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Emerging technology in SCM

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ABSTRACT

With the recent celebration of "International Women Day" and festive of color. Today we will focus on Emerging technology in the Supply Chain. Facility location decisions play a critical role in the strategic design of supply chain networks. In this paper, new technology and models in the context of supply chain management is given. We identify basic features that such models and technology must capture to support decision-making involved in strategic supply chain planning. In particular, the integration of location decisions with other decisions relevant to the design of a supply chain network is discussed. Furthermore, aspects related to the structure of the optimization of cost in supply chain are also addressed. Significant contributions to the current state-of-the-art are surveyed taking into account numerous factors. Supply chain performance measures and optimization techniques are also reviewed. Applications of facility location models to supply chain network design ranging across various industries are presented. New Techs presently use by the industry in the market for saving there time and cost. At last a brief statement given by ASSOCHAM supporting the Logistics sector in India.

1. Introduction.

As we are aware about one of the well renowned company in India i.e.Flipkart. They are one of the most emerging leaders in the market who play there role in Logistics Sector in India. Generally they provides a platform in which they are having a variety of product line as per the customer needs and requirement. This is not only reason that make company as a leader in the market they have more than that as per the customer orientation. As a customer we generally look for a product that satisfy our needs and status.

We Indians are quite ahead in logistics sector. According to the World Bank we are in the 35^{th} position all over the world in 2016. There are some countries who is having more competency in logistics sector. Germany holds the top position followed by Luxemburg and Sweden. If we compare our country in past records of the World Bank than our rank was decreased a lot which is one of the greatest achievement for the country. Previously in 2014 we were at 54^{th} position according to the World Bank Data.

Now the point arises where we are lacking in the world and why our country is not reaching in the top of the world. We reached to the 35^{th} position but still we are not in the top. The answer for this could be many reason like cost optimization, product response, lack of technology, lack of infrastructures, customs, international shipments, tracking and tracing, timeliness etc.

Today the world is moving faster and we all are running besides any motive of our life. Today the world ask for the shortcuts, more simplicity and more leisure. One of the greatest achievement of the world is "*Technology*" which enhanced the walking underground to the other planet. We may assume a future stage when the logistics sector will provide there service in other planets.

Many companies wants to enhance their brand all over the world but it is not possible because only one king can rule the jungle. Lots of companies assures that their services are best, but is it? No, some companies just give the fake advertisements and it goes wrong when we look behind it. Nowadays many frauds are occurring nearby, but we are not aware about it because we generally don't focus on others matter. We always wants our profit and that's the one of the big mistake that everyone is doing now.

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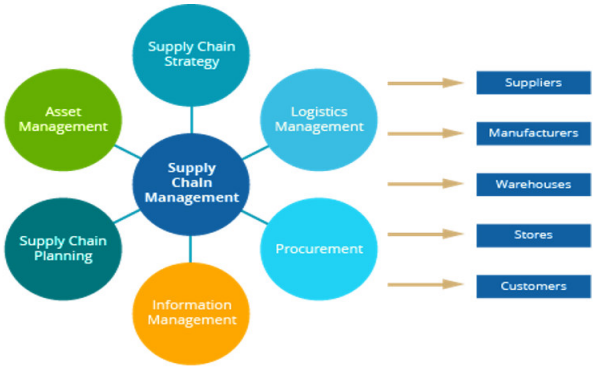
The present world market scenario and the emerging trends in supply chain management have posed a new challenge to the major players, forcing them to reshape their sale and purchase strategies for achieving competitive advantage in today's easily accessible, 'single market' world. Defence procurements policies of the nations have not been spared, especially those of fast growing economies like India.

2. Objectives of study.

- To Highlight the latest technology in the market with respect to SCM
- To understand digital SCM
- To learn how to optimise SCM profitably.
- To know the significance of LIMS (Laboratory Information Management System).

Figure 1: SCM Linkage.



Source: Author.

3. Latest technology in the market.

3.1. IoTs.

When we think connectivity we think about easy stuff like phones, tablets, MacBook, laptops etc. it totally changing the world where we learn, play and work. The Internet of Everything and the data generated from the supply chain leads to accelerated decision making. Experts predict that by 2022, one trillion sensors will be connected to the internet. The amount of data these sensors will be able to share is astronomical and everything from Lorries and warehouses, to toaster and kettles will be talking to one another.

