), providers lease units through a monthly service contract instead of customers paying an up-front capital expenditure.

Internet of Things : An emerging trend for supply chain managers is asset tracking through IoT to save time and money and enable data-driven decision-making.

The IoT is made up of interconnected physical devices that can monitor, collect and send data to cloud-based software for analysis via Wi-Fi. IoT devices have improved quality management in supply chains through GPS tracking of shipments and monitoring parcel conditions. RFID chips, smart devices and mobile sensors can track and authenticate products, measure temperature, humidity, light levels, movement, handling, speed and other environmental factors of shipments.

The growing pace of technological innovation propels digital supply chain management solutions. Thankfully, embarking on the technical journey will become more accessible and cost-effective as more technologies emerge. Organizations that rapidly adopt these emerging solutions while incrementally replacing legacy systems will better navigate this decade with greater insight and efficiency.

Danny Shields is vice president of industry relations at Avetta, a provider of cloud-based supply chain risk management technology.

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Source: supplychainbrain,com

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ELIMINATING 8 WASTES FOR IMPROVING SUPPLY CHAIN EFFICACY

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Abstract : A supply chain is a Chain of Supplies - is the network of all the individuals, organizations, resources, activities and technology involved in the creation and supply of a product, from the delivery of source materials from the Supplier to Manufacturer to Distributer to Wholesaler to Retailer and Eventually Delivery to the End User or Consumer. **Lean** is the concept of efficient manufacturing/operations that grew out of the **Toyota Production System** in the middle of the 20th century. Since then, "lean" which was started as an important concept, in the world of manufacturing first, has thrived in to other fields such as Supply Chain Management (SCM). **Lean management** is an approach to managing an organization that supports the concept of continuous improvement, a long-term approach to work that systematically seeks to achieve small, incremental changes in the processes in order to improve efficiency and quality by eliminating or minimising the process waste and maximising the value of the product or service to the customer.

In this article we shall discuss **8 types of wastes in the entire value stream of supply chain** and analyse **Cause - Effect & Solution** for **improving Supply Chain Efficacy**.

Key Words: Supply Chain, Supply Chain Management, Value Chain, Value Stream Mapping, Lean, Waste

Supply Chain Management (SCM) : A supply chain is a Chain of Supplies - is the network of all the individuals, organizations, resources, activities and technology involved in the creation and supply of a product, from the delivery of source materials from the Supplier to Manufacturer to Distributer to Wholesaler to Retailer and Eventually Delivery to the End User or

Supply Chain Management (SCM) is the Management of a Network of Inter-Connected Businesses involved in Receipt of Inputs, Processes and Delivery of Finished Goods or Services Required by the End Consumer. Supply Chain Management spans all Movements and Storage of Raw Materials, Work-in-Process Inventory and Finished Goods from Point of Origin to Point of Destination at Consumption.

Supply Chain Management (SCM) can be defined as **Management of the Supply Chains** as an **Integrated Process of Acquisition** and **Management of Flow of Supply** of from point of origin to point of consumption and **Delivering Further Value Added Output to the Next Level Point of Consumption** (like from supplier to manufacturer to wholesaler to retailer and to final consumer) by **Balancing Supply and Demand** with **Optimal Management of Resources** with the objective of establishing relationships for **Maximizing Value for Mutual Benefits** on Economically, Socially and Environmentally **Sustainable basis**. (As defined by the Author **SN Panigrahi** in his Article "**Value Insights into Supply Chain**" Published in Aug'2010 issue of MMR – IIMM).

Lean Concept : Lean is the concept of efficient manufacturing/operations that grew out of the **Toyota Production System** in the middle of the 20th century. Since then, "lean" which was started as an important concept, in the world of manufacturing first, has thrived in to other fields such as Supply Chain Management (SCM).

Supply chains generally are over imposed with **Value Chain** which refers to the process in which businesses receive raw materials, **add value** to them through production, manufacturing, and other processes to create a finished product, and then sell the finished product to consumers. A **Lean supply chain** focuses on **adding value** for customers, while identifying and eliminating waste—anything that doesn't add that value in the supply chain.The focus is on **reducing waste** in the entire chain of supplies resulting in **reduction of cost and lead-time**as well as an**increase in quality of delivery.**

According to Womack and Jones, there are **Five Lean Principles : Define (Identify) Value, Value Steam**
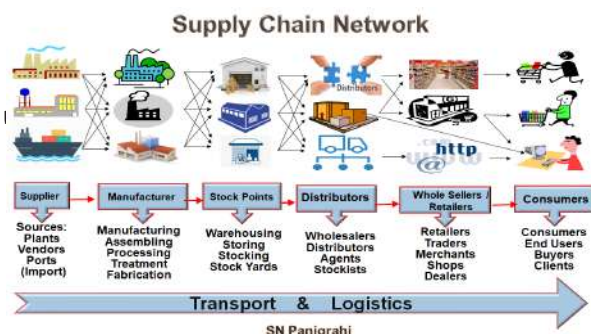
Mapping, Create Flow, Establish Flow and Pursuit Perfection.

Value Added(VA) & Non-Value Added (NNVA) : In lean, processes are configured so that they include only activities that add value to the item and ultimately to the customer, termed as **Value Added(VA)**– with everything else seen as waste.There are two forms of waste – firstly there is necessary waste, called **Necessary but Non-Value Added (NNVA)** – whereby the activity does not add value to the end product but is necessary for the process to function or for the business requirement – secondly there is **Non-Value Added(NVA)** activities that in no way necessary is treated as Pure Waste - which consume resources, increases cost or lead time as a result, but doesn't add any value. That means Any Activity or Features that Doesn't Add Value to the Product or Service, from the Point of View of the Customers and also not required by the Business.
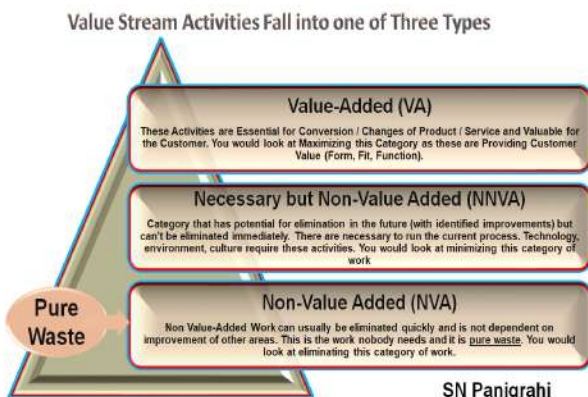
In order to **Improve Efficiency, Effectiveness, Profitability and Optimize Resources**, Lean methodology demands the elimination of any aspects of the process, material, effort, or expense that **add no value from the customer's perspective**. When **Waste is removed**, only the steps that are required to deliver a satisfactory product or service to the customer remain in the supply chain process. Lean Management consists of a set of tools that help to identify and eliminate waste.

