SUPPLY CHAIN MANAGEMENT

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INTRODUCTION TO SUPPLY CHAIN MANAGEMENT

The concepts of a supply chain and supply chain management are receiving increased attention as means of becoming or remaining competitive in a globally challenging environment. What distinguishes supply chain management from other channel relationships?

The network created amongst different companies producing, handling and/or distributing a specific product is called *supply chain*. Specifically, the supply chain encompasses the steps it takes to get a good or service from the supplier to the customer. Supply chain management is a crucial process for many companies, and many companies strive to have the most optimized supply chain because it usually translates to lower costs for the company. Quite often, many people confuse the term logistics with supply chain. In general, logistics refers to the distribution process within the company whereas the supply chain includes multiple companies such as suppliers, manufacturers, and the retailers.

Supply chain management (SCM) is a total system approach to manage flow of information, materials and services from raw material suppliers through factories and warehouses to the end customer.

Supply chain management is also defined as "an integrative philosophy to manage the total flow of a distribution channel from the supplier to the ultimate user".

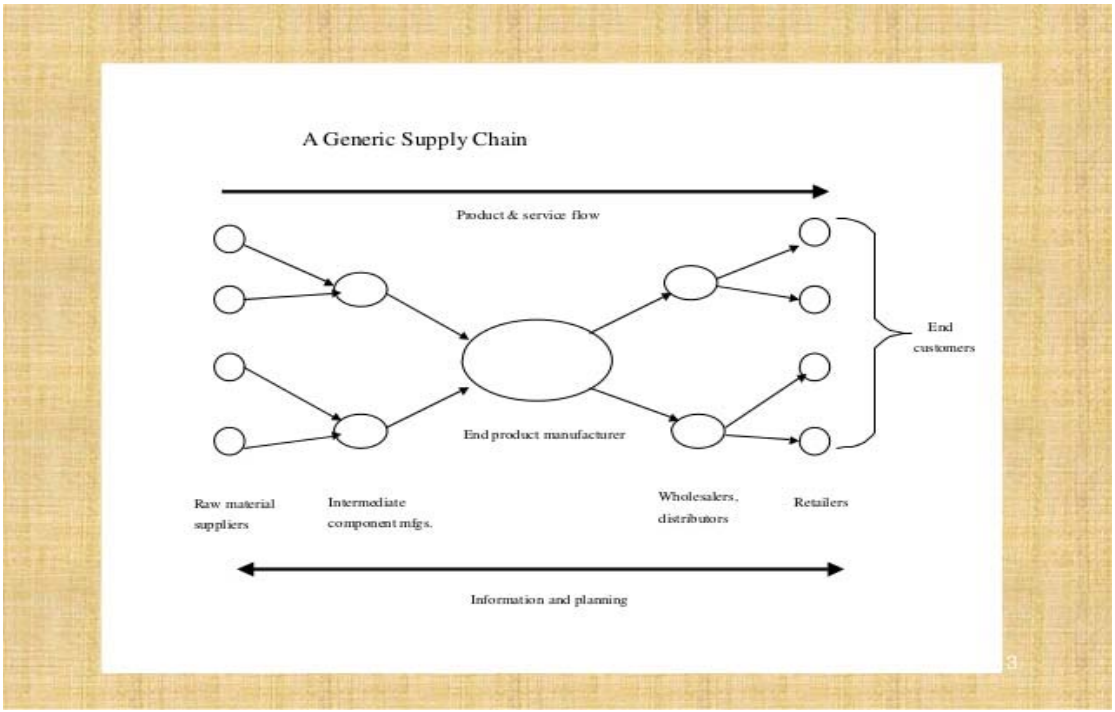
This means greater coordination of business processes and activities, such as inventory management, across the entire channel and not just between a few channel pairs.

Supply Chain Management (SCM) is a principle emphasizing the utilization of an efficient integrated system of suppliers, producers, warehouses, retailers and customers, so that items can be produced and distributed system-wide at the right quantities, locations, and time to minimize costs and maximize services.

A supply chain is the linkage of series of organizations with facilities, functions, processes, and logistics activities that are involved in producing and delivering a product or service.

Supply chain management encompasses the planning and management of all activities involved in sourcing and procurement, conversion, and all logistics management activities. Importantly, it also includes coordination and collaboration with channel partners, which can be suppliers,

intermediaries, third party service providers, and customers. In essence, supply chain management integrates supply and demand management within and across companies.



Objectives of supply chain management

- ✓ *Shared Efficiency*

  Managing stock, transportation and logistics can be complex and quite expensive for a company if it doesn't have an effective *Supply chain management* system. When manufacturers, collaborate on a supply chain system, it is easier for each company and its partners to ensure effective efficiency.

- ✓ *Optimization of Transportation*

  The main feature of supply chain management is transportation and logistics that is within a company. In a self-dependent business, everyone is fully responsible for its role in ordering, shipping and transporting goods, but costs are high and timing is poor.

- ✓ *Quality Improvement*

  Providing the best value is the ultimate goal that should be kept in mind by a company and its partners. The more closely connected a company is with those partners, the more likely it will improve the overall quality of the consumer experience and their expectations.

- ✓ *Long-Term Stability*

By forming strong trusting supply chain relationships and working toward best practices in distribution, a company can aim for long-term stability. Collaborative planning, coordination and distribution activities spread the risks of business decisions across multiple companies.

Reasons for keeping supplies

- ✓ *Meet variation in Production Demand*

  Production plan changes in response to the sales, estimates, orders and stocking patterns. Accordingly the demand for raw material supply for production varies with the product plan in terms of batch quantities. Holding supplies at a nearby warehouse helps issue the required quantity and item to production just in time.

- ✓ *Cater to Cyclical and Seasonal Demand*

  Market demand and supplies are seasonal depending upon various factors like seasons; festivals etc and past sales data help companies to anticipate a huge surge of demand in the market well in advance. Accordingly they stock up raw materials and hold inventories to be able to increase production and rush supplies to the market to meet the increased demand.

- ✓ *Economies of Scale in Procurement*

  Buying raw materials in larger quantities and holding inventory is found to be cheaper for the company than buying frequent small lots. In such cases one buys in bulk and holds inventories at the plant warehouse.

- ✓ *Take advantage of Price Increase and Quantity Discounts*

  If there is a price increase expected few months down the line due to changes in demand and supply in the national or international market, impact of taxes and budgets etc, the company's tend to buy raw materials in advance and hold stocks as a hedge against increased costs. Companies resort to buying in bulk and holding raw material inventories to take advantage of the quantity discounts offered by the supplier. In such cases the savings on account of the discount enjoyed would be substantially higher that of inventory carrying cost.

- ✓ *Reduce Transit Cost and Transit Times*

  In case of raw materials being imported from a foreign country or from a faraway vendor within the country, one can save a lot in terms of transportation cost buy buying in bulk and transporting as a container load or a full truck load. Part shipments can be costlier. In terms

of transit time too, transit time for full container shipment or a full truck load is direct and faster unlike part shipment load where the freight forwarder waits for other loads to fill the container which can take several weeks. There could be a lot of factors resulting in shipping delays and transportation too, which can hamper the supply chain forcing companies to hold safety stock of raw material inventories.

- ✓ *Long Lead and High demand items need to be held in Inventory*

  Often raw material supplies from vendors have long lead running into several months. Coupled with this if the particular item is in high demand and short supply one can expect disruption of supplies. In such cases it is safer to hold inventories and have control.

Types of supplies

Supply of goods or services or both is defined as sale, transfer, barter, exchange, license, rental, lease or disposal made or agreed to be made for a consideration by a person in the course or furtherance of business**.**

There are different types of supplies as stated below;

1 Based on location

i. *Intra-State* is a type of supply of goods or services where the **location of the supplier** and the **place of supply** of goods are in the same State.

ii. *Territorial waters*

Where the location of the supplier is in the territorial waters; or where the place of supply is in the territorial waters; or the place of supply will be in the nearest Coastal State.

iii. *Inter-State supply*

It is a supply of goods or services, where the location of the supplier and place of supply are in two different States

2 Based on combination

i. *Composite Supply*It means a supply made by a taxable person to a recipient consisting of two or more taxable supplies of goods or services or both, or any combination thereof,

which are naturally bundled and supplied in conjunction with each other in the ordinary course of business, one of which is a principal supply.

ii. *Mixed Supply*It means two or more individual supplies of goods or services, made in conjunction with each other by a taxable person for a single price where such supply does not constitute a composite supply**.**

iii. *Continuous Supply* Continuous supply is of two types viz.,**continuous supply of goods** and **continuous supply of services.**

3 ***Based on recipient***

i. *Inward Supply* It means receipt of goods or services or both whether by purchase, acquisition or any other means with or without consideration.

ii. *Outward Supply* It means a supply of goods or services or both, whether by sale, transfer, barter, exchange, license, rental, lease or disposal or any other mode, made or agreed to be made by such person in the course or furtherance of business.