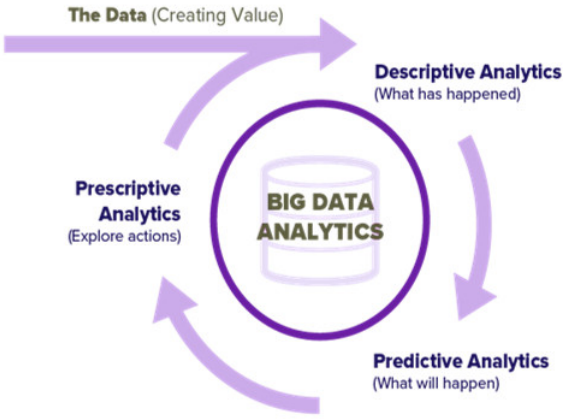
The Internet of Things has a huge implication for supply chain management as it could improve efficiency, reduce waste, resolve issues in their earliest stages and help to reach targets. It guides us how the product is likely to be made, get the details of shipment, what?s the product quality. It also allows to ensure temperature inside the truck carrying the cargo for security purpose.

3.2. Big Data and analytics.

With so many sensors connected to different parts of the supply chain, the huge amount of data gather from each stage can enable faster and better decision making from people. The backbone of the supply chain has been shaken by the digital revolution, which is characterised by innovations such as the Internet of Things, 3D printing, robotics, machine-to-machine communication, and demand sensing, among other things.

As supply chains merge with IoT and big data, the one-size-fits-all, linear supply chain that buys, makes, moves, stores and delivers products to all customers and channels in the same way is becoming archaic and no longer adequate for future success. Seventy-two percent of the surveyed companies say that big data is capable of delivering strong improvement effects in SCM over the next three years.

Figure 2: Analytics Process.



Source: Author.

Companies making more than 80 percent of their products to stock see significantly greater effects (20 percentage points) than companies making more than 80 percent of their products to order, underlining the high importance of big-data analytics for make-to-stock businesses.

3.3. Satellite Communication.

Some companies are taking connectivity to a whole new level by utilising advances in satellite technology. Satellite services have got cheaper and more reliable, and chips have got smaller. It's emerging as an important technology in transforming supply chains. Satellite solution are allowing businesses to track cargo in trucks, trains and ships as they go beyond the mobile phone network.

"Whatever the cargo – from hazardous chemicals to craft beer – IoT sensors and satellite communications can share details about the location and environmental condition, such as temperature and pressure, to everyone in the supply chain. In the worst case, if a ship collides, a sensor can instantly notify the relevant parties with always-on satellite communication"

3.4. Machine learning.

Till now any sales forecasting was done by humans by looking at previous data but it was an imperfect science as humans are not only swayed by previous experience, external biases and other factors, but they can't handle large volume of data at a single time.

By applying predictive and recommendation models to historical sales data, retailers are able to forecast at a granular level-by product, individual store and even day of the week.

This helps to optimise SCM lowering risks of overestimation or underestimation for product inventory and increase efficiencies across the whole business.

3.5. Robotics & Autonomy.

Presently we are developing more and more and there's a partnership between the robots and humans that allow them to work collaboratively, but its likely more robotics will be introduced to further streamline supply chains. Japan is far ahead in this matter. There factories have been running "light out" for weeks at a time with little or no human presence.

The latest robots have the ability to learn how to complete multiple jobs much more efficiently and conveniently that human ever could. Robots have a capability of interacting with staff are being trailed in one of Matrix's factories in China to take low level tasks off the hands of its workers, In time this will increase production efficiency.

With the addition of robots, employees can be more focused and productive in their roles stepping away from menial tasks to completing work that is more fulfilling.

3.6. Wearable.

The use of wearable and the cloud enables businesses to track supply chain inactivity in real time in order to meet customer stringent demands. Supermarket are pushing supplier harder than ever to meet stringent traceability, food safety and quality benchmarks – a situation that looks certain to continue throughout the coming years. Dealing with this pressure is the biggest challenge the industry faces.

