Logistics management

Business, Management

Concepts Objectives and Elements of Logistics

Definitions of Logistics

Logistics is new unique, it never stops! Logistics is happening around the globe 24 hours days Seven days a week during fifty-two weeks a year.

Few areas of business involve the complexity or p the geography typical of logistics. Logistics is concerned with getting products and services where they are needed whenever they are desired. Most consumers take a high level of logistical competency for granted. When they go to store, they expect products to be available and fresh. It is rather difficult to visualize any marketing or manufacturing without logistical support Modern logistics is also a paradox. Logistics has been performed since the beginning of civilization: it’s hardly new.

However implementing best practice of logistics has become one of the most exciting and challenging operational areas of business and public sector management According to Council of logistics management: “ Logistics is the process of planning, implementing and controlling the efficient, effective flow and storage of goods, services and related information from point of origin to point of consumption for the purpose of conforming the customer requirement”. Logistical management includes the design and administration of systems to controls the flow of material, work- in – process, and finished inventory to support business unit strategy.

Logistics is the designing and managing of a system in order to control the flow of material throughout a corporation. This is a very important part of an international company because of geographical barriers. Logistics of an

international company includes movement of raw materials, coordinating flows into and out of different countries, choices of transportation, and cost of the transportation, packaging the product for shipment, storing the product, and managing the entire process. Analysis of the figure of evolution of logistics Fragmentation 1960

This era was known as fragmentation because every thing that done was disintegrated Evolving Integration At this stage of time new concepts of Logistical management were evolving Total integration In the present scenario because of technological advances logistics has evolved as part of management Concept of Logistics The concept of logistics is fairly new in the business world. The theoretical development was not used until 1966. Since then, many business practices have evolved and logistics currently costs between 10 and 25 percent of the total cost of an international purchase.

There are two main phases that are important in the movement of materials: material management and physical distribution; Materials management is the timely movement of raw materials, parts, and supplies. The physical distribution is the movement of the firm's finished products to the customers. Both phases involve every stage of the process including storage. The ultimate goal of logistics is: " To coordinate all efforts of the company to maintain a cost effective flow of goods. " Word, ’Logistics’ is derived from French word ‘ loger’, which means art of war pertaining to movement and supply of armies.

A military concept, fighting a war requires:

1. Setting of an objective

2. Meticulous planning to achieve the objective
3. Troops properly deployed
4. Supply line consisting weaponry, food, medical assistance, etc. maintained
5. Plan should be such that there is minimum loss to men & material Like fighting a war in the battlefield, the marketing managers also need a suitable logistics plan that is capable of satisfying the company objective of meeting profitably the demand of targeted customers.

Inbound logistics + Material Management + Physical Distribution = Logistics

Discussion of each and every term in this above summation

1. Inbound logistics covers the movement of materials received from suppliers
2. Material management describes the movements of material & components within a firm
3. Physical distribution refers to movement of goods outward from the end of the assembly line to the costumer.
4. Supply- chain management is somewhat larger than logistics and it links logistics more directly within the user's totalcommunicationnetwork & with the firm engineering staff. It includes manufacturer and suppliers but also transporters, warehouses, retailers and customers themselves.

Importance of Дogistics

1. Transportation cost rose rapidly due to the rise in fuel prices
2. Production efficiency was reaching a peak

3. Fundamental change in inventoryphilosophy
4. Product line proliferated
5. Computertechnology
6. Increased use or computers vii. Increased public concern of products Growth of several new, large retail chains or mass merchandise with large demands & very sophisticated logistics services, by pass traditional channel & distribution
7. Reduction in economic regulation
8. Growing power of retailers
9. Globalization

The interrelation of different logistics element and their costs should be based on total cost rather than individual costs.

The objectives of Logistics Operating Objectives

In terms of logistical system design and administration, each firm must simultaneously achieve at least six different operational objectives. These operational objectives, which are the primary determinants of logistical performance, include rapid response, minimum variance, minimum inventory, movement consolidation, quality, and life-cycle support. Each objective is briefly discussed.

Rapid Response

Rapid response is concerned with a firm's ability to satisfy customer service requirements in a timely manner. Information technology has increased the capability to postpone logistical operations to the latest possible time and then accomplish rapid delivery of required inventory. The result is elimination of excessive inventories traditionally stocked in anticipation of

customer requirements. Rapid response capability shifts operational emphasis from an anticipatory posture based on forecasting and inventory stocking to responding to customer requirements on a shipment-to-shipment basis.

Because inventory is typically not moved in a time-based system until customer requirements are known and performance is committed, little tolerance exists for operational deficiencies.

Minimum Variance

Variance is any unexpected event that disrupts system performance. Variance may result from any aspect of logistical operations. Delays in expected time of customer order receipt, an unexpected disruption in manufacturing, goods arriving damaged at a customer's location, or delivery to an incorrect location-all result in a time disruption in operations that must be resolved.

Potential reduction of variance' relates to both internal and external operations. Operating areas of a logistical system are subject to potential variance. The traditional solution to accommodating variance was to establish safety stock inventory or use high-cost premium transportation. Such practices, given their expense and associated risk, have been replaced by using information technology to achieve positive logistics Control. To the extent that variances are minimized, logistical productivity improves as a result of economical operations.