4 Based on tax treatment

i. *Exempt Supply* Exempt Supply of any goods or services is one which attracts nil rate of tax or which may be wholly exempt from tax. It includes non-taxable supply. In the case of exempt supply in respect of any goods and/or services, the taxable person shall not be required to pay tax.

ii. *Zero-Rated Supply*

It means **export** or supply of goods or services to a **Special Economic Zone** developer or a Special Economic Zone unit.

iii. *Non-Taxable Supply* ***Non-taxable supply*** is the sale of any good or service which attracts **nil rate** of tax and is similar to exempt supply.

iv. *Taxable Supply*

Supply on which tax shall be paid.

Characteristics of supply chain management

The following are some of the characteristics that must be part of the next generation of supply chains.

✓ *Inventory Management Approach*

In contrast with each firm establishing its own inventory management policy independent of others in the channel, a supply chain management approach involves channel-wide management of inventories. This approach does not necessarily seek to eliminate most of the inventory from the channel, such as zero inventory or just -in-time systems, but only the redundant inventories in the system. This emphasis on inventory reduction may be a key difference between supply chain management and vertical marketing systems, which concentrate on the control or equity relationships of firms, such as franchise agreements.

- ✓ *Cost Efficiencies*

  A supply chain management approach implies a channel-wide evaluation of costs to identify total cost advantages. For example, some channel members may enjoy lower borrowing rates, especially when the supply chain includes international channel members. Other key areas for analysis are lowest labor rates, most effective processes, most capital available, lowest cost of capital, lowest tax rate, most advantageous logistics costs, and most depreciation or other tax advantages. Less-coordinated channel structures leave each firm to its own devices for cost control. However, a channel which enjoys lower costs than its competitors can allocate the savings to more productive uses, such as research and development or lowering its price to the customer.

- ✓ *Time Horizon*

  An extended time horizon is important to enduring relationships. Each member expects its membership in the supply chain to continue for a considerable if not an indefinite time into the future. Otherwise, investments in integrated information systems and operating systems may be too high for payback during a shorter relationship life cycle. While there is often a fixed contractual time span, the relationship is expected to extend beyond the life of the contract indefinitely.

- ✓ *Amount of Mutual Information Sharing and Monitoring*

  The entire channel is managed more effectively when members have access to information pertinent for the conduct of their business. Information monitoring is not just down the channel, as from manufacturer to customer, but in both directions. It is not necessary that all channel members have access to the same information, only that which is needed for them to better manage their supply chain linkages.

- ✓ *joint Planning*

In traditional channel systems, planningbetween channel members focuses on the transaction and is short term, such as thedelivery terms of a particular purchase order. If the channel is to be more closely coordinated, then joint planning of such activities as material flows and development of new products is in order. There is a continuous process of planning, evaluation, and improvement over multiple years. A key difference for supply chain management is the wider system planning than just two levels. While joint planning may be done in pairs as with partnerships supply chain management involves more pairs in the planning process. The supply chain management concept would suggest that many entities in the channel should take part in the planning.

- ✓ *Compatibility of Corporate Philosophies*

  Compatible corporate philosophies are less important for one-time or infrequent transactions than for longer term relationships. Here, the term compatible corporate philosophies is used to mean agreement on the basic directions for the channel, not necessarily similar operating procedures and certainly not agreement on every issue. Incompatible corporate cultures make coordination more difficult and moving the firms in the same direction less likely. Compatibility goes beyond individual personalities as the individuals involved may change over the life of the corporate relationship. Less compatible corporate cultures may exist between certain pairs in supply chains, but this makes the continued relationship more challenging.

- ✓ *Breadth of Supplier Base*

  Traditional systems often involve several suppliers of the same materials or services to increase competition and to obtain more favorable terms of sale. This approach also spreads the risk of shutdown if one supplier becomes suddenly unable to fulfill the contract or order. The supply chain management approach suggests that the supplier base be reduced so that the firms can be more closely integrated. A reduced supplier base permits closer management and coordination of a few relationships.

- ✓ *Channel Leadership*

  Organizations are characterized by having a top management structure, often headed by a strong chief executive. The supply chain clearly needs to have leadership in order to develop and execute strategy. Traditionally, channels *have* a leader which is an organization which manages the channel and resolves conflict.

- ✓ *Sharing of Risks and Rewards*

  Research suggests that a close relationship requires that channel members be willing to share risks and rewards *over* the long term. This implies a win-win situation *over* the life of the supply chain. In traditional systems, channel members are relatively independent, with a short term approach that does not consider counter-balancing of risks and rewards over time. If a *very* strong leader commands a sufficient market share of the supplier's business, the supplier may choose to remain in the supply chain even though the only sharing of rewards is the privilege of doing business in the channel, or the sharing is quite limited. This may be characterized by a 'win-not lose' relationship rather than the expected "win-win" one.

- ✓ *Flexibility*

  Agility has always been important in supply chains. This trait has to trickle down to next generation supply chains, as they should be able to react to sudden changing circumstances in the operating environment. Any kind of unpredictable and devastating incident, such as a natural disaster, medical epidemic, political or economic instability, has the potential to overthrow supply chains. However, when they are flexible, have a strong risk assessment program, intelligent decision support systems and are demand driven, next gen supply chains can thrive in even the most challenging and competitive environments.

- ✓ *Speed of Operations and Delivery*

  Information systems, such as electronic data interchange (EDI), can contribute to the speed of operations through reduced order cycle times on the purchasing side. Information technologies such as EDI and barcoding help manage the flow of goods on the distribution side, such as faster picking and dispatching. While these technologies are currently applied in many channels, their use is localized by function or a few channel members. A supply chain management approach examines the whole channel and exploits these technologies channel-wide.

  Speed is of the essence of the next generation of supply chains. It will be more and more critical for supply chains to be able to respond to demands as quickly as they can, in order to ensure quick delivery for retailers and other key members of the supply chain. Companies will want to have a stock of products as soon as they are needed and they will also want to move more stock in a shorter period of time.

- ✓ *Global Reach Long*

Gone are the days when companies could locally limit the delivery of their products. Thanks to the Internet, you can expand supply chains on a global scale. At the same time, it is possible for global supply chains to react at a local level. Next gen supply chains must know how tocreate global hubs that are not only effective, but can also supply products locally without needing to transport them across the world for just a few orders.

- ✓ *Optimized Inventory*

  The trick with efficient inventory management is that you should have just the right amount of stock in the warehouse. Having too much will result in expired and unsold stock, while too little will almost always assure that you don't have enough stock when it is urgently needed. This calls for optimizing inventory so that your supply can always meet the demand. The quantity of stock must be dictated by the current consumer behavior, buying trends, and local demand for the product. One way you can optimize inventory in any supply chain is by incorporating various tools, such as industrial weighing scales and truck scales. Innovative shipping techniques must also be employed to speed up the delivery process.

- ✓ *Go Green and Sustainable*

  Try to have a green supply chain which does not impact the environment negatively. Ensure that you don't put any kind of pressure on the environment during any stage of the supply chain. At the same time, make sure that the supply chain is sustainable as well. Practices like utilizing raw materials in a sustainable manner, making eco-friendly packaging and using alternative energy sources to run the manufacturing plant and supply chain will go a long way in ensuring that next gen supply chains are sustainable.