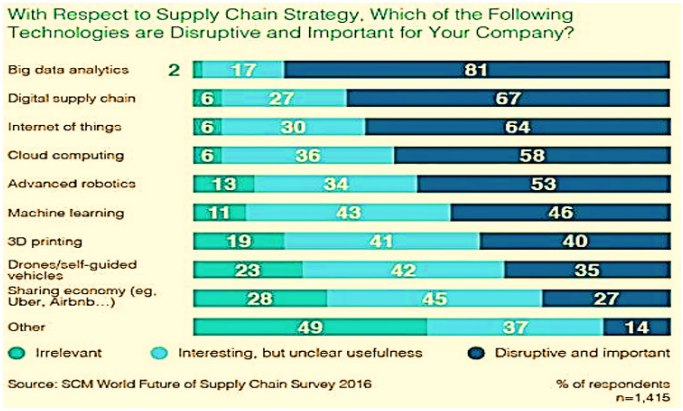
Wearable technology also provides substantial benefits for job satisfaction and productivity. Employee who are armed with wearable devices in the workplace, on average, increase their productivity by 8.5 percent.

3.7. 3D Printing.

The implication of on-demand production for the supply chain are huge, with positive environmental consequences in terms of reduction in transport, pollution and production waste. 3D printing can also reduce dependence on large factory employment, particularly in developing countries where resources may be scarce.

Supply chains are being disrupted from every by these new technologies and it's the companies that embrace this revolution early on that will be the overall winners. Retailers, Suppliers and Service Providers need to understand their offering might change but there's no set path to digitisation, and every company will have to embrace these technologies in a different way.

Figure 3: Comparative Study in SCM Tech.



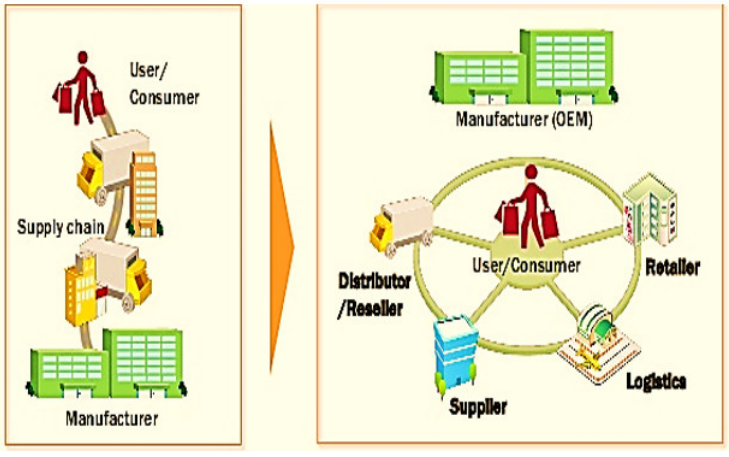
Source: Author.

4. Digital SCM.

Companies in various sectors throughout Europe are investing heavily to digitalize their business models in general and their supply chain management (SCM) in particular. Take major logistics service providers such as DHL, which has announced that it will rely increasingly on big data to minimize risk, while trials it has conducted with employees using data glasses for picking processes have increased productivity by 25 percent.

Logistics provider DB Schemer is investing in a digital mobility lab, and airlines with a strong cargo business, such as Lufthansa and Emirates, are expanding their paperless e-freight offering, which includes data cleaning for customers. Ocean carriers and forwarders, such as Kuehne + Nagel, use INTTRA's ocean freight platform for e-payments, and global retailers Amazon and Alibaba have invested in robotics for goods handling, drones for deliveries, and new apps for optimizing own asset-light delivery services in cities.

Figure 4: Linear SCM v/s Digital SCM.



Source: Author.

5. E-platforms, smart tagging, and 3D printing:

Few companies confirm high SCM optimization potential during the next three years Just 40 percent of the companies currently use transport management systems and software to optimize their transport networks and routing. The picture is similar with respect to using software for electronic management of freight documents.

In transport sourcing and routing, as well as in optimization of mode selection, considerable differences are evident between very large enterprises (such as those with revenues of more than ?10 billion) and others. Among the former, the share of those expecting advantages from big data is almost twice as high.

Only a third of respondents see potential to deliver significant efficiency gains in the three years ahead by attaching GSM or radio transmitters to products, packaging, or containers to improve tracking. Insufficient IT integration with other partners in the supply chain, directly or over a shared platform, and the lack of a clear business case for the investment are explanations.