Thus, a basic objective of overall logistical performance is to minimize variance.

Minimum Inventory

The objective of minimum variance involves asses commitment and relative turn velocity. Total commitment is the financial value of inventory deployed throughout the logistical system. Turn velocity involves the rate of inventory usage over time. High turn rates, coupled with inventory availability, means that assets devoted to inventory are being effectively utilized. The objective is to reduce inventory deployment to the lowest level consistent with customer servicegoalsto achieve the lowest overall total logistics cost.

Concepts like zero inventories have become increasingly as managers seek to reduce inventory deployment. The reality of reengineering a system is that operational defects do not become apparent until inventories are reduced to their lowest possible level. While the goal of eliminating all inventories is attractive, it is important to remember that inventory can and does facilitate some important benefits in a logistical system. Inventories can provide improved return on investment when they result in economies of scale in manufacturing or procurement.

The objective is to reduce and manage inventory to the lowest possible level while simultaneously achieving desired operating objectives. To achieve the objective of minimum inventory, the logistical system design must control commitment and turn velocity for the entire firm, not merely for each business location.

Movement consolidation

One of the most significant logistical costs is transportation. Transportation cost is directly related to the type of product, size of shipment, and distance.

Many Logistical systems that feature premium service depend on high-speed, small-shipment transportation.

Premium transportation is typically high-cost. To reduce transportation cost, it is desirable to achieve movement consolidation. As a general rule, the larger the overall shipment and the longer the distance it is transported, the lower the transportation cost per unit. This requires innovative programs to group small shipments for consolidated movement. Such programs must be facilitated by working arrangements that transcend the overall supply chain.

Quality improvement

A fifth logistical objective is to seek continuous quality improvement. Total quality management (TQM) has become a major commitment throughout all facets of industry. Overall commitment to TQM is one of the major forces contributing to the logistical renaissance. If a product becomes defective or if service promises are not kept, little, if any, value is added by the logistics. Logistical costs, once expended, cannot be reversed. In fact, when quality fails, the logistical performance typically needs to be reversed and then repeated. Logistics itself must perform to demanding quality standards.

The management challenge of achieving zero defect logistical performance is magnified by the fact that logistical operations typically must be performed across a vast geographical area at all times of the day and night. The quality challenge is magnified by the fact that most logistical work is performed out of a supervisor's vision. Reworking a customer's order as a result of incorrect shipment or in-transit damage is far more costly than performing it right the first time. Logistics is a prime part of developing and maintaining continuous TQM improvement.

Life-Cycle support

The final logistical design objective is life-cycle support. Few items are sold without some guarantee that the product will perform as advertised over a specified period. In some situations. The normal value-added inventory flow toward customers must be reversed. Product recall is a critical competency resulting from increasingly rigid quality standards, product expiration dating andresponsibilityfor hazardous consequences. Return logistics requirements also result from the increasing number of laws prohibiting disposal and encouraging recycling of beverage containers and packaging materials.

The most significant aspect of reverse logistical operations is the need for maximum control when a potentialhealthliability exists (i. e.. a contaminated product). In this sense, a recall program is similar to a strategy of maximum customer service that must be executed regardless of cost. Johnson & Johnson's classical response to the Tylenol crisis is an example of turningadversityinto advantage. The operational requirements of reverse logistics range from lowest total cost, such as returning bottles for recycling, to maximum performance solutions for critical recalls.

The important point is that sound logistical strategy cannot be formulated without careful review of reverse logistical requirements. Some products, such as copying equipment, derive their primary profit from selling supplies and providing aftermarket. Service. The importance of service support logistics varies directly with the product and buyer. For firms marketing consumer durables or industrial equipment, the commitment to life-cycle support constitutes a versatile and demanding operational requirement as well as one of the largest costs of logistical operations.

The life-cycle support capabilities of a logistical system must be carefully designed. As noted earlier, reverse logistical competency, as a result of worldwide attention to environmental concerns, requires the capacity to recycle ingredients and packaging materials. Life-cycle support, in modern terms, means cradle-to-cradle logistical support. We will now cover the components of Logistics The components mainly comprises of the part mostly of which we have already covered in our earlier semesters With the help of the figure given below can you tell me with how many terms are you aware with?

Yes that very nice of all of you that you are aware of most of the terms But don’t panick!!! I would be covering each term in detail so that you can revise with me For the components see the figure given below Inputs into logistics

1. Natural resources
2. Human Resources
3. Financial Resources
4. Information Resources

Can anyone tell me what these resources regarding logistics management?