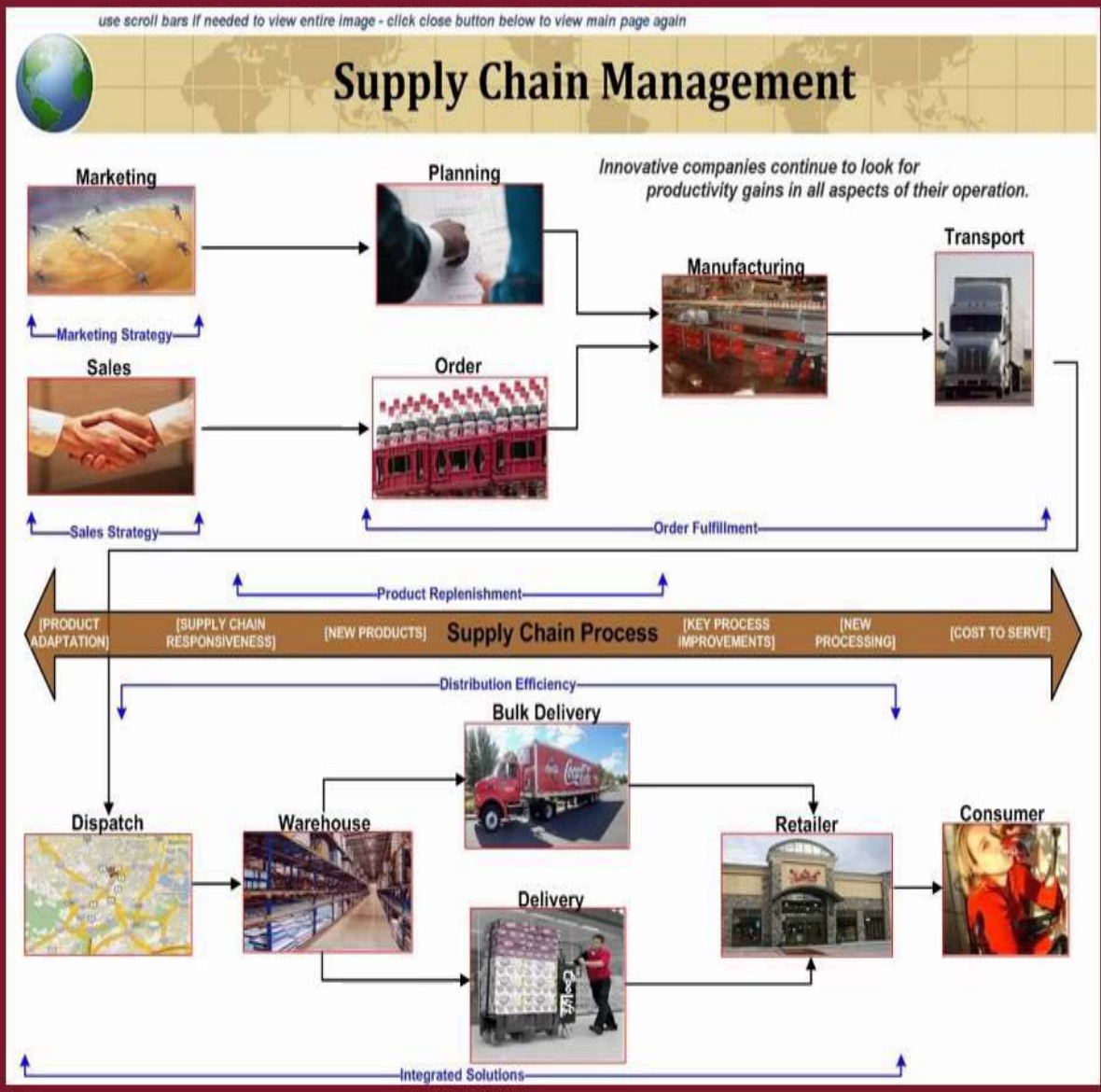
- ✓ *Proactive Strategy* Supply chains should be proactive in case of disruption, sudden changes or potential disasters. Utilizing data modeling and research, you can gain insights and knowledge into how you should be prepared for such events. By being proactive, you can ensure that you offer great services at all times, and that you don't get tangled with excuses that hinder your ability to deliver when needed.

- ✓ *Innovativeness*

  Every supply chain should embrace innovation and technology. By incorporating the latest technology in your supply chains, you can ensure that you stay competitive and offer excellent services at all stages. Modifications can be small or large, but you must constantly

try to incorporate innovative approaches across various functions and supply chain processes.

Comparison of traditional channels and supply chain management		
Element	***Traditional channels***	***Supply chain management***
Inventory Independent efforts Joint reduction in Management Approach	Independent efforts	Joint reduction in channel inventories
Total Cost Approach	Minimize firm costs	Channel-wide cost efficiencies
Time Horizon	Short term	Long term
Amount of information sharing and monitoring	Limited to needs of current transaction	As required for planning and monitoring processes
Amount of Coordination of Multiple levels in the channel	Single contact for the transaction between channel pairs Multiple contacts	Multiple contacts between levels in firms and levels of channel
Joint Planning	Transaction-based	On-going
Compatibility of Corporate Philosophies	Not relevant	Compatible at least for key relationships
Breadth of Supplier Base	Large to increase competition and spread Risk	Small to increase coordination
Channel Leadership	Not needed	Needed for coordination focus
Amount of Sharing of Risks and rewards	Each on its own	Risks and Rewards shared over the long term
Speed of Operations Information and Inventory flows	"Warehouse" orientation (storage, safety stock) Interrupted by barriers to flows Localized to channel pairs	DC orientation (inventory, velocity) Interconnecting Flows: JIT, Quick Response; across the channel



Supply Chain Model

Key Activities/ Functions of Supply Chain Management

Supply Chain Management is a cross functional approach to managing the movement of raw materials into an organization and movement of the finished goods out of the organization toward the end consumer.

Several models have been proposed to understand the activities required to manage material movement across organizational and functional boundaries.

SCOR is a supply chain management model promoted by the supply chain council. Another model is the Supply Chain Management floated by the Global Supply Chain Forum (GSCF).
Supply Chain activities can be grouped into strategic, tactical and operational level of activities.

The firm's supply chain strategy does not exist in a vacuum. It must be consistent with both the overall business strategy and efforts within such areas as purchasing, logistics, manufacturing and marketing. The Supply Chain activities have to be clearly spelled out for the given business

i. Strategic activities

- ✓ *Strategic network optimization*, including the number, location, and size of warehouses, distribution centers and facilities.
- ✓ *Strategic partnership* with suppliers, distributors, and customers, creating communication channels for critical information and operational improvements such as cross docking, direct shipping, and third-party logistics.
- ✓ *Product design coordination*, so that new and existing products can be optimally integrated into the supply chain, load management
- ✓ *Information Technology infrastructure*, to support supply chain operations.
- ✓ Where to make and what to make or buy decisions
- ✓ Align overall organizational strategy with supply strategy

ii. Tactical activities

- ✓ *Sourcing* contracts and other purchasing decisions.
- ✓ *Production decisions*, including contracting, locations, scheduling, and planning process definition.
- ✓ *Inventory decisions*, including quantity, location, and quality of inventory.
- ✓ *Transportation strategy*, including frequency, routes, and contracting.

- ✓ *Benchmarking* of all operations against competitors and implementation of best practices throughout the enterprise.
- ✓ Milestone payments
- ✓ Focus on customer demand and Habits

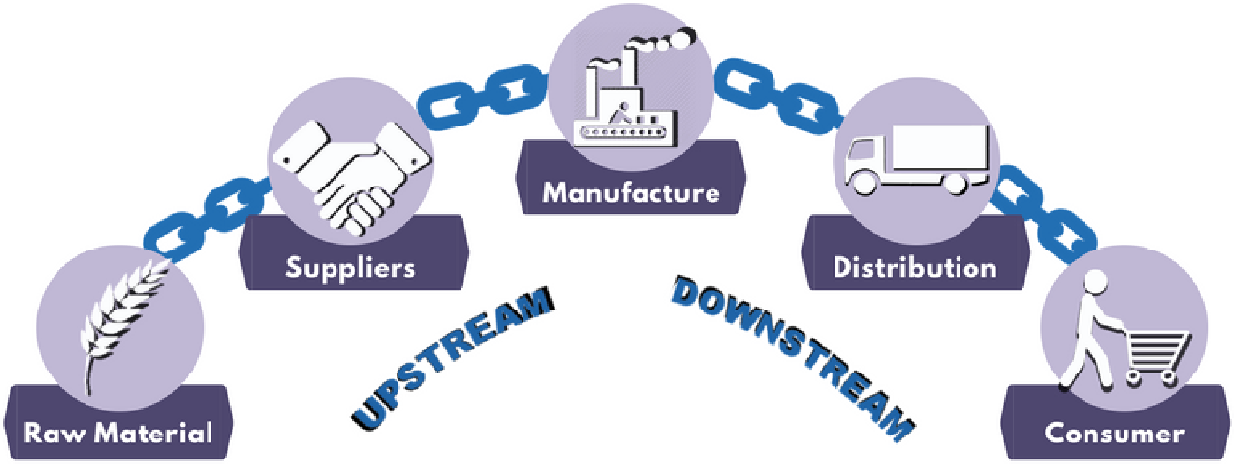
iii. Operational activities

- ✓ Daily production and distribution planning, including all nodes in the supply chain.
- ✓ Production scheduling for each manufacturing facility in the supply chain (minute by minute)
- ✓ Demand planning and forecasting, coordinating the demand forecast of all customers and sharing the forecast with all suppliers.
- ✓ Sourcing planning, including current inventory and forecast demand, in collaboration with all suppliers
- ✓ Inbound operations, including transportation from suppliers and receiving inventory.
- ✓ Production operations, including the consumption of materials and flow of finished goods.
- ✓ Outbound operations, including all fulfillment activities and transportation to customers.
- ✓ Order promising, accounting for all constraints in the supply chain, including all suppliers, manufacturing facilities, distribution centers, and other customers.
- ✓ Performance tracking of all activities

Thus Supply Chain activities depend a lot on a firm's business model as also on how it wants to move

Upstream and Downstream Supply Chain

Due to the different types of companies included in a supply chain, with different positions, two models, *upstream* and *downstream* supply chains have been found. For companies that deal mainly with suppliers on its *buy-side*, are considered within an upstream supply chain, while other companies that concentrates on customers and providing services deals in the perspective of the *sell-side* of the supply chain, downstream.



