

EMERGING TRENDS IN MANAGEMENT

BBA

V SEMESTER

CORE COURSE

(2011 Admission)



UNIVERSITY OF CALICUT

SCHOOL OF DISTANCE EDUCATION

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STUDY MATERIAL

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Layout & Settings: Computer Cell, SDE

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UNIT I

SUPPLY CHAIN MANAGEMENT

[Supply Chain Management : Meaning and definition components/participants of SC- concept of SCM- Objectives of SCM- SCM process : Customer relationship management, customer service management, demand management, customer order fulfillment, manufacturing flow management , Procurement management/supplier relationship management, product development & Commercialization, returns management – Factors driving the evolution of SCM – objectives of SCM – supply chain planning.]

INTRODUCTION

The supply chain, which is also referred to as the logistics network, consists of suppliers, manufacturing centres , warehouses, distribution centres, and retail outlets, as well as raw materials, work-in-process inventory, and finished products that flow between the facilities . In a typical supply chain, raw materials are procured and items are produced at one or more factories, shipped to warehouses for intermediate storage, and then shipped to retailers or customers. Consequently, to reduce cost and improve service levels, effective supply chain strategies must take into account the interactions at the various levels in the supply chain.

MEANING AND DEFINITION OF SUPPLY CHAIN MANAGEMENT:

The **supply chain** is the network of organizations that are involved through upstream and downstream linkages in the different process and activities that produce value in the form of products and services in the hands of ultimate customers. **Supply chain management** is an external integration of interrelated functions of the firm with its channel members, vendors, and all third-party logistics service providers who contribute in the flow of goods (raw materials, semi-finished and finished products) and related information from the point of inception to the point of consumption with efficiency.

It can be defined as:

“Supply chain management is a set of approaches utilized to efficiently integrate suppliers, manufacturers, warehouses, and stores, so that merchandise is produced and distributed at the right quantities, to the right locations, and at the right time, in order to minimize system wide costs while satisfying service level requirements.”

This definition leads to several observations.

First, supply chain management takes into consideration every facility that has an impact on cost and plays a role in making the product conform to customer requirements: from supplier and manufacturing facilities through warehouses and distribution centres to retailers and stores. Indeed, in some supply chain analysis, it is necessary to account for the

suppliers' suppliers and the customers' customers because they have an impact on supply chain performance.

Second, the objective of supply chain management is to be efficient and cost-effective across the entire system; total system wide costs, from transportation and distribution to inventories of raw materials, work in process, and finished goods, are to be minimized. Thus, the emphasis is not on simply minimizing transportation cost or reducing inventories but, rather, on taking a systems approach to supply chain management.

Finally, because supply chain management revolves around efficient integration of suppliers, manufacturers, warehouses, and stores, it encompasses the firm's activities at many levels, from the strategic level through the tactical to the operational level.

The definition of supply chain management developed and used by The Global Supply Chain Forum: "Supply Chain Management is the integration of key business processes from end user through original suppliers that provides products, services, and information that add value for customers and other stakeholders."

THE EVOLUTION OF SUPPLY CHAIN MANAGEMENT

In the 1980s, companies discovered new manufacturing technologies and strategies that allowed them to reduce costs and better compete in different markets. Strategies such as just-in-time manufacturing, lean manufacturing, total quality management etc. and vast amounts of resources were invested in implementing these strategies. Unfortunately, this huge investment typically includes many unnecessary cost components due to redundant stock, inefficient transportation strategies, and other wasteful practices in the supply chain.

For instance, experts believe that the grocery industry, a notoriously low-margin industry, can save about \$30 billion, or 10 percent of its annual operating cost, by using more effective supply chain strategies . To illustrate this issue, consider the following two examples:

1. It takes a typical box of cereal more than three months to get from the factory to a supermarket.
2. It takes a typical new car, on average, 15 days to travel from the factory to the dealership. This lead time should be compared with the actual travel time, which is no more than four to five days. Where transportation cost is by far the largest cost component; inventory cost is slightly higher than half of the transportation costs.

Thus, in the 1990s many companies focused on strategies to reduce their costs as well as those of their supply chain partners. For example Procter & Gamble estimates that it saved retail customers \$65 million in a recent 18-month supply chain initiative. "According to Procter & Gamble, the essence of its approach lies in manufacturers and suppliers working closely together . . . jointly creating business plans to eliminate the source of wasteful practices across the entire supply chain".

As the example suggests, an important building block in effective supply chain strategies is strategic partnerships between suppliers and buyers, partnerships that can help both parties reduce their costs. Indeed, manufacturers such as Procter & Gamble and

Kimberly-Clark and giant retailers like Wal-Mart have used strategic partnering as an important element in their business strategies. Firms such as 3M, Eastman Kodak, Dow Chemical, Time Warner, and General Motors turned over large portions of their logistics operations to third party logistics providers (3PLS- service of external agencies/organizations that could handle non value adding services). At the same time, many supply chain partners engage in information sharing so that manufacturers are able to use retailers' up-to-date sales data to better predict demand and reduce lead times. This information sharing also allows manufacturers to control the variability in supply chains (known as the bullwhip effect) and by doing that reduce inventory and smooth out production.

Among the first companies to utilize real-time information was Milliken and Company, a textile and chemicals company. Milliken worked with several clothing suppliers and major department stores, all of which agreed to use data from the department stores to "synchronize" their ordering and manufacturing plans. The lead time from order receipt at Milliken's textile plants to final clothing receipt at the department stores was reduced from 18 weeks to 3 weeks.

The huge pressure during the 90s to reduce costs and increase profits pushed many industrial manufacturers towards outsourcing; firm considered outsourcing everything from the procurement function to production and manufacturing. Indeed, in the mid 90s there was a significant increase in purchasing volume as a percentage of the typical firm's total sales. More recently, between 1998 and 2000, outsourcing in the electronic industry has increased from 15 percent of all components to 40 percent.

Finally, in the late 90s (2000), the Internet and the related e-business models led to expectations that many supply chain problems would be solved merely by using these new technologies and business models. E-business strategies were supposed to reduce cost, increase service level, and increase flexibility and, of course, increase profits, albeit sometime in the future. In reality, these expectations frequently were not met, as many e-businesses failed. In many cases, the downfall of some of the highest-profile Internet businesses can be attributed to their logistics strategies.

The Internet introduced new channels and helped to enable the direct-to-consumer business model. These new channels required many companies to learn new skills, and added complexity to existing supply chains.

The landscape has changed in recent years. Industry recognized that trends, including outsourcing, off shoring, lean manufacturing, and just-in-time that focus on reducing manufacturing and supply chain costs significantly increase the level of risk in the supply chain. As a result, over the past several years, progressive firm have started to focus on strategies that find the right balance between cost reduction and risk management. A number of approaches have been applied by industry to manage risk in their supply chains:

- Building redundancy into the supply chain so that if one portion fails, for example, a fire at a warehouse or a closed port, the supply chain can still satisfy demand.
- Using information to better sense and respond to disruptive events.
- Incorporating flexibility into supply contracts to better match supply and demand.

- Improving supply chain processes by including risk assessment measures.
- Using service of fourth-party logistics (4PLS) - The 4PLS is a supply chain integrator that assembles and manages the resources, capital, technology and capabilities of its own organization and other organizations who provide complementary service to design, build, and deliver a comprehensive supply chain solution.(outsourcing entire supply chain process from a single organization)

The implementation of ERP systems(Enterprise Resource Planning), motivated in many companies by year 2000 concerns, as well as new technology such as tools for supplier performance assessments, have created opportunities to improve supply chain resiliency and responsiveness. Similarly, advanced inventory planning systems are now used to better position inventory in the supply chain, and to help firms better understand the impact of product design alternatives on supply chain costs and risks, thus facilitating the integration of the development chain and the supply chain.

The urgency of supply chain challenges has not diminished over the years with the recent increase in supply chain costs. With complexity driven by globalization, high transportation costs, poor infrastructure, weather-related disasters, and terrorist threats, managing the supply chain has become even more challenging.

SUPPLY CHAIN COMPONENTS/PARTICIPANTS

Supply chain participants generally include:

1. **Raw materials providers.** Raw materials providers sell raw materials like steel, fuel or other commodities to manufacturers who need these to run their operations or incorporate into the goods that they manufacture. Raw materials providers also sell raw materials to others in the supply chain for resale or consumption.
2. **Manufacturers.** Manufacturers manufacture or produce:
 - a) their own off-the-shelf products; or
 - b) Custom products based on third-party specifications.

The term manufacturer is also used to refer to a product manufacturer or producer that outsources the actual manufacture or production of its products to a third party. Manufacturers sell their goods to others in the supply chain for resale, but also sell goods directly to end users for consumption.

3. **Distributors.** Distributors are typically middlemen that purchase goods from manufacturers or other middlemen for their own account with the intention of reselling them to others in the supply chain, for example:
 - a) Wholesalers
 - b) End users, for example, consumers or companies that need the goods.

Distributors also include manufacturers that distribute their own products. Distributors typically bear inventory risk and the risk of loss regarding the goods, as well as credit risk related to their customers.

4. **Resellers.** The meaning of "reseller" varies from industry to industry. A reseller may refer to an entity that purchases goods from manufacturers or distributors with the intention of reselling them to end users for consumption or incorporation into another product. A reseller that resells goods to consumers is commonly referred to as a retailer. Resellers typically bear inventory risk and the risk of loss regarding the goods, as well as credit risk related to their customers.
5. **Franchisers.** Franchisers are owners of business systems and processes who grant one or more third parties (franchisees) the right to use their business systems or processes, as well as *trademarks* or trade names to produce and market goods (or services) according to uniform specifications in exchange for a one-time franchise fee plus a percentage of sales revenue (royalty).
6. **Sales representatives.** Sales representatives market, advertises, promote and solicit the sale of the goods on behalf of the seller (such as a manufacturer or distributor) to the seller's customers in the specified territory. Sales representatives do not take title to the goods or bear inventory risk or risk of loss regarding the goods. They also do not bear the credit risk of the customers.
7. **Logistics providers.** These entities provide a variety of services on behalf of other participants in the supply chain to move the goods between the participants. Logistics providers may take temporary custody of the goods, but do not take title to the goods. Logistics providers include:
 - a) warehousemen, which are entities engaged in the business of storing goods for hire;
 - b) carriers, which are entities like trucking companies that issue bills of lading; and
 - c) Customs brokers, which are entities engaged in the business of clearing goods through customs barriers for importers and exporters.
8. **Financiers.** In addition to sellers who provide seller-financing, such as extended or deferred payment terms, these entities include banks, factoring companies and other entities who provide:
 - a) purchase-money financing for a buyer to pay the purchase price of goods;
 - b) commercial letters of credit to buyers to further the payment of goods in the ordinary course of a transaction; or
 - c) Factoring to sellers who sell or assign their *receivables* to accelerate their cash flow.
9. **Credit support providers.** These entities provide credit support to any party that is insecure about the payment or other obligations of the other party, for example:
 - a) banks that issue standby letters of credit; and
 - b) Sureties like insurance companies that provide surety bonds.
10. **End users.** These include any participant in the supply chain who purchases goods for:
 - a) their own use or consumption; or
 - b) Incorporation as raw materials or components into their own products.

11. **Lessor.** Some users do not own the goods (for example, equipment) that they use in their businesses. Rather, they lease equipment from others in the supply chain who own the equipment. The party that owns the equipment is commonly referred to as the lessor. The party that has the exclusive right to use the equipment is commonly referred to as the lessee. Lessor and lessees engage in equipment leasing for a variety of reasons including:
- a) allocation of the equipment's life-cycle between the parties;
 - b) tax advantages; and
 - c) Accounting treatment.

THE CONCEPT OF SUPPLY CHAIN MANAGEMENT

Companies are increasingly emphasising on their *core competencies* ('to do what you are best at and leave all other non-value-added activities to more suited players.') and working on to build strong relationships with their supply chain partners who possess essential complementary capabilities. Success will depend on *how well companies collaborate* to manage important processes and activities across company boundaries to better meet customer requirements and demand. The efforts to *align* goals, share resources, and collaborate across company boundaries are the essence of supply chain management.

OBJECTIVES OF SUPPLY CHAIN MANAGEMENT

The fundamental objective is to "*add value*".

That brings us to the example of the fish fingers. During the Supply Chain Management'98 conference in the United Kingdom this fall, a participant in a supply chain management seminar said that total time from fishing dock through manufacturing, distribution, and final sale of frozen fish fingers for his European grocery-products company was 150 days. Manufacturing took a mere 43 minutes. That suggests an enormous target for supply chain managers. During all that time, company capital is--almost literally in this case--frozen. What is true for fish fingers is true of most products. Examine any extended supply chain, and it is likely to be a long one. James Morehouse, a vice president of consulting firm A.T. Kearney, reports that the total cycle time for corn flakes, for example, is close to a year and that the cycle times in the pharmaceutical industry average 465 days. In fact, Morehouse argues that if the supply chain, of what he calls an "extended enterprise," is encompassing everything from initial supplier to final customer fulfilment, could be cut to 30 days, that would provide not only more inventory turns, but fresher product, an ability to customise better, and improved customer responsiveness. "All that add value," he says. And it provides a clear competitive advantage.

Supply Chain Management becomes a tool to help accomplish corporate strategic objectives:

- a) reducing working capital,
- b) taking assets off the balance sheet,
- c) Accelerating cash-to-cash cycles,
- d) Increasing inventory turns, and so on.

SUPPLY CHAIN PLANNING

Supply Chain Planning enables manufacturers to synchronize enterprise-wide production and supply with enterprise-wide demand. The solution allows manufacturers to aggregate total demand and centrally plan for the production capacity and supplies required to satisfy that demand. Supply Chain Planning consolidates sales, production, inventory and purchasing information to help companies become more demand-driven and actually manufacture items based on real demand.

In today's demand-driven market, it is critical for manufacturers to optimize and integrate sales and logistics and incorporate such data into the production schedule in a timely manner. Supply Chain Planning delivers substantial benefits to manufacturers including:

1. Increased responsiveness to market changes
2. Improved visibility into aggregated demand as well as enterprise-wide production and supply
3. Reduced inventory levels
4. Improved customer service and on-time delivery performance
5. Optimized supply to meet demand profitably
6. Lowered inventory, distribution and transportation costs
7. Increased demand forecast accuracy with compressed planning cycle times

Move Planning Closer to Demand:

Supply Chain Planning helps manufacturers increase responsiveness by shifting the planning process closer to actual demand. Manufacturers can then more effectively synchronize production and procurement activities with actual demand and in the process lower costs, decrease inventory levels, and improve customer service. By synchronizing internal and external supply chain processes, Supply Chain Planning helps manufacturers transform themselves into demand-driven organizations that are more flexible and can respond quickly to changes in the market.

Total Demand Visibility:

Supply Chain Planning increases manufacturers' visibility into enterprise-wide demand by aggregating forecasts and sales orders created by customers and local sales offices into one, comprehensive demand stream. This demand stream can be organized in a wide variety of ways — by corporate entity, customer, customer type, product family or end-item — to allow corporate planners to see when, where and what kind of demand is being generated. The enterprise planning solution provides users with complete visibility into aggregated demand through a single, easy-to-use screen. Planners can adjust this demand based on the historic accuracy of the various demand streams.

Enterprise-wide Planning:

Supply Chain Planning provides visibility into demand and also allows manufacturers to determine the optimal way to fulfil that demand based on available enterprise-wide supply and production resources. From the same screen, planners can see the production and inventory required to meet demand in user-defined time-buckets. Supply Chain Planning allows users to drill into demand details to see how supporting production and supply plans were created as well as to make any changes necessary to meet the demand or achieve business objectives more effectively. This ability to plan production and procurement activities centrally against aggregated demand is essential for manufacturers who wish to realize strategic business objectives such as cost reduction or improved responsiveness.

The enterprise planning capabilities enables manufacturers to allocate demand intelligently to the most appropriate production facility based on lowest manufacturing cost or available resources including capacities and inventories, transport costs, and lead times from facility to customer.

Supply Chain Planning ensures that manufacturers optimize their production and procurement activities on an enterprise-wide basis. The module enables planners to allocate demand to individual factories for further planning and fulfilment.