8 Wastes : The 8 Wastes (Abbreviated as **Down Time**) are as follows.

Now let's discuss for each of the Waste in the Supply Chain analyse the **Cause - Effect & Solution**

1. Defects

Defects involve scrap or material that is thrown out or reworked…and much more. Concessions may be made to a customer or Discounted-sale pricing may be used so defective material can be sold. In addition, the quality control system that must be put in place for an out-of-control process has **high inspection costs**.

Every bit of scrap Costs Money and Time – Money for the Materials, Resource to pay staff, Utilities etc to do it again, but also means that you have to push another planned job back in the queue in order to get

the rework out! It's all cost and less cash for the business.

Paperwork (including electronic) tracking for defects and waste removal isn't free. Defects that actually reach the customer can cause greater pain, with loss of not only that customer, but many others from viral word-of-mouth dissatisfaction. Some experts estimate defects have a 10x negative impact on a company - **Waste Related to Costs for Inspection of Defects in Materials and Processes, Customer Complaints and Repairs / Rectifications**

1. Defect Waste : Cause - Effect & Solution

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2. Over Production

Overproduction is

Ø **Making something too soon,**

Ø **Making too much of something (greater Volumes), or**

Ø **Making something faster than is needed.**

It unnecessarily **consumes time, effort, money, materials and resources** that could have been better spent elsewhere, leaving your organization with the burden and logistics of dealing with **excess inventory**, Product Damage from warehouse stocking and removal, defects introduced by high-speed Processes, strain on human Interaction with Machines.

The problem is, "**the customer may want 10 items, for instance, but we will produce 20 items and store them**…….". **Producing something at the Wrong Time or in Unnecessary Amounts.**

2. Over-Production Waste: Cause - Effect & Solution

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3. Waiting

Waiting : When work in progress and goods are not being worked on, they sit there waiting – waiting for the next process. This is typical of traditional '**Batch and Queue**' methods. **Waiting means that product is costing the company money and not adding value.**

Waiting involves **delays to process steps**, often extending customer lead time. This may include waiting for authorization from a superior, even though the authorization is a rubber stamp rather than critical input. It can involve inefficient changeovers, poor communications, large batch processing, and uneven workstation loading.

Ø **Parts or Assemblies waiting in queues for the next step in the operation**

Ø **People Waiting for Authorization / Approval / Other Procedural Aspects, Waiting for Material, Equipment or Tools to Perform their Operation**

Ø **Finished Products waiting to be Shipped or Sitting in Stores**

Ø **Idle Equipment / Equipment Breakdowns**

Ø **Vendor / Third-party Company Delays / Logistical**

Delays

Waiting for people or services to be delivered (time when people, processes or equipment are idle)

3. Waiting Waste : Cause - Effect & Solution

Cause
- Unplanned Downtime
- Production Bottlenecks and not Balanced Production Workloads / uneven production
- Setup Times that are Too Long
- Producing to a Forecast Instead of a Pull System
- Not Enough People / Materials / Equipment / Tools / Other Resources
- Poor Quality Built into the Process
- Ineffective Internal Communication / Policies & Procedures Like Approvals / Authentications

Effect
- Waiting Waste ties up significant Capital in many businesses and the cost of capital drives up costs throughout the organization.
- Common waiting contributors include non-productive labor, equipment inefficiencies, production bottlenecks, lack of quality communication, insufficient materials, and information gaps; all of which contribute **Performance, Profits and Customer Satisfaction** because of Late Deliveries, Missing Schedules, Project Cost Over-runs.

Solution
- **Balanced Production Workloads** to ensure Even Production Flow
- Setting up a 'Pull' system from the End Customer
- Processes Adjustment to Eliminate Waste
- Establishing Stable Schedules
- Developing Multi-skilled / Flexible Human Resources so that people can respond quickly and be re-tasked to other areas as demand changes
- Just-in-Time Availability

Tip: One of the greatest steps one can take toward improving profits and reducing costs, is to remove all elements of waiting-waste from all business departments, processes

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4. Non-utilized Talent

Not fully utilized people represents the waste of talent present in many organizations. Because operators are close to their processes daily, they can often recognize problems or opportunities that staff or superiors just don't see, but the workers may never be asked for their input. They may also have outside talents that aren't formally part of their assigned jobs, but could be of use. The recommendation? **Value people for their brains, not just their brawn.**

Non-Utilized Talent is a key waste described in the lean manufacturing ideology. This waste pertains to the loss or incomplete use of human capability and resources within a production process.

Non-Utilization Waste is the waste of human potential, often the most costly waste of all. It occurs when management is too separated from the role of employees and managers view themselves as the sole resource for organizing, planning, assigning, controlling or improving work processes. When the role of employees is to simply follow directions without

question, non-utilization waste is bound to happen.

4. Non-utilized Talent Waste : Cause - Effect & Solution

Cause
- Wrong Selection of Resources / Wrong / Excess Recruitment
- Not being on Task / Not Following Processes / Not having well Established Processes
- Not Leveraging Available Critical Thinking Skills / Mis-assignment of Tasks to People with the Wrong Skills
- Demotivation of People / Lack of a Teamwork Environment / Poor Training.
- Seek to Limit Employee Development in the expectation that employees who advance their workplace talents and capabilities will seek "better" employment opportunities elsewhere or higher compensation for the given task.

Effect
- Many businesses suffer non-utilization waste, primarily because it is a cultural, not a technical issue. Signs of non-utilization waste can include low morale, inconsistent production or quality, unengaged people, micromanaging and lack of employee empowerment to make decisions.
- Organizations Risk Facing a Higher Employee Turnover Rate, Employee Frustration, and having to Pay Higher Salaries for Certain Employees even through under Utilized their Talent.