Torben Weilmünster, Director of supply chain management for the pharmaceuticals and consumer division at Merz, acknowledges the advantages of radio-based tracking but adds: "Radio/GSM tagging isn't business-critical. The technology cannot generate higher sales as such. The ability to locate goods precisely at any given time does not yet offer anyone within the supply chain a sufficiently valuable information advantage to warrant the higher expense."

Although supply chain managers do not expect e-platforms to drive a marked shift in the purchase of logistics services toward direct carrier selection and transactions in the next few years (only 10 percent of respondents support this notion), 45 percent see e-platforms as becoming of high significance in the optimization of their supply chains.

Only a small group of respondents expect to see appreciable improvements result from automation technology, in particular through greater use of robots or self-driving vehicles.

6. LIMS.

Quality is such an important part of the supply chain that manufacturing companies implement information systems specifically for the laboratories that perform the quality inspections on finished goods and in-process materials.

The Laboratory Information Management System (LIMS) is an information system that can schedule testing, track tests, and pass test results to other systems in the supply chain, such as an Enterprise Resource Planning (ERP) system.

The LIMS system is used primarily as a reporting tool where users can enter information about a test sample, such as the inspection number, the batch of material it was extracted from, the date, time, location etc.

The LIMS system holds the details of the sample and the information pertaining to where the sample is. As the sample moves through the testing process, the LIMS system can be updated so that users where each sample is at any time. The tracking of a sample can be performed by entering the sample number into the system and manually entering the location or by using barcodes. When a sample is initially entered into the system, the LIMS can print a barcode label with the unique sample number.

6.1. LIMS Functionality.

Different LIMS systems offer a variety of functionality. The systems have developed from simple data entry and record storage to complex relational database-driven tools. They now offer enhanced functionality often provided over the wireless networks and company intranet, allowing greater flexibility for inspections in remote and difficult environments.

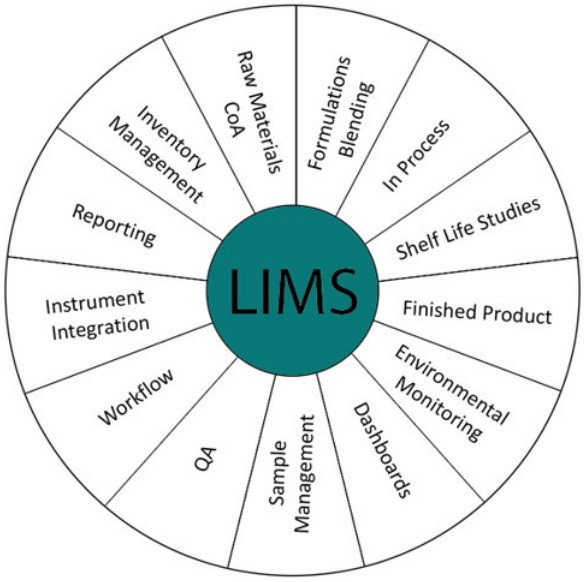
6.2. Equipment Calibration and Maintenance.

When inspections are carried out the equipment used to extract the sample and to test the sample must be maintained correctly and calibrated so that there are no errors introduced into the test results. The LIMS system should contain maintenance records of the equipment used in testing so that notifications can be generated to perform regular preventive maintenance.

With some instruments and equipment, the requirement may include calibration after a certain number of uses, for example, the use of a depth micrometre may require that it is calibrated after 50 uses or every month, whichever comes first.

LIMS systems can also contain the calibration instructions so that a notification and a calibration instruction sheet can be sent to the maintenance department or a specialty outside vendor.

Figure 5: Benefits of LIMS.



Source: Author.

6.3. Testing Methods.

A LIMS system should contain and manage the process, procedures, and methodologies that can be used to perform the test required at the plant. The system should provide a single

repository for these methodologies and be able to select the correct method for the tests that are to be performed.

7. Optimisation of SCM Profitably.

The supply chain of the extended enterprise has become an increasingly complex ecosystem of people, processes and technologies. Once exclusively comprised of internal systems, most supply chains have greatly expanded due to the proliferation of computer networks and Internet tools and technologies during the past two decades. These innovations opened the door for true collaboration between partners, distributors and suppliers that extended well beyond the four physical (and virtual) walls of the enterprise.