Support for Global PSI Planning:

Supply Chain Planning provides full support for Global PSI (Production, Sales, and Inventory) planning commonly used by leading electronics and high-volume manufacturers. The solution contains a global model of production resources and inventory that can be used to fulfil demand. The Global PSI model is created from multiple Local PSI models generated from the production planning or materials planning systems in use at each factory.

Key Capabilities:

Supply Chain Planning provides advanced capabilities for manufacturers, including:

- Accurate visibility of demand across product lines, geographies and customers by aggregating information from multiple sources
- Accurate visibility of enterprise-wide production capacity and supply requirements
- Optimization of key activities within a manufacturer including production, procurement and distribution
- Multi-tier, multi-enterprise planning collaboration between trading partners.

SUPPLY CHAIN MANAGEMENT PROCESS

The Global Supply Chain Forum identified eight key processes that make up the core of supply chain management:

- Customer Relationship Management
- Customer Service Management
- Demand Management

- Order Fulfillment
- Manufacturing Flow Management
- Procurement (supplier relationship management)
- Product Development and Commercialization
- Returns (returns management).

The term “procurement” is defined as “...the act of buying... all those activities necessary to acquire goods and services consistent with user requirements” The procurement process renamed as “supplier relationship management”. The name of the returns process to returns management.

The eight key business processes run the length of the supply chain and cut across firms and functional silos within each firm. Functional silos include Marketing, Research and Development, Finance, Production, Purchasing and Logistics. Activities in these processes reside inside a functional silo, but an entire process will not be contained within one function.

Each process is described at strategic and operational levels.

The strategic portion consists of the establishment and strategic management of each process, and provides a blueprint for implementation.

This is a necessary first step in integrating the firm with other members of the Supply chain.

The operational portion is the actualization of the process once it has been established.

CUSTOMER RELATIONSHIP MANAGEMENT

The customer relationship management process provides the structure for how the relationship with the customer is developed and maintained. Management identifies key customers and customer groups to be targeted as part of the firm’s business mission. Customer teams tailor Product and Service Agreements (PSA) to meet the needs of key accounts and segments of other customers.

Teams work with key accounts to improve processes, and eliminate demand variability and non-value-added activities. Performance reports are designed to measure the profitability of individual customers as well as the firm’s financial impact on those customers.

THE STRATEGIC PROCESS

At the strategic level, the customer relationship management process provides the framework for managing relationships with customers, and is comprised of five sub processes

In the first, the Process team reviews the corporate and marketing strategies to identify customer segments that are key to the organization’s success now and in the future.

Next, the team identifies the criteria for categorizing customers and provides guidelines for determining which customers qualify for tailored PSAs and which customers

will be grouped into segments and offered a standard PSA that is developed to provide value to the segment. Potential criteria include: profitability, growth potential, competitive positioning issues, access to market knowledge, market share goals, margin levels, level of technology, resources and capabilities, compatibility of strategies, and channel of distribution. As part of this sub process, the team develops the firm's strategy for dealing with segments of customers who do not qualify for individually tailored PSAs.

In the third sub-process, the team develops guidelines for the degree of differentiation in the PSA. This involves developing the differentiation alternatives and considering the revenue and cost implications of each. The output is the degree of customization that can be offered to customers. The goal is to offer PSAs that enhance the profitability of the firm and the customers. To find and understand the differentiation opportunities, this sub-process will interface with all of the other processes.

Developing the framework of metrics involves outlining the metrics of interest and relating them to the customer's impact on the firm's profitability as well as the firm's impact on the customer's profitability. The customer relationship management process has the responsibility for assuring that the metrics used to measure all of the other processes are not conflicting. Management needs to insure that all internal and external measures are driving consistent and appropriate behaviour.

In the final sub-process, the team develops the guidelines for sharing process improvement benefits with customers. The goal is to make these process improvements win-win solutions for both the firm and the customer.

In summary, the objective of customer relationship management at the strategic level is to identify customer segments, provide criteria for categorizing customers, provide customer teams with guidelines for customizing the product and service offering, develop a framework for metrics, and provide guidelines for the sharing of process improvement benefits with the customers.

The Operational Process

At the operational level, the customer relationship management process deals with writing and implementing the PSAs. It is comprised of seven sub-processes.

First, customers are differentiated based on the criteria developed at the strategic level. Key customers are identified and other customers are grouped into customer segments.

Next, the account or segment management teams are formed, including the salesperson who will be the account or segment manager. The teams are cross functional with representation from each of the functional areas.

In the case of key accounts, each team is dedicated to a specific account and meets regularly with the customer. In the case of customer segments, a team manages a group of customers and develops and manages the standard PSA for the segment.

Each account team reviews their account or segment of accounts to determine the products purchased sales growth and their position in the industry. Once the team has an

understanding of the customer(s), they work with each account or segment of accounts to develop improvement opportunities in sales, costs and service. These opportunities might arise anywhere, so the account teams need to interface with each of the other processes.

In the fifth sub-process, each team develops the PSA for their account or segment of accounts. This team first outlines and drafts the PSA, and then gains commitment from the internal functions. For key accounts, they present the PSA for acceptance, and work with the customer until agreement has been reached. It is important that the PSAs for key accounts include a communication and continuous improvement plan. For other accounts, the PSA is presented to the customer.

In the sixth sub-process, the team implements the PSA, including regular meetings with key customers. At this point, input is provided to each of the other processes that are affected by the customizations in the PSA.

In the last operational sub-process, the team captures and reports the process performance measures. Metrics from each of the other processes also are captured in order to generate the customer profitability reports. These profitability reports provide information for measuring and selling the value of the relationship to each customer and internally to upper management. The value provided should be measured in terms of costs, impact on sales, and associated investment; otherwise the efforts incurred will go unrewarded.

Customer Service Management

The customer service management process is the firm's face to the customer. It provides the single source of customer information, such as product availability, shipping dates and order status. Real-time information is provided to the customer through interfaces with the firm's functions, such as manufacturing and logistics. Customer service management is responsible for administering the PSA.

The Strategic Process

At the strategic level, the customer service management process is concerned with designing the process for managing the PSA. Customer relationship management Develop Customer Service Strategy provides the set of products and services the firm can offer its customers. The strategic customer service management process is responsible for planning how each of the possible products and services to be included in the PSA is going to be delivered and managed. Strategic customer service management has four sub-processes.

In the first, the customer service strategy is developed for the set of PSA features identified in the customer relationship management process. The team identifies the deliverables of the customer service process, operationalise the triggers for initiating action, and defines the staffing needs. The deliverables of the process are standardized responses to standardized events that occur while administering the PSA. The output of this first sub-process is a list of events with its corresponding triggers and deliverables.

In the second sub-process, the team develops response procedures for each of these events. This includes developing the internal and external coordination required to respond.

Next, the process team identifies the infrastructure for implementing the response procedures. This involves identifying the sources of the information needed to handle each of the events and determining the appropriate communication means for internal and external coordination. This sub process provides the information technology and communication needs for managing the PSAs efficiently and effectively. If there are technical constraints restricting the establishment of this infrastructure, the products and services that are affected have to be re-evaluated and eventually modified to make them feasible.

As in the other processes, the last sub-process of customer service management at the strategic level is to develop the framework of metrics. The metrics should provide management with the information necessary to identify problems and improvement opportunities in the administration of the PSA. These measurements are used not only for managing the process, but also for improving its efficiency. The team interfaces with the customer relationship management team to assure that the metrics developed are consistent with the firm's objectives.

In short, the objective of customer service management at the strategic level is to develop the necessary infrastructure and coordination means for implementing the PSA and providing a key point of contact to the customer.

The Operational Process

At the operational level, the customer service management process is responsible for responding to both internal and external events. The first step is to recognize the event. This might seem trivial but the goal of being proactive makes this a challenging part of administering the PSA. The team needs to have a thorough understanding of the firm's operations, and try to foresee the effects of a given event on the customer and on the internal operations of the firm. Events that require action might originate in any one of the other processes so coordination is essential.

Once the event is recognized, the team evaluates alternatives for managing the event with the least disruption to the customer and internal operations. The team determines a set of alternative actions working jointly with the specialists in each of the functions affected by the event or that can contribute to implementing the solution. This requires interfacing with other processes that are affected by the alternative responses. The implementation of the selected alternative is coordination intensive, as other business process owners or function managers often need to participate in the implementation. At this point, the actual response to the event is executed.

Finally, the customer service management process includes monitoring and reporting the process performance. This sub-process includes recording the event in a database that can be used for future reference, and monitoring the evolution of the event in order to know to what extent the response has been implemented. Part of the sub-process is collecting information and informing the customer about how the issue is being resolved. Performance of the process is measured and conveyed to the customer relationship management and supplier relationship management teams.

Demand Management

The demand management process needs to balance the customers' requirements with the firm's supply capabilities. This includes forecasting demand and synchronizing it with production, procurement, and distribution. "Demand Management coordinates all acts of the business that place demand on manufacturing capacity".

The process is also concerned with developing and executing contingency plans when operations are interrupted.

The Strategic Process

Demand management is about forecasting and synchronizing.

The process team first determines which forecasting approaches to use. This includes determining the levels and timeframes of the forecasts needed throughout the firm. Different parts of the organization might need different forecasts. The team determines the sources of the data required to generate the forecasts. These might include historical data, sales projections, promotion plans, corporate objectives, market share data, trade inventory, market research, and new categories of growth. If systems such as collaborative planning, forecasting and replenishment (CPFR) or vendor managed inventory (VMI) are being implemented, the customer is a direct source of data.

Once the team decides on the method of forecasting and the sources of data, they plan the information flow. Several functional silos and customer relationship management need to provide input to the forecasting process. The forecasts are then communicated to the other process teams that are affected by them, including customer service management, order fulfilment, manufacturing flow, and product development and commercialization.

Next, the team determines the synchronization procedures required to match the demand forecast to the firm's production, sourcing and distribution capabilities. To do this, they need to understand the capacity and flexibility available at all points along the supply chain. They also need to determine the long-term planning requirements, particularly in the case of demand with high seasonality or long term changes, such as sustained growth. At this point in the process, the team might recognize future capacity issues and make recommendations to proactively address them before they cause problems.

Another important component of the strategic demand management process is developing contingency plans in the event of either internal or external events that disrupt the balance of supply and demand. The team develops guidelines or rules to deal with unexpected demand or interruptions to supply. These guidelines should be developed in accordance with the expectations of the customers outlined in the customer relationship management process, and with input from manufacturing flow and supplier relationship management. The team determines the guidelines and communicates them to the customer service management team, since they address the concerns of customers when these events occur.

Finally, as with the other processes, the team develops the framework of metrics to be used to measure and monitor the performance of the process. Typical process measures

might include forecast error and capacity utilization. Again, the team confirms these measures with the customer relationship management team to assure consistency.

The Operational Process

At the operational level, the process team executes the forecasting and synchronization as it was designed at the strategic level. This begins with collecting the data. To do this, the team interfaces with the marketing functional silo as well as the order fulfillment and customer service management processes. These sources are close to the customer and provide critical information on sales projections and anticipated demand.

With all the required data in hand, the team develops the forecasts. They track and analyze the forecast error and incorporate this feedback to fine-tune the forecasting method. This is an important component of the learning process associated with good forecasting.

The forecast provides the input for matching demand with supply. Some firms refer to this as aggregate planning. Sources of information for the synchronization sub process include customer relationship management, customer service management, manufacturing flow, and product development and commercialization. The output of the synchronization sub-process is an aggregate production plan and an inventory-positioning plan. The team also develops a rough-cut capacity plan for any new products soon to be launched.

These plans need to be communicated throughout the firm, and therefore there are interfaces with customer relationship management, customer service management, order fulfillment, manufacturing flow, supplier relationship management, and product development and commercialization. In addition, any internal or external event that causes a disruption to supply or large forecast errors needs to be handled with the contingency management plans developed at the strategic level.

Another key component to demand management is an ongoing process aimed at increasing flexibility and reducing variability (in demand, lead-times, capacity, etc). The former helps management respond quickly to both internal and external events, and the latter aids in consistent planning and minimizing surprises. “The supply chain which best succeeds in reducing uncertainty and variability is likely to be most successful in improving its competitive position”. For example, to gain flexibility, the team might work with the manufacturing flow team to find ways to introduce postponement into the manufacturing process. To reduce demand variability, the team might work with the customer relationship management team to help customer’s better plan promotions. In order to find ways to increase flexibility and reduce variability, the process team works with the sales, marketing and manufacturing organizations, customers and suppliers. This involves process interfaces with customer relationship management, customer service management, manufacturing flow and supplier relationship management.

Finally, the process team is responsible for measuring the performance of the process with the metrics developed at the strategic level. These metrics are used to improve the process and are conveyed to the customer relationship management and supplier relationship management teams.

Customer Order Fulfilment

A key to effective supply chain management is to meet customer requirements in terms of order fulfillment. Effective order fulfillment requires integration of the firm's manufacturing, logistics and marketing plans. The firm should develop partnerships with key members of the supply chain to meet customer requirements and reduce total delivered cost to customers.

The Strategic Process

The strategic order fulfillment process considers manufacturing, logistics and marketing requirements to design the distribution network. In the first sub-process, the team reviews the role of customer service in the marketing strategy, customer service goals, and the supply chain structure. This requires an interface with the customer relationship management process.

Next, the requirements for order fulfillment are specified, including the order to-cash cycle. Key inputs include manufacturing capabilities, lead-times and customer service requirements. At this stage, the customer relationship management and manufacturing flow processes provide input. The team evaluates the core competencies within order fulfillment and determines which aspects of the process are potentially service differentiating.

Evaluating the logistics networks is an important step in order fulfillment. The design and operation of the network has a significant influence on the cost and performance of the system. It has been estimated that up to 80% of the total cost of the final product is determined in the design of the network. It is necessary to evaluate the network including: which plants produce which products; where warehouses, plants, and suppliers are located; and, which transportation modes should be used. Important input to this sub-process comes from the demand management and returns processes. The resulting network is provided to the manufacturing flow process.

The next strategic sub-process is to define the plan for order fulfillment, determining how orders from various customers or segments of customers will be filled. The process team communicates with the customer relationship management process team to make sure that all customer expectations are met.

In the final sub-process, a framework of metrics is developed and communicated to the customer relationship management process. Typical process measures might include order-to-cash cycle time, order fill rate, and order completeness.

The Operational Process

The order fulfillment operational process defines the specific steps regarding how customer orders are: generated and communicated, entered, processed, documented, picked, delivered, and handled post delivery. There are three steps to accepting and processing an order.

First, orders are generated and communicated. Generally, these orders come from customer service management. Second, a member of the order fulfillment team receives, enters, edits the orders, and transmits these data to the customer service management and

demand management processes. Third, the inventory and customers' credit are checked and the order is processed. Information about these orders is provided to the manufacturing flow process.

In the next sub-process, the team handles all documentation. They acknowledge the order and prepare the bill of lading, picking instructions, packing slips and generate the invoice. At the order picking stage, the merchandise is picked, packed, and staged for loading. The load confirmation is prepared and feedback is provided to customer service management.

The order fulfillment team is responsible for preparing shipping documents, transmitting delivery confirmation, and auditing and paying the freight bill. They also provide delivery information to the customer service management team.

In the final sub-process, the team performs post-delivery activities, including receiving and posting payment, recording bad debt expense, and measuring performance. Feedback is provided to customer relationship management, supplier relationship management and returns management.

Manufacturing Flow Management

The manufacturing flow process deals with making the products and establishing the manufacturing flexibility needed to serve the Review Manufacturing, Sourcing, Marketing target markets. The process includes all activities necessary for managing the product flow through the manufacturing facilities and for obtaining, implementing and managing flexibility.

The Strategic Process

At the strategic level, the objective of manufacturing flow is to determine the manufacturing infrastructure needed for fulfilling the customers' needs and wants. The process begins with the team reviewing the functional business strategies from marketing, logistics, manufacturing and purchasing. This sub-process requires interfaces with customer relationship management, where the corporate and marketing strategies are reviewed. These strategies help identify the expertise and the changes in the manufacturing technology that are needed to operationalise manufacturing flow. Incompatibility between the manufacturing process and market characteristics may have "unfavourable impact on business performance". In the same vein, environmental aspects of manufacturing set by the business plan, corporate strategy, and the environmental laws have to be taken into account. Manufacturing strategy is linked to the corporate strategy since environmental management practices may strengthen the firm's competitive advantage.

