DEPARTMENT OF BUSINESS AND SOCIAL STUDIES

COURSE TITLE: INTRODUCTION TO PURCHASING AND SUPPLIES MANAGEMENT

COURSE OUTLINE

COURSE TITLE: Introduction to Purchasing and Supplies Management

Purpose: To introduce students to purchasing and supply management concepts and techniques necessary to perform the purchasing function of an organization

Course Objectives: By the end of the course the students should be able to:-

- Describe the importance and relationship of the purchasing department ad other departments
- Explain the purchasing cycle
- Describe warehousing and inventory control

Course Content:

Introduction- meaning and evolution of purchasing; objectives and principles of purchasing; Relationship between purchasing department and other departments; Specification of requirements; Purchasing records; Sourcing; Warehousing- receipt and inspection of materials; Inventory control systems- demand forecasting; Inventory related costs; Location and layout; Physical distribution.

References

- Arjan Van Weele (2004), *Purchasing and Supply Chain Management*, PVT publishers, New Delhi
- Benton W C (2007), *Purchasing and Supply Management*, Routledge, London
- Michael Quayle (2005), *Purchasing and Supply Chain Management: Strategies And Realities*, Routledge, London

MODE OF ASSESSMENT	**MARKS (%)**
C. A.Ts and Assignments	*30*
Final Examination	*70*
Total	*100*
Pass mark	*40*

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CHAPTER ONE

THE EVOLUTION AND ORGANIZATION OF PURCHASING AND SUPPLIES MANAGEMENT

Learning Objectives

By the end of this chapter the learner should be able to:

a) *Differentiate between purchasing, procurement supply management materials management and supply chain management*
b) *State the role of purchasing*
c) *Describe the contribution of purchasing department to the overall firm's performance*
d) *Describe the relationship between purchasing department and other departments in the organization*
e) *Discuss the approaches to purchasing and supply department internal organization in a single plant firm*

1.1 Introduction

Purchasing describes the process of buying: learning of need, locating and selecting suppliers negotiating prices and other pertinent terms, and follow up to ensure delivery. It entails the following activities:

i) Purchase needs identification through liaison with user departments.
ii) Identification of potential suppliers and negotiation.
iii) Selection of suppliers.
iv) Market research for important materials.
v) Analysis of proposals.
vi) Issuance of purchase orders.
vii) Administration of contracts and resolutions of related problems
viii) Maintenance of purchasing records.

Procurement is a broader term and includes purchasing stores, traffic, receiving, incoming inspection and salvage. Procurement and purchasing are used interchangeably, this is however somewhat imprecise. Procurements process or concept encompasses a wider range of supply activities than those included in the purchasing functions .it

includes the traditional role, with more buyer participation is related material activities. These activities include;

i) Development of material and service requirements and other specifications.

ii) Materials research and value analysis activities.

iii) Extensive market research.

iv) Conduct of all purchasing functions.

v) Suppliers quality management

vi) Management of investments recovery activities (salvage of surplus and scrap)

Essentially therefore procurement tends to be broader and more proactive, focusing on strategic matters, rather than mere implementation of purchasing concept.

Supply management is a system management concept employed by some organizations designed to optimize the factors of materials costs, quality and services. It is a process responsible for the development and management of a firm's material management of a firm total supply system. It includes and expands the activities of the purchasing function and the procurement process. The other activities in supply management are:

i) Early Purchasing Involvement (EPI) and Early Supplier Involvement (ESI) in product design and subsequent specification development for crucial items.

ii) Heavy use of cross–functional teams in supplier qualification and selection.

iii) It depicts effect to develop better, more responsive supplies than the term purchasing.

iv) Purchasing partnering and strategic alliances with supplies.

v) Strengths Weaknesses Opportunities and Threats (SWOT) analysis.

vi) Continuous monitoring and improvement in the supply chain.

vii) Participation in strategic planning process.

Materials Management is the integration of related materials functions to provide cost effective delivery of material and services to an organization. It is an organizational concept from a managerial perspective designed to enhance coordination and control of the various materials activities. Since action or decision taken at any point in the materials chain, usually impacts on a number of other activities or decision point in the chain, it is imperative to enhance reporting, communication and control procedures

designed to enhance a coordinated decision making among the involved groups or departments. Materials management includes the following activities:

i) Purchasing and supply management activities.
ii) Inventory management
iii) Receiving activities
iv) Stores and warehousing
v) In-plant material movement
vi) Production planning, scheduling and control
vii) Traffic and transportation
viii) Scrap and surplus disposal.