Solution
- Encourage Employee Involvement - create a culture that invites employees to be part of the work
- Cross Training, Self-improvement, Skills Advancement, Process Improvements, New Responsibilities, Work Flexibility, Reward and Appreciation
- Recognize under-utilized Talent, and channel it toward appropriate forms of development and training, will help usher in a new era of employee satisfaction, retention, and overall productivity.

Tip: Employees at any level can offer valuable insights about the job they perform every day. They witness first hand certain inefficiencies and understand how it can be improved. Do not let this feedback go untapped.

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5. Transportation

Transportation Waste deals with Unnecessary or Extra Movement of Products that is **Not Directly Associated with the Value Adding Process**. From a customer perspective, **Transport Adds NO Value to the Product**, as it is not being physically transformed. Transportation does not make any transformation to the product that the consumer is supposed to pay for.

Transport waste in manufacturing can include the movement of Raw Materials, Tools, Inventory, Equipment or End Products more than is absolutely necessary to achieve the production goals.

In fact, transportation can sometimes even reduce value. The more times a product is transported, the more likely it is subject to mishandling and damage. Even cosmetic packaging damage may cause customers to reject product.

Conveying, transferring, picking up, setting down, piling up and otherwise moving unnecessary items

5. Transportation Waste : Cause - Effect & Solution

Cause
- Unnecessary Steps in a Process / Process Flows which are not Aligned
- Transport of Product from one Functional Area to Another
- Poor Production Layout so that Materials move Longer Distances or To & Fro Movement; Multiple Storage Locations
- Not well Designed Systems- Lengthy or Complex Material Handling System
- Overproduction which in turn leads to the waste of Resources & Inventory; Inventory that then has to be Transported throughout your facility or between factories and even continents.

Effect
- Transportation not only Costs Money & other Resources, but can also Result in the Increased Risk of that Product being Damaged, Lost or Misused.

Solution
- Processes Should be as Close Together as Possible and Material Flow Directly from Process to Process without any Significant Delays in between.
- Simplifying Processes, Adjusting Physical Layouts, Rationalizing Processes to Minimize Product Handling, Shortening Steps between Process Steps for People.
- Eliminate or Reduce Overproduction which will in turn reduce the amount of inventory in the system which will need to be transported.

Tip: Layout should be changed as per the principles of lean manufacturing, create value streams and make that value flow at the pull of the customer, that will result in huge savings in time and money

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6. Inventory

Inventory is the **Raw Materials, Work In Progress (WIP) and Finished Goods** stock that is held, we often hold far more than is required to produce goods and services when the customer wants them using Just in Time (JIT) principles. Also Capital Goods not in use or Obsolete Items are Kept in Inventory.

The waste aspects of holding large amounts of inventory are many:

Ø **The product made may not be what the customer ultimately wants.**

Ø **The product may go bad or become obsolete before the customer purchases it.**

Ø **The inventory may contain large blocks of nonconforming product that slipped through quality control.**

Ø **Holding inventory costs money (estimate 20 to 30 percent carrying cost).**
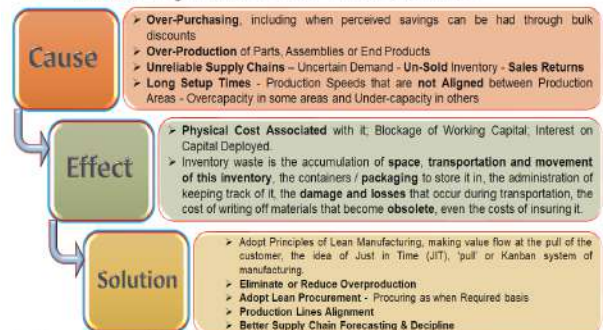
Ø **Tying up money in inventory limits opportunities to use funds elsewhere.**

Excessive supplies, materials or info for any length of time (having more on hand than what's needed)

Inventory may be in the form of **Raw Material, Work in Progress or Finished Goods**.

In any of these three forms of inventory, if it hasn't been sold, it is **cash that has been tied up into the material**, which the customer hasn't bought yet– These result in a massive drain on the cash flow.

6. Inventory Waste : Cause - Effect & Solution

Cause
- Over-Purchasing, including when perceived savings can be had through bulk discounts
- Over-Production of Parts, Assemblies or End Products
- Unreliable Supply Chains – Uncertain Demand - Un-Sold Inventory - Sales Returns
- Long Setup Times - Production Speeds that are not Aligned between Production Areas - Overcapacity in some areas and Under-capacity in others

Effect
- Physical Cost Associated with it; Blockage of Working Capital; Interest on Capital Deployed.
- Inventory waste is the accumulation of space, transportation and movement of this inventory, the containers / packaging to store it in, the administration of keeping track of it, the damage and losses that occur during transportation, the cost of writing off materials that become obsolete, even the costs of insuring it.

Solution
- Adopt Principles of Lean Manufacturing, making value flow at the pull of the customer, the idea of Just in Time (JIT), 'pull' or Kanban system of manufacturing.
- Eliminate or Reduce Overproduction
- Adopt Lean Procurement - Procuring as when Required basis
- Production Lines Alignment
- Better Supply Chain Forecasting & Deciphine

Tip: These wastes are heavily interlinked with Over-Production & Transportation

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7. Motion
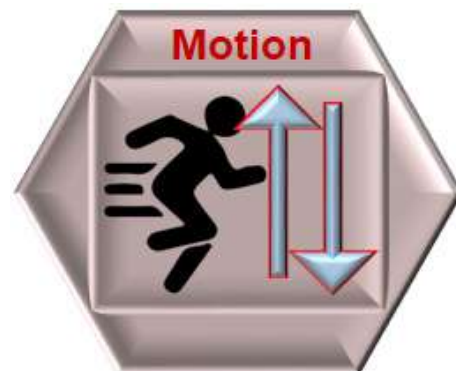
Similar to transportation, but **Motion refers to movement of operator and equipment**.

Motion Wasted in lean manufacturing is the **increased motion of machinery or a person due to an inefficient manufacturing process**. Wasted motion increases the amount of wear and tear on both workers and machinery, therefore decreasing its lifespan or ability to work on at a manufacturing site.