RISKS IN SUPPLY CHAIN MANAGEMENT

Current business trends are leading to complex and dynamic supply chains. Increasing product/service complexity, out-sourcing and globalization are the reasons that have enhanced the risk, changed its location and nature in supply chains.

Riskcan be broadly defined as a chance of danger, damage, loss, injury or any other undesired consequences.

A more scientific definition of risk was provided by the Royal Society (1992): ‘‘the probability that a particular adverse event occurs during a stated period of time, or results from a particular challenge”.

Risk management is the process of identifying, assessing, and controlling risks arising from operational factors and making decisions that balance risk with offsetting benefits.

Risk management strives to address risk proactively, in advance of problems and also in optimizing organization and supply chain response after a risk occurs.

It is a process of measuring or assessing risk and then developing strategies to manage the risk. Risk management is the broad activity of planning and decision making designed to deal with the occurrence of hazards or risks. Risks include both unlikely but high impact disruption risks, as well as more common volatility in demand, internal processing, and supply.

Risk in the context of supply chains may be associated with the production/procurement processes, the transportation/shipment of the goods, and/or the demand markets.

Types of supply chain risks

- ✓ *Supply or input risk*

  This relates to potential or actual disturbances to the flow of product or information emanating within the network, upstream of the focal company. Therefore, it is risk associated with a Company's suppliers, or supplier's being unable to deliver the materials the company needs to effectively meet its production requirements/demand forecasts. It adversely affects inward flow of any type of resource to enable operations to take place

- ✓ *Demand Risk*

  Demand risk relates to potential or actual disturbances to flow of product, information, and cash, emanating from within the network, between the focal company and the market. This demand risk can be a failure on either the high or low side to accurately accommodate the level of demand. It encompasses uncertainties in both product volume and mix.

- ✓ *Process Risk*

  Processes are the sequences of value-adding and managerial activities undertaken by the company. Process risk relates to disruptions to these processes. It affects a firm's internal ability to produce and supply goods/services, which results from the consequences of a breakdown in a core operating, manufacturing or processing capability

- ✓ *Control Risk*

  Controls are the assumptions, rules, systems and procedures that govern how an organization exerts control over the processes. In terms of the supply chain they may be order quantities, batch sizes, safety stock policies etc. Control risk is therefore the risk arising from the application or misapplication of these rules

- ✓ *Strategy risk*

  One of the first supply chain risks to consider is the risk involved in choosing a supply chain strategy. While new business owners often overlook the intricacies of their supply chain strategy, it is vital to consider the pros and cons of each option.

- ✓ *Market risk*

At the same time, however, outsourcing some or all of your product lines from overseas can put your supply chain at risk if manufacturing quality isn't up to standard. It is much easier to monitor local suppliers and to enforce quality standards since it is usually feasible to visit the site in person. However, this can be much more complicated and expensive when outsourcing overseas, and it may be difficult to maintain quality standards for your products.

To mitigate this risk, business owners need to conduct thorough research before choosing a supplier to ensure they are reliable and trustworthy. Once a supplier is chosen, ensure standards are communicated clearly and regularly, and if feasible, consider hiring a representative to supervise production processes.

- ✓ *Performance risk*

  Relatedly, suppliers don't only need to be monitored to ensure quality standards, but also because they are subject to many changes that could directly impact your supply chain. Consider for example threats such as bankruptcies, performance issues, ownership changes, labour strikes and geopolitical changes. Any of these things can become a major risk to the smooth functioning of your supply chain, so business owners need to remain vigilant.

  To mitigate the damage caused by such risks, business owners need to be continuously reviewing the condition of each supplier, including their individual geopolitical environments. By remaining alert to changes for suppliers, you can work proactively to prevent the effect in your own supply chain.

- ✓ *Financial risks*

  These risks can range from an unexpected or unfavorable change in exchange rates all the way to a supplier's bankruptcy. Some examples of financial risks include budget overruns, finding the limitation, constructive changes, and missed milestones requiring additional funding. Financial risks also encompass unexpected cost overruns that may be linked to other risk factors such as changes in the scope of work required to successfully complete the activity.

- ✓ *Legal risks*

  Legal and contractual risks are often related to disputes or different interpretations of contractual obligations, or from not meeting the requirement included in the terms and

conditions. Use or misuse of intellectual property can also be considered as a legal risk, especially when patent infringement is a possibility. We can also include in this category violation of laws, as well as civil lawsuits.

- ✓ *Environmental risk*

  In the sourcing process, it is critical to evaluate the risk to the environment created by your supplier or contractor. Environmental risk includes the organization's negative impact on water, air, and soil as a result of discharges, emissions, and other forms of waste.

- ✓ *Sociopolitical risk*

  When the regulatory environment changes in response to a new government or to increasing awareness of inequitable social conditions, many existing institutions experience difficulty in adapting. Sourcing efforts, especially those in low-cost countries, must consider the impact of these changes on the culture and business operations within that environment. Stability comes with a price.

- ✓ *Project organization risk*

  These are generally a result of not having the right people or equipment in the right place at the right time. This can also be considered as a planning risk.

- ✓ *Human behavior risk*

  Not surprisingly, human behavior risks are the most difficult to assess. Sometimes the project or activity may be put in danger due to an illness or injury or due to the departure of key personnel. Sometimes, it may be the result of poor judgment or bad decisions.

- ✓ *Extreme Weather Events*

  Extreme weather represents one of the most significant risks to ocean freight on the globe. Tropical storms can toss ocean carriers aside like trash. Depending on the route, tropical storms may not have been a significant threat in recent years. However, global climate change indicates tropical storm threat is on the rise. Shippers need to re-evaluate ocean route use and determine which carriers can increase shipping in anticipation of tropical storms.

- ✓ *Catastrophes*

  Catastrophes include human made and natural disasters that do not fall into the weather-related category. For instance, earthquakes and famine are two catastrophes that may affect global trade. *According to J. Paul Dittman, Ph.D. via Supply Chain Management Review, up*

to 47 percent of shippers do not have a backup plan for ensuring continuity following a natural disaster or major equipment failure.

- ✓ *Connectivity*

  In the 24/7 world of modern trade, global supply chain risks also exist within the connectivity of today's systems. Although systems can be integrated through open-source software, integration and modification of systems increase risk. Each modification may result in added costs for new upgrades, and poorly integrated systems could lead to bottlenecks and disruptions.

  To minimize the risk, create a backup data resource. Decentralize data storage. Ensure system connectivity is on a secure network. Eliminate vulnerabilities to your systems, such as encrypting personnel PCs, tablets and smartphones. When integrating systems, avoid unnecessary modifications, and work with expert supply chain systems' integrators to maximize efficiency and profitability.

- ✓ *Cyber Attacks*

  Cyber-attacks have become a predominant risk in modern supply chain management. Someone with malicious intent could bring down entire supply chain networks and force freight rates to skyrocket. Cyber-attacks are also becoming a weapon for terrorists too, so any person, government or agency could be working to undermine your digital footprint.

  Choose supply chain systems' vendors with a proven record of maintaining stringent cyber security protocols. Limit personnel access to the system to those necessary for shipment processing and maintain the strong physical security of your facilities. Penetration testing and a strong IT team can also reduce the risk of cyber-attacks.

In addition to the categories just outlined, our assessment should identify if the risks to be considered are internal risks (related to our own operations) or external risks – related to conditions outside of our organization, such as market factors, political climate, regulatory environment, economic circumstances, etc. More specifically:

- Internal risks are risks that you can control or influence. They include cost estimates, staff assignments, schedule delays, and product design.

- External risks are risks that you as a contract manager can't control or influence. External risks include governmental actions relating to taxes that could affect a financial contract, whether delays that could affect a construction contract, and a change in currency rates that could affect the value of an international contract.