Supply chain management is a system approach to managing the entire flow of information, materials and services from raw materials, supplier through factories, warehouses to end customers

1.2 The Evolution of Purchasing

Purchasing can be traced as far back as 2800 BC in cuneiform clay tablets purchasing orders. Curiously only during the past two countries has purchasing been addressed in trade books and text books. In 1832 Charles Babbage addressed purchasing in his book "On the Economy, Machinery and Manufacturing" The first book devoted specifically to purchasing, "The Handling of Railway Supplies: The Purchase and Disposition" published in 1887 was authored by Marshall M. Kirkman. The first college textbook on purchasing was authorized by Howard T. Lewis of Harvard University in 1933.

Although interest of purchasing and supply function has been a phenomenon in the 20^{th}, it was recognized as independent and importing function well before 1900. Growth of interest and attention to purchasing was rather uneven in the early 1900's but by 1915, several books on purchase had appeared and several articles had been published in trade press primarily in the engineering journals.

Yet prior to World War I (1914-1918) most firms regarded the purchase function primarily as a clerical activity. However during the world war, the ability to obtain raw materials supplies ad services needed to keep the factories and mines operating were the

key determinates of organizational success. Attention was given to the organization policies and procedures for purchase functions, and so it emerged as a recognized management activity.

Historically since management interest has focused on research and development, marketing, finance and operations, purchasing has frequently been subordinated to these functions. Mangers are however becoming aware impact on the bottom line that does any other functions. It is with such insights the purchasing has evolved and evolves through the following four stages.

i) ***Passive stage-*** Purchasing function has no strategic direction and primarily reacts to the requests of other functions,

This stage is characterized by:

a) High proportion and individual communications due to purchasing low visibility

b) Supplier selections based on price and availability.

ii) ***Independent stage-*** Purchasing functions adopts the latest purchasing techniques and processes, but its strategic direction is independent of the firms competitive strategic.

a) Performance is based primary on cost reduction and efficiency measures.

b) Coordination links are established between purchasing and technical discipline.

c) Top management recognizes the importance of professional development.

d) Top management recognizes the opportunities in purchasing for contribution to profitability

iii) ***Supportive-*** Purchasing function support the firm's competitive strategy by adoption purchasing techniques and products which strengthens the firm's competitive position

a) Purchase is included in sales proposal teams.

b) Suppliers are considered a resource with emphases on experience motivation and attitude.

c) Market product and suppliers are continuously monitored and analyzed.

iv) ***Integrative stage-*** Purchasing strategy is fully integrated into the fir 's competitive strategy and constitutes part of an integrated effort among peers to formulate and implement a strategic plan. In this stage;

a) Cross-functional training of purchasing professionals executive is made available

b) Permanent lines of communication are established among other functional areas.

c) Professional development focuses on strategic elements of the competitive strategy

d) Purchasing performance is measures in terms of contributions to the firm's success

1.3 The Role of the Purchasing Department

The purchasing department is expected by the management to fulfill the following five rights.

i) Right Quality

ii) Right Suppliers

iii) Right Quantity

iv) Right Time

v) Right Price

These rights are also referred to as *the principles of purchasing*. In order to undertake these rights the purchasing department delineates the following as in roles;

i) *To support company operations with an uninterrupted flow of materials and services.*

ii) *To buy competitively*- Keep abreast of the forces of demand and supply that regulate prices and material availability on the market; understanding suppliers cost structure and ability to help reduce it further; price negotiation to help reach a fair price.

iii) *To buy wisely*- Continual search for better vales that yield the best combination of quality service and price; reconciling users needs with suppliers capabilities by use of cross functional teams;

iv) *To keep inventory investment and inventory losses at a practical minimum.*

v) *To develop effective and reliable sources of supply*- "buy suppliers" not "products" e.g. co-operatives.

vi) *To develop good relationship with suppliers community and good Continuing relationship with active suppliers*- good relationship with potential suppliers is invaluable.

vii) *To achieve maximum integration with other departments of the firm*- Understanding major needs of user departments and provide such support as; standardization of programmes, future price forecasting, make or buy analysis and providing a repository of information and data from suppliers.

viii) *To handle the purchasing and supply management function proactively and in a professional cost effective manner*- Continual analysis of activities to eliminate those that only marginally contribute to the effectiveness of the organization and establishing policies and procedures that achieve departments objectives in the most cost effective manner

1.4 The Contribution of Purchasing Department to the Overall Firm's Performance

As a function, purchasing is common to all types of business operations. The purchasing department however is an organizational unit of a firm whose duties may include responsibility for part or all of the purchasing function and additional activities as well. As a matter of fact, the purchasing function is usually performed most effectively and efficiently by a centralized unit made of buying specialist who a time may work in conjunction with a more comprehensive cross-functional team of specialists.