Think of the fact that operators moving around, searching and finding things cannot be adding value. Same too with equipment – if you are spending time lumping equipment around, you cannot be using it to add value and make money, plus the chances of damage increases.

Examples : Walking; Reaching; Lifting; Lowering; Bending; Stretching or otherwise unnecessary moving
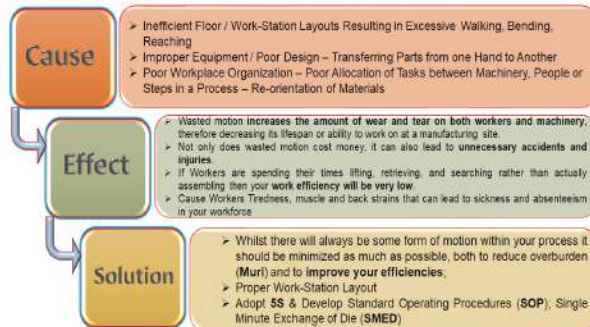
Even small non-value-added motion can be very costly. Think of an extra twist of the wrist on every item many

times a day that leads to a repetitive motion injury, with lost-time and disability costs.

Unnecessary movement that does not add value (movement that is done too quickly or too slowly)

7. Motion Waste : Cause - Effect & Solution

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8. Excess Processing

Excess Processing is about completing work for the customer, which is **more than the customer really wants.**

Excess Processing is **adding more value to a productthan the customer actually requires** such as

Ø   Painting areas that will never be seen or be affected by corrosion.

Ø   Over polishing an area that does not require it.

Ø   Tolerances that are too tight.

Ø   Excess Processing Waste **can occur in the office as well as manufacturing areas**. Producing more detailed reports than necessary in order for one report to satisfy many users is one from of office over-processing waste.

Ø   Not getting clear customer requirements and specifications creates excessive processing and possible repairs and re-processing.

Ø   Excess processing might be **extra steps in a process, unnecessary customization, inefficient routings** and other things not necessary or valued by the customer.

Ø   Organizations may want to provide the shiniest, most sparkly widget, but anything beyond a customer's spec is non-value-added, or muda.

Ø   **Unnecessary Processes and Operations Traditionally Accepted as Necessary, but Customer Doesn't want**

8. Excess Processing Waste : Cause - Effect & Solution
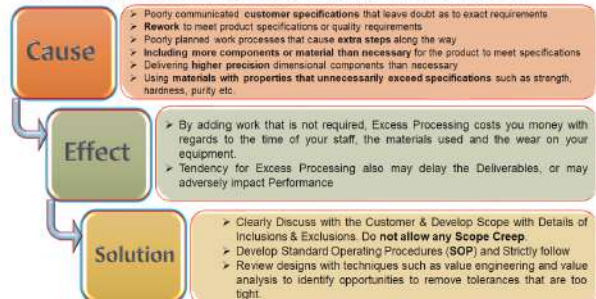
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Conclusion : Lean supply chain management requires businesses to examine every process in their supply chain and identify areas that are not adding any value but using efforts and unnecessarily resources, which can be measured in monitory terms, in time, or resource consumed. The purpose of such exercise is to eliminate waste in the Supply Chain. To be Lean is to provide what is needed, when it is needed, with the minimum number of resources, optimal use of materials, equipment and space. The analysis can improve a company's competitiveness, its customer service, and the company's overall profitability.

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USER FIRST, TECHNOLOGY LATER

DR. KAUSTUBH DHARGALKAR
PH.D-CORPORATE INNOVATION & DESIGN THINKING

The following is an excerpt from the Author's book, **"It's Logical - Innovating Profitable Business Models"**. The focus is on 'User-Centric' approach to problem solving, how qualitative/human behavioral parameters can lead to breakthrough solutions.

"A new metric for enhancing the efficiency of the 'Calling Process' had been casually mentioned by someone at the lowest rung in the hierarchy"

In most companies, most of the time, the solution generation process begins with-

- What capabilities do we have?
- What technologies do we have control over?

Conventional logic says, the above are appropriate questions. They may be appropriate, but they are not the right ones in today's dynamic times.

Without getting into an intellectual debate over this, let us look at an example.

Innovation in a Service-based organisation

A tele-calling BPO was looking at 'Enhancing the efficiency of the Calling Process'. The initial focus, as is the buzz today, was on 'Digital Transformation'. They were looking at enhancing the efficiencies of the various processes through the use of technology. The HR folks got in touch with DK seeking a proposal for a 'Breakthrough Ideation' workshop for enhancing the efficiency of the 'Calling Process'. To begin with they were insistent on having the workshop only for senior management (VPs and above). However, considering that there was a real problem to be solved, DK insisted on having the entire team involved in the workshop. A few back and forths later, it was decided that a team of nineteen would participate in the workshop. This team comprised senior management, techies, solution architects and two tele-calling executives (the ones who actually make the calls).

The workshop began with a 'Hits and Misses' session, where participants shared what they thought has worked and what hasn't in the past. This went on for a couple of hours. A lot of jargon was being thrown around. Many 'Quality of Service (QOS)' goals were being discussed. DK noticed that the two tele-calling executives (hereinafter referred to as TCs for brevity)

had not uttered a word throughout the discussion.

During the first break, DK made it a point to sit with the two TCs over coffee to make them voice out their observations, since they were the ones who were in actual touch with the end-user (the prospect who they would call).

After some goading, one of them mentioned, "All this high level discussions are fine, but when I pick up my headphones and speak to a prospect, I can sense whether she/he is interested in our offering or not on the basis of her/his voice tone". This was cursory statement by him, but it was a loaded one. It was a trigger for Innovation to begin. A new metric for enhancing the efficiency of the 'Calling Process' had been casually mentioned by someone at the lowest rung in the hierarchy (but more importantly, the only rung in direct contact with the end-user).

As the participants reassembled after the break, DK asked the concerned TC to repeat what he had told him during the break. DK insisted on exploring this observation further. Initially, this parameter, viz. 'Voice Tone' was treated as too subjective to be useable at scale. The argument being, every TC's judgement would be different and it would be impossible to standardise the process. one of the VPs said, "We have 3500 TCs making around 50 to 70 calls per 8-hour shift, which cumulatively translates to 1,75,000 to 2,45,000 calls per day. If we were to take the subjective judgement of every TC, it would be impossible to run our operations." DK insisted on holding the negatives at bay for a while and delve a little deeper into possibilities. With a little prodding, the techies in the team said, "Voice is basically a sound wave that has frequency, wavelength and amplitude. And these parameters are perfectly measurable".