Summary

Understanding supply risks can enable purchasing organizations to take effective action in response to those risks. Risk management should form an integral part of good purchasing and supply practice. It is essential to address the right risks and use the right strategies.

A number of techniques and tools may be useful in helping you identify risks. Supply risk management activities can involve process improvement, buffer strategies, forming strategic alliances and developing suppliers

Importance of Risk management

- ✓ *Risk management stimulates many supply best practices*. For example, risk management is a key stakeholder in eliminating waste. The use of resources or assets creates inherent risk. Use or deployment of wasteful resources creates unnecessary additional risk to the organization, as well as to the supply chain. Risk to even a wasteful resource or asset may potentially compound losses in other assets should risk occur.。
- ✓ *Risk management generally improves supply chain partner relationships* as joint risk sharing and risk information improve, and through increasing trust as risk management practice demonstrates commitment and capability the supply chain can count on.。
- ✓ *It provides visibility of supply chain-wide risk*, ascertaining the reality of constant risk exposure not only within the network of a single organization's facilities, but across a broader domain of geographies and capabilities.。
- ✓ *The reality of soft risk—risk that is difficult to measure—and its unintended consequences in business management.* There is a need for constant awareness and vigilance toward decisions, processes, practices and goals that may unintentionally increase or decrease in the supply chain.
- ✓ *Every business faces the balance point of risk and reward*. Over the course of history earning a greater reward generally requires enduring a greater risk. Risk management ensures that

risk exposure is optimally minimized while the organization seeks its greatest reward from its people, assets, capabilities and resources.

- ✓ *Gain competitive advantage through risk management*

  Improved risk management enables an organization to take market share from competitors when a common risk strikes, and leads to improvements in discovering, preventing and addressing smaller risks, which may cost effort, expense or time. These benefits increase when practiced across a supply chain. A supply chain practicing risk management is faster to spot risk, faster to respond to it and faster to claim advantages from these capabilities. Competitor supply chains and organizations may not have as well developed risk management practices. This becomes a key strategic competitive advantage even for commodity product producers.

Risk identification techniques

- ✓ ***Brainstorming:*** This is one of the most known risk identification techniques. According to PMI (2013), this technique is usually performed with a multidisciplinary set of experts, not on the team. The goal being to obtain a comprehensive list of project risks. Here, all relevant persons associated with project gather at one place. There is only one facilitator who is briefing about different aspects of the participants and then after note down the factors. Before closing it the facilitator review, the factors eliminate the inessential ones. This technique appears to be a well-organised risk identification technique because it entails an open discussion which is attended by project teams and other project participants. Therefore, it creates an opportunity to discuss the existence of risks as well as the potential impacts thereof. However, it is predisposed to be influenced by stronger parties if not monitored (Khalafallah, 2002).
- ✓ ***Interviews/Expert Opinion:*** Experts or interviewing experienced participants in a project can be a great help in avoiding or solving similar problems over and over again. All project members or the relevant persons can be interviewed in order to identify the factors affecting risk (PMI, 2013; and Khalafallah, 2002).
- ✓ ***Questionnaires:*** The risk identification questionnaire technique can be used to detect potential risks in a project. The questions are well structured and handed out to project team

members by the project manager. It allows for consistency and short response periods as well as open disclosure of risks. The major disadvantage is that the final results are based on the ideas of individuals (Khalafallah, 2002).

- ✓ ***Delphi technique:*** This method is identical to brainstorming but here the projects participants do not know each other, and they are not at the same place. They will identify the factors without consulting other project participants. Like in brainstorming, the facilitator sums up the identified factors. This method may be appropriate to the identification of risks, but it is more suitable to attaching possibility of occurrence and potential impacts of previously identified risk events. This technique of RI is supported by structured knowledge, experience and creativity from an expert (Jayasudha&Vidivelli, 2014)
- ✓ ***Expert systems:*** This technique makes use of the past experiences of experts to identify potential risks in a construction project. The disadvantage of this technique is that it tends to out rightly ignore any risk that was previously omitted, and it only relies on knowledge (Khalafallah, 2002).
- ✓ ***Past Experience:*** Previous experience from the similar project, the analogy can be formed for identification of the factors. When comparing the characteristics of projects will provide insight about the common factors (Gajewska&Ropel, 2011).
- ✓ ***Checklists:*** These techniques can be quick and simple; it is impossible to build exhaustive ones. The checklist can be developed based on historical information and knowledge that has been accumulated from previous similar projects and from other sources of information (Gajewska&Ropel, 2011). Serious attention should be taken to explore items that do not appear on the checklist. Further, the checklist should be re-examined during project closure to improve it for future projects.
- ✓ ***Documentation review:*** A planned and detailed documentation reviews need to be performed on a project from time to time, taking into cognizance all the assumptions, plans and previous project files. These can serve as indicators that reveal entrenched risks in the project (PMI, 2013). Most of the aforementioned techniques are based on separating a process into its essential components for analysis. This reductionist perception fails to consider the interactions between components and new risks that may arise as a consequence of the interaction with the internal and external environment (White, 1995). Risk finding contemplates all exposures, including direct losses such as the need to replace stolen property

and indirect losses such as loss of important employees as a result of death or retirement (Hollman& Forrest, 1991). RI is not an invariable process, but should be the attention of perpetual evolution. Changes in the

Course work **Submission date: 22nd February 2020 at 2:00pm**

Question one: a) Discuss the process of identifying and managing risks in a supply chain

b) Explain the following terms

i. Order picking
ii. Zoning
iii. Disposal

Question two: a) Discuss the receipt cycle

b) Explain stock holding costs and benefits

INVENTORY CLASSIFICATION

Item coding

This is a way of identifying specific items and categorizing related inventory items.

Coding also allows a warehouse tracking **system** to monitor the quantity of items in inventory and their status. Services may also have an item code assigned for invoicing purposes.

Methods of store management and codification

- ✓ *Alphabetical Codification:*

  In this method, letters of the alphabet are used to describe an item. Sometimes combinations of alphabets are designed to give a mnemonic meaning e.gBT-Bolt, NT-NUT, PN-PIN, SC-Screw, RT-Rivet.

  Since the numbers of Alphabets are limited, even with a combination of letters as above there is a serious limitation to the number of items which can be uniquely coded under this method. Further, sometimes the same combinations of the alphabets are capable of different meanings.

  It is also not easy to evolve a combination of letters to give a mnemonic meaning in which case alphabets have to be used without attaching any particular meaning. This method is not suitable except for tiny organizations where the number of items to be coded is very, very limited.

- ✓ *Numerical Codification*

  Against the alphabetical system, the numerical system is based on numbers, simple numbers, block numbers or dash/stroke numbers. Examples are:

Materials	Simple No.	Block Number	Dash or Stroke Number
Raw Materials	01	1–1000	15
Iron Orc	05	1–10	15–1 or, 15/1
Iron Pig	06	11–20	15–2 or, 15/2
Iron Melted	07	21–30	15–3 or, 15/3
Iron Bright	08	31–40	15–4 or, 15/4
Iron Steel	09	41–50	15–5 or, 15/5
Iron Sheets	10	51–60	15–6 or, 15/6
Iron Bars	11	61–70	15–7 or, 15/7
Iron Mould	12	71–80	15–8 or, 15/8

i. Simple Number

One number is allotted against each material, with some other number being kept as provision for other items.

ii. Block Number

The numbers are so designed as that material of similar nature or group comes under one block. As for example, raw material block comes under 1-1000, consumable oil and lubricant materials block comes under 1001-2000, packaging materials block come under 2001-3000 and so on.

Again, Raw material block may be subdivided into small blocks according to the category of materials, as for example, iron, steel and allied group, copper, nickel, alloy etc. 1-100, 101-200, 201-300, 301-100, 401-500 respectively.

Dash/Stroke Number:

A further improvement over the block numbering is Dash/Stroke' numbering system. A Dash or stroke is put against the main element of the material in order to code the material in the same group.

✓ *Mnemonic Codification:*

When we use letters to help memory, we call such a system a mnemonic system. This system is therefore, a special application of the alphabetical system. Alphabets are allotted to an item according to its initials or abbreviation. For example,

Table 14.1 Mnemonic Codification

Materials	Code
Furniture	FU
Iron	Ir
Steel	St
Ceiling Fan (Large)	CFI
Building Material	Bm
Door Shutter	Ds
Paint Oil and Lubricants	Pol

Mnemonic system alone is confusing since one symbol may convey impression of two or more objects, as for example, 'FIT may mean furniture or fuel or St may indicate stationery or steel.