Prior to the 1950, the purchasing department was a clerically oriented order placing unit. In the ensuing years however, managerial emphasis has focused on specialization of individual buying activities, professionalism and contribution to the firm's profit. This emphasis by the management on the purchasing department has been

borne out to of the realization of the profit potential of purchasing as a function. Every shilling saved in purchasing is equivalent to a new shilling in profit. The profit margin of a firm is usually given as;

$$Pr\,ofit\,M\,arg\,in = \frac{Net\ Income}{Sales}$$

The top management's performance is frequently evaluated on the basis of the return on investment (ROI). One of the ways of measuring ROI is;

$$ROI = \frac{Net\ Income}{Sales} \times \frac{Sales}{Total\ Assets}$$

Since; $\frac{Sales}{Total\ Assets} = Assets\ Turnover\ Rate;and\ \frac{Net\ Income}{Sales} = Pr\,ofit\,M\,arg\,in$

Then; $ROI = Pr\,ofit\,M\,arg\,in \times Asset\ Turnover\ Rate$

$$i.e.\ ROI = \frac{Sales}{Total\ Assets} \times \frac{Net\ Income}{Sales} = \frac{Net\ Income}{Total\ Assets}$$

Since firm's profit margins reflect ability to control cost relative to revenue. The assets turnover rate reflects management's ability to effectively utilize the firm's productive assets. Therefore, a firm's management can improve ROI (managerial performance) by:

i) Reducing costs relative to sales.

ii) Producing more sales from available assets (or increasing sales relatively faster than investment)

iii) By some combination of the two

Purchasing as such contribute to ROI by both increasing profit margins and by increasing the assets turnover rate.

1.5 The Relationship between Purchasing Department and other Departments

a) Purchasing and Design/Engineering

i) Preparation of specifications for purchased material and components.

ii) Quality assurance or defect prevention

iii) Value analysis[1] and Value engineering[2]

[1] *A systematic procedure aimed at ensuring that necessary functions are achieved at minimum cost without detriment to quality reliability, performance and delivery (usually a post production activity)*

iv) Information to design departments regarding availability of materials, suppliers and costs.

v) Agreement of alternatives when specified materials are not available.

vi) Issues arising from the increasing importance of buying rather that making, i.e. reduction of vertical integration.

vii) Importance of buying completer systems rather than individual components.

viii) evaluation of cheaper alternate materials;

ix) Building co-makership/designership relationship.

x) Creation of a library of books, catalogues, journals and specifications for joint use by the design and purchasing departments.

b) Purchasing and Production or "User" Departments

i) Preparation of material schedules to meet Just–In-Time (JIT) requirements.

ii) Ensuring that delivery schedules are maintained.

iii) Control of inventory to meet production requirements.

iv) Disposal of scrap and obsolete items

v) Quality control or defect detection and correction

vi) Approval of "first off "samples.

vii) Make or buy decisions

viii) Sub-contracting decisions

ix) Suppliers development

x) General involvement in such techniques and systems as production technology, computer integrated technology and MRP[3] and MRPII[4]

c) Purchasing and Marketing

i) Provision of sales forecasts on which purchasing can base its forwarded planning of materials and components.

ii) Ensuring that, by efficient buying, purchasing contributes to the maintenance of competitive prices.

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[2] *The application of value analysis at the pre-production stage or development stage*

[3] *Material Requirement Planning; A product oriented computerized technique aimed at minimizing inventory requirement and maintaining delivery schedules*

[4] *Manufacturing Resource Planning; Concerned with any resource entering the production line including manpower, machines and money in addition to materials*

iii) Obtaining materials on time to ensure that marketing and production meets the promised delivery dates.

iv) Exchange of information regarding customers and suppliers.

v) Marketing implications of partnerships sourcing.

vi) Liaison with respect to reciprocal trading.

d) Purchasing and Finance

i) Provision of accurate forecasts of purchase schedules since they have an impact on working capital and cash flow positions of the firm.

ii) Evaluation of potential income from unexpected buying opportunities against the potential income from other alternative uses of the firm's capital.

iii) Co-ordination to arrive are at the right time to buy for the firm (purchasing department's right time may not be the finance department's right time)

iv) A co-operative relationship between purchasing and finance clearly impacts on the development of good supplier relationship e.g. through prompt payments.

Factors Considered When Establishing Purchasing Liaison[5]

i) Expert knowledge required by the department concerned.

ii) Departmental objectives of all the department

iii) Responsibility held to every department and how they contribute to the effectiveness within the purchasing function.

iv) Materials requirements of various departments.

v) The channel of communication –free flow of information

Limitations to development of purchasing liaison

i) Department conflict due to differences in objects.

ii) Time is wasted due to slow decision making.

iii) Any failure in one department could lead to failure in other department.