The team then focused on how one could quantify the 'Voice Tone' of a prospect's response. Finding a technology to make this happen became the focus of the innovation effort. The brief for the solution generation process emerged as:

"Can we recognise voice tone patterns and corelate them with the outcome of the call?"

The company had a repository of recorded call logs of a few million prospect calls made over the previous eight

years (Recollect the 'Your call may be recorded for training and quality purposes' disclaimer that we usually hear when we speak to a Customer Service Executive?). The outcomes (whether converted or not, if converted then the duration of time taken for conversion, number of repeat calls required etc.) of these calls too were documented in the archives. Over the next seven months, a Machine Learning (ML) algorithm was built to understand the relationship between the 'Voice Tone of a prospect' and the outcomes achieved. Lo and behold, co-relations between voice tonality and outcomes emerged from the archived call logs. Painstaking analysis led to the emergence of clear patterns in the co-relations as follows:

1. Voice tone pattern—1 '! Outright 'Yes'
2. Voice tone pattern—2 '! Maybe 'Yes'
3. Voice tone pattern—3 '! On the fringe of 'Yes' and 'No'
4. Voice tone pattern—4'! Maybe 'No'
5. Voice tone pattern—5 '! Outright 'No'

Many iterations later, the final solution unfolded as follows:

A self-learning algorithm was created. This algorithm analyses the voice of the prospect during a live call. When a call centre executive makes a call and the prospect responds, the prospect's voice is fed to the voice analysis engine in real time. Within the first twelve words uttered by the prospect, her/his 'Voice tone' is analysed and the prospect gets slotted into one of the above mentioned five categories. All this happens in real-time (during the conversation between the TC and the prospect). The category to which the prospect belongs to is displayed on the screen in front of the TC and the relevant conversation flow (questions to be asked) appear onscreen, facilitating the TC to have an meaningful and effective conversation.

All this leads to better targeting of the marketing and sales effort, reducing the cost, time and effort required in the sales cycle. The prospects who are inclined towards the 'NO' categories get directed to other sales channels and are approached differently (not through the calling process). So no more pesky calls for such people.

P.S. This company did not have the requisite technology in-house. They searched around in the start- up ecosystem and found a couple of them dabbling in the appropriate kind of speech recognition tools, collaborated with them and the result is there for all to see. Hats off to their perseverance!!!

Now, time for a question:

Did DK and the team start with a technology in mind at the beginning of the problem- solving exercise?

No, they did not. Initially, they just focussed on the user, the need for an appropriate technology emerged later.

This is what I mean by User first... Technology later.

Compare this with the points I made at the beginning of this chapter, viz. "In most companies, most of the time, the solution generation process begins with-
• What capabilities do we have?
• What technologies do we have control over?"

Had the call centre stuck to this conventional approach, they would not have been able to come up with the breakthrough.

Key Learning Points

For creating breakthroughs, focus on the following:
1. User
2. User
3. User

1. User First ... Technology Later.

   Do not get enamored by technology. Begin the problem solving process by focusing on the user and not with an attitude of 'which technology I should use to overcome this challenge?' Remember you have to understand the problem first and to understand that you have no option but to begin with the user.

2. Try to find new metrics for enhancing service quality levels rather than just attempting to utilize new technologies to enhance efficiencies of existing metrics. The 'User first' approach will help unearth these new and untried metrics. That's where the magic lies. Do not ignore 'Qualitative' metrics because they appear to be immeasurable at present.

3. As a corollary to point number 2 above, Don't give up on wild ideas. However, crazy the idea of using 'Voice Tone' as a metric sounded initially, it did see the light of the day.

4. Involve people with diverse backgrounds in the problem-solving process. Remember, the trigger for innovation came from the tele-calling executive and then was built upon by the techies in the team. If there were no techies in that team during the workshop, that trigger may have been shelved as being 'too subjective to be used at scale'.

5. Collaborate and co-create.

   The company did not have the requisite speech recognition technology in-house. They were open to explore the ecosystem and it took time for finding the right partners. If it were not for their willingness to experiment, the idea would have suffered a quiet death.

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QUICK SHOPPING!

SEEMA MOHANTY
GLOBAL SUPPLIER MANAGER FUNGICIDES, BAYER INDIA

we still have not gone back to exactly how we shopped before the pandemic started.

I t seems I have been an online shopper for as long as the concept has existed in India! My first option has always been to jump into an online shopping site and order with a few clicks.

However, most people made a major shift towards online shopping only with the onset of lockdowns during the ongoing pandemic. What is still more interesting is that increasingly quicker deliveries are picking up traction. Yes, deliveries within 30–45 minutes are on the rise. Let us explore this interesting and fast developing space from multiple angles

e-commerce and q-commerce shopping: e-commerce shopping typically refers to buying something online or through the internet. Delivery time typically ranges from 3–5 days or more depending on from where the item is being shipped. Quick commerce or q-commerce can be termed as an evolution of e-commerce. In q-commerce, typical delivery times are around 30–45 minutes.

Customer Preferences: With the changing socio dynamics, we also see a change in customer preferences in how they choose to shop. While earlier, many families used to shop monthly for their consumables, the trend is slowly changing with changing needs and preferences. Today more and more people choose the convenience of ordering their groceries with a few clicks from the comfort of their homes rather than beating traffic to go to a store for their monthly shopping.

But it does not just stop there. We find a section of people who would rather keep it simpler still – order as and when they need a particular thing. Why spend time in planning and ordering in bulk and in advance when they can order on the go? This is where quick commerce companies come into picture to fulfil this need. These companies bring in the much-needed flexibility and convenience of delivering within 30 minutes. Moreover, the pandemic brought with it, lockdowns in which people were advised not to venture out if not absolutely necessary. The pandemic also brought in the necessity to adhere to social distancing. Online shopping has been a definite answer to both these requirements. Thus, both the traditional e-commerce as well as quick commerce industries have expanded during the pandemic.