The most recent technology advancements – the widespread usage of Web 2.0 tools and social networks, on-demand software, cloud computing adoption and the ubiquity of mobile technologies have served to present further challenges (and opportunities) for optimal supply chain management.

Manufacturers have been forced to evolve or perish when it comes to optimizing the processes as well as navigating the new tools and best practices for supply chain management. Most have become acutely aware of the challenges and trade-offs that affect their increasingly complex, competitive and transparent supply chains.

At any point in time, an optimized supply chain stays lean, manages costs and perhaps most critically, responds instantaneously to even minor fluctuations in demand. While there is no single playbook to ensure success in an incredibly dynamic global market, here are five tips that should be considered for the manufacturing enterprise:

1. **Think Globally but Act Locally**: This is not only a geographic reference; but it is also an important point to consider when thinking strategically about supply chain or value chain planning. Companies increasingly must think in terms of global opportunities for procurement of goods AND services, and when considering the global needs of the corporation. Manufacturers should consider multiple channels and determine the optimal levels of inventory within the echelons of the supply chain process. This is also critical to consider carbon footprint levels and ensure the greening of the supply chain. However, during the execution of the supply chain it is important to optimize locally to maximize your investments in critical resources: infrastructure, assets and technology;
2. **Focus on Core Strengths and outsource all other Activities**: Many organizations try to do too many things or don't realize that they can outsource repetitive or tasks or one-off projects (for e.g. determining the optimal distribution network; the payment and audit of freight bills or supporting enhancement of its information systems). Quite often it seems as though an organizations' internal resources are able to do better job in the short run. Most often, by relying upon a specialized third-party provider, a better value will be realized in the long term. Focusing on your organizations core competencies will help you grow your business;
3. **3. Improve Collaboration between Manufacturer/Supplier and Retailer for Demand Data Driven Forecasting and Inventory Management**: This will help organizations reduce inventory, improve fulfilment rates and product availability at point of purchase and ensure a lean supply chain improving margins and profitability. Today, technology provides myriad opportunities to collaborate, there is a proliferation of data available to be mined and advances in computing power and connectivity allows us to test for optimality in ever increasing areas;
4. **Utilize Mobile-Based Technology**: This technology can help improve field sales, merchandizing and marketing, and enable direct services to the consumer (through customized location-based coupons or services that improve employee productivity in the field). Providing information such as provenance, origin, item contents and specialized information on demand about sustainability, local content or manufacturing methodology enhances the brand and allows companies to connect directly with the consumer;
5. **Build a Responsive Supply Chain**: Utilize source data such as POS sales, as well social media information to identify trends and demand changes much earlier and enable your supply chain to respond faster to increase sales, improve service levels and reposition inventory to maximize true benefits. Multi-channel programs will change expectations from supply chain forecasting/planning paradigms to building responsive supply chains;

Conclusion.

According to the report - Cargo and Logistics Industry in India - the Make in India campaign will connect the sub-continent with global networks and will not only improve the country's logistics industry but will also make the country a more attractive location to do business in.

In a statement, the Associated Chambers of Commerce and Industry of India (Assocham) said: "India can save up to $50 billion if logistics costs are brought down from 14 percent to nine percent of countries gross domestic product (GDP) thereby making domestic goods more competitive in global markets. The study said: "With expected inflow of new investments owing to government's thrust on promoting domestic manufacturing sector, India's cargo and logistics industry is likely to clock a compounded annual growth rate of about 16 percent during the course of next few years."

The same study has also indicated that the ' Make in India' campaign will see investments connect the country to global production networks that would generate new business for logistics thereby making it an attractive location to do business as compared to other regions in the world.

The government should create a uniform tax structure and do away with multiple checkpoints and documentation requirements which would lead to speedier delivery of cargo, it added.

In this connection, the study has also emphasised that with the passing of the constitutional amendment bill on the Goods and Services Tax (GST) in Parliament *will*further improve the logistics sector performance by bringing down the distribution costs by 15 percent.

This landmark bill to reform India's indirect tax regime has been passed by the Lok Sabha, but is stalled in the Rajya Sabha where the ruling National Democratic Alliance currently lacks a majority.

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