The objective of the second sub-process is to determine the degree of manufacturing flexibility the firm and the supply chain require. This sub-process provides the manufacturing capabilities and constraints, such as the minimum batch size and cycle time, the labour expertise needed for manufacturing, and the quality policy and controls. Product development and commercialization, and order fulfilment provide input to this sub-process. The team defines the make/buy strategies, for example, what manufacturing activities are regarded as strategic and should not be outsourced at any cost? These strategies provide

indications to supplier relationship management about supplier selection and eventually the guidance of partnership opportunities. In the last activity of this sub-process, the team plans capacity growth based on the marketing strategy and the business plan.

The degree of flexibility established in the previous sub-process leads to the determination of the push-pull boundaries. The customer tolerance time (the time the customer is willing to wait for an order) and the customer service goals constrain the extent to which manufacturing can be postponed in the supply chain. Postponement promises to be beneficial to the supply chain, but might lead to longer delivery times. The degree to which the firm postpones manufacturing and logistics activities depend to a great extent on the design of the products; therefore, the product development and commercialization process provides input for setting the push-pull boundaries. In order to determine the push pull boundaries for the supply chain, the team identifies the decoupling point separating the part of the supply chain operating in a make to-order environment from the part of the supply chain based on planning, which is the typical make-to-stock operating environment. The push-pull boundaries help to determine the stocking points in the supply chain for servicing manufacturing facilities, distribution centers and customers. These stocking points, referred to as decoupling points, permit the downstream section of the supply chain to operate independently from the upstream section. The decisions made in this sub-process are communicated to the supplier relationship management team since the push-pull boundaries affect the interactions with the suppliers. Similarly, coordination with order fulfillment is necessary for establishing lead-times and stocking requirements.

The objective of the next sub-process is to identify manufacturing constraints and requirements to help determine the capabilities of the supply chain. The role of suppliers and the supplier development strategy is an important component of this sub-process for defining the extent to which activities in the supply chain are synchronized. The process team designs communication mechanisms for synchronizing the activities with minimal management effort. They also develop acceptance criteria for establishing the quality standards expected at each step of the manufacturing process. Performing these activities may lead to identifying needs for the suppliers that can be included in a supplier development program; if so, this is an input for the supplier relationship management process.

In the next sub-process, the team determines the manufacturing capabilities and translates them into deliverables to the customer. For example, the minimum cycle time and the minimum economically viable lot size is a result of the design of the manufacturing capabilities. For a strategy to be effective, it must be communicated and understood throughout the organization. At this point, the manufacturing flow and customer relationship management teams discuss the possible features of the PSA, and adjust infeasible features. The capabilities are communicated to the demand management, order fulfillment, and returns process teams. Further, the customer service management team receives the order acceptance guidelines. The team uses these guidelines every time a customer has a request. They help to identify which customers' requests can be fulfilled. Some requests require additional management time to evaluate their economic and technical viability.

In the final sub-process, the team develops the metrics framework and communicates it to the customer relationship management team. These metrics measure the effectiveness of the manufacturing flow process and might include cycle time, inventory levels, and product quality.

The Operational Process

Manufacturing flow at the operational level looks like operations management internal to the firm. However, certain characteristics of the process are designed to integrate internal operations management with activities in the supply chain. In the first sub-process, the team determines the routing and velocity through manufacturing. This step includes developing a master production schedule by translating the output of demand management into resource and production planning. The team integrates the capacity of the manufacturing facilities into these decisions to assure no disruptions in the product flow. This sub-process interacts with demand management to establish manufacturing priorities, and with supplier relationship management to set priorities for suppliers and to gain their commitment of resources.

In the next step, manufacturing and material planning, the process team produces a detailed capacity plan and a time-phased requirement plan. Interfaces with the customer relationship management and supplier relationship management processes extend the focus of this sub-process to other supply chain members. Manufacturing planning and control encompasses creating the overall manufacturing plan, performing the detailed planning of materials and capacity needs, and executing these plans.

Next, capacity and demand are synchronized. This step identifies what inventory levels are needed for synchronizing the activities of the many supply chain members. Inventory includes raw materials, work-in-process, sub-components, and packaging at the different tiers. This step requires input from demand management and order fulfillment, and provides output to customer service management.

The final step in the manufacturing flow process, measuring performance, includes more than just tracking process measures, and reporting them to the customer relationship management and supplier relationship management teams. It includes analyzing product quality and examining the root causes of quality problems. The manufacturing flow process team is responsible for finding solutions to quality issues. This might involve working with supplier relationship management, product development and commercialization, or returns management.

Supplier Relationship Management (Procurement management)

Supplier relationship management is the process that defines how a company interacts with its suppliers. As the name suggests, this is a mirror image of customer relationship management. Just as a company needs to develop relationships with its customers, it needs to foster relationships with its suppliers. As in the case of customer relationship management, a company should forge close relationships with a small subset of its suppliers, and maintain more traditional relationships with the others. Each supplier

agrees to a PSA that defines the terms of the relationship. Supplier relationship management is about defining and managing these PSAs.

The Strategic Process

At the strategic level, the output of the process is an understanding of the levels of relationships the firm will maintain, and the process for segmenting the suppliers and working with them to develop appropriate PSAs. To do this, the process team first reviews the corporate, manufacturing and sourcing strategies, and identifies product and service components that are key to the organization's success now and in the future.

With these key components driving the decisions, the team identifies criteria for categorizing suppliers. Criteria to examine might include, but are not limited to: the supplier's profitability, growth and stability; the criticality or required service level of the components purchased; the sophistication and compatibility of the supplier's process implementation; the supplier's technological capabilities and compatibility; the volume purchased from the supplier; the capacity available from the supplier; the culture of innovation at the supplier; and, the supplier's anticipated quality levels.

The team determines which of these criteria should be used and how a supplier will be measured on each one. They develop a categorization scheme that will guide the operational team on determining the firm's key suppliers, and grouping other suppliers into segments.

Key suppliers work with customized PSAs; other suppliers work with standard PSAs with little to no customization. Therefore, a standard PSA is written for each supplier segment. For key suppliers, the team provides guidelines for the degree of customization that is acceptable. To do this, they consider the quality and cost implications of various differentiation alternatives, and select the boundaries for the degree of customization that might be required or desired. At this step, the team interfaces with each of the other processes because they need to understand the degree of differentiation that is desirable as well as be ready to design systems for supporting these alternatives. For example, examining the demand management process might lead the team to consider implementing CPFR with some of the suppliers, but doing so might require implementing new technology and making changes to the existing demand management process.

With each of the other supply chain processes, an important step at the strategic level is developing the metrics framework. This is particularly critical in the supplier relationship management process because these metrics measure the success of the firm's relationship with its suppliers. With these metrics management sees the impact of the integration in the supply chain. It is important that the team relates these metrics to the supplier's impact on the firm's profitability as well as the profitability of the supplier. It is key that the team performs profitability analyses because management can use these to sell the value of supply chain activities. Improvements from suppliers may have impact throughout the organization and these should be reflected in supplier cost or profitability reports.

It is important for the supplier relationships to be win-win. If both parties do not gain from the relationship, the incentive to be in the relationship is diminished and it will

likely dissolve. The supplier relationship management process team must develop guidelines for sharing process improvement benefits with the suppliers. For example, Wal Mart decided to split cost savings with Procter and Gamble three ways: 1/3 to Wal-Mart, 1/3 to the supplier and 1/3 to the customer. A key to this step of the process is finding ways to easily quantify benefits in financial terms.

The Operational Process

Once the process team determines the criteria for categorization of suppliers and the levels of customization at the strategic level, the operational supplier relationship management process develops and manages the PSAs. First, the team implements the categorization scheme in order to identify key suppliers and supplier segments. This involves analyzing how suppliers impact the firm's profitability and measuring each supplier on the appropriate criteria.

Each key supplier is assigned to a supplier management team. Other suppliers are grouped into segments and a management team is assigned to each segment. Each supplier/segment team is comprised of a team manager and a cross functional set of team members. Each supplier/segment team internally reviews the suppliers to assure that they understand the role of that supplier in the supply chain. A supplier team works with each key supplier to identify improvement opportunities within the account. The team examines each of the other supply chain processes, both at the firm and at the supplier, looking for opportunities to increase sales, reduce costs, and improve service.

Next, each team works with a key supplier to negotiate the PSA. Recall that segments of other suppliers receive a standard PSA. For key suppliers, the team customizes the agreement according to the improvement opportunities identified. An important step in developing the PSA for key suppliers is gaining commitment of the company's internal functions, particularly those affected by the customized PSAs. The PSA includes a communication plan between the firm and the supplier and a continuous improvement plan.

Once the suppliers have agreed to the PSA, the supplier teams are responsible for implementing and managing it. This involves working with the other processes to assure that the PSA is being adhered to, and meeting with the suppliers regularly to monitor progress and performance.

Measuring performance is a critical part of the supplier relationship management process because management needs to assess the success of the firm's relationships. The other process teams communicate supplier related performance to the account teams who tie these metrics back to the profit of both the firm and the supplier, and report the results both internally and to the supplier.

Product Development and Commercialization

Product development is critical to the continuing success of the firm.

Developing new products quickly and getting them to the marketplace in an efficient manner is a major component of corporate success. Time to market is a critical objective of this process. Supply chain management includes integrating customers and suppliers into

the product development process in order to reduce time to market. As product life cycles shorten, the right products must be developed and successfully launched in ever-shorter timeframes in order to remain competitive.

The Strategic Process

The first step in the strategic portion of the product development and commercialization process is to review the sourcing, manufacturing and marketing strategies to determine how those plans will likely impact product development. The marketing strategy contains the needs assessment of customers.

Next, the process team develops the idea generation and screening processes. This stage can include determining sources for ideas, considering incentives for developing new products for the focal firm and their suppliers and customers, beginning to develop formalized customer feedback programs, and establishing guidelines for strategic fit. At this point, the product development and commercialization process interfaces with the customer relationship management process to provide the framework that will be used to determine how new products will impact customers and the level of acceptance of those products.

The process team then establishes guidelines for the membership of the cross functional product development team. It is critical to have the right people from the internal functional silos along with key customers and suppliers involved in the product development and commercialization process. This step includes determining the extent of involvement from both key customers and suppliers. Empirical studies found that firms may form alliances to complement their existing internal knowledge and help them learn about new markets and technologies as well as to reduce overall risk in the product development process. In this stage of the process, the team assesses relative strengths, weaknesses, and roles of personnel to determine who should be involved in the product development and commercialization process. The team examines constraints to determine which resources the firm can utilize on specific new product projects.

The fourth step is to develop product rollout issues and constraints. The team identifies pinch points that could hamper the product development and commercialization process. Activities within this sub-process include market and promotion planning, sales force training, inventory deployment planning, and transportation planning. In this stage of the process, each of the internal functional silos has to be involved to avoid poor product rollouts. In addition, the team obtains input from the order fulfillment team to assess how new products will impact the network flow.

Next, the team establishes new product project guidelines. This includes determining time-to-market and profitability expectations, and estimating the drain on human resources resulting from new product projects. The team establishes guidelines for examining the strategic fit of potential new products and for making the make/buy decision.

The final step to the strategic product development and commercialization process is to develop the framework of metrics. Typical process metrics might include time to market, time to profitability and first year sales. The metrics are communicated to the customer

relationship management team to assure they do not conflict with other metrics or the firm's objectives.

The Operational Process

The first step in the operational product development and commercialization process is to define new products and assess fit. Using the means defined at the strategic level, new product ideas are generated and screened. In this initial screening, the team completes a market assessment, consults with key customers and suppliers, and determines the fit with existing channels, manufacturing, and logistics environments. This involves interfaces with customer relationship management and supplier relationship management, as well as with the functional silos in the firm.

Using the guidelines developed at the strategic level, a cross-functional product development team is established for each product idea that passes the screening process. Key suppliers and customers are included on the team as early as possible in order to compress time to market. Therefore, this sub-process includes an interface with supplier relationship management and customer relationship management. The focal company might also participate in the product development process of a key customer. For example, a supplier of salad dressings may participate in the product development process of a restaurant chain. In such cases, the customer relationship management process team is actively involved.

The team is responsible for formalizing the product development project. This step includes determining time-to-market expectations, identifying likely product profitability scenarios, and further examining the strategic fit of the product within the firm and its key markets.

The product development team manages the process of designing and building prototypes of the product ideas. For example, the auto companies develop concept cars to test new product ideas. In this phase, each team works with suppliers and performs a value analysis to determine what portions of the product design and rollout process add value. They then source materials and manufacture prototypes.

Once the team evaluates the prototypes, they determine how much of the new product should be manufactured in-house. Many firms adopt a short-term perspective for making make/buy decisions. However, these decisions may have strategic implications for the firm. For example, during the development of the personal computer, IBM outsourced the operating system to a small company named Microsoft. This decision may have enabled IBM to bring the PC to market quicker, but with hindsight, it was clearly a strategic error. The make/buy decision "...should be formulated from a strategic perspective with senior management involvement". Once it is determined what will be sourced, the team assesses supply capabilities and manages requests for quotations. Sourcing decisions require interfaces with the customer relationship management, manufacturing flow and supplier relationship management processes.

In the sixth sub-process, the team determines the marketing and distribution channels for the new product. These channels are defined with input from customer relationship

management and order fulfillment. Then, the team develops the market plan for the product and does initial inventory planning.

The next step is the actual product rollout. Many products are unsuccessful due to poor management of product rollout. In this step, the team sources materials, positions inventory, and manufacture the product. They also implement the market plan, train the sales force on the new product offering, and execute the promotion plan. Inventory is deployed using methodologies developed in demand management. It is important that the other process teams are involved in planning and executing the product rollout.

In the final step, the team measures process performance through the metrics developed at the strategic level, and communicates results to the customer relationship management and supplier relationship management teams.

Returns Management

Effective returns management is a critical part of supply chain management.

While many firms neglect the returns process because management does not believe it is important, this process can assist the firm in achieving a sustainable competitive advantage. Effective management of the returns process enables the firm to identify productivity improvement opportunities and breakthrough projects.

The Strategic Process

In the first step of the strategic returns process, the team reviews environmental and legal compliance guidelines. Team members need to understand laws that apply to used products and products planned for disposal. They also need to recognize rules associated with recall campaigns and packaging issues.

Next, the team develops return avoidance, gate keeping and disposition guidelines. Return avoidance means manufacturing and selling the product in a manner such that returns are minimized. This avoidance can be derived from improved quality or better instructions to the consumer as to how to properly operate the product. Gate keeping is the screening of defective and unwarranted returned merchandise at the entry point into the reverse logistics process. Improved gate keeping is a critical factor in making the entire reverse flow manageable and efficient. It assures that only product that should be returned to a specific point in the returns network is indeed returned to that point. Disposition guidelines define as clearly as possible the returned item's ultimate destiny. Typical disposition options include return to supplier, refurbish or remanufacture, recycle, and landfill. The team can examine potential secondary markets including Internet-based auctions or retailers that specialize in returned goods or "seconds".

A firm should be able to make disposition decisions quickly. The team develops the rules in conjunction with other members of the supply chain, as well as with input from other processes, such as customer relationship management, product development and commercialization, and supplier relationship management. Disposition and return reason codes compliant with company policy are developed during this stage of the process.

Next, the team develops the returns network and flow options. During this stage, the team develops plans for transporting and holding returned products until they reach their final disposition. For some firms, products may be routed to central returns centers where returned items are consolidated and examined. The team also determines what transportation programs the firm will employ. For example, supply chain managers might decide that utilizing backhauls may be the most efficient way of transporting returns. Developing the returns network requires input from customer service management, order fulfillment, and supplier relationship management.

In the fourth step, the process team develops credit rules governing the returns process. At this stage, the finance organizations of the focal firm, and key suppliers and customers negotiate how returned merchandise will be credited. The team establishes credit authorization guidelines and credit policies. Since this involves both suppliers and customers, supplier relationship management and customer relationship management are involved in determining the rules.