Now, the question is – is this customer behavior here to stay? Well, we can answer this based on our own behavior as customers. As things are opening up more and more, we still have not gone back to exactly how we shopped before the pandemic started. And if you ask me, our preference for social distancing and minimal touch points in any transaction have also increased. This means, online shopping is here to stay and also to increase.

The Modus Operandi: In traditional e-commerce, companies typically have their warehouse or fulfillment centres in a bigger space and outside of city locations.

However, quick commerce usually have their micro-warehouses within 2–3 kilometres radius from their customer base. These micro- warehouses may also be termed as dark stores. They are like typical retail stores, but do not allow customers to come in and shop there. These are spaces where goods are kept, packed as per customer orders and handed over to delivery personnel who later deliver the orders to the respective locations. Since these dark stores are in close proximity to customer locations, order fulfillment becomes a matter of few minutes!

Some quick commerce companies also operate as marketplaces or pick up items from retail stores and deliver to customers.

Technology : Technology is definitely at play to make quick deliveries work at scale. It is vital to choose the shortest route to take in order to get the order delivered. Here comes the use of various routing algorithms that quick commerce companies are using to reach customer locations in the fastest manner possible.

Logistics : It is not enough to just have the fastest route to customer location. The real challenge is to physically reach there. Therefore, to navigate faster through roads and traffic and also to keep operating costs low, quick commerce companies are mostly using two wheelers instead of trucks. The future however holds possibility of drones delivering goods to customers. This will definitely lead to further reduction in delivery times. But drone movement is currently a highly regulated area and will need significant collaboration between government and various other stakeholder bodies to draft relevant policies and guidelines. Moreover, in that case, the customers also need to be 'educated' on how to receive goods from a drone!

Are such quick deliveries safe?

With ever increasing customer demand for faster deliveries, do you think this quick commerce industry is sustainable in the longer term from a safety point of view? There are two ways to look at it. One school will say that with developing technologies and perhaps also drones in play, deliveries will become increasingly quicker as well as cost effective. So, it definitely is here to stay.

The reality at the moment is however a bit different. We are seeing increasing number of delivery personnel on two wheelers on roads and oftentimes they just zoom past without caring much for traffic rules. They not only put themselves but also others on the road in jeopardy. Are Indian roads even suitable for increased number of two-wheelers on roads – this question will also determine the future of this industry.

Is quick commerce industry sustainable?

According to a report by RedSeer, quick commerce in India is expected to clock in USD 5 Bn in Gross Merchandise Value by 2025 compared to just about USD 300 Mn in 2021.

There are many start-ups in this field today and more are still coming up.

These companies operate at very thin margins and currently they are investing into technologies, dark stores and delivery personnel to capture as much market as possible. Shift is also happening from primarily groceries and food items to items like other consumables and small electronics. Many quick commerce companies are also tying up with bigger e-commerce companies for a win-win deal. While this industry tries to evolve and make itself sustainable, we as customers can just try to be more humane – i.e. in case our goods arrive a few minutes later than the promised 30 minutes, let us just be patient. We might never come to know what the delivery person might have endured to make our ordered goods reach us in time (or in some cases a bit late)!

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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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ISO20400:2017(E)
SUSTAINABLE PROCUREMENT
UNDERSTANDING THE FUNDAMENTALS

This article ISO 20400-2017(E) - 'Sustainable Procure-ment - Understanding the Fundamentals' is in continu-ation to ISO 20400-2017(E)-'Sustainable Procurement – Introduction Terms and Definition' published in June 2022 on page no. 8.

Understanding the fundamentals

4.1   Concept of sustainable procurement

Sustainable procurement is procurement that has the most positive environmental, social and economic impacts possible across the entire life cycle and that strives to minimize adverse impacts.

Sustainable procurement is a powerful instrument when an organization considers sustainabilify requirements and its own contribution to sustainable development.

4.2   Principles of sustainable procurement

The main principles for sustainable procurement are the following.

—   Accountability: An organization should be accountable for its. own impacts on society, the economy and the environment In the context of procurement, this specifically includes accountability for impacts and for those on the organization's supply chains, with a life cycle-perspective on goods or services.

—   Transparency: An organization should be transparent in those decisions and activities that impact the environment, society and the economy. In the context of procurement, this specifically includes being transparent in its procurement decisions and activities and encouraging its suppliers to be transparent. Transparency is the basis for stakeholder dialogue and collaboration.

—   Ethical behaviour: An organization should behave ethically and promote ethical behaviour throughout its supply chains,

—   Full and fair opportunity: An organization should avoid; bias and prejudice in all procurement decision-making. All suppliers, including local suppliers and small and medium-sized organizations (SMOs) should have a full and fair opportunity to compete.

—   Respect for stakeholder interests: An organization should respect, consider and respond to the interests of stakeholders impacted by its procurement activities.

—   Respect for the rule of law and international norms of behaviour: An organization should strive to be aware of any violations throughout its supply chains. It should actively encourage its suppliers to abide by these rules and assess and address compliance as situations require.

—   Respect for human rights: An organization should respect internationally recognized human rights.

—   Innovative solutions: An organization should seek solutions to address its sustainability objectives and encourage innovative procurement practices to promote more sustainable outcomes throughout entire supply chain,

—   Focus on needs: An organization should review demand, buy only what is needed and seek more sustainable alternatives.

—   Integration: An organization should ensure that sustainability is integrated into all existing procurement practices to maximize sustainable outcomes,

—   Analysis of all costs: An organization should consider the cost incurred over the life cycle, value for money achieved, and the costs and benefits for society, the environment and the economy resulting from its procurement activities,

—   Continual improvement: An organization should worktowards continually improvingits sustainability practices and outcomes, and encouraging organizations in its supply chains to do the same.