Management actions

1. Planning
2. Implantation
3. Control

We have already discussed these terms in first and second semesters

Logistics Management

1. Raw Material

2. In-Process Inventory
3. Finished Goods

These are the systems through which products goes from suppliers to customers. Logistics activities

1. Customers Service
2. Demand forecasting
3. Distribution communication
4. Inventory Control
5. Material Handling
6. Order Processing
7. Part & Service Support
8. Plant and Warehouse side selection
9. Procurement
10. Packaging
11. Return goods handling
12. Salvage & scrap disposal
13. Traffic & transportation
14. Warehousing & Storage

Outputs of Logistics

1. Marketing Orientation
2. Time & Place Utility
3. Efficient Movement to Customer
4. Proprietary asset

Components of logistics management: Questions for self-analysation A. What do you understand by term LOGISTICS? Explain it with the evolution concept. B. With the help of suitable figure discuss the components of logistical systems. C. Define the term LOGISTICS, with suitable example . And the importance of logistics in today’s business life. D. With the help of suitable example clearly explain the objectives of Logistics. Why tylenol remains number one Johnson & Johnson's McNeil Consumer Products Division was hit with a major crisis in September 1982. Their top-seHing product line, Tylenol, was linked to seven deaths in the Chicago area.

At the time of the incident, Tyleool enjoyed 35 percent of the $1 billion analgesic market, but by the end of September, this market share had dropped 80 percent. Currently, Tylenol is again the top-selling brand with approximately 30 percent of the now $2, 7 billion analgesic market. t How Was Johnson & Johnson (1) able to regain market share and a leading image after such a damaging tragedy? Its recovery was successful because of reverse logistics capability coupled with a marketing strategy that focused on protecting the consumer and going above and beyond what was necessary to instill] trust and an image of security.

This recovery plan is a positive prototype for other corporations to follow, which, in effect, may increase the potential for voluntary product recants across a variety of industries. When the List news reports hit about cyanide-tainted Extra-Strength Tylenol capsules, J was unsure whether the tampering occurred in its manufacturing operations or at the retail level. As such, its first efforts were directed at pinning down the problem. As soon as the lot

numbers were identified from the first few deaths, J stopped production in the plant responsible.

At the same time, it halted all Tylenol commercials nationwide and began recalls that eventually involved 31 million bottles of product, which had a retail value of $100 million. Another strategy that J took was to work openly and closely with the media. 1 has traditionally maintained a distance from the press, but in this case it felt that openness and honesty would help reduce consumer panic and provide a vehicle for disseminating critical information. A crisis team was put together that included J as well as McNeil executives and top managers.

This team was quite sure that the tampering had occurred at the retail level since the incident was isolated to Chicago's West Side and other samples from the same lot were normal. Regardless, they began the recall with the remaining 93, 000 bottles from this lot. The expenses of this first phase of the recall included $1 million just for phone calls and telegrams to doctors, hospitals, and distributors. The sixth poisoning ensured that the tampering was at the retail level since the bottle came from a lot manufactured at its second plant. Since the cause was now isolated, J&1 could concentrate on containment.

The first step was to advocate a total recall. While this step was in some ways unnecessary, J&J felt it was a key step to ensure consumer confidence. At first, the FBI and FDA advised against a total recall because of the potential psychological response of the person who tampered with the product and the response of consumers in general. However, after copycat

strychnine poisoning in California, all parties agreed that complete removal was the best solution. This total recall entailed the following

1. Advertisements stating that NcNeil would exchange tablets for capsules,
2. Thousands of letters to the trade to explain the incident and recall procedures,
3. Media statements,
4. A sales force of over 2, 000 employees to contact doctors and pharmacists to regain trust and restore their recommendations that had traditionally served as the main promotional avenue for Tylenol products,
5. An extensive reverse logistics system that included buying products back from retailers and consumers and shipping returns to disposal centers, and
6. Creating a tamperproof package. It is estimated that recall costs were at least $100 million, most of which involved the reverse logistics operations.

By January 1983, the new tamperproof bottles of Tylenol were on the retail shelf. Consumer confidence was obviously regained as a result of the extensive voluntary recall] program, effective public relations, and sales programs and repack operations. This confidence was shown by the fact that at the end of the year, Tylenol had regained almost 30 percent of the market although market share has remained at about 30 percent, sales dollars have

more than doubled. Since the total industry sales were about $1 billion in the early 1980s but are now $2. 7 billion.

Logistics Subsystem Marketing Logistics

In 1991 the Council of Logistics Management (CLM) a prestigious, professional organization, defined logistics as " the process of planning, implementing & controlling the efficient, effective flow the point of origin to the point of consumption for the purpose of conforming to customer requirements". " Logistics means the art of managing the flow of raw materials and finished goods from the source to the user" To get goods from where they arise to the right place in the right form, at the right time, at the right cost, " Logistics or physical distribution or distribution logistics is an integral part of Marketing Process".

Essence of logistics in marketing

1. Marketing Process is successfully completed when
2. Products are produced and priced to satisfy the identified needs of the segment of buyers Arrangements are made to supply these goods through selected distribution channels
3. An awareness is created among the buyers about the availability of the goods through information facilitation &
4. Goods are physically supplied to the buyers at the place & time selected by them.
5. Besides satisfying the customers need, the marketing process must be profitable to the seller.