The last step of the strategic returns process is developing the framework of metrics and communicating it to the customer relationship management team. Possible metrics are return rates and financial impact of returns. As part of this sub-process, the team develops procedures for analyzing return rates and tracing the returns back to the root causes.

The Operational Process

At the operational level, the returns process is about managing the day-to-day returns activities. The process is initiated when a return request is received from a customer. This customer may be a consumer returning an item, or a retailer or distributor sending back items that did not sell. In some cases, these returns come through the customer service management process.

Once a return request is received, it is necessary to determine the routing for the returned product and generate the return material authorization (RMA) derived from the request. Advanced ship notices are sent, signalling to the receiving firm that the returns are on their way.

Once the item is returned, it is verified, inspected, and processed. This processing should be completed as quickly as possible so that product value does not decrease any more than necessary. The order fulfilment team may become involved at this point to assist in managing the return flow back to the warehouse or central returns centre.

Employees analyze the returns and select the appropriate dispositions using the rules developed in the strategic returns process. The disposition of the product can include return to the supplier, refurbishment, and remanufacture, recycling, reselling as is, reselling through a secondary market, or sending the product to a landfill.

Once the returns are processed, credit is given to the appropriate customer, consumer or supplier. In some circumstances, a supplier might be crediting the firm for a return. This sub-process will use the credit authorization guidelines developed in the strategic returns process.

In the final step of the returns process, the team analyzes the causes of the returns and measures process performance. The data on returns are used to make improvements to the product and the processes. This analysis might result in feedback to the customer relationship management, manufacturing flow management, supplier relationship management, or product development and commercialization processes. This analysis should be used in the ongoing strategic returns process to help develop avoidance guidelines.

Implementing Integrated Supply Chain Management

The implementation of supply chain management involves identifying the supply chain members with whom it is critical to link, the processes to be linked with each of these key members, and the type/level of integration that applies to each process link. The objective of supply chain management is to create the most value for the entire supply chain network, including the end-customer. Successful supply chain management involves the coordination of activities within the firm and between members of the supply chain. Consequently, supply chain process integration and reengineering initiatives should be aimed at boosting total process efficiency and effectiveness across the supply chain.

Although the functional expertise remains in place, implementing supply chain management requires making the transition from a functional organization to one focused on business processes first inside the firm and then across firms in the supply chain.

If the proper coordination mechanisms are not in place across the various functions, the supply chain processes will be neither effective nor efficient. By taking a process focus, all functions that touch the product or provide information must work together. For example, purchasing depends on sales and marketing data fed through a production schedule to assess specific order levels and timing of requirements. These orders drive production requirements that, in turn, are transmitted upstream to suppliers.

The increasing use of outsourcing has accelerated the need to coordinate supply chain processes since the organization becomes more dependent on suppliers. Consequently, coordination mechanisms must be in place within the organization. Where to place these coordination mechanisms, and which teams and functions are responsible for managing them become critical decisions.

The requirements for successful implementation of supply chain management include:

- Executive support, leadership and commitment to change.
- An understanding of the degree of change that is necessary.
- Agreement on the supply chain management vision and the key processes.
- The necessary commitment of resources and empowerment to achieve the stated goals.

UNIT II

LOGISTICS MANAGEMENT

[Meaning and definition – significant of logistics –business logistics- concepts of logistics management – objectives of logistics management – elements of logistics management – logistics management v/s supply chain management – integrated logistics-operating of objectives of integrated logistics.]

INTRODUCTION

As far back as history records, the goods that people wanted were not always produced where they wanted to consume them, or these goods were not accessible when people wanted to consume them. Food and other commodities were widely dispersed and were only available in abundance at certain times of the year. Early peoples had the choice of consuming goods at their immediate location or moving the goods to a preferred site and storing them for later use. However, because no well developed transportation and storage systems yet existed, the movement of goods was limited to what an individual could personally move, and storage of perishable commodities was possible for only a short time. This limited movement-storage system generally constrained people to live close to the sources of production and to consume a rather narrow range of goods. Even today, in some areas of the world consumption and production take place only within a very limited geographic region. Striking examples can still be observed in the developing nations of Asia, South America, Australia, and Africa, where some of the population live in small, self-sufficient villages, and most of the goods needed by the residents are produced or acquired in the immediate vicinity. Few goods are imported from other areas. Therefore, production efficiency and the economic standard of living are generally low. In this type of economy, a well-developed and inexpensive logistics system would encourage an exchange of goods with other producing areas of the country, or even the world.

As logistics systems improved, consumption and production began to separate geographically. Regions would specialize in those commodities that could be produced most efficiently. Excess production could be shipped economically to other producing (or consuming) areas, and needed goods not produced locally were imported. This exchange process follows the *principle of comparative advantage*. This same principle, when applied to world markets, helps to explain the high level of international trade that takes place today. Efficient logistics systems allow world businesses to take advantage of the fact that lands, and the people who occupy them, are not equally productive. Logistics is the very essence of trade. It contributes to a higher economic standard of living for us all. To the individual firm operating in a high-level economy, good management of logistics activities is vital. Markets are often national or international in scope, whereas production may be

concentrated at relatively few points. Logistics activities provide the bridge between production and market locations that are separated by time and distance. Effective management of these activities is the major concern of this Program.

MEANING AND DEFINITION OF LOGISTIC MANAGEMENT

The benefits of co-ordinated logistics management appeared around 1961, in part explaining why a generally accepted definition of business logistics is still emerging. Therefore, it is worthwhile to explore several definitions for the scope and content of the subject.

A dictionary definition of the term *logistics* is:

“The branch of military science having to do with procuring, maintaining, and transporting material, personnel, and facilities.”

This definition puts logistics into a military context. To the extent that business objectives and activities differ from those of the military, this definition does not capture the essence of business logistics management. A better representation of the field may be reflected in the definition promulgated by the Council of Logistics Management (CLM), a professional organization of logistics managers, educators, and practitioners formed in 1962 for the purposes of continuing education and fostering the interchange of ideas. Its definition:

“Logistics is that part of the supply chain process that plans, implements, and controls the efficient, effective flow and storage of goods, services, and related information from the point of origin to the point of consumption in order to meet customers’ requirements.”

This is an excellent definition, conveying the idea that product flows are to be managed from the point where they exist as raw materials to the point where they are finally discarded. Logistics is also concerned with the flow of services as well as physical goods, an area of growing opportunity for improvement.

It also suggests that logistics is a **process**, meaning that it includes all the activities that have an impact on making goods and services available to customers when and where they wish to acquire them. However, the definition implies that logistics is part of the supply chain process, not the entire process.

Although early definitions such as physical distribution, materials management, industrial logistics and channel management - all terms used to describe logistics - have promoted this broad scope for logistics, there was little attempt to implement logistics beyond a company’s own enterprise boundaries, or even beyond its own internal logistics function. Now, retail firms are showing success in sharing information with suppliers, who in turn agree to maintain and manage inventories on retailers’ shelves. Channel inventories and product stock outs are lower. Manufacturing firms operating under just-in-time production scheduling build relationships with suppliers for the benefit of both companies by reducing inventories.

SIGNIFICANCE OF LOGISTICS

Logistics is about creating *value* - value for customers and suppliers of the firm, and value for the firm's stakeholders. Value in logistics is primarily expressed in terms of time and place. Products and services have no value unless they are in the possession of the customers when (time) and where (place) they wish to consume them. For example, concessions at a sports event have no value to consumers if they are not available at the time and place that the event is occurring. Good logistics management views each activity in the supply chain as contributing to the process of adding value. If little value can be added, it is questionable whether the activity should exist. However, value is added when customers are willing to pay more for a product or service than the cost to place it in their hands. To many firms throughout the world, logistics has become an increasingly important value-adding process for a number of reasons.

Costs Are Significant

According to the International Monetary Fund (IMF), logistics costs average about 12 percent of the world's gross domestic product. Robert Delaney, who has tracked logistics costs for more than two decades, estimates that logistics costs for the U.S. economy are 9.9 percent of the U.S. gross domestic product (GDP), or \$921 billion. For the firm, logistics costs have ranged from 4 percent to over 30 percent of sales. Logistics costs, substantial for most firms, rank second only to the cost of goods sold (purchase costs) that are about 50 percent to 60 percent of sales for the average manufacturing firm. Value is added by minimizing these costs and by passing the benefits on to customers and to the firm's shareholders.

Logistics Customer Service Expectations Are Increasing

The Internet, just-in-time operating procedures, and continuous replenishment of inventories have all contributed to customers expecting rapid processing of their requests, quick delivery, and a high degree of product availability.

In most of the companies finished goods inventory turnover is 20 or more times per year Total order cycle time of five working days Transportation cost of one percent of sales revenue or less, if products sold are over \$5 per 500 gms As might be expected, the average company performs below these cost and customer service benchmarks.

Supply and Distribution Lines Are Lengthening with Greater Complexity

The trend is toward an integrated world economy. Firms are seeking, or have developed, global strategies by designing their products for a world market and producing them wherever the low-cost raw materials, components, and labour can be found (e.g., Ford's Focus automobile), or they simply produce locally and sell internationally. In case, supply and distribution lines are stretched, as compared with the producer who wishes to manufacture and sell only locally? Not only has the trend occurred naturally by firms seeking to cut costs or expand markets, but it is also being encouraged by political arrangements that promote trade. Examples of the latter are the European Union, the North America Free Trade Agreement (NAFTA) between Canada, the United States, and Mexico,

and the economic trade agreement among several countries of South America (MERCOSUR).

Globalization and internationalization of industries everywhere will depend heavily on logistics performance and costs, as companies take more of a world view of their operations. As this happens, logistics takes on increased importance within the firm since its costs, especially transportation, become a larger part of the total cost structure. For example, if a firm seeks foreign suppliers for the raw materials that make up its final product or foreign locations to build its product, the motivation is to increase profit. Material and labor costs may be reduced, but logistics costs are likely to increase due to increased transportation and inventory costs. The “trade off”, may lead to higher profit by reducing materials, labour, and overhead costs at the expense of logistics costs and tariffs. “Outsourcing” adds value, but it requires careful management of logistics costs and product-flow times in the supply channel.

Logistics Is Important To Strategy

Firms spend a great deal of time finding ways to differentiate their product offerings from those of their competitors. When management recognizes that logistics/SC affects a significant portion of a firm’s costs and that the result of decisions made about the supply chain processes yields different levels of customer service, it is in a position to use this effectively to penetrate new markets, to increase market share, and to increase profits. That is, good supply chain management can generate sales, not just reduce costs.

Logistics Adds Significant Customer Value

A product, or service, is of little value if it is not available to customers at the time and place that they wish to consume it. When a firm incurs the cost of moving the product toward the customer or making an inventory available in a timely manner, for the customer “value” has been created that was not there previously. It is value as surely as that created through the production of a quality product or through a low price. It is generally recognized that business creates four types of value in products or services. These are: form, time, place, and possession. Logistics creates two out of these four values. Manufacturing creates *form* value as inputs are converted to outputs that are raw materials are transformed into finished goods. Logistics controls the *time* and *place* values in products, mainly through transportation, information flows, and inventories. *Possession* value is often considered the responsibility of marketing, engineering, and finance, where the value is created by helping customers acquire the product through such mechanisms as advertising (information), technical support, and terms of sale (pricing and credit availability). To the extent that SCM includes production, three out of the four values may be the responsibility of the logistics/supply chain manager. In addition to the four Ps in marketing(product, price, place, promotion)now added a fifth one is Pace (speed) through logistic service.

Customers Increasingly Want Quick, Customized Response

Fast food retailers, automatic teller machines, overnight package delivery, and electronic mail on the Internet have led us as consumers to expect that products and services

can be made available in increasingly shorter times. In addition, improved information systems and flexible manufacturing processes have led the marketplace toward mass customization. Rather than consumers having to accept the “one size fits all” philosophy in their purchases, suppliers are increasingly offering products that meet individual customer needs.

Companies too have been applying the concept of quick response to their internal operations in order to meet the service requirements of their own marketing efforts. The quick response philosophy has been used to create a marketing advantage. Saks Fifth Avenue applied it, even though big profits are made through big margins and not on cost reductions that might be achieved from good logistics management. Supply chain costs may even rise, although the advantage is to more than cover these costs through increased profits.

Logistics/SC in Non-manufacturing Areas

It is perhaps easiest to think of logistics/SC in terms of moving and storing a physical product in a manufacturing setting. This is too narrow a view and can lead to many missed business opportunities. The logistics/SC principles and concepts learned over the years can be applied to such areas as service industries, the military and even environment management.

Service Industry

The service sector of industrialized countries is large and growing. In the United States, over 70 percent of all jobs are in what the federal government classifies as the service sector. The size of this sector alone forces us to ask if logistics concepts are not equally applicable here as they are to the manufacturing sector. If they are, there is a tremendous untapped opportunity yet to be fulfilled.

Many companies designated as service firms in fact produce a product. Examples include: McDonald’s Corporation (fast foods); Dow Jones & Co., Inc. (newspaper publishing); and Sears, Roebuck and Co. (merchandise retailing). These companies carry out all the typical supply chain activities of any manufacturing firm.

However, for service companies such as Bank One (retail banking), Marriott Corporation (lodging) and Consolidated Edison (electric power), supply chain activities, especially those associated with physical distribution, are not as obvious. Even though many service-oriented companies may be distributing an intangible, nonphysical product, they do engage in many physical distribution activities and decisions.

A hospital may want to extend emergency medical care throughout the community and must make decisions as to the locations of the centers. United Parcel Service and Federal Express must locate terminals and route pickup and delivery trucks. The East Ohio Gas Company inventories natural gas in underground wells during the off-season in the region where demand will occur.

Bank One must locate and have cash inventory on hand for its ATMs. The Federal Reserve Bank must select the methods of transportation to move cancelled cheques among member banks.

The Catholic Church must decide the number, location, and size of the churches needed to meet shifts in size and location of congregations, as well as to plan the inventory of its pastoral staff.

Xerox's repair service for copying equipment is also a good example of the logistics decisions encountered in a service operation.

Managing logistics in service industries does represent a new direction for the future development of logistics practice.

Military

Before businesses showed much interest in co-ordinating supply chain processes, the military was well organized to carry out logistics activities. More than a decade before business logistics' developmental period, the military carried out what was called the most complex, best-planned logistics operation of that time-the invasion of Europe during World War II. Although the problems of the military, with its extremely high customer service requirements, were not identical with those of business, the similarities were great enough to provide a valuable experience base during the developmental years of logistics. For example, the military alone maintained inventories valued at about one-third of those held by all U.S. manufacturers. In addition to the management experience that such large-scale operations provide, the military sponsored, and continues to sponsor, research in the logistics area through such organizations as the RAND Corporation and the Office of Naval Research. With this background, the field of business logistics began to grow. Even the term *logistics* seems to have had its origins in the military. A recent example of military logistics on a large scale was the conflict between the United States and Iraq over Iraq's invasion of the small country of Kuwait. This invasion has been described as the largest military logistics operation in history. The logistics support in that war is yet another illustration of what world class companies have always known: Good logistics can be a source of competitive advantage.

Environment

Population growth and resultant economic development have heightened our awareness of environmental issues. Whether it is recycling, packaging materials, transporting hazardous materials or refurbishing products for resale, logisticians are involved in a major way. After all, the United States alone produces more than 160 million tons of waste each year; enough for a convoy of 10-ton garbage. In many cases, planning for logistics in an environmental setting is no different from that in manufacturing or service sectors. However, in a few cases additional complications arise, such as governmental regulations that make the logistics for a product more costly trucks reaching halfway to the moon. by extending the distribution channel.

Business Logistics in the Firm

It has been the tradition in many firms to organize around marketing and production functions. Normally, marketing mean selling something and production means making something. Although few business people would agree that their organization is so simple, the fact remains that many businesses emphasize these functions while treating other activities, such as traffic, purchasing, accounting, and engineering, as support areas. Such an attitude is justified to a degree, because if a firm's products cannot be produced and sold, little else matters. However, such a pattern is dangerously simple for many firms to follow in that it fails to recognize the importance of the activities that must take place between points and times of production or purchase and the points and times of demand. These are the logistics activities, and they affect the efficiency and effectiveness of both marketing and production.