✓ *Combined Alphabetical & Numerical Codification:*

This system, as the name suggests, is the combination of both the alphabetical and the numerical system described before. In order to improve upon the alphabetical system, and also to take advantage of the numerical system, this system allows alphabets to be retained to a limited extent and then uses the number codes.

The materials are first grouped under some main classes and then it allows sub grouping under numbering system. The table 14.2 states the illustration for combined alphabetical and numerical codification system.

Table : 14.2 Combined alphabetical and numerical system of codification.

Main Class (Broad Particular Class Distinction)	Sub Group I	Sub Group II	Code
1. Carbon	CB		
Carbonic Acid	—	11	CB–11
Carbonic monoxide	—	12	CB–12
Carbon Dioxide	—	13	CB–13
2. Maganese	MN		
Maganese Acetate	—	21	MN–21
Maganese Dioxide	—	22	MN–22
Maganese Oxalate	—	23	MN–23
3. Phosphorous	PH		
Phosphoric Acid	—	51	PH–51
Phosphorus Pentoxide	—	52	PH–52
Phosphorus Trioxide	—	53	PH–53
4. Sulphur	SP		
Sulphrous Acid	—	81	SP–81
Sulphuric Acid	—	82	SP–82
Sulphur Oxide	—	83	SP–83

✓ *Decimal Codification*

Under this system of codification, within the range often numerals 0-9, some significance is attached to every digit in the code. Thus, the whole range of items in stores can be codified without difficulty.

Numbers are assigned in such a manner that each digit represents a sub-group or sub-account of the previous digit. The principal advantage of a decimal system is its capacity to accommodate a new item. The disadvantage is that it becomes cumbersome when a basic unit has many minor assemblies which in turn consists of numerous sub-assemblies.

The entire ranges of items have first to be classified under a broad class. Further classification will follow some group patterns, according to their particular nature. Further sub-divisions will follow for type, size, grade, shape, condition etc.

- ✓ *Colour coding*

Advantages of coding

- ✓ Helps in avoiding lengthy description.
- ✓ Correct identification of items.
- ✓ Prevents duplication.
- ✓ Standardize the items
- ✓ Reduces varieties.
- ✓ Facilitate recording, accounting and costing.
- ✓ Easy locating and indexing.

Labelling

Whenever you manufacture a product, you want to communicate the value of the product to the customers. One of the ways to do that is to use product labelling. Product labelling has become a means of communication between the brand and the consumer. Product labelling has very important information which is printed on the product packaging.

Product labelling is a part of the packaging of a product. Labelling is the written information on the packages. These written labels on the package cover important information which needs to be communicated to a customer. Product labelling is different from packaging. A product packaging might have the brand colours, the logo and the material as well as the shape of the package etc. The product is the informational / written part.

Importance of labelling

- ✓ *Brand and Product Identity*

  The label on the product is the primary product identity. The name of the product and the brand itself is considered as part of product labelling and these product labels form the brand identity.

- ✓ *Grade and type*

  Product labelling can be used to differentiate between the various grades and type of the product.

- ✓ *Requirement by law*

  As mentioned above, there are numerous labelling requirements which might be specified by a regulatory body. Some of them which are very common include Ingredients, manufacturing plant, batch number, expiry date, safety instructions etc. Thus, a company has to consider all legal requirements before deciding on the product labelling.

- ✓ *Description*

  By law, a product might not be required to print usage instructions on the package of the product. Some products use a manual to communicate the same whereas others imbibe usage instructions on the packaging itself.

- ✓ *Promotion*

Buy 2, get 1 free. This is a type of product labelling which you would have most likely encountered especially during festive season. If a promotion is printed on the package, it has to be adhered to. It also comes to the immediate attention of the customer.

- ✓ *Additional information*

  There may be additional information on the product, of use to the customer, which can be used for product labelling.

Types of warehouse labels

- ✓ *Floor Labels*

  Floor labels are ideal for large warehouses with several rooms. They are manufactured to survive heavy floor traffic and wear and tear. They are designed to withstand harsh solvent, oil, hydrocarbon solutions, and other contaminants, and they can be customized for any size, shape, length, or content requirements.

- ✓ *Rack Labels*

  The most common type of warehouse label is a rack label, which is used to streamline workflow by making items and sections easier to identify for employees. They help identify the right products for inventory management, storing, and shipping purposes. There are several types of rack labels, and they include multi-level, magnetic, cold storage, and more. Rack labels can be easily color-coded for identification; they can also be designed with arrows, and can be placed on aisles for easy locating of items.

- ✓ *Warehouse Magnets*

  Out of all the warehouse label options, magnets are the most reusable option. They can be applied regardless of temperature, removed without any mess or scratches, and can be reapplied without the need of sticky adhesives like tape. Magnetic signs and labels are typically used for shelf and rack location labeling as they can be moved when required.

- ✓ *Retro-Reflective Labels*

  This option is terrific for barcoding shelves. They can be scanned up to 45 feet away. They are a great solution for warehouse racks, pallets, and other industrial surfaces.

- ✓ *Warehouse Signs*

  A great safety feature, warehouse signs can help identify hazards to employees working in the plant. Since most warehouse workers operate heavy machinery and have to navigate

around sharp corners and aisles, warehouse signs are extremely important. Employees should be made aware of proper procedures and potential hazards within the warehouse, and these safety signs are helpful for notifying workers of forklift safety warnings, clearance height and capacity alerts, quality-control warnings, and safety reminders.

STANDARDIZATION

Product standardization refers to the process of maintaining uniformity and consistency among the different iterations of a particular good or service that are available in different markets. It is a process of marketing a good or service without making any changes to it. If a product is changed at all, it is only changed superficially. Otherwise, the characteristics of the good or service remain uniform. It is made using the same materials and processes, has the same packaging and is marketed under the same name. Product standardization is useful for a number of reasons.

Standardization is also the process of establishing a technical standards which could be

- Standard specification,
- Standard test method,
- Standard definition,
- Standard procedure or practice, etc.

By using standardization, provider and user can easily communicate through the set guidelines.

Reasons for standardization

- ✓ Economies of scale in production
- ✓ Economies in product R&D
- ✓ Economies in marketing
- ✓ "Shrinking" of the world marketplace/economic integration
- ✓ Global competitions
- ✓ High costs of adaptation process
- ✓ Industrial and high tech products

- ✓ Entering the similar markets
- ✓ Export
- ✓ Strong image of the country/producer/brand

Advantages of standardization

- ✓ For **businesses**, the widespread adoption of International Standards means that suppliers can develop and offer products and services meeting specifications that have wide international acceptance in their sectors. Therefore, businesses using International Standards can compete on many more markets around the world.
- ✓ For **innovators** of new technologies, International Standards on aspects like terminology, compatibility and safety speed up the dissemination of innovations and their development into manufacturable and marketable products.
- ✓ For **customers**, the worldwide compatibility of technology which is achieved when products and services are based on International Standards gives them a **broad choice** of offers. They also benefit from the **effects of competition** among suppliers.
- ✓ For **governments**, International Standards provide the technological and scientific bases underpinning health, safety and environmental legislation.
- ✓ For **trade officials**, International Standards create **guideline** for all competitors in the markets. The existence of divergent national or regional standards can create technical barriers to trade. International Standards are the technical means by which political trade agreements can be put into practice.
- ✓ For **developing countries**, International Standards that represent an international consensus on the state of the art are an important source of **technological know-how**. By defining the characteristics that products and services will be expected to meet on export markets,

International Standards give developing countries a basis for making **the right decisions** when investing their scarce resources and thus avoid squandering them

Disadvantages of standardization

- Lack of Uniqueness
- Vulnerability to Trade Barriers
- Strong Local Competitors
- Similarities among customers are assumed, not proven
- Over standardization
- Narrow Vision

STOCK CONTROL SYSTEM

An *inventory control system* is a system that encompasses all aspects of managing a company's inventories; purchasing, shipping, receiving, tracking, warehousing and storage, turnover, and reordering.

Inventory control systems are processes used to track and manage inventory to ensure the business has enough on hand, so it doesn't run out but not too much that it has to be stored which costs a company money. Inventory control can be manual or automated.

Functions of stock control

- ✓ To develop policies, plans and standards required so as to achieve the inventory control objectives
- ✓ Effective running of stores. This may include problems of layout, utilization of storage space, issuing and receiving procedures of items kept in stock.
- ✓ Technological responsibility for the state of different materials. This may include the method of storage, maintenance procedures, studies of deterioration and obsolete materials and corrective action required.
- ✓ Stock Control System. This includes purchase procedures of materials, ordering policies, physical verification and records of items stored.
- ✓ To ensure the timely availability of requisite input materials and avoid building up of stock levels of final product.
- ✓ Maintenance of Specified Inputs. Specified raw materials, finished components/parts work m process, general supplies in sufficient quantities are maintained to meet the production requirements of the enterprise.
- ✓ Protection of Inventories. The inventories are to be protected from improper material handling; wrong and unauthorized removal from the stores.
- ✓ Pricing. Pricing of all input materials being supplied to various shops is essential for further cost estimation of final products.