So in the Marketing sense, utility is not merely the usefulness of a product to satisfy the customer needs but also moving the product from a manufacturing facility to the user. “ Thus, Logistics is a link between the manufacturing & selling process that leads to the creation of place and time utility” While the production element in the marketing – mix (product, price, place & promotion) leads to creation of ‘ form’ utility by taking decisions as product line variety, design, color brand, service, etc. he distribution element comprising distribution channel fixation & physical movement, creates ‘ time’ & ‘ place’ utility by ensuring that the produced goods reach the place & time chosen by the buyer. Logistics is the designing and managing of a system in order to control the flow of material throughout a corporation. This is a very important part of an international company because of geographical barriers.

Relevance of Logistics in Export Management

International trade is becoming a more important part of the GNP in the industrially advanced countries.

Many firms in these countries have production centers world wide for markets all over the world. Lack of local resources, small size of home market and many other reasons has resulted in functional centers being maintained in various countries. Issues associated with international transportation of finished goods are essentially the same as those that apply to transportation in domestic trade. But, under international operations, goods can be out of exporter's control for longer period of time, more documentation is required, packaging may be more costly and shipping insurance is more costly.

The transportation alternatives include ocean shipping and containerization as well as airfreight. The basic activities involved in the flow of goods, like transportation, warehousing and holding of inventories, should be integrated in a systems approach. The systems approach would recognize the trade-offs, such that sometimes more expensive airfreight may be opted for, instead of less expensive ocean shipping, because of savings in warehouse and inventory costs. In the field of exports, it should be noted that transport systems in developing countries are generally not as efficient as in the industrially advanced countries.

Transportation is often considered to be the most important single determinant of plant location. Firms in international trade also try to reduce amount of unnecessary product packaging, since packing material can account for almost 40 per cent of the weight of the products shipped. A company can reduce inland transportation charges by locating its distribution facilities adjacent to container ports or airports. The burden of documentation can be eased through computerization. Export management involves marketing in overseas market.

Hence the discussions on the interface of logistics with marketing holds good for the relevance of logistics in export management. Yet, in addition, export management has certain unique features, as discussed above, to be understood in the context of relevance of logistics to export management. Importance of Logistics as a strategic resource Logistical Management includes the design and administration of systems to control the flow of material, work-in-progress and finished inventory to support business unit strategy.

Discussion of the concept of logistics, its place in the value-chain process leading to profitability, its contribution as one of the primary functions and its interface with other functions of the firm bring outs its importance as a strategic resource. However, to be of a real strategic influence, a good amount of competency has to be achieved and a well-defined logistical mission and objectives has to be committed to, by every one in the firm, especially the top management. Logistical competency Logistics involves detailed and complex work.

Logistical management starts with how logistical competency fits into a firm's overall strategic. Positioning. It is fundamentally important to view logistics as to how it can be exploited as a core competency. For logistical competency to develop, it is important to develop an integrated framework that defines and relates key concepts. This integration should be in such a way that competitively superior logistical performance contributes to overall enterprise strategy. Logistical competency is a relative assessment of a firm's capability to provide competitively superior customer service at the lowest possible total cost.

This typically means that logistical performance is dedicated to supporting any or all marketing and manufacturing requirements in a manner that exploits delivery capability. In short, the strategy is to provide superior service at a total cost below industry average. Alternative logistical capabilities, emphasizing flexibility, time-based performance, operational control, postponement capabilities, and most of all a commitment to perfect service performance typically characterize the service platform of superior logistic achievers.

So we can say that all enterprises must perform logistics to achieve their basic business goals. One of several competencies required to create customer value is logistics. When logistics becomes a cornerstone of basic business strategy, it must be managed as a core competency. The Logistical Mission Logistics exists to satisfy customer requirements by facilitating relevant manufacturing and marketing operations. The challenge is to balance service expectations and cost expenditures in a manner that achieves business objectives.

Basic logistical service is measured in terms of Availability

Availability means having inventory to consistently meet customer material or product requirements. Operational performance Operational performance deals with the elapsed time from order receipt to delivery. Operational performance involves delivery speed and consistency. A firm's operational performance can be viewed in terms of how flexible it is in accommodating unusual and unexpected customer requests.

Service reliability

Service reliability involves the quality attributes of logistics. For logistics performance to continuously meet customer expectations, it is essential that management be committed to continuous improvement. Do you know in 1956, in an effort to explain conditions under which high-cost air transport could be justified, Lewis, Colleton and Steele conceptualized the total cost of logistics. Total cost was positioned to include all expenditures necessary to perform logistical requirements. The authors illustrated an electronic parts distribution strategy Wherein the high variable cost of direct factory to

customer air transport was more than offset by reductions in inventory and field warehouse costs.

They concluded that the least total cost logistical way to provide desired customer service was to centralize inventory in one warehouse and make deliveries using air transportation. The concept of total cost, although basic, had not previously been applied to logistical analysis. Managers typically focused on minimizing functional cost, such as transportation, with the expectation that such effort would achieve the lowest combined cost. The total-cost concept opened the door to examining how functional costs interrelate. The appropriate level of logistics cost expenditure must be related to desired service performance.

The simultaneous attainment of high availability, operational performance, and reliability is expensive. A significant managerial challenge stems from the fact that logistical cost and increased performance have a no proportional relationship. The typical logistical system in an enterprise seeks to develop and implement an overall logistical competency that satisfies key customer expectations at a realistic total-cost expenditure. Overall, logistical management is concerned with operations and coordination. Operations deal with strategic movement and storage. To complete the total operations mission.