Focuses in Purchasing and Supply

Historically purchasing focused on internal processes and tactics. In recent years however there has been progression from these focuses to;

[5] *A liaison is a communication or co-operation between people or organizations.*

a) Value Adding Benefits

Today many world–class organizations expect their purchasing and supply management function to focus on the following value-adding outputs of proactive purchasing.

i) *Quality*- purchased materials and services should be virtually defect-free.

ii) *Cost*- strategic cost management through reduction total cost of acquiring, moving, holding, converting and supporting products containing purchased materials and services through out the supply chain.

iii) *Time*- the time required to bring a new product to the market can be reduced by 20-40% through the establishment of a world-class strategic supply management system.

iv) *Technology*- ensuring the supply base of the firm provides appropriate technology in a timely manner and ensuring that the technology which affects the firm's core competences is carefully controlled when dealing with outside supplier.

v) *Continuity of supply*- monitoring supply trends, developing appropriate supplier alliances and taking such other actions as required in reducing the risk of supply disruptions.

b) Strategic focus

i) *Integration*- the firm's strategy must be integrated with the firms marketing, conversion and finance strategies and that of the corporation.

ii) *Business environment*- purchasing must address the identifications of threat and opportunities in the supply environment.

iii) *Technology*- technology is often used as a strategic tool. Its control is therefore critical in order to insulate it from access from competitors.

iv) *Component and commodity strategies*- development of formalized market driven supply plans for critical purchased materials and services.

v) *Management Information System*- ensuring a cost effective, timely and comprehensive information system to provide data necessary to make optimal supply decisions

vi) *Supply base strategy*- the supply base that the firm belongs to must be carefully developed and managed to ensure that the firm belongs to a successful value chain in an increasingly competitive market place.

vii) *Centralization of development and management*- while low-value adding activities are decentralized the development and management of the firms supply strategy is centralized.

viii) *Use of senior procurement professional*- the key supply relationships or alliance is assigned to senior procurement professional.

ix) *Use of professional personnel*- the purchasing department is manned by fewer but far more professional personnel.

1.6 Purchasing and Supply Organization Structure

In any given time there are several factors that determine whether purchasing and supply is a top level function reporting to the C.E.O or a Sub function reporting a top level executive such as the head of manufacturing. These factors are;

i) *Availability of materials*- when materials are brought in volatile markets suggest to price instability and periodic shortages then it is wise t have purchasing as a top level function.

ii) *Absolute shilling volume of purchase*- where the magnitude of expenditure is high top level purchasing can produce significant profit through nit savings which add in thousand when large purchase are made.

iii) *Percent of product cost represented by materials*- if the material costs are 40% or more of its products cost small reductions in material costs increase profit significantly, as such top-level purchasing pays off.

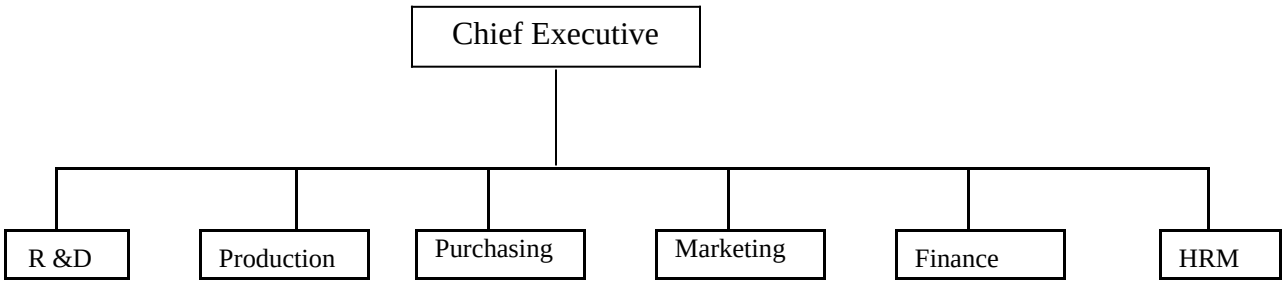
iv) *Types of materials purchased*- Most large firms use a wide range of materials, many of whose prices and service arrangement can be influenced by creative purchasing performance. However in firms whose materials are standard top level purchasing can produce little profit.

Types of Organization Structures

Organization theory identifies three types that represent distinct forms of organizational structures, namely: functional, divisional, and matrix.

a) Functional Organizational Structures

These are based on specializations required to perform the primary tasks of the organization. The specializations include; Research and Development (R and D), Production, Purchasing, Marketing, Finance, Human resource management. An illustration of a functional organizational structure is shown below:



Advantages of* a *Functional Organizational Structure

i) The CEO is in touch with all primary functions.

ii) It gives status to major functional areas.

iii) Communication and decision making within the function is made easy.

iv) It simplifies training of functional specialists

v) It preserves strategic control at top management level.

Disadvantages of* a *Functional Organizational Structure

i) Co-ordination with other functional areas may be unsatisfactory.

ii) Emphasis can be on narrow functional rather than wider organizational objectives.

iii) Tasks are entities in themselves, unrelated to a wider process.

iv) Many activities do not "add value."

v) Wasteful interdepartmental conflict and rivalry may be encouraged.