Characteristics of a good control system

- ✓ *Ease of Use*

  A stock control system should not require weeks of training, an indecipherable and bulky user manual, or other complexities when learning how to use and navigate the system. It should have straight-forward and easily understood functions and operations that need minimal training or explanation to use.

- ✓ *Scalability*

  This factor is important whether you are a small business with a tiny stock room or a large corporation with multiple warehousing and distribution facilities scattered across the country. You need a stock control system that can adapt to your company's needs and grow with your business without requiring major upgrades or modifications.

- ✓ *Integration with Existing Data Assets*

  When looking for a stock control system, you don't want to incur the potentially costly replacement of your existing data assets and infrastructure to implement new operational methods and procedures. The stock control system should be able to integrate seamlessly with your existing IT software and hardware.

- ✓ *Inventory Monitoring*

  With user-defined parameters, an ideal stock control system can monitor your company's optimized inventory levels and provide you with instant notifications and follow-up reminders when your inventory reaches predetermined volumes. The inventory monitoring processes should also permit automated replenishment of select units as determined by the user or system administrator.

- ✓ *Real-Time Updating Capabilities*

  When changes are made to your inventory, you need to know immediately. Whether those changes are to on-hand or remotely warehoused stock, and whether the changes are a result of order fulfillment, incoming shipments, or losses due to damage in transit, you want your stock control system to have the capability to update data across your network in real time.

- ✓ *Financial Management*

  A good stock control system will have financial management features that give you the ability to make changes to pricing structures (temporary and permanent) and stock costs. It

should also offer the ability to set up multiple accounts for manipulating and managing the financial aspects of your company's logistics operations**.**

- ✓ *Reporting Options*

  Your stock control system should offer you a diverse array of reporting options that cover the end-to-end aspects of your stock management operations. This could include importing data from point-of-sale systems, individual and bulk information, and report generation for the history of company orders, shipment data, customer orders, and price changes, just to name a few.

- ✓ *Auditing Features*

  Conducting internal audits of your supply chain components is an important aspect of your company's overall logistics management. A stock control system with built-in audit processes would give you access to the strong and weak points in your system before any weaknesses become critical issues.

- ✓ *Single Interface Design*

  Regardless of the options included in a stock control system, it should provide access to all of those options in a single interface, without requiring the use of multiple programs, applications, or sub-systems to complete all of your stock management tasks.

- ✓ *Customization*

  An ideal stock control system should be customizable so you can tailor it to fit your specific needs. This would eliminate having a system lacking features you want but can't have, and features you don't need but can't get rid of.

When you have a stock control system that includes these ten features and qualities, you will have the ability to maintain better control over your supply chain. Keeping your stock control system effective and successful is just one part of your overall logistics management strategy, but it is certainly an important one, and the right stock control system can be integrated into your existing operations to help ensure the continued success of that strategy.

Manual system

A manual system is like a bookkeeping system in which records maintenance is done by hand, without using a computer system or any automatic system. In this type of system transactions are written in journals, from which the information is manually retrieved into a set of financial

statements. These systems suffer from higher rate of inaccuracy, and they are much slower than computerized systems. ”

Manual systems can waste both money and time. For example, administrators can spend a breathtaking amount of time searching for misplaced documents in a manual system.

It’s not just money lost, but people, too. The research reports that searching for lost and misplaced documents accounts for much working hours per year for each employee. This has a big, negative ripple effect on professional perception, workplace productivity and organizational morale.

Employees tend to leave disorganized organizations, and the frustration of working with manual systems can be a primary driver of employee turnover.

The effect on service delivery is also quite obvious, since customer frustration grows and company reputations diminish whenever documents generated by manual processes are misplaced.

Automated systems reduce paper and make data storable, retrievable and searchable. Once automated systems are implemented, the time your employees waste searching for misplaced documents can be spent on more strategic, value-generating activities.

Computerized or Automated System

Automated system is a combination of both software and hardware which is designed and programmed to work automatically without the need of any human operator to provide inputs and instructions for each operation.

Automated systems allow you to monitor your processes in real time and identify problems as they arrive, enabling quick adjustments along the way. While manual systems can be difficult to coordinate, similar to the old saying that “the right hand doesn’t know what the left hand is doing”, automated systems work in tandem on their own.

For instance, according to hotels, they could experience significant gains after automating their inventory and procurement systems. First, there are big cost savings and shorter fulfillment cycles. Second, hotels could experience significant time savings that free up staff to do more

client-centric functions that enhance the overall business. Third, an automated system could bring better accuracy because staff members are no longer required to reenter data from paper documents. This dramatically reduces clerical errors. Fourth, automation would deliver an increased ability to negotiate better deals with suppliers. In any negotiation, it's essential to know exactly how much volume of supply is needed, allowing the purchaser to more accurately estimate volumes and purchase accordingly. The bottom line is that informed buyers have more leverage

Manual System Vs Automated System

- ✓ *Speed*

  The main difference between manual and computerized systems is speed. Accounting software processes data and creates reports much faster than manual systems. Calculations are done automatically in software programs, minimizing errors and increasing efficiency. Once data is input, you can create reports literally by pressing a button in a computerized system.

- ✓ *Cost*

  Another difference between manual and computerized systems is cost. Manual accounting with paper and pencil is much cheaper than a computerized system, which requires a machine and software. Other expenses associated with accounting software include training and program maintenance. Expenses can add up fast with costs for printers, paper, ink and other supplies.

- ✓ *Backup*

  A third difference between manual and computerized systems is the ease of backup of a computerized system. All transactions can be saved and backed up, in case of fire or other mishap. You cannot do this with paper records, unless you make copies of all pages--a long and inefficient process.

Factors that affect levels of stock held

a) Minimum stock level

This represents the quantity which must be maintained in hand at all times. If stocks are less than the minimum level, then the work will stop due to shortage of materials. The following factors are considered in determining minimum level;

- ✓ *Lead Time*

  A purchasing firm requires some time to process the order and time is also required by the supplier/vendor to execute the order. The time taken in processing the order and then executing it is known as lead time. It is essential to maintain some inventory during this period to meet production requirements.

- ✓ *Rate of Consumption*

  It is the average consumption of materials items in the industry. The rate of consumption will be decided on the basis of past experience and production plans.

- ✓ *Nature of Material*

  The nature of material also affects the minimum level. If a material is required only against special orders of the customer then minimum stock will not be required for such materials.

- ✓ *Re-ordering Level*

  When the quantity of materials reaches a certain level then fresh order is sent to procure materials again. The order is sent before the materials reach minimum stock level. Reordering level is fixed between minimum level and maximum level. The rate of consumption, number of days required to replenish the stocks, and maximum quantity of materials required on any day are taken into consideration while fixing reordering level.

b) Maximum level

It is the quantity of materials beyond which a firm should not exceed its stocks. If the quantity exceeds maximum level limit then it will be termed as overstocking. A firm avoids overstocking because it will result in high material costs. Overstocking will lead to the requirement of more capital, more space for storing the materials, and more charges of losses from obsolescence. The following factors are key in its determination;

- ✓ The availability of capital for the purchase of materials in the firm.
- ✓ The maximum requirements of materials at any point of time.
- ✓ The availability of space for storing the materials as inventory.
- ✓ The rate of consumption of materials during lead time.
- ✓ The cost of maintaining the stores.
- ✓ The possibility of fluctuations in prices of various materials.
- ✓ The nature of materials. If the materials are perishable in nature, then they cannot be stored for long periods.
- ✓ Availability of materials. If the materials are available only during seasons then they will have to be stored for the future period.
- ✓ Restrictions imposed by the government. Sometimes, government fixes the maximum quantity of materials which a concern can store. The limit fixed by the government will become the deciding factor and maximum level cannot be fixed more than that limit.
- ✓ The possibility of changes in fashions will also affect the maximum level

STOCK OBSOLESCENCE

Obsolete inventory is often referred to as "obsolete stock," "dead inventory," or "excess inventory." These terms all apply to any items that have reached the end of its "product lifecycle," which means there is no market demand for the product anymore.

Most businesses determine that its inventory is obsolete once there are no sales after a set amount of time.

Obsolete inventory is a warning sign that you haven't been following inventory management best practices.