Attention must be directed to integrating physical distribution, manufacturing support, and procurement into a single logistical process. These three areas, functioning as an integrated and coordinated process, can best provide operational management of materials; semi finished components, and finished products moving between locations, supply

sources, and customers of an enterprise. The mission of the logistical system is measured in terms of total cost and performance. Performance measurement is concerned with the availability of inventory, operational capability, and quality of effort.

Logistical costs are directly related to desired level of performance. As a general rule, the greater the desired performance, the higher the total logistics cost. The key to effective logistical performance is to develop a balanced effort of service performance and total-cost expenditure. The strategic integration of logistics is fundamental to an enterprise's success. While a firm may not select to differentiate competitively on the basis of logistical competency, it must perform logistical responsibilities as part of the fundamental process of creating customer value.

The relative importance that a firm places on logistical competency will determine the degree of emphasis on achieving internal and external integration. Flexibility is key to logistical competency. Logistical flexibility results from integration and from implementing time-based control techniques. There are four logistics concepts:

1. The systems concept
2. The total cost concept
3. The after-tax concept
4. The trade-off concept

The systems concept is based on all functions of a organization working together in order to maximize benefits.

This concept sometimes requires certain components of the organization to operate sub optimally in order to achieve maximum goals of the system. The total cost concept is based on the systems concept; however goal achievement is measured in terms of cost. A variation of the total cost concept is the after-tax concept. This goal of this concept is after-tax profit. This concept is becoming very popular because of the many different national tax policies. The trade-off concept links the system together in a way that is very efficient, but can have trade-offs that might be inefficient.

The advantages of such high efficiency must be weighed against the risk involved. Logistics is a system having number of components, which can be combined in different proportions to achieve a set objective. Long-term objective is profitability; short-term objective is to survive competition by recovering marginal costs. Logistics sub-systems i. Physical Supply or Management of flow of raw materials, spare parts, consumable stores and machinery & tools from suppliers ii. Physical distribution or management of finished goods from the factory to the buyers & iii.

Logistical Controls for managing the logistics system, it helps an efficient co-ordination of physical supply & distribution sub-systems. Objective of an ideal logistic system is to ensure flow of supply to the buyer

1. In Correct Quantity
2. At Desired location
3. At Required time
4. At useable condition
5. At the lowest total cost

Thus the objectives encompass efforts to coordinate physical distribution and material management in order to savemoneyor improve service. Elements of logistics system

1. Transportation
2. Warehousing
3. Inventory Management
4. Packing & Utilization &
5. Information & Communication

When economists originally discussed supply-and-demand relationships, facility location and transportation cost differentials were assumed either nonexistent or equal among competitors. Given a facility network and information capability, transportation is the operational area of logistics that geographically positions inventory. Because of its fundamental importance and visible cost, transportation has received considerable managerial attention over the years. Almost all enterprises, big and small, have managers responsible for transportation.

Finding and managing the desired transportation mix is a primary responsibility of logistics. Network of three of the functional areas of logistics - information, transportation, and inventory can be engineered into a variety of different operational arrangements. Each arrangement will have the potential to achieve a level of customer service at an associated total cost; In essence, these three functions combine to create a system solution for integrated logistics. The final functions of logistics - warehousing, material

handling, and packaging - also represent an integral part of an operating solution.

However, these functions do not have the independent status of the three previously discussed. Warehousing, material handling and packaging are an integral part of other logistics areas. For example, merchandise typically needs to be warehoused at selected times during the logistics process. Transportation vehicles require material handling for efficient loading and unloading. Finally, the individual products are most efficiently handled when packaged together into shipping cartons or other types of containers. Logistics is viewed as the competency that links an enterprise with its customers and suppliers.

Information from and about customer’s flows through the enterprise in the form of sales activity, forecasts, and orders. The whole process is viewed in terms of two interrelated efforts, inventory flow and information flow. Information flow is a key element of logistics operations. Paper-based information flow increases both operating cost and decreases customer satisfaction. Electronic information movement and management provide the opportunity to reduce logistics expense through increased coordination and to enhance service by offering better information to customers.

Information flow was often overlooked because it was not viewed as being important to customers. The Council of Logistics Management recognized this change in 1988 when it incorporated " material, in-process, finished goods and information" into its definition of logistics Transportation is a key activity in the logistics value chain as it moves product through the various stages of production and ultimately to the consumer. The primary functions

include product movement, product storage and integration of international production and distribution operations.

The major transportation principles involve economies of scale and economies of distance. While effective distribution systems should not be designed to hold inventory for an excessive length of time, there are occasions when inventory storage is justified. While the traditional warehousing role has been to maintain a supply of goods to protect against uncertainty, contemporary warehousing offers many other value-added services. These services can be described in terms of economic and service benefits. Economic benefits include consolidation, break bulk and cross-dock, processing/postponement, and stockpiling.

Service benefits include spot stocking, assortment, mixing, product support, and market presence The handling of products is a key to warehouse productivity. Handling activities include receiving, in storage handling, and shipping. Packaging has a significant impact on the cost and productivity of the logistical system. An integrated logistics approach to packaging operations can yield dramatic savings. A marketing mix is a compilation of activities designed to attract customers while simultaneously achieving business objectives.