4.3   Core subjects of sustainable procurement

The seven core subjects of sustainable procurement are the following:

—   organizational governance: decision-making processes and structures;

—   human rights: due diligence, human rights risk situations, avoidance of complicity, resolving grievances, discrimination and vulnerable groups, civil and political rights, economic, social and cultural rights, fundamental principles and rights at work;

—   labour practices: employment and employment relationships, conditions of work and social protection, social dialogue, health and safety at work, human development and training in the workplace;

—   the environment: prevention of pollution, sustainable resource use, climate change mitigation and adaptation, protection of the environment, biodiversity and restoration of natural habitats;

—   fair operating practices: anti-corruption, responsible political involvement, fair competition, promoting sustainability in the value chain, respect for property rights;

—   consumer issues: fair marketing, factual and

unbiased information, fair contractual practices, protecting consumers' health and safety, sustainable consumption, consumer service and support, and complaint and dispute resolution, consumer data protection and privacy, access to essential services, education and awareness;

— community involvement and development: community involvement, education and culture, employment creation and skills development, technology development and access, wealth and income creation, health, social investment.

NOTE Annexes A and fi provide further information.

4.4 Drivers for sustainable procurement

The motivations of organizations for practising sustainable procurement differ depending on the type of organization and the context in which they operate. Drivers for sustainability should be analysed to help define the sustainability objectives and goals for the supply chain and to aid internal communication.

EXAMPLE If an organization is driven by competitive advantage, public policies, environmental protection or human rights, then the sustainability objectives and goals need to be aligned with these elements.

When top management has established the extent to which the organization is motivated towards sustainable procurement by specific drivers, it is possible to link them to the core subjects (see 4.3). issues and aspects and then to develop objectives and goals.

Examples of sustainable procurement drivers are:

— customer: responding to customer and consumer sustainability expectations, such as safety, environmental benefits and universal design throughout the supply chains;

— competitive advantage: in competitive markets the ability to offer goods or services considering a sustainable value proposition supported by the supply chains can be a differentiator;

NOTE 1 This can also be an advantage to the supplier as well as the purchasing organization.

— innovation: using sustainable procurement to stimulate innovation from the supply chains in order to gain greater shared value and to generate new markets;

— stakeholder expectations: responding to increasing stakeholder expectations to take account of environmental and social factors, e.g. in order to maintain a societal license to operate;

— legislation and regulation: compliance with legislation throughout entire supply chains;

NOTE 2 Organizations are increasingly required by governments to operate more sustainably, e.g. through restrictions on waste to landfill, improving supplier diversity, carbon disclosure, anti-trafficldng, anti-slavery.

— public policies: achievement of desired objectives such as promoting competitiveness/ creating opportunities for SMOs, efficient management of public resources, good governance or social inclusion;

— risk management: sustainability issues can

influence brand value and reputation, market share, market capitalization, legal exposures, price volatility and access to/ supply, financial liabilities, moral/ethical exposures and the risks associated with operating licences;

— security of supply chains: avoiding disruptions due to product recall, financial penalties or supplier. failure, implementing continual improvement processes, avoiding depletion of resources;

— investor confidence: sustainable procurement might improve scores from rating agencies and attract investment;

— workers: paying attention to sustainability issues, including promotion of decent work, can lead to greater productivity and attract, motivate and retain talent;

— supplier commitment: paying attention to sustainability issues can lead to improving supplier relationships, leading to an improved supplier contribution to organizational objectives;

— cost optimization: optimizing use of resources can lead to cost savings, reduced environmental impacts, economies of scales and improved return on investment;

— economic value creation: assessing more comprehensive life cycle cost and benefit information can help the organization to be more effective;

— personal leadership: committed leadership from key people in the organization can promote sustainable practices including sustainable procurement;

— organizational ethics: paying attention to sustainability issues can enhance the ethical behaviour of the organization and increase alignment with the organization's culture and values.

4,5 Key considerations for sustainable procurement

4.5.1 Managing risk (Including opportunity)

Risk management is dynamic, iterative and responsive to change. Organizations should manage their sustainability risks (including opportunities] related to procurement activities,

The objective of risk management in the context of sustainable procurement is to identify, prioritize and manage the internal and external risks (including opportunities) related to procurement activities. This includes considering how suppliers throughout the supply chains are capable of meeting sustainability requirements such as those associated, with monitoring and auditing.

When it is done correctly, risk management should ensure that the significant sustainability impacts are managed appropriately, resources are applied efficiently, and that decisions taken can be justified.

Risk management includes risk assessment (identification, analysis, evaluation) and risk treatment. It should be integrated into the organization's governance, including procurement procedures.

Due diligence is a way to apply risk management to

adverse sustainability impacts.

4.5.2 Addressing adverse sustalnability imparts through due diligence

Organizations can cause or contribute to adverse sustainability impacts through:

— their procurement practices or the activities of their suppliers, contractors, business partners, investment companies or intermediaries throughout entire supply chains;

— the design, procurement, use or disposal of goods or services by the organization and its supply chains. Due diligence is a way to address adverse impacts:

— when organizations identify potential adverse sustainability impacts in their supply chains, they should seek to prevent or control them; ^

— when organizations identify actual adverse sustainability impacts in their supply chains, they should seek to treat, remediate or control them.

The organization should implement a due diligence process to address adverse impacts and be accountable for it.

4.5.3 Setting priorities for sustainability issues

Setting priorities enables the organization to focus its efforts on managing risks [including opportunities) and to deliver the maximum contribution to sustainable development,

Organizations should prioritize issues (e.g. those listed in Annex A) in consultation with stakeholders using the following iterative process.

a) Relevance: Analyse whether the sustainability issue applies to the organization, determined by factors such as:

1). connection with core activities (processes, goods or services) of the organization;

2) linkage to legislation, regulations and international norms of behaviour;

3) activities in the supply chains or within the organization's sphere of influence;

4) sector-based initiatives including codes of conduct.

b) Significance: Analyse which relevant sustainability issues are most impacted by the activities and decisions of the organization, determined by factors such as:

1) severity of adverse sustainability impacts linked to their intensity, frequency of occurrence, , and distribution through the supply chains;

2] potential effect of taking action or falling to take action on sustainability and stakeholders;

3) societal expectations of responsible behaviour and level of concern of stakeholders regarding the impacts.

c) Other considerations that can help the organization to prioritize relevant and significant sustainability issues, including:

1) the effort needed to achieve the required result;

2] performance with regard to legal compliance, international standards, international norms of behaviour, best practices;

3] contribution to organizational objectives;

4) capacity to influence;

5) extent of the impact of other organizations or persons on the organization itself.