The difference in operating objectives (maximize revenue versus minimize cost) for marketing and production/operations may lead to a fragmentation of interest in, and responsibility for, logistics activities, as well as a lack of co-ordination among logistics activities as a whole. This, in turn, may lead to lower customer service levels or higher total logistics costs than are necessary. Business logistics represents a regrouping, either by formal organizational structure or conceptually in the minds of management, of the move-store activities that historically may have been partially under the control of marketing and production/ operations.

NATURE AND CONCEPTS

Logistics is a recent addition in the jargon of integrated business management, formerly with the traditional fields of marketing, finance, production and per-sonnel, although it has been an integral part of these sectors since the Industrial Revolution. Business logistics, physical distribution, materials management, outbound logistics, in-bound logistics, logistics management, supply chain management are only some of the terms being used to define and describe the concept of approximately the same subject—logistics, perhaps due to a rapid change in the scope and wide use of the subject matter.

The term 'Logistics' stems from the Greek word 'Logisticos', meaning 'the science -of computing and calculating.' Since ancient times, logistics has been performed but earlier, it was used first within the facet of military science. In the militafysense, Webster defines Logistics as 'the procurement, maintenance and transportation of military materials, facilities and personnel' (*Webster's Dictionary*, 1963).

Further, a US Air Force Technical Report (1981) defines this term as 'the science of planning and carrying out the movement and maintenance of forces. In this most comprehensive sense ,logistics pertains to those aspects of military operations which deal with: (a) design and development, acquisition, storage, movement, distribution, maintenance, evacuation and disposition of materials; (b) movement, evacuation and hospitalization of personnel; (c) acquisition or construction, maintenance, operation, disposition of facilities and(d)acquisition or furnishing of services.

In 1905, Major Chauncey B. Baker wrote, 'That branch of the Art of War pertaining to the movement and supply of armies is called Logistics.'

Logistics systems and various models were used by military forces during World War II to ensure that troops and materials were made available at the_ right place to meet the country's requirements. For instance, in a book of Gulf War, it is noted on the first phase that US forces planned, moved, and served 122 million meals during the brief engagement—a task comparable to feeding all the residents of Wyoming and Vermont three meals a day for forty days (*Transport Topics, 1991*).

Hence, from a military point of view, logistics refers to a supportive system which reflects the practical art of moving armies and materials engaged in combats enemy to achieve the desired results.

Today, in the industrial and commercial world, logistics has acquired wider meaning. Essentially, it covers activities for the material flow from the source to the processing facilities, and subsequent distribution of finished goods from there to the ultimate users. Previously, the term physical distribution was commonly used, which refers to manufacturing and commerce to describe the broad range of activities concerned with efficient movement of finished products from the end of production line to the consumers'

An early definition encompassing the total material flow involves 'a total approach to the management of all activities involved in physically acquiring, moving and storing raw materials, in-process inventory and finished goods. Inventory from the point of origin to the point of use or consumption.

In 1961, in broader sense, this same term has been defined as 'that area of business management responsible for the movement of raw materials and finished products and the development of material system.

In 1991, the Council of Logistics Management (CLM), a prestigious professional organization, modified its 1976 definition of Physical Distribution Management by first changing the term to Logistics and then changing the definition as follows:

"Logistics is the process of planning, implementing and controlling of efficient, effective flow and storage of goods, services and related information from the point of origin to the point of consumption for the purpose of conforming to customer expectations.

An engineering-oriented definition of logistics has been given by The Society of Logistics Engineers (SOLE, 1947), a professional organization, comprising about 10,000 practitioners of logistics engineering from government, the armed forces, and defence-related cooperation, as:

The art and science of management, engineering, and technical activities concerned with the requirements, design, and supplying and maintaining the resources to support activities, plans and operations.

A more systematic definition of logistics management has been given by Bowersox and Closs (1996) as:

Logistical Management includes the design and administration of system to control the flow of materials, work-in-process, and finished inventory to support business unit strategy.

On the basis of above facet of logistics management, a more comprehensive definition of it is:

Logistics management refers to designing, developing, producing and operating an integrated system which responds to customer expectations by making available the required quantity of required quality products as and when required to offer best customer service at the least possible costs.

It is an internal integration of interrelated managerial functions to ensure a smooth flow of raw materials from the point of inception to the first production point, semi-finished goods within production process, and finished goods from the last production point to the point of consumption. Hence, a set of activities which are involved in the gamut of logistics include procurement, materials handling, storage and warehousing, protective packaging, order processing, forecasting, inventory management, transportation, and related information system. After careful analysis and review of various definitions, the major features of logistics management may be drawn as:

- (i) It ensures a smooth flow of all types of goods such as raw materials, work-in-process and finished goods.
- (ii) It has the ability to meet customer expectations and requirements of goods.
- (iii) It ensures the delivery of quality product.
- (iv) It offers the best possible customer service at the least possible cost.
- (v) It is an integration of various managerial functions for optimization of resources.
- (vi) It deals with movement and storage of goods in appropriate quantity.
- (vii) It enhances productivity and profitability.

Companies have to present best quality product at a reasonably least price as and when required, avoiding a stock-out situation which has given impetus to the concept of *Logistics Management*, since it has the ability to ensure a consistency in the quality, tremendous cost-saving potential and making available goods at the place of requirements in time.

BUSINESS LOGISTICS

Business logistics is a relatively new field of integrated management study in comparison with the traditional fields of finance, marketing, and production. As previously noted, logistics activities have been carried out by individuals for many years. Businesses also have continually engaged in move store (transportation-inventory) activities. The newness of the field results from the concept of *co-ordinated management* of the related activities, rather than the historical practice of managing them separately, and the concept that logistics adds value to products or services that are essential to customer satisfaction

and sales. Although co-ordinated logistics management has not been generally practiced until recently, the idea of co-ordinated management can be traced back to at least 1844. In the writings of Jules Dupuit, a French engineer, the idea of trading one cost for another (transportation costs for inventory costs) was evident in the selection between road and water transport:

“The fact is that carriage by road being quicker, more reliable and less subject to loss or damage; it possesses advantage to which businessmen often attach a considerable value. However, it may well be that a saving induces the merchant to use a canal; he can buy warehouses and increase his floating capital in order to have a sufficient supply of goods on hand to protect himself against slowness and irregularity of the canal, and if all told the saving in transport gives him a cost advantage, he will decide in favour of the new route.”

Supply chain management (SCM) is a term that has emerged in recent years that captures the essence of integrated logistics and even goes beyond it. Supply chain management emphasizes the logistics interactions that take place *among* the functions of marketing, logistics, and production within a firm and those interactions that take place between the legally separate firms within the product-flow channel. Opportunities for cost or customer service improvement are achieved through **co-ordination** and **collaboration** among the channel members where some essential supply chain activities may not be under the direct control of the logistician.

Definitions of the supply chain and supply chain management reflecting this broader scope are:

“The supply chain (SC) encompasses all activities associated with the flow and transformation of goods from the raw materials stage (extraction), through to the end user, as well as the associated information flows. Materials and information flow both up and down the supply chain.”

“Supply chain management (SCM) is the integration of these activities, through improved supply chain relationships, to achieve a sustainable competitive advantage.”

After careful study of the various definitions being offered, Mentzer and other writers propose the broad and rather general definition as follows:

“Supply chain management is defined as the systematic, strategic coordination of the traditional business functions and the tactics across these business functions within a particular company and across businesses within the supply chain, for the purposes of improving the long-term performance of the individual companies and the supply chain as a whole.”

It is difficult, in a practical way, to separate business logistics management from supply chain management. In so many respects, they promote the same mission:

“To get the right goods or services to the right place, at the right time, and in the desired condition, while making the greatest contribution to the firm.”

Some claim that supply chain management is just another name for integrated business logistics management (IBLM) and that the broad scope of supply chain

management has been promoted over the years. Conversely, others say that logistics is a subset of SCM, where SCM considers additional issues beyond those of product flow. For example, SCM may be concerned with product pricing and manufacturing quality. Although SCM promotes viewing the supply channel with the broadest scope, the reality is that firms do not practise this ideal. Fawcett and Magan found that companies that do practise supply chain integration limit their scope to one tier upstream and one tier downstream.

The focus seems to be concerned with creating seamless processes within their own companies and applying new information technologies to improve the quality of information and speed of its exchange among channel members.

The boundary between the logistics and supply chain management terms is fuzzy.

OBJECTIVES OF LOGISTICS MANAGEMENT

Within the broader objectives of the firm, the business logistician seeks to achieve supply channel process goals that will move the firm toward its overall objectives. Specifically, the desire is to develop a logistics activity mix that will result in the highest possible return on investment over time.

There are two dimensions to this goal:

- (1) The impact of the logistics system design on the revenue contribution.
- (2) The operating cost and capital requirements of the design.

Ideally, the logistician should know how much additional revenue would be generated through incremental improvements in the quality of customer service provided. However, such revenue is not generally known with great accuracy. Often, the customer service level is set at a target value, usually one that is acceptable to customers, the sales function, or other concerned parties. At this point, the logistics objective may become one of minimizing costs subject to meeting the desired service level rather than profit maximization or return on investment. Unlike revenue, logistics costs usually can be determined as accurately as accounting practice will allow and are generally of two types: operating costs and capital costs.

Operating costs are those that recur periodically or those that vary directly with variation in activity levels. Wages, public warehousing expenses, and administrative and certain other overhead expenses are examples of operating costs.

Capital costs are the one-time expenses that do not change with normal variations in activity levels. Examples here are the investment in a private trucking fleet, the construction cost of a company warehouse, and the purchase of materials-handling equipment. If it is assumed that there is knowledge of the effect of logistics activity levels on revenues of the firm, a workable financial objective for logistics can be expressed in the ratio known as

ROLA (return on logistics assets).

ROLA is defined as:

$ROLA = \frac{\text{Contribution to revenue} - \text{logistics operating costs}}{\text{Logistics assets}}$

Logistics assets

The contribution to revenue refers to the sales resulting from the logistics system design. Logistics operating costs are the expenses incurred to provide the level of logistics customer service needed to generate sales. Logistics assets are the capital investments made in the logistics system. ROLA is to be maximized over time.

If the value of money is high, maximizing the present value of cash flows or maximizing the internal rate of return is a more appropriate statement of the objective. Maximizing the cumulative return on investment over time is the single most important objective to ensure the long-run survival of the firm.

Operational objective of logistical management:

1. Right response
2. Right quality
3. Right quantity
4. Right value
5. Right cost trade-offs
6. Right information

ELEMENTS OF LOGISTICS MANAGEMENT

Logistics management consists of eight elements called wings of logistics. These are discussed in a nutshell below.

1. Customer Order Processing

Flow of Actions

1. Filling up the order form
2. Deciding the specifications of the product
3. Deciding the quality check list of the product
4. Deciding the delivery schedule
5. Deciding the location of delivery

Important Factors

1. Cost of order processing
2. Whether the company is capable of producing a component
3. Detailed list of specifications

Techniques

1. Electronic data Interchange (EDI)
2. E-ERP or CPFR
3. Web portal

2. Location Analysis

Flow of Actions

1. Cost of transportation of raw materials and finished goods
 - . Proximity to suppliers
 - . Proximity to customers
2. Availability and type of land
3. Availability of secondary resources
4. Availability of desired manpower at affordable cost
5. Communal harmony
6. Governmental regulation and taxation

Important Factors

1. Cost of operations as a percentage of sales
2. Shelf life of product

3. Inventory Control

Flow of Actions

1. on hand inventory analysis
2. Communicating the quantity, quality and timing of material with the supply points.
3. Getting the material of right quality, quantity and at right time

Important Factors

1. Inventory control at planning stage
2. Lead time
3. Cost vs. importance of raw material

Techniques

1. DRP and replenishment order control
2. Fixed order interval system
3. Economic order quantity with ROP system
4. Selective inventory control (ABC, VED, FSN analysis etc.)
5. Order forecasting using statistical tools

4. Material Handling

Flow of Actions

1. Type of material (Business significance like raw material, finished goods etc.)
2. Material handling requirements of the material (Fragile, inflammable)

3. Cost ratio of material handling to material cost.
4. Material default location, identification and traceability

Important Factors

1. Material breakage
2. Pilferage
3. Cost of material handling
4. Number of handlings

Techniques

1. Operational research
2. Material flow analysis
3. Computerized material retrieval system
4. ASRS (Advanced Storage & Retrieval System)

5. Packaging

Flow of Actions

1. Packaging requirement for the material (Refrigeration, Fragile etc.)
2. Primary packaging
3. Secondary packaging
4. Cost of packaging
5. Transportation requirement for packaging (Vibration proof, water or moisture tight)

Important Factors

1. Protection to product
2. Holding the product
3. Communicating the message to customers
4. Customer requirement for packaging
5. Reverse logistics for packaging
6. Recycling of packaging material
7. Cost of packaging

Techniques

1. Standardized box packaging
2. Containerization of packaging
3. Direct part marking
4. ISO 14001

5. Recycling of packaging materials
6. Reusable packaging materials
7. Eco-friendly packaging materials
8. Bar coding
9. Bumpy bar coding
10. GPS tracking system
11. RFID

6. Transportation

Flow of Actions

1. Mode of transportation
2. Cost of product
3. Speed of transportation
4. Ambience requirement of material (Refrigeration, Vacuum)
5. Cost of transportation
6. Urgency of the product to customers

Important Factors

1. Urgency of the product
2. Cost of product
3. Cost of transportation

Techniques

1. Containerized transportation
2. Cool Chain Transport (Refrigerated Vans/Containers)
3. Multi-modal Logistics
4. Milk Run Distribution systems
5. Cross Docking
6. Direct Shipment

7. Warehousing

Flow of Actions

1. Location of the warehouse
2. Inventory level at the warehouse
3. Storage requirement of the product
4. Packaging and repackaging requirement of the product
5. Shelf life of the product

Important Factors

1. Availability of space
2. Availability of proper material handling systems
3. Strategic location
4. Packing and Re-packing facilities
5. Information and allied services

Techniques

1. Third Party Logistics
2. Third party warehousing

8. Customer Service

Flow of Actions

1. Contractual services offered to client
2. Type of customer service required for the product
3. Location of the service centre
4. Service level at the service centre
5. Cost of service vs. replacement

Important Factors

1. Contractual requirement of customer service
2. Service quality
3. Reverse logistics

Techniques

1. AMC (Annual Maintenance Contracts) and free replacements
2. Limited (free) trial period
3. Guarantee & warrantee
4. User clubs
5. Help lines, toll free number, call centers
6. CRM

Quick Response Manufacturing (QRM)

Quick response manufacturing (QRM) is a companywide strategy to cut lead times in all phases of manufacturing and office operations. It can bring the manufacturing firm's products to market more quickly and secure its business prospects by helping to compete in a rapidly changing manufacturing arena.

QRM will not only make the manufacturing firm more attractive to potential customers; it will also increase profitability by reducing non-value-added time, cutting inventory and increasing return on investment.

Kanban System

The kanban system is an information system to harmoniously control the production quantities in every process. It is a tool to achieve just-in-time production. In this system what kind of units and how many units needed are written in a tag-like card called kanban. The kanban is sent to the people of the preceding process from the subsequent process. As a result, many processes in a plant are connected with each other. This connecting of processes in a factory allows for better control of necessary quantities for various products.

Autonomation

Autonomation means to build in a mechanism a means to prevent mass production of defective work in machines or product lines. Autonomation is not automation, but the autonomous check of abnormality in the process. The autonomous machine is a machine to which an automatic stopping device is attached. In Toyota factories, almost all the machines are autonomous, so that mass production of defects can be prevented and machine breakdowns are automatically checked. The idea of Autonomation is also expanded to the product lines of manual work. If something abnormal happens in a product line, the worker pushes stop button, thereby stopping his whole line.

Two-bin System

The Working of the System begins with, the stock from the first bin is consumed. The emptying of first bin indicates that the stock has reached ROL and the replenishment action is initiated. The quantities in the second bin are consumed during the replenishment period. This system reduces the work involved in record keeping and entering (clerical) errors.