The so-called four P's -products/service, promotion, price, and place - constitute a generic marketing mix. The key to formulating an effective mix strategy is to integrate resources committed to these activities into an effort that maximizes customer impact. Logistics ensures that customer requirements involved in timing and location of inventory and other related services are satisfactorily performed. Thus, the output of logistical

performance is customer service. Logistical competence is a tangible way to attract customers who place a premium on time and place-related performance.

Thus the discussion on the objectives, logistics interface with marketing and the system elements brings out the depth of the scope of logistics in the efficient functioning of any business entity. The key to excellent logistics is to achieve integration of both internal and external operations. Such integration requires clear identification concerning the role that logistical competency is expected to play in overall enterprise strategy.

Key Factors

Involved in efficient and effective and effective logistics system are

1. Shippers (users of logistics)
2. Suppliers (of logistics services)
3. Carrier (rail, road, sea, water, pipeline)
4. Warehouse Providers v. Freight forwarders
5. Terminal operators (port, stevedores, etc
6. Government (regulator of logistics)

Trade-Off Analysis

Trade-off analysis is afamilyof methods by which respondents' utilities for various product features (usually including price) are measured. In some cases, the utilities are measured indirectly. In this case, respondents are asked to consider alternatives and state a likelihood of purchase or preference for each alternative.

As the respondent continues to make choices, a pattern begins to emerge which, through complex multiple regression (and other) techniques, can be broken down and analyzed as to the individual features that contribute most to the purchase likelihood or preference. The importance or influence contributed by the component parts. i. e. , product features, are measured in relative units called " utils" or " utility weights. " In other cases, respondents are asked to tell the interviewer directly how important various product features are to them. For example, they might be asked to rate on a cale of 1 to 100 various product features, where 1 means not at all important to their purchase decision and 100 means extremely important to their purchase decision. Trade-off analyses produce several types of information. First, they tell us what features (and levels of features) are most valued by customers. Second, they allow us to model how likely people will be to purchase various configurations of products, the share of revenue these products will most likely receive and what role price plays in the assessment of acceptability. There are four main types of trade-off

1. Conjoint
2. Discrete Choice
3. Self-explicated
4. Hybrid

One additional model, the MACROModel©2, will be discussed which does not fall into any of the above four categories. We will discuss each of these trade-off types after reviewing a few basic concepts. Experimental Design, A critical issue in most trade-off methods is the selection of product attributes to be combined together to create each product configuration to be tested. If

every possible combination of attributes were included in the study, the study would be said to be using a complete or full factorial design.

This is desirable but very seldom practical. For example, if we had 6 attributes with 3 levels each, the total number of possible combinations would be 36 or 729. This is much too large to ask one respondent to rate (and 6 attributes with 3 levels each is untypical modest). When a fractional factorial design is used, only a fraction of the total possible number of product combinations needs to be tested, For the above example, a fractional factorial design could be generated (usually with the help of a computer) that would require perhaps as few as 14 product configurations to be rated.

It must be kept in mind, however, that whenever a fractional factorial design is used, some information will be lost. It is the job of the researcher creating the experimental design to ensure that the information being sacrificed (usually higher order interaction effects) does not compromise the project's ability to answer the research objectives. Bridging Occasionally, even with the most efficient fractional factorial design, we still end up with more products than can be practically accommodated.

One possible solution to that problem is bridging3. Bridging allows the attributes to be divided into two or more sets (with some attributes common to all sets). Each set of attributes is treated like its own trade-off study. A fractional factorial design is created for each set of attributes. Respondents are asked to rate or rank two smaller sets of products rather than one large set. The utilities are calculated for each trade-off exercise independently and bridged together to create one final set of utilities.

Cognitive and Non-cognitive Behavior

Critical to the selection of an appropriate trade-off technique is the issue of which type of behavior, cognitive or non-cognitive, best represents the behavior being measured. Cognitive behavior is behavior that is based on rational, conscious decision-making. Such factors as price, functionality or durability are typically cognitive. Non-cognitive behavior is behavior that is based on less tangible or even less conscious factors such as status, aspiration, insecurity, perceived taste, etc.

One might argue that the selection of a life insurance policy, a computer or a water heater are all cognitive decisions and that the selection of a beer, a skin cream or a pair of pants are all non-cognitive. One might also argue that all decisions made by humans are non-cognitive. However, trade-off techniques that employ direct questions (self-explicated and hybrid) all assume that the behavior being modeled is cognitive, because at least some of the product features are being rated in a way that requires both awareness and honesty from the respondent.

That is, the respondent must be aware of the degree to which a product feature affects his or her purchase decision and also be willing to admit to that degree of affect. Additionally, any data collection methods that rely on verbal or written descriptions of product features all assume that the behavior being modeled is cognitive, because the process of understanding a verbal or written description is itself a cognitive behavior. Non-cognitive trade-off models should be based on an indirect trade-off technique (conjoint or discrete choice) and data collection that relies on experience rather than language to communicate the product choices.