An organization should look at the sustainabiiity issues in an integrated way and be prepared to manage situations where addressing one issue might involve a trade-off with another issue,

4.5.4 Exercising **influence**

An organization should, to the fullest extent possible, exercise its capacity to influence the behaviour of suppliers and others stakeholders towards sustainabiiity.

Influence can derive from factors such as:

a) the degree of direct control between the organization and the supplier;

b) the terms of the contract between the organization and the supplier;

c) the proportion of sales the organization represents for the supplier;

d) the ability of the organization to incentivize the supplier to improve performance in terms of future sales, reputational advantage, capacity-building assistance, etc.;

e) the reputational benefits for the supplier of working with the organization, and the reputational harm of that relationship being withdrawn;

f) the ability of the organization to collaborate with other buyers, including industry peers, to incentivize improved performance;

g) the ability of the organization to engage government in requiring improved performance by the supplier through implementation of public policies, monitoring, sanctions, etc.

Such factors are considered to fall within an organization's sphere of influence.

4.5.5 Avoiding complicity

Through its procurement activity, an organization should avoid being complicit in the wrongful acts of other organizations that cause adverse sustainabiiity impacts.

While their boundaries are imprecise and evolving, three forms of complicity can be described:

— direct complicity: this occurs when an organization knowingly assists in the commission of wrongful acts;

— beneficial complicity: this occurs when an organization benefits directly from wrongful acts;

— silent complicity: this occurs when an organization fails to raise the issue of wrongful acts.

NOTE Annex A provides further information.

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BRANCH NEWS

AURANGABAD BRANCH

Indian Institute of Materials Management (IIMM), Aurangabad Branch, has organized "MAT-SELECT-5" on theme - "Profit sustainability and growth in volatile business environment" as on 18th June 2022 at Hotel Rama International. The conference was attended by 500 plus delegates across the industries. Approximate 100 delegates from Aurangabad Industrial Suppliers association attended the Event.

Mr. Vinayak Pol – Executive Director of Aurangabad Electricals Limited and Mr. Ramesh Gehaney – Executive director of Endurance Technologies Ltd were the Guest of Honour of the event. Mr.H.K.Sharma, National President of IIMM was the Special guest of the Event. Mr.SurajDumne (AISA-President) and Mr.DattaBedade (AISA- Secretary) were also on dias as special Invitee and as associates of the Event.

Mr. Vinayak Pol said that all the Industry is passing through the challenging time. In his speech he explained about the VUCA world for volatility, uncertainty, complexity and ambiguity which describes the situation of constant, unpredictable change that is now the norm in certain industries and areas of the business world. He very well explained the strategies under uncertainties, understanding the potential benefits in Indian market, entering the business of manufacturing for electric vehicles parts and positive attitude in volatile business environment.

Mr. Ramesh Gehaney said that the prevailing crisis in the industrial sector developed due to corona would come to an end only by jointly working towards the goal of development and looking for the new opportunities. He further said we need to look at the global market, not just the Indian market. Such opportunities have now arrived and we should make good use of it. How we meet the customer expectations is important. We need to have a strong record of how to adapt to changing times.

A Souvenir was also released on this occasion. There are total 25 articles from the supply chain professionals. Also the very first time an E-Souvenir was also released in the inauguration function.

A case study book on topic India's 2-Wheeler Electric Vehicle Market: Opportunities & Risks written by Mr. Sushant Patare was released. This book will free for readers.

Mr. H. K. Sharma, National President of IIMM presented President Gold Medal to Mr. Sanjay Sanghai (National Council Member, IIMM), Mr.K.Srihari (Chairman), Mr. Sushant Patare (Vice-Chairman) and Mr. Paras Mutha (Conference Chairman).

Three important sessions of the event:

1) Dr. Anil Lamba: Financial Literacy Activist and International Corporate Trainer. Topic: 3 super secrets of Increasing Profits.

2) Mr.T.A.B.Barathi: Vice-President (SCM), Wheels India Ltd, TVS Group. Topic: Challenges & Opportunities in Material Cost Optimization.

3) Lt.Gen.Balbir Singh Sandhu: Former Director General Supplies & Transport- Defense.Topic: Defining strategy for Optimization of Profit & Growth

IIMM Branch Chairman - K.Srihari, Hon Secretary – Shrikant Muley, Vice Chairman- Sushant Patare, Conference Chairman – Paras Mutha, Conference Vice Chairman- Mr. Sunil Ved, National Council Member – Dr. Narendra Joshi, Sanjay Sanghai, Executive Committee members & Co-Opted Members –Ravindra Kathavi, Yogesh Koshe, Phani kumar, Lalit Lohade, Ramesh Jaulkar, Milind Ghogle, Prem Kadam, Ameya Kolte, Sushil Pande, Sunil Sonar, Kailash Gadekar, Dr. Vinay Lomte, Dr. Abhay Kulkarni, Ravindra Mohite, Sachin Raut, Vikas Narwade took efforts for the success of the event.

Mr.K.Srihari – Branch Chairman announced that very soon IIMM, Aurangabad Branch will be ready with the Excellence Training Centre cum Class & Office with various educational facilities in service of Industry and SCM fraternity.

LUCKNOW BRANCH

IIMM Day Programme - 23/04/2022 : Mr. S.K Jha Managing Director (Ex)HAL, Accessories Complex, Lucknow inaugurated the programme with lighting of the Lamp, after that he shared his views views and ideas on the behalf of IIMM, Lucknow.

Mr. Chitransh Chandra , Asst commissioner SGST Kanpur Range-2 gave his power point presentation on GST, its benefit, salient features, IGST mechanism, GST registration and returns and Role of Technology.

After the presentation a memento was given by Mr S.K.Jha Past Chairmen and Ex MD (A HAL Accessories Complex

24/04/2022 ; Mr. Raheesh Dwivedi, Dy, General Manager(Quality) Tata Motors, Lucknow gave Power point presentation on **Upcoming Technology** covering Lean Manufacturing Concepts, New Technologies & Electrical Mobility etc. After the presentation Memento was given by Mr. C.K Vishwakarma Executive Director (Ex) HAL, Lucknow.

After that the vote of thanks given by Mr. Prashant Singh DGM HAL, Lucknow & Chairmam IIMM, Lucknow Branch. Programe followed by high tea.

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