JUST IN TIME (JIT)

JIT is a Japanese management philosophy, which has been applied in practice since the early 1970s in many Japanese manufacturing organizations. It was first developed and perfected within the Toyota manufacturing plants by Taiichi Ohno as a means of meeting consumer demands with minimum delays. Taiichi Ohno is frequently referred to as the father of JIT. JIT is more of a manufacturing and waste elimination philosophy than commodity purchasing technique. It originally referred to the production of goods to meet customer demand exactly, in time, quality and quantity, whether the customer is the final purchaser of the product or another process further along the production line. It has now come to mean producing with minimum waste. Waste is taken in its most general sense and includes time and resources as well as materials. There are seven types of waste namely:

- . Waste from overproduction
- . Waste of waiting time
- . Transportation waste
- . Processing waste

- . Inventory waste
- . Waste of motion
- . Waste from product defects

VENDOR MANAGED INVENTORY (VMI)

VMI can be defined as:

It is a streamlined approach to inventory and order fulfillment. With it, the supplier and not the retailer, is responsible for managing and replenishing inventory. This is done by using EDI, by electronic transfer of data over a network. It can also be seen as a mechanism where the supplier creates the purchase orders based on the demand information exchanged by the retailer/customer. Vendor Managed Inventory (VMI) is basically evolved to facilitate the operations at retail stores. It involves a continuous replenishment program that uses the exchange of information between the retailer and the supplier to allow the supplier to manage and replenish merchandise stock at the store or warehouse level. VMI was first applied to the grocery industry, between companies like Procter & Gamble (supplier) and Wal-Mart (distributor).

JIT - II

Lance Dixon, the father of JIT-II describes it, as "This is the ultimate partnership program for compatible customers and suppliers, because it is the next logical step in the application of the management cycle to the value chain, through the management of time within the supply chain. It represents the use of alignment and mobilization strategies with suppliers using in-plant vendor representatives to achieve breakthrough changes". JIT system was based upon the synchronized planning between the buyer's needs and the supplier's production capabilities. It will not produce any breakthroughs or generate any major organizational transformation. It will result into proper materials control across organizations. JIT-II can be regarded as a major catalyst for the productive change across organizations and qualifies a toy component of the macro logistics management model. In other words, we can say that JIT system assures the un-interrupted incoming material supply as per demand, whereas JIT-II ensures the un-interrupted production from manufacturing lines.

DISTRIBUTION STRATEGIES

Distribution strategies can be of the following types:

- Cross docking
- Milk runs
- Direct shipping
- Hub and spoke model

Cross Docking

Cross docking co-ordinates the supply and delivery so that the goods arrive at the receiving area and are transferred straight away to the loading area, where they are put into

delivery vehicles. In other words, Cross docking is the movement of materials from the receiving docks directly to the shipping docks.

Milk Runs

A milk run is a route in which a truck either delivers product from a single supplier to multiple retailers or goes from multiple suppliers to single retailer . In other words, in a milk run, a supplier delivers directly to multiple retail stores on a truck or a truck picks up deliveries for many suppliers of the same retail store. The main job of the supply chain manager is to decide on the routing of each milk run.

Direct Shipping

Direct shipping refers to the method of distribution in which the goods come directly from the suppliers to the retail stores. In case of direct shipment network, the routing of each shipment is specified and the supply chain manager only needs to decide on the quantity to ship and the mode of transportation to use. This system eliminates the need for the intermediate facilities that are otherwise required, e.g. warehouses and distribution centers. The products that are generally distributed through the method of direct shipping are certain perishable items, high volume goods, high bulk items and specialty products.

Hub and Spoke Model

In case of the hub and spoke model the distribution model's hub is the location that holds inventory for a large region, with each spoke leading to a smaller distribution centre, which houses inventory for a smaller region. The main driver of the hub and spoke model is the proximity to the customer, with the goal being to supply to a maximum amount of customers in a minimum amount of time. In today's distribution environment, however, this goal can be attained in many cases without a hub and spoke operation, which has very high overheads. Hub and spoke, these days, is often restricted to fulfilling the just-in-time needs of heavy manufacturing industries.

THIRD-PARTY LOGISTICS (TPL/3PL)

Third-party logistics refers to the concept of outsourcing the logistics and distribution of a manufacturing or service firm to a logistics service provider so that the manufacturing company can focus on its core competencies of new product development manufacturing them and marketing the products.

The logistics and distribution activities add up to almost around 5 per cent to the cost to thereby increasing the final cost of the product. In addition to this the inventory costs add around 15 per cent to the cost of the product. To increase operational efficiency it is necessary for firms to cut these costs to remain competitive. So manufacturing firms outsource these activities to LSPs which in coordination with the manufacturing firms' needs control inventory and reduce costs. Third party logistics is the activity of outsourcing activities related to logistics and distribution. The 3PL industry includes Logistics Solution Providers (LSPs) and the shippers whose business processes they support. Companies opt for third party logistics for the following reasons:

- Improved strategic focus: Using 3PLs companies can concentrate on their core tasks and improve customer satisfaction.
- Resource constraints.
- Lowered costs: According to research reports companies can reduce their inventory management costs by around 15-30 per cent. Also 3PL service providers invest large sums of money in developing processes that aim to achieve logistical excellence, which are unavailable to other companies.
- Expansion of markets: Outsourcing logistical activities to 3PLs allow companies to get into new businesses, new markets or a new channel of distribution quickly and with a limited outlay of cash.
- For more professional and scientific approach to logistical problems.
- For improvement in service levels with improved response time.
- For efficient management of inventory resulting in better utilization of working capital.
- Increased flexibility: A 3PL contract provides for relatively short term commitments as compared to building and maintaining the same resources by the company itself, thus freeing up resources for other uses.

In addition to the logistics and distribution functions, 3PLs also perform functions such as fund collection, providing information of goods movement consumer demographics, warehousing and value-added activities such as assembling, packaging, flow of funds and reverse logistics.

FOURTH-PARTY LOGISTICS (4PL)

The term 4PL with the following definition:

"An integrator that assembles the capabilities, technology and resources of its own organization and other organizations to design, build and run comprehensive supply chain solutions."

For a firm to be 4PL it must have exhaustive skills in investing and maintaining the infrastructure and resources that makes it the manager of multiple 3PL service providers crucial to the client organization. However, the definition of 4PL was misinterpreted by many 3PLs who thought 4PL as a kind of 3PL plus service and began providing some value-added activities such as assembling, picking and then marketing themselves as 4PL providers.

BENCHMARKING

A benchmark is a standard of performance Benchmarking helps organizations identify standards of performance in other organizations and to import them successfully to their own. It allows organizations to discover where they stand in relation to others. By identifying, understanding, comparing, and adapting ewe's own organization with the outstanding practices and processes of others, an organization can target problem areas, set levels of performance, and identify solutions to improve results. A public sector organization can borrow the best practices of the private sector, and vice versa. Organizations that accomplish a particular activity at the highest value, i.e. at the lowest

cost and/or quality or efficiency are considered best-in-class. In determining what qualifies as world class, benchmarking asks the question: "who are we now, and who do we want to be?" The best benchmarking efforts not only match the performance of others but also motivate to exceed it. Typically performed by internal personnel who already have a thorough knowledge of the process under review, benchmarking looks beyond performance measures and cost ratios. It considers the total organizational impact. In benchmarking with comparison to others, an organization:

- Determines how leading organizations perform specific processes
- Compares their methods to its own
- Uses the information to improve upon or completely change its processes

SUPPLY CHAIN MANAGEMENT V/S LOGISTICS MANAGEMENT.

A supply chain is “the connected series of activities which is concerned with planning, coordinating and controlling material, parts and finished goods from suppliers to the customer”.

Supply chain management includes all value-adding activities from the extraction of materials through the transformation processes and through delivery to the end user. Supply chain management spans and crosses organizational boundaries and treats the organisations within the supply chain as a unified virtual business entity .Supply chain management, focuses on “integrating and managing flow of goods and services and information trough the supply chain in order to make it responsive to customer needs while lowering total costs”.

Supply chain management requires managing the flow of information through the supply chain in order to attain the level of synchronisation that will make it more responsive to customer needs, while lowering costs. The keys to effective supply chain management are information, communication, cooperation, and trust.

Essentially, the existence of supply chain management is “to manage the flow of information, products and services across networks of customers, organisations and supply chain partners”.

Logistics constitutes the supply chain management.

Logistics management is the part of supply chain management that plans, implements , and controls the efficient, effective, forward, and reverse flow and storage of goods, services, and related information between the point of origin and the point of consumption in order to meet customer's requirements.

Supply Chain Management establishes and *manages* the business-to-business links that ultimately enables the sale of goods (or services) to consumers.

Logistics essentially *transfers* or *moves* the good (or service) from one place to the other. Logistics is a function that falls under the wide umbrella of Supply Chain Management, and is only one part of the entire process.

Supply Chain Management is a much broader, integrating process which entails many other aspects aside from Logistics.

INTEGRATED LOGISTICS MANAGEMENT

Integrated Logistics is defined as “ the process of anticipating customer needs and wants; acquiring the capital, materials, people , technologies and information necessary to meet those needs and wants; optimizing the goods-or-service-producing a network to fulfill customer requests; and utilizing the network to fulfill customer request in a timely way.”

Integrated logistics is a service-oriented process. It incorporates actions that help move the product from the raw material source to the final customer.

Integrated Logistics Management

The movement of raw materials and components to a manufacturing company must be managed. So must the movement of finished goods from the manufacturing plant to further processing, to the retail, or to the final consumer. The management of this movement is called integrated logistics management.

Variables affecting the Evaluation and Growth of Integrated Logistic

Many variables affected the evaluation and growth of integrated logistic.

The first was the growth of the consumer awareness and the marketing concept. Product line expanded to meet the rising demand for more selections. This product line expansion put great presser on distribution channels to move more products and keep cost down, especially in transportation and inventory.

A second factor was the introduction of the computer. Computer experts and integrated logistic manager quickly found a multitude of computer application for logistic. This application offered still greater efficiency in transportation routing and scheduling, inventory control, warehouse layout and design, and every aspect of integrated logistic. In fact computers allowed integrated logistic managed to modal integrated logistic system and then analyze the effect of proposed change. This application greatly advances the system’s approach.

The third variable leading to the growth of integrated logistics was the world wide economy in the 1970s and 1980s. Global recession and rising interest rates caused many firms to refocus attention on reducing cost advantage; many firms were forced to reevaluate overall transportation needs. Also, rising interest rates turned attention to maintaining minimum inventory levels because of the cost of capital.

Globalization of business and the development of world trade blocks are a fourth factor influencing the growth of integrated logistics. Integrated logistic can provide firms with a cost advantage. Furthermore, trading blocks in Europe. Southeast Asia, Asia, Africa and the Americans (European Union, association of Southeast Asian nations and the Asian-pacific economic cooperation, southern African development community, North American free trade agreement and now the free trade agreement of the Americas) require integrated logistics to tie the participating countries into single marketplaces.

The final factor affecting integrated logistics is the growth of just-in-time manufacturing (JIT), supply management, transportation, and electronic data interchange (EDI) in the 1980s and 1990s. As manufacturers adopted total quality management (TQM), JIT, and EDI, integrated logistics management has come to the forefront. Effective TQM and JIT require optimizing the inbound and outbound transportation and more efficient inventory management.

Activities related to integrated logistics.

1. Physical distribution.
2. Materials management.
3. Logistics engineering.
4. Business logistics.
5. Logistics management.
6. Integrated logistics management.
7. Distribution management.
8. Supply chain management.

Although the activities include under each term vary, they share one key ingredient: *“The concept of a continuous uninterrupted flow of the product.”*

Operations involved in integrated logistics model.

1. Inbound logistics: - It is referred to as procurement or physical supply. It deals with the relationship between the firm and its suppliers. It addresses the flow of materials from the suppliers to the plant or into service operations.
2. Conversion / operations: - It deals with the logistical relationship between and among the facilities of the firm. It addresses how goods and materials move among workstations within operations.
3. Outbound logistics: - It is referred to as physical distribution. It is the logistical relationship between the firm and its customers. It is the movement of a finished product out of the plant to the final customer.

Each of these relationships is sustained by the execution of 5 primary logistics activities like transportation, facility structure, inventory management, material handling and communication / information. These activities are interwoven throughout the integrated logistics system. Each is vital and is found at every stage.

- Transportation :- it is necessary in outbound, inbound as well as conversion processes. It deals with the movement of a product into, through, and out of the plant / warehouse. It is the most expensive logistics activity, accounting for 50 % or more of total logistics costs.

- Facility structure refers to the strategic placement of warehouses, service centre, and plants throughout the supply chain. It includes the numbers and types of plants, their locations and their operations.
- Inventory management refers to product buffers of raw materials, work in progress, and finished goods in logistics pipelines.

If every activity worked perfectly, if there were no variation in transit time, no variation in processing time, no loss or damage, no volume discounts for transportation, no volume discount for products, and if firms could forecast demand accurately there would be no need to store product.

Unfortunately, integrated logistics managers operate in an imperfect world and buffer inventory is a reality.

OPERATIONAL OBJECTIVES OF INTEGRATED LOGISTICS

To achieve logistical integration within a supply chain context, six operational objectives must be simultaneously achieved:

- (1) Responsiveness,
- (2) Variance reduction,
- (3) Inventory reduction,
- (4) Shipment consolidation,
- (5) Quality, and
- (6) Life cycle support.

The relative importance of each is directly related to a firm's logistical strategy.

Responsiveness

A firm's ability to satisfy customer requirements in a timely manner is referred to as responsiveness. Information technology is facilitating response-based strategies that permit operational commitment to be postponed to the last possible time, followed by accelerated delivery. The implementation of responsive strategies serves to reduce inventories committed or deployed in anticipation of customer requirements. Responsiveness serves to shift operational emphasis from forecasting future requirements toward accommodating customers on a rapid order-to-shipment basis. Ideally, in a responsive system, inventory is not deployed until a customer commits. To support such commitment, a firm must have the logistical attributes of inventory availability and timely delivery once a customer order is received.

Variance Reduction

All operating areas of a logistical system are susceptible to variance. Variance results from failure to perform any expected facet of logistical operations as anticipated. For example, delay in customer order processing, an unexpected disruption in order selection, goods arriving damaged at a customer's location, and/or failure to deliver at the right

location on time all create unplanned variance in the order-to-delivery cycle. A common solution to safeguard against detrimental variance is to use inventory safety stocks to buffer operations. It is also common to use premium transportation to overcome unexpected variance that delays planned delivery. Such practices, given their associated high cost, can be minimized by using information technology to maintain positive logistics control. To the extent that variance is minimized, logistical productivity will improve. Thus, variance reduction, the elimination of operational disruptions, is one basic objective of integrated logistics management.

Inventory Reduction

To achieve the objective of inventory reduction, an integrated logistics system must control asset commitment and turn velocity. Asset commitment is the financial value of deployed inventory. Turn velocity reflects the rate at which inventory is replenished over time. High turn rates, coupled with desired inventory availability, mean assets devoted to inventory are being efficiently and effectively utilized; that is, overall assets committed to support an integrated operation are minimized.

It is important to keep in mind that inventory can and does facilitate desirable benefits. Inventories are critical to achieving economies of scale in manufacturing and procurement. The objective is to reduce and manage inventory to the lowest possible level while simultaneously achieving overall supply chain performance objectives.

Shipment Consolidation

One of the most significant logistical costs is transportation. On average over 60 cents of each logistics dollar is expended for transportation. Transportation cost is directly related to the type of product, size of shipment, and movement distance. Many logistical systems that feature direct fulfillment depend on high-speed, small-shipment transportation, which is costly. A system objective is to achieve shipment consolidation in an effort to reduce transportation cost. As a general rule, the larger a shipment and the longer the distance it is transported, the lower the transportation cost per unit. Consolidation requires innovative programs to combine small shipments for timely delivery. Such programs require multi firm coordination because they transcend the supply chain. Successful e-commerce fulfillment direct-to-consumers require innovative ways to achieve effective shipment consolidation.

Quality

A fundamental operational objective is continuous quality improvement. Total Quality Management (TQM) is a major initiative throughout industry. If a product becomes defective or if service promises are not kept, little if any value can be added by the logistics process. Logistical costs, once expended, cannot be reversed or recovered. In fact, when product quality fails after customer delivery and replacement is necessary, logistical costs rapidly accumulate. In addition to the initial logistics cost, products must be returned and replaced. Such unplanned movements typically cost more than original distribution. For this reason, commitment to zero-defect order-to-delivery performance is a major goal of leading-edge logistics.

Logistics itself is performed under challenging conditions. The difficulty of achieving zero-defect logistics is magnified by the fact that logistical operations typically are performed across a vast geographical area during all times of day and night and without direct supervision.

Life Cycle Support

The final integration design objective is life cycle support. Few items are sold without some guarantee that the product will perform as advertised. In some situations, the initial value-added inventory flow to customers must be reversed. Product return is common as a result of increasingly rigid quality standards, product expiration dating, and responsibility for hazardous consequences. Reverse logistics also results from the increasing number of laws encouraging the recycling of beverage containers and packaging materials. The significant point concerning reverse logistics is the need to maintain maximum control when a potential liability exists, such as potentially contaminated product. A well-designed and coordinated reverse logistical capability is important when firms are required to recall products. During 2010, Johnson & Johnson confronted the need to recall several products. These recalls extended across several months involving a number of different brands. The efficiency and effectiveness of their predetermined reverse logistics capabilities were a major factor in the success of these recalls. The operational requirements for reverse logistics range from lowest total cost, such as returning bottles for recycling, to maximum control in situations involving defective products. Firms that design efficient reverse logistics often are able to reclaim value by reducing the quantity of products that might otherwise be scrapped or sold at a discount. Sound integrative strategy cannot be formulated without careful review of reverse logistical requirements.

For some products, such as copying equipment and printers, primary profit lies in the sale of supplies and aftermarket service. The importance of life cycle support is significantly different in situations where in a majority of profits are achieved in the aftermarket. For firms marketing consumer durables or industrial equipment, the commitment to life cycle support constitutes a versatile and demanding marketing opportunity as well as one of the largest costs of logistical operations. Life cycle support requires **cradle-to-cradle** logistics. Cradle-to-cradle logistical support goes beyond reverse logistics and recycling to include the possibility of aftermarket service, product recall, and product disposal.

UNIT III

TOTAL QUALITY MANAGEMENT:

Quality – Meaning & Definition – Quality education – Efficiency v/s effectiveness – drivers of quality – quality management – internal & external customers- vision statement – Mission statement – objectives of QM – Targets – Action Plans – Principles of QM – Total quality management :Evolution , Definition – Preparing for TQM – Stages in TQM implementation – TQM models – TQM planning – TQM software.

INTRODUCTION

Our globalized economy is dominated by three Cs – Competition, Change and Complexity. The best way to meet the challenge of the three Cs is to focus on our customers. Once it is accepted that success begins and ends with the customer, we find ourselves on to the path to Total Quality Management (TQM).

MEANING AND DEFINITION OF QUALITY

Quality is consistent conformance to customer expectations.

This means that when customer needs and wants change we have to change to accommodate those needs, or we will no longer be delivering quality.

Total quality is the perfect control over all technical and business processes.

We never achieve total quality. However, this is the goal for companies that practice lean manufacturing. Some people use the lean mterm lean thinking when lean manufacturing techniques are used by non-manufacturing companies; but it is the same thing.

The dictionary has many definitions of “quality”. A short definition that has achieved acceptance is: “Quality is Customer Satisfaction”. “Fitness for use” is an alternative short definition. Here, customer means anyone who is impacted by the product or process.

Quality is “a predictable degree of uniformity and dependability, at low cost and suited to the market”.

Quality is a relative term, generally used with reference to the end-use of a product. Quality should be aimed at the needs of the consumer, present and future.

According to ISO 8402, quality is “the totality of features and characteristics of a product or service that bear on its ability to satisfy stated or implied needs”.

Broadly quality is:

- a) Fitness for use
- b) Grade
- c) Degree of preference
- d) Degree of excellence
- e) Conformity to requirements

Dimensions of Quality: The following are the components reveal the dimensions of quality.

Manufacturing and Service Industries

- Product Features Accuracy
- Performance Timeliness
- Reliability Completeness
- Durability Friendliness and courtesy
- Ease of use Anticipating customer needs
- Serviceability Knowledge of server
- Aesthetics
- Availability Reputation
- Reputation

Quality Planning: Quality planning is the pre determined activities in order to achieve conformation to the requirements. Many organizations are finding that strategic quality plans and business plans are inseparable. The quality planning procedure given by Joseph. A. Juran has the following steps:

- Identify the customers
- Determine their needs
- Translate those needs into our language.
- Develop a product that can respond to those needs
- Optimize the product features to meet our and customer needs

Quality Costs : All organizations make use of the concept of identifying the costs needed to carry out the various functions – product development, marketing, personnel, production etc.,

Until the 1950's this cost concept had not been extended to quality function, except for the departmental activities of inspection and testing.

During the 1950's the concept of "Quality Cost" emerged. Different people assigned different meanings to the term. Some people equated quality cost with the cost of attaining quality; some people equated the term with the extra incurred due to poor quality. But, the

widely accepted thing is “Quality cost is the extra cost incurred due to poor or bad quality of the product or service”.

Categories of Quality Cost: Many companies summarize quality costs into four broad categories. They are (a) internal failure costs - The cost associated with defects that are found prior to transfer of the product to the customer.

b) External failure costs - The cost associated with defects that are found after product is shipped to the customer.

c) Appraisal costs - The cost incurred in determining the degree of conformance to quality requirement.

d) Prevention costs - The cost incurred in keeping failure and appraisal costs to a minimum. We can also include the hidden costs ie., implicit costs.

But higher quality doesn't mean higher costs. The companies estimate quality costs for the following reasons:

- a) To quantifying the size of the quality problem in the language of money improves communication between middle managers and upper managers.
- b) To identify major opportunities for cost reduction.
- c) To identify the opportunities for reducing customer dissatisfaction and associated threats to product saleability.

QUALITY EDUCATION

Quality education: - Many definitions of quality in education exist, testifying to the complexity and multifaceted nature of the concept. The terms efficiency, effectiveness, equity and quality have often been used synonymously

(Adams, 1993). Considerable consensus exists around the basic dimensions of quality education today, however.

Quality education includes:

1. Learners who are healthy, well-nourished and ready to participate and learn, and supported in learning by their families and communities;
2. Environments that are healthy, safe, protective and gender-sensitive, and provide adequate resources and facilities;
3. Content that is reflected in relevant curricula and materials for the acquisition of basic skills, especially in the areas of literacy, numeracy and skills for life, and knowledge in such areas as gender, health, nutrition, HIV/AIDS prevention and peace;
4. Processes through which trained teachers use child-centred teaching approaches in well-managed classrooms and schools and skilful assessment to facilitate learning and reduce disparities;

5. Outcomes that encompass knowledge, skills and attitudes, and are linked to national goals for education and positive participation in society.

This definition allows for an understanding of education as a complex system embedded in a political, cultural and economic context. This paper will examine research related to these dimensions. It is important to keep in mind education’s systemic nature, however; these dimensions are interdependent, influencing each other in ways that are sometimes unforeseeable.

This definition also takes into account the global and international influences that propel the discussion of educational quality (Motala, 2000; Piphoo, 2000), while ensuring that national and local educational contexts contribute to definitions of quality in varying countries (Adams, 1993). Establishing a contextualized understanding of quality means including relevant stakeholders. Key stakeholders often hold different views and meanings of educational quality. Indeed, each of us judges the school system in terms of the final goals we set for our children our community, our country and ourselves.

Definitions of quality must be open to change and evolution based on information, changing contexts, and new understandings of the nature of education’s challenges. New research — ranging from multinational research to action research at the classroom level— contributes to this redefinition.

Systems that embrace change through data generation, use and self-assessment are more likely to offer quality education to students. Continuous assessment and improvement can focus on any or all dimensions of system quality: learners, learning environments, content, process and outcomes.

EFFICIENCY V/S EFFECTIVENESS

The difference between efficient and effective is that efficiency refers to how well you do something, whereas effectiveness refers to how useful it is.

For example, if a company is not doing well and they decide to train their workforce on a new technology. The training goes really well - they train all their employees in record time and tests show they have absorbed the training well. But overall productivity doesn't improve. In this case the company's strategy was efficient but not effective. Quality management includes both aspects. The following chart shows the comparative importance of efficiency and effectiveness in quality management.

	Effectiveness	Efficiency
Meaning:	Effectiveness is about doing the right task, completing activities and achieving goals.	Efficiency is about doing things in an optimal way, for example doing it the fastest or in the least expensive way. It could be the wrong thing, but it was done optimally.
Effort oriented:	No	Yes

	Effectiveness	Efficiency
Process Oriented:	No	Yes
Goal oriented:	Yes	Yes
Time oriented:	No	Yes

QUALITY MANAGEMENT

Quality management is the process of identifying and administering the activities needed to achieve the quality objectives of an organisation.

INTERNAL AND EXTERNAL CUSTOMERS

A customer is anyone who needs our help - in any, whichever, way. or A customer is anyone we are trying to help.

There are two types of customers – external and internal:

1. External customers are outside the organization. They need our help with information, purchase, and use of the product. Suppliers also are customers because they need information and other inputs.
2. Internal customers include everyone in the organization. Everyone in the organization plays three roles: supplier, processor and customer. Each person receives something from someone (as a customer), does something with it (as a processor) and passes it to a third individual (as a supplier).

It is necessary to satisfy all the needs of internal customers and keep them happy. This has a big impact on how well they serve external customers. We have to very strongly focus on our external customers - users and suppliers. There are at least six good reasons for doing so:

1. The customer decides the worth of a product and service (henceforth collectively called 'product'). She decides whether the value of the product is worth its price. Value is a subjective measure of the benefits vis-à-vis cost of the product.
2. If the customer feels that the product has poor value she may not buy it. We cannot let this happen.
3. Customer focus helps us understand her needs and wants. By giving her exactly what she wants we ensure very good value for our offering. We win against competition only by offering superior value.
4. Focus on capturing the "voice of the customer". To deliver superior value, a product should be conceived, developed and delivered as per customer expectations.

5. When a product meets all customer expectations, it has Good Quality. Without customer focus there is little chance that we can deliver superior products.
6. Customer focus is necessary because a one-size-fits-all solution is unacceptable. It just does not deliver full value. This is why firms differentiate the market and concentrate on serving customers who belong to a specific segment.

QUALITY STATEMENTS: VISION STATEMENT AND MISSION STATEMENT.

Core values and concepts provide the unity of purpose. In addition to that, the quality statements include the vision statement, mission statement and quality policy statement. They are the part of the strategic planning process.

Vision Statement: It is a short declaration of what an organization aspires to be tomorrow. It is the ideal state that might never reach but which you continuously strive to achieve.

Example: We will be the preferred provider of safe, reliable, and cost-effective products and services that satisfy the electric-related needs of all customer segments.
FLORIDA POWER & LIGHT COMPANY

Mission Statement: The mission statements answers the following questions :

Who we are? Who are the customers? What we do? And How we do it ?

It is the usually a one paragraph statement which describes the function of the organization. It provides a clear statement of purpose for employees, customers and suppliers.

Example: To meet customers' transportation and distribution needs by being the best at moving their goods on time, safely and damage free.

CANADIAN NATIONAL RAILWAYS

OBJECTIVES OF QUALITY MANAGEMENT

The objective of quality management is to provide products which are dependable, satisfactory and economical.

PRINCIPLES OF QUALITY MANAGEMENT

The principles are derived from the collective experience and knowledge of the international experts who participate in ISO Technical Committee ISO/TC 176, Quality management and quality assurance, which is responsible for developing and maintaining the ISO 9000 standards. The eight quality management principles are defined in ISO 9000:2005, Quality management systems – Fundamentals and vocabulary, and in ISO 9004:2009, Managing for the sustained success of an organization –A quality management approach.

Principle 1 – Customer focus

Principle 2 – Leadership

Principle 3 – Involvement of people

Principle 4 – Process approach

Principle 5 – System approach to management

Principle 6 – Continual improvement

Principle 7 – Factual approach to decision making

Principle 8 – Mutually beneficial supplier relationships

Principle 1 – Customer focus

Organizations depend on their customers and therefore should understand current and future customer needs, should meet customer requirements and strive to exceed customer expectations.

- Increased revenue and market share obtained through flexible and fast responses to market opportunities
- Increased effectiveness in the use of the organization's resources to enhance customer satisfaction
- Improved customer loyalty leading to repeat business.
- Researching and understanding customer needs and expectations
- Ensuring that the objectives of the organization are linked to customer needs and expectations
- Communicating customer needs and expectations throughout the organization
- Measuring customer satisfaction and acting on the results
- Systematically managing customer relationships
- Ensuring a balanced approach between satisfying customers and other interested parties (such as owners, employees, suppliers, financiers, local communities and society as a whole).

Principle 2 – Leadership

Leaders establish unity of purpose and direction of the organization. They should create and maintain the internal environment in which people can become fully involved in achieving the organization's objectives.

- People will understand and be motivated towards the organization's goals and objectives
- Activities are evaluated, aligned and implemented in a unified way
- Miscommunication between levels of an organization will be minimized.
- Considering the needs of all interested parties including customers, owners, employees, suppliers, financiers, local communities and society as a whole
- Establishing a clear vision of the organization's future
- Setting challenging goals and targets
- Creating and sustaining shared values, fairness and ethical role models at all levels of the organization
- Establishing trust and eliminating fear
- Providing people with the required resources, training and freedom to act with responsibility and accountability

- Inspiring, encouraging and recognizing people's contributions.

Principle 3 – Involvement of people at all levels are the essence of an organization and their full involvement enables their abilities to be used for the organization's benefit.

- Motivated, committed and involved people within the organization
- Innovation and creativity in furthering the organization's objectives
- People being accountable for their own performance
- People eager to participate in and contribute to continual improvement.
- People understanding the importance of their contribution and role in the organization
- People identifying constraints to their performance
- People accepting ownership of problems and their responsibility for solving them
- People evaluating their performance against their personal goals and objectives
- People actively seeking opportunities to enhance their competence, knowledge and experience
- People freely sharing knowledge and experience
- People openly discussing problems and issues.

Principle 4 – Process approach

A desired result is achieved more efficiently when activities and related resources are managed as a process.

- Lower costs and shorter cycle times through effective use of resources
- Improved, consistent and predictable results
- Focused and prioritized improvement opportunities.
- Systematically defining the activities necessary to obtain a desired result
- Establishing clear responsibility and accountability for managing key activities
- Analysing and measuring of the capability of key activities
- Identifying the interfaces of key activities within and between the functions of the organization
- Focusing on the factors – such as resources, methods, and materials – that will improve key activities of the organization
- Evaluating risks, consequences and impacts of activities on customers, suppliers and other interested parties.

Principle 5 – System approach to management

Identifying, understanding and managing interrelated processes as a system contributes to the organization's effectiveness and efficiency in achieving its objectives.

- Ability to focus effort on the key processes
- Providing confidence to interested parties as to the consistency, effectiveness and efficiency of the organization.
- Structuring a system to achieve the organization's objectives in the most effective and efficient way
- Understanding the interdependencies between the processes of the system
- Structured approaches that harmonize and integrate processes
- Providing a better understanding of the roles and responsibilities necessary for achieving common objectives and thereby reducing cross-functional barriers
- Understanding organizational capabilities and establishing resource constraints prior to action
- Targeting and defining how specific activities within a system should operate
- Continually improving the system through measurement and evaluation.

Principle 6 – Continual improvement

Continual improvement of the organization's overall performance should be a permanent objective of the organization.

- Performance advantage through improved organizational capabilities
- Alignment of improvement activities at all levels to an organization's strategic intent
- Flexibility to react quickly to opportunities.
- Employing a consistent organization-wide approach to continual improvement of the organization's performance
- Providing people with training in the methods and tools of continual improvement
- Making continual improvement of products, processes and systems an objective for every individual in the organization
- Establishing goals to guide, and measures to track, continual improvement
- Recognizing and acknowledging improvements.

Principle 7 – Factual approach to decision making

Effective decisions are based on the analysis of data and information

- Informed decisions
- An increased ability to demonstrate the effectiveness of past decisions through reference to factual records
- Increased ability to review, challenge and change opinions and decisions.
- Ensuring that data and information are sufficiently accurate and reliable

- Making data accessible to those who need it
- Analysing data and information using valid methods
- Making decisions and taking action based on factual analysis, balanced with experience and intuition.

Principle 8 – Mutually beneficial supplier relationships

An organization and its suppliers are interdependent and a mutually beneficial relationship enhances the ability of both to create value

- Increased ability to create value for both parties
- Flexibility and speed of joint responses to changing market or customer needs and expectations
- Optimization of costs and resources.
- Establishing relationships that balance short-term gains with long-term considerations
- Pooling of expertise and resources with partners
- Identifying and selecting key suppliers
- Clear and open communication
- Sharing information and future plans
- Establishing joint development and improvement activities
- Inspiring, encouraging and recognizing improvements and achievements by suppliers.

TOTAL QUALITY MANAGEMENT

TQM is a process designed to focus on customer expectations, preventing problems, building commitment to quality amongst all managers and staffs, and promoting open and transparent decision making.

An organization must define its own version of TQM. This definition is its goal, in general terms, of what it is trying to accomplish. It becomes a building block for the company's vision, mission, and quality statements. It also helps to define the critical success factors that will lead it to success

The success of a company depends largely on continuous quality improvement using TQM. Implementing TQM requires action by everyone. What we need is integrated TQM based on teams working on all fronts. We cover this separately in a subsequent presentation

EVOLUTION OF TOTAL QUALITY MANAGEMENT

The history of quality control is undoubtedly as old as industry itself.

In 1924, W.A. Shewhart of Bell Telephone Laboratories developed a statistical chart of the control of product variables. This chart is considered to be the beginning of statistical quality control.

Later in the same decade, H.F.Dodge and H.G.Romig, both of Bell Telephone Laboratories, developed the area of acceptance sampling as a substitute of 100% inspection.

In 1946, the American society for Quality Control was formed. Recently the name was changed into American Society for Quality (ASQ).

In 1950's W.Edwards Deming emphasized about the management's responsibility to achieve quality.

In 1960's the first quality control circles were formed for the purpose of quality improvement.

In the late 1980's the automotive industry began to emphasize statistical process control.

After 1990's the ISO became the model for a quality management system world wide.

Quality Movement in India:

Before Independence in India, quality has been a tradition but not in a consolidated form.

Walter Shewhart, the father of Statistical Quality Control, visited India for a short period of three months during 1947-48 and initiated the SQC movements in Indian companies.

The quality movement was consolidated in the 1980s in the Indian Industries to bring out synergy of resources by the pioneering efforts of Confederation of Indian Industries (CII)

Dr.W.Edward Deming, the father of Quality Control , who taught Japanese about applying PDCA cycle (Deming Cycle) came to India in early 1950s.

The TQM movement in USA in 1980s triggered quality movement in India in the year 1982 and Quality Circle was born.

Prof. Ishikawa , the founder of quality movement in Japan was invited by CII to come to India to address Indian Industry in 1986.

CII organized a first major seminar with Joseph Juran in 1987.

CII provided a focus and an impetus to the quality movement by forming a TQM division in 1987. By then the focus was shifted from quality circles to quality management.

CII set up the TQM division with the help of 21 companies who agreed to support the journey of TQM in India. The chief executives of these companies formed a National Committee on Quality.

CII also launched the first news letter on Quality.

The year 1987 brought the ISO 9000 standards into reality and visible strategies emerged.

CII organized training programmes in ISO 9000 quality systems for international standards and certification in the year 1989.

From the year 1991, Indian companies started to get the ISO 9000 certifications.

The concept of TQM spread over the service sector and technology apart from engineering applications.

CII organized and launch of National Quality Campaign in 1992, led by the Prime Minister of India and the “ Quality Summit ” organized by CII has now become an annual feature across the country. The future thrust on quality movement in India would be based on: Application Research (Industry and Academics) Experience Sharing ISO certifications Environmental protection, safety and consumer protection for quality enhancement.

DEFINITION OF TOTAL QUALITY MANAGEMENT

Definition of TQM: “Total Quality Management is a management approach that tries to achieve and sustain long term organizational success by encouraging employee feedback and participation, satisfying customer needs and expectations, respecting societal values and beliefs, and obeying governmental statutes and regulations.”

Five Pillars of TQM are,

- Product
- Process
- System
- People
- Leadership

“Total Quality Management is an effective system for integrating the quality development, quality maintenance and quality improvement efforts of various groups in an organization continuously, so as to enable marketing, engineering, production and service at the most economic levels which allow for full customer satisfaction.”

PREPARATION FOR TQM

The TQM is applied to many stages of Industrial Cycle which are listed below:

1. Marketing
2. Engineering
3. Purchasing
4. Manufacturing
5. Mechanical
6. Shipping
7. Installation and product service.

Fundamental factors affecting Quality: (9 M's)

1. Market
2. Money
3. Management
4. Men
5. Motivation
6. Materials
7. Machines and Mechanization
8. Modern Information Methods
9. Mounting Product Requirements.

Benefits of TQM

Customer satisfaction oriented benefits

1. Improvement in product quality
2. Improvement in product design
3. Improvement in production flow
4. Improvement in employee morale and quality consciousness
5. Improvement in product service
6. Improvement in market place acceptance

Economic improvement oriented benefits:

1. Reduction in operating costs
2. Reduction in operating losses
3. Reduction in field service costs
4. Reduction in liability exposure.

Principles of TQM

Visionary leadership

Customer-driven excellence

Organizational and personal learning

Valuing employees and partners

Agility

Focus on the future

Managing for innovation

Management by fact

Public responsibility

Focus of results and creating values

Systems perspective

Quality Council:

In order to build quality in the culture, a quality council is established to provide overall direction. It is the driver for the TQM engine.

In a typical organization the quality council is composed of the chief executive officer (CEO); the senior managers of the functional areas, such as design, marketing, finance, production, and quality; and a Coordinator or consultant.

Duties of the quality council:

- a) To develop the vision, mission and quality statement of the organization, with the input from all the personnel.
- b) To develop strategic long-term plan with goals and annual quality improvement program with objectives.
- c) Create a total education and training plan.
- d) Determine and continuously monitor the cost of poor quality.
- e) Determine the performance measures of the organization and monitor.
- f) Continuously determine those projects that improve and affect external and internal customer satisfaction.
- g) Establish multifunctional project and work group teams and monitor their progress.
- h) Establish and revise the recognition and reward system to account for the new way of doing business.

TQM MODELS

In today's global competition and economic liberalization, quality has become one of the important factors for achieving competitive advantage. Quality management has represented a rebirth in organization management with an emphasis on excellence. The market offers different alternatives for quality management implementation, such as the ISO standards, the European Foundation for Quality Management (EFQM) model, the Malcolm Baldrige model or the Six Sigma methodology. The difficulty in implementation of each initiative varies from case to case. The quality movement has gone through many transformations. In the past, controlling quality meant that the product had to be inspected after it was produced to check whether it met all the specifications or not. The transformation from inspection mode to prevention mode is considered to be a very important step in building quality from the very beginning of the manufacturing process. The quality movement focused on building quality in every task that is performed in an organization. Therefore, it was seen a dramatic shift in the quality management focus from

a concentration just on manufacturing, to a wide company spectrum of activities and, more specifically, to the needs of the internal and external customers.

Promoting sustainable excellence in Europe is also the declared mission of the European Foundation for Quality Management (EFQM), organization that defines excellence as an expression of the following eight fundamental concepts: 1) Achieving Balanced Results; 2) Adding Value for Customers; 3) Leading with Vision, Inspiration and Integrity; 4) Managing by Processes; 5) Succeeding through People; 6) Nurturing Creativity and Innovation; 7) Building Partnerships; 8) Taking Responsibility for a Sustainable Future. It can observe that these concepts, which are the underlying principles of the EFQM Excellence Model have explicit or implicit connections with the basic principles of TQM.

TQM EXCELLENCE MODELS

Business Excellence is “excellence” in strategies, business practices, and stakeholder-related performance results that have been validated by assessments based on specific models proven to support the challenging journey towards excellence. TQM models are often called Business Excellence Models. Also, TQM itself is now often called Business Excellence. TQM models as a key mechanism for improving the performance Of organisations, as well as national competitiveness. The most popular of these models are manifestations of principles of TQM implementation in the entire organisation. By far the majority of organisations that use such a model do so for a self-assessment through they can identify improvement opportunities, areas of strengths, using the model as a framework for future organisational development.

3.1. The EFQM Model

The EFQM Excellence Model has recently been reviewed and revised so to align the framework with current business needs and trends. Used as a tool for assessment, it delivers a picture of how well the organization compares to similar or very different kinds of organizations. As a management model, it can be used to define aspirations for the organization’s capability and performance. EFQM model supports organizations in defining what sustainability means, providing approaches for its implementation and ensuring consistency between apparently conflicting responsibilities toward shareholders, employees and society.

EFQM Excellence Model 2010

According to some recent estimation there are at least 76 countries operating a national Business Excellence award and the Foundation (EFQM) believes that, in Europe alone, at least 30,000 organisations use its model. The EFQM estimation is based on the number of EFQM members, plus the members of its national partners and other organisations about there are information that they use the model. The purpose of use varies by the different managerial targets, from mergers up to self-assessment.

The Baldrige Model

The most popular and influential model in the western world is the one launched by the US government called the Malcolm Baldrige Award Model (also commonly known as

the Baldrige model, the Baldrige criteria, or The Criteria for Performance Excellence). More than 60 national and state/regional awards base their frameworks upon the Baldrige criteria. In the US nearly two million copies of the Malcolm Baldrige Model (Figure 9) have been distributed since the award's launch in 1988.

Malcolm Baldrige Model (six Sigma methodologies)

The Baldrige model provides a systems perspective for understanding performance management and reflects validated, leading-edge management practices against which an organisation can measure itself. With their acceptance nationally and internationally as referential model for performance excellence, the Baldrige criteria represent a common language for communication among organisations for sharing best practices.

The Australian model: Business Excellence Framework

The Australian model, named Business Excellence Framework (BEF), is defined as an integrated leadership and management system that describes the elements essential to sustainable organisational excellence" BEF is based on enduring principles of organisational improvement that are interpreted according to individual business settings using seven 'Categories' and seventeen sub-categories, or 'Items'. The seven business settings (Categories) are the following: information and knowledge; leadership; customer and market focus; strategy and planning; people; process management, improvement and innovation;

THE STATE OF "EXCELLENCE" IN ROMANIA

In Romania, "the journey" through TQM toward Business Excellence began in fact after 1990 with the transition to the quality assurance approach. Very likely, the major driving force was the imperative of EU integration that imposed a series of necessary changes related to harmonizing national legislation, structures and procedures with those of European Community countries.

In a pertinent analysis of the existing situation after a first decade of attempts aiming at quality assurance.

This national Quality Award is based on the former version of EFQM Model, i.e. the framework for European Quality Award used in Europe until 2000, so he adopted the same criteria, sub-criteria and weights.

TQM PLANNING AND IMPLEMENTATION

There are seven basic steps to strategic quality planning.

- a) Customer needs
- b) Customer positioning
- c) Predict the future
- d) Gap analysis
- e) Closing the gap
- f) Alignment
- g) Implementation

Strategic planning can be performed by any organization. It can be highly effective, allowing organizations to do the right thing at the right time, every time.

Deming Philosophy

W. Edwards Deming, an American quality expert, became a Parama-Guru in Japan because he preached the philosophical basis of quality and productivity, which was accepted, absorbed and implemented with sustained positive results by the Japanese. The Highest Award in the Japanese Industrial Circles is the Deming prize for quality. Dr. Deming introduced the Plan –Do-Study-Act cycle to the Japanese decades ago. A Company plans a change, does it, checks the results and depending upon the results, acts either to standardize the change or to begin the cycle of improvement again with new information. Continuous or never ending improvement requires such a circular approach. Deming's Philosophy is given in his 14 points of quality management. Most of these points were given in a seminar for 21 presidents of leading Japanese industry in 1950. The rest were developed and the original ones modified over a period of three decades.

1. Create and publish the aims and purposes of the organization.
2. Learn the new philosophy.
3. Understand the purpose of inspection.
4. Stop awarding business based on price alone.
5. Improve constantly and forever the system.
6. Institute training.
7. Teach and institute leadership.
8. Drive out fear, create trust and create a climate for innovation.
9. Optimize the efforts of teams, groups and staff areas.
10. Strive to eliminate intradepartmental conflicts
11. Eliminate exhortations for the work force.
 - a) Eliminate numerical quotas for the work force.
 - b) Eliminate Management by Objective.
12. Remove barriers that rob people of pride of workmanship.
13. Encourage education and self-improvement of everyone.
14. Take action to accomplish the transformation.

In addition he also pointed out the 7 deadly diseases that affecting the above transformation.

The Seven Deadly Diseases

1. Lack of constancy of purpose.
2. Emphasis on short-term profits.
3. Evaluation by performance, merit rating, or annual review of performance.

4. Mobility of management.
5. Running a company on visible figures alone.
6. Excessive medical costs.
7. Excessive costs of warranty, fuelled by lawyers that work on contingency fee.

A Lesser Category of Obstacles

1. Neglect of long-range planning.
2. Relying on technology to solve problems.
3. Seeking examples to follow rather than developing solutions.
4. Excuses such as "Our problems are different".
5. Others.

Barriers to TQM Implementation:

- a) Lack of management commitment
- b) Inability to change organizational culture
- c) Improper planning
- d) Lack of continuous training and education
- e) Incompatible organizational structure and isolated individuals and department
- f) Ineffective measurement techniques and lack of access to data and results
- g) Paying inadequate attention to internal and external customers
- h) Inadequate use of empowerment and team work
- i) Failure to continually improve

TQM SOFTWARE

TQM software helps an organization to build and manage quality programs. Now ERP ,SAP are commonly developed by organization for TQM through information technology **Enterprise resource planning (ERP)** is a cross-functional enterprise system driven by an integrated suite of software modules that supports the basic internal business processes of a company. ERP gives a company an integrated real-time view of its core business processes such as production, order processing, and inventory management, tied together by ERP applications software and a common database maintained by database management systems. ERP systems track business resources (such as cash, raw materials, and production capacity) and the status of commitments made by the business (such as customer orders, purchase orders, and employee payroll), no matter which department (manufacturing, purchasing, sales, accounting, and so on) has entered the data into the system. ERP facilitates information flow between all business functions inside the organization, and manages connections to outside stakeholders.

Enterprise system software is a multi-billion dollar industry that produces components that support a variety of business functions. IT investments have become the largest category of capital expenditure in United States-based businesses over the past decade. Enterprise systems are complex software packages that offer the potential of integrating data and processes across functions in an enterprise. Although the initial ERP systems focused on large enterprises, there has been a shift towards smaller enterprises also using ERP systems.

Organizations consider the ERP system a vital organizational tool because it integrates varied organizational systems and enables flawless transactions and production. However, an ERP system is radically different from traditional systems development. ERP systems can run on a variety of computer hardware and network configurations, typically employing a database as a repository for information.

Systems, Applications, Products in data processing, or SAP

Systems, Applications, Products in data processing, or SAP, was originally introduced in the 1980s as SAP R/2, which was a system that provided users with a soft real-time business application that could be used with multiple currencies and languages. As client–server systems began to be introduced, SAP brought out a server based version of their software called SAP R/3, henceforth referred to as SAP, which was launched in 1992. SAP also developed a graphical user interface, or GUI, to make the system more user friendly and to move away from the mainframe style user interface.

For the next 10 years SAP dominated the large business applications market. It was successful primarily because it was extremely flexible. Because SAP was a modular system (meaning that the various functions provided by it could be purchased piecemeal) it was an extremely versatile system. A company could simply purchase modules that they wanted and customize the processes to match the company's business model. SAP's flexibility, while one of its greatest strengths is also one of its greatest weaknesses that lead to the SAP audit.

There are three main enterprise resource planning (ERP) systems used in today's larger businesses: SAP, Oracle, and PeopleSoft. ERP's are specifically designed to help with the accounting function and the control over various other aspects of the company's business such as sales, delivery, production, human resources, and inventory management. Despite the benefits of ERP's, there are also many potential pitfalls that companies who turn to ERP's occasionally fall into.