For example, if you are modeling the pant selection process, show respondents a variety of pants that they can see and touch. A consumer may respond to the phrase " light blue pants" very differently than he or she would to a particular pair of light blue pants.

The Four Main Types of Trade-Off Conjoint

Conjoint analysis is the original trade-off approach and uses linear models. There is metric conjoint, where respondents monadic ally rate various product configurations, and non-metric conjoint, where respondents rank a set of product configurations.

There are also full-profile conjoint, partial-profile conjoint and pair wise conjoint. Full-profile conjoint uses all product features in every product configuration. Partial profile conjoint uses a smaller subset of available product features in the product configurations. Pair wise conjoint requires the respondent to rate their preference for one product over another in a paired comparison. We will only discuss conjoint methods in general in this paper. Conjoint models are simply regression models which are constructed for each individual respondent.

Typically, each respondent rates or ranks 20 to 30 product configurations. Each product configuration contains different levels of the product attributes being tested. If the product levels are varied appropriately (the role of experimental design), a regression model can be estimated for each individual, using the product ratings as cases. The coefficients from the model are the utilities or utils. A conjoint approach should be used if a limited number of attributes needs to be tested and utilities need to be

estimated for individual respondents, e. g. conjoint-based segmentation. Discrete Choice Discrete choice differs from conjoint in that respondents are shown a set of products from which they pick the one they most want to buy or none if they are not interested in any of the choices shown (rather than rate or rank choices). Respondents are shown several sets of choices sequentially. For each choice set, they are asked to pick one or none. This is in contrast to most forms of conjoint where respondents are not allowed to choose none of the product options (MACRO incorporates no-buy choices into its conjoint models).

The discrete choice procedure has the advantage of being more like the actual purchase decision process than does any of the data collection methods used in most Conjoint studies. . Also, in conjoint methods, the mathematical models constructed to simulate market behavior are based on linear regression models. In discrete choice, the basis is the multinomial logit model4, which is non-linear. Another analytical difference is that, in conjoint procedures, the utility weights are estimated for each respondent individually. These weights can often provide the basis for a very powerful customer segmentation.

Most commercially available forms of discrete choice do not allow this option, although this may be rapidly changing. Further, because discrete choice models are generally estimated at the aggregate level, there exists the possibility that respondents will have strong but opposite preferences to one another. These preferences will effectively cancel each other out when the model is constructed at the aggregate level, yielding the incorrect

conclusion that respondents had no strong preference. This is sometimes referred to as the heterogeneity problem.

There are two basic forms of discrete choice: classic and exploding data5. Classic discrete choice involves showing a respondent a series of sets of products (as described above). In exploding data discrete choice, respondents are asked to rank order a set of products based on purchase interest (similar to non-metric conjoint). This rank-ordered data set can be transformed into a format suitable for logic model estimation. Exploding data discrete choice has the advantage of more efficient data collection over classic discrete choice. The exploding data approach creates many times ore data points (or cases) than the classic approach with the sameinterviewlength. Discrete choice should be used if the primary objective of the study is to estimate market share or price sensitivity, a limited number of attributes need to be tested and the sample population is known to be homogeneous withrespectto all product attributes. Self-Explicated Conjoint and discrete choice both determines respondent’s utilities indirectly. Self-explicated determines respondents' utilities directly. With self-explicated scales, respondents are asked directly how important all levels of all attributes are to their purchase interest.

Despite its conceptual simplicity, self-explicated models have been shown to be comparable to conjoint models. Self-explicated conjoint analysis requires respondents to reveal their utilities directly. Accordingly, standard questionnaire methods can be used to collect the information. The technique involves the following steps:

1. Respondent are informed about all the attributes and their levels, and the respondents are then asked to identify attribute levels that are totally unacceptable to them
2. From among the acceptable levels of the attributes, respondents are asked to indicate which are the most preferred and least preferred levels of each attribute
3. Using the respondents' most important attribute as an anchor, elicit importance ratings for the other attributes (on a 0 - 100 scale)
4. For each attribute, rate the desirability of the different acceptable levels with the attribute
5. Utilities for acceptable attribute levels are obtained by multiplying the importance rating and the desirability ratings.

The utilities are then entered into a choice simulator program, and choice information similar to other conjoint programs can be obtained. Self-explicated approaches are useful when there are a large number of attributes and the decision process being modeled is cognitive.

Hybrid

Hybrid models are models that use a combination of the above techniques. The most famous hybrid model is ACA, Adaptive Conjoint Analysis. Adaptive Conjoint Analysis, in this procedure, a computer program prompts the interviewer with questions. The procedure is as follows:

Respondents are first walked through a battery of feature-importance ratings and rankings; second, through a series of pair wise trade-offs of different product configurations. The product configurations shown to any one respondent may not include all of the attributes being tested. The

configurations to be paired are based on the answers to the importance questions and rankings asked in the beginning of the interview. Items that are considered of little importance show up in the comparisons less often. Items that are considered of greater importance show up in the comparisons more often.