Causes of obsolescence

- ✓ *Inaccurate Forecasting*

  Bad forecasting of consumer demand means you risk ending up with excess stock. What if this stock becomes obsolete before you can sell it all? Once a product hits the end of its life cycle, these goods will not be able to get customers.

  Obsolete stock can result in storage costs, as well as the cost of their disposal. Effective forecasting methods will help your business accurately meet demand and avoid surplus stock.

- ✓ *Poor Product Quality or Design*

  Poor quality or design occurs when a product does not meet the expectations of its customers. As a result, demand will quickly decline. You will be left with a large amountof stock that cannot be sold. Also, this cost is not just monetary. Not only will it shorten the product's life cycle, it can also damage the reputation of your brand. Practicing excellent quality assurance and thorough market research will help you avoid these losses.
- ✓ *Inadequate Inventory Management System*

  Manually tracking and planning your company's future orders is error-prone and takes up a lot of time. But, you can avoid these errors and save the costs. Using an inventory management system to track your stock levels can prevent surpluses. Less surpluses, less chance of having obsolete stock. Finding the right system can help your business avoid carrying obsolete stock.
- ✓ *Long Lead Times*

  An inefficient supply chain can result in long lead times. So, you may accumulate excess inventory that will never sell. Reducing lead times will help streamline your supply chain and decrease the amount of stock you need to keep on hand. As a result, this will prevent obsolete stock risks by improving the accuracy of purchase orders to consumer demand. You can do this with more accurate forecasting or using a just-in-time delivery strategy.
- ✓ *No Management of Obsolete Inventory*

  Expecting dead stock to sell as your storage expenses pile up is far from efficient. Instead, you should have an inventory reduction plan in place/ this will mitigate the risk of stock piling up. What does this plan entail? You can assign a team of employees to actively work improving inventory processes that will reduce your levels of obsolete inventory.
- ✓ Change in technology

Stock control documents

The normal process of purchasing, storing, control and issue of materials consists of the following documents:

- ✓ *Bill of Materials*

  Bill of Materials is a comprehensive list of materials, with specifications, material codes and quantity of each material required for a particular job, process or production unit. It will also

include the details of substitute materials. It is prepared by the engineering or planning department for submission of quotation and after the receipt of work order. It is a method of documenting materials required for execution of the specified job work.

Bill of Material acts as an authorization to the Stores Department in procuring the materials and the concerned department in material requisition from the stores. It is an advance intimation to the concerned departments of the job, work order to be completed.

BILL OF MATERIALS

Job No. :
Job Starting Date :
Job Finishing Date :

Sl. No. :
Date :

Sl. No.	Material Code No.	Description	Size/ units	Quantity	Issue Particulars			
					Date	Qty.	Rate (Rs.)	Amount (Rs.)

Production Planning Dept. Purchase Dept. Stores Dept. Costing Dept. Production Control Dept.

- ✓ *Purchase Requisition*

CIMA defines Purchase Requisition as "an internal instruction to a buying office to purchase goods or services. It states their quantity and description and elicits a purchase order".

The manager in-charge of Purchase Department should obtain requisition from the Stores in-charge, departmental head or similar person requiring goods before placing orders on suppliers. If the present stock run down to the reorder level, then the stores department send a Purchase Requisition to Purchase Department, authorizing the department to order further stock.

XYZ Ltd

PURCHASE REQUISTION

S/No. Date:

Item code	Description	Quantity	Rate	Amount	Supplier
Authorized sign					

- ✓ *Purchase Order*

  If the Purchase Requisition received by the Purchasing Department is in order then it will call for tenders or quotations from the suppliers of materials. It will send enquiries to prospective suppliers giving details of requirement and requesting details of available materials, prices, terms and delivery etc. Quotations will then be compared and will place order with those suppliers who will provide the necessary goods at competitive prices.

  The number of copies of routing of Purchase Orders depends on the procedure followed in the organization. Normally, the copies of the purchase orders will be sent to the Supplier, Department originating Purchase Requisition, Inspection Department, and Accounting Department.

XYZ Ltd

PURCHASE ORDER

S/No:

Date:

Supplier quotation:

To ……

……..

Please supply the following items on the terms and conditions mentioned below

Item code	Description	Quantity	Rate	Amount	Delivery date

Terms of delivery: Terms of payment: Special terms:					
Purchasing/ procurement officer					

- ✓ *Material Inspection Note*

When materials are delivered, a supplier's carrier will usually provide a document called 'delivery note' or 'delivery advice' to confirm the details of materials delivered. When materials are unloaded, the warehouse staff check the material unloaded with the delivery note. Then the warehouse staff prepares a Materials Receipt Note, a copy of which is given to the supplier's carrier as a proof of delivery.

After receiving the materials the Inspection Department thoroughly inspects whether the quality of material is in accordance with the purchase order and the quality of material received and it prepares a note called 'material inspection note', copies of which are sent to the supplier and stores department

XYY Ltd
Inspection Note

S/No. **Date**

Item code	Description	Quantity	Rate	Amount	Remarks
The above items have been thoroughly inspected and we are of the opinion that they are in accordance with our requirements and they are fit for our use. We recommend their purchase 1…… Date……. 2…… 3…… Inspection officers					

- ✓ *Goods Received Note (GRN)*

Once the inspection is completed, GRN is prepared by the stores department, and copies of GRN is sent to the purchasing department, costing department, accounts department and production department, which initiated purchase requisition.After receipt of GRN from the Stores Department and invoice from the supplier, the accounts department will check with the purchase order and take necessary steps for making payment to the supplier.

XYY Ltd

Goods Received Note

S/No……. **Inspection note No:…….**

Purchases order No……. **Delivery not No:…….**

Date of order……. **Date:……..**

Received from …….

Item code	Description	Quantity	Rate	Amount	Remarks

Received by:……

Checked by:…….

Storekeeper …….

Store ledger clerk…….

- ✓ *Stores Requisition Note*

It is also called 'materials requisition note'. When Production or other departments requires material from the stores it raises a requisition, which is an order on the stores for the material required for execution of the work order. This note is signed by the department in-charge of the concerned department. It is a document which authorizes the issue of a specified quantity of materials.

It will include the cost centre or job number for which the requisition is being made, a specimen stores requisition note is given below

STORES REQUISITION NOTE

Job No. :
Department :

Sl. No. :
Date :

Sl. No.	Description	Code No.	Quantity	Rate (Rs.)	Value (Rs.)

Entered in
Bin Card :
Stores Ledger :

Department Incharge

Any person who requires materials from the stores must submit stores requisition note. The store keeper should only issue materials from stores against such a properly authorized requisition and this will be entered in the bin card and stores ledger. A copy of the requisition will be sent to the costing department for recording the cost or value of materials issued to the cost centre or job

- ✓ *Material Transfer Note*

If materials are transferred from one department or job to another within the organization, then material transfer note should be raised. It is a record of the transfer of materials between stores, cost centres or cost units showing all data for making necessary accounting entries.

MATERIAL TRANSFER NOTE

Transfer from :
Transfer to :

Sl. No. :
Date :

Sl. No.	Description	Material code	Quantity	Rate (Rs.)	Amount (Rs.)

Issuing Department

Receiving Department

✓ *Material Return Note*

If materials received from the stores are not of suitable quality or if there is surplus material remaining with the department, they are returned to stores with a note called 'material return note' evidencing return of material from department to stores.

MATERIAL RETURN NOTE

Date of Return :

Sl. No. :
Date :

Sl. No.	Description	Material code	Quantity	Rate (Rs.)	Value (Rs.)

Returning Department

Store Keeper

✓ *Bin Card*

A 'bin card' indicates the level of each particular item of stock at any point of time. It is attached to the concerned bin, rack or place where the raw material is stored. It records all the receipts of a particular item of materials and its issues. It gives all the basic information relating to physical movements. It is a record of receipts, issues and balance of the quantity of an item of stock handled by a store.

XYZ Ltd

Bin Card/ Stores Ledger

S/No:……. **Maximum Level:……**

Item code:……. **Minimum level……..**

Item description…… **Reorder level……**

Receipt					**Issue**					
Date	**G.R.N No.**	**Qty**	**Rate**	**Amount**	**Reqn No.**	**Qty**	**Rate**	**Amount**	**Bal.**	**Rmks**

- ✓ *Stores Ledger*

  Stores department will maintain a record called ‘stores ledger’ in which a separate folio is kept for each individual item of stock. It records not only the quantity details of stock movements but also record the rates and values of stock movements. With the information available in the stores ledger, it is easier to ascertain the value of any stock item at any point of time. The minimum, maximum and reorder levels of stock are also mentioned for taking action to replenish the stock position

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