For each pair of products being tested, the respondent is to indicate which product they prefer and the degree to which they prefer it. The software continues prompting with pair wise comparisons of product configurations until enough data has been collected to estimate conjoint utilities for each level of each feature. Since the procedure is adaptive, only a fraction of the total number of possible product combinations is tested. ACA is an approach that is appropriate for building preference models of cognitive behavior with large numbers of attributes.

It may not be as useful when price sensitivity, non-cognitive purchase decisions or interaction terms are to be modeled. Cake Method and Logit-Cake Method Other hybrid models include the Cake Method and the Logit-Cake Method. Both of these models have been developed by MACRO Consulting and were designed to overcome weaknesses in other models.

Cake Method

The Cake Method is a unique, proprietary approach to conjoint analysis which offers several advantages over other conjoint methods: A large number of product features (50 or more) can be included in the model First rder interactions can be estimated at both the disaggregate and aggregate levels There is complete control over the experimental design, in a full-

profile format Since product combinations are specified, via traditional experimental design, before the interview takes place, physical exhibits can be easily incorporated into the interview The approach involves a specific data collection procedure as well as a unique analytic protocol. The basic outline of the approach is to:

1. Collect self-explicated scales on most of the product attributes tested
2. Conduct a full-profile conjoint exercise with a limited number of product attributes, some of which are common to the self-explication exercise
3. Estimate conjoint utilities for each respondent
4. Bridge self-explicated scales to utility weights The Cake Method should be used when there are a large number of attributes, utilities need to be estimated for individuals, interaction terms need to be measured and the purchase decision is at least partially cognitive.

Logit-Cake Method

The Logit-Cake Method is a unique, proprietary approach to choice-based trade-off analysis which offers several advantages over other conjoint methods:

1. A large number of product features (50 or more) can be included in the model
2. The heterogeneity problem long associated with aggregate logit models is avoided
3. The traditional advantages of logit models over conjoint models are maintained

4. First order interactions can be estimated
5. There is complete control over the experimental design, in a full-profile format Since product combinations are specified, via traditional experimental design, before the interview takes place, physical exhibits can be easily incorporated into the interview, The approach involves a specific data collection procedure as well as a unique analytic protocol.

The basic outline of the approach is

1. Collect self-explicated scales on all product attributes tested
2. Conduct a full-profile choice-based exercise with a subset of product attributes
3. Segment the sample based on self-explicated scales
4. Estimate logit models for each respondent cluster
5. Bridge self-explicated scales to logit-based utility weights

The Logit-Cake Method should be used when there are a large number of attributes, market share and price need to be estimated, interaction terms need to be measured and the purchase decision is at least partially cognitive.

MACRO Model

One other model will be discussed in this paper. It does not fall into any of the four main types of trade-off models. In fact, it is not strictly speaking a trade-off model because it does not estimate utilities for any product attributes.

The MACRO Model was developed by MACRO Consulting to address a specific research methods need that frequently occurs in new product development and packaging. The MACRO Model is a unique approach to new product screening which offers several advantages over other methods:

1. A large number of concepts or packages (50 or more) can be screened at one time
2. Price sensitivity can be calculated for every new product concept screened
3. Price/volume can be individually optimized for every product concept tested
4. New product concepts can be screened and/or completely rank ordered on consumer appeal, market share, unit volume, gross dollar volume or gross profits. The approach involves a specific data collection procedure as well as a unique analytic protocol.

The basic outline of the approach is to Sort a stack of new product concepts cards (all new product concepts, each at three price points) into two piles: would definitely buy and would not buy. Note: Stack would contain several existing products as reference have them rank order the would buy pile on a continuum from most want to buy to least want to buy.

If the number of items to be sorted is too large for one sorting exercise, the task can be broken down into several smaller exercises, with two or three items common across sorting tasks. After the data are collected for all respondents for the various sorting exercises, a bridging technique can be used to incorporate the data from the separate exercises into one rank ordering of all of the items used in the study. Once the data are combined

into one rank order data set for each respondent, the MACRO Model© (a first choice share of preference model) can be constructed.

The MACRO Model© should be used when the product is too complex to decompose into attributes, e. g. , packaging graphics, when a large number of highly different products are to be included, e. g. , new product screening, when price sensitivity needs to be measured and when products will be screened based on their revenue potential. Conclusion There are a variety of approaches to trade-off analysis, each with its advantages and disadvantages. Which trade off procedure is best is dependent on the issues and constraints of each marketing problem.

The marketing problem should be discussed with a researcher who is knowledgeable in all appropriate methodologies before a research approach is selected. Thus trade-off are necessary. The aspects of trade-off analysis are

1. Within One logistics Elements, Trade-off that occurs within a single element
2. Between logistics Element, Trade-off that are possible by considering the impact of one on the other
3. Interface between companies functions, these trade-off are brought about through impact on production.
4. Between the Company & other organizations, These trade-off benefit all concerned organizations.

Forms of logistics management. Centralized logistics management Centralized logistics management provides that managers that also head

other divisions of the company head the logistics operations. This type of management helps avoid internal problems by having a central manager that ultimately decides how logistics and operations are coordinated. Decentralized logistics management Decentralized logistics management is based on the fact that a company needs to have a division that helps control the local-adaptation needs. Dealing with different cultures requires input from the local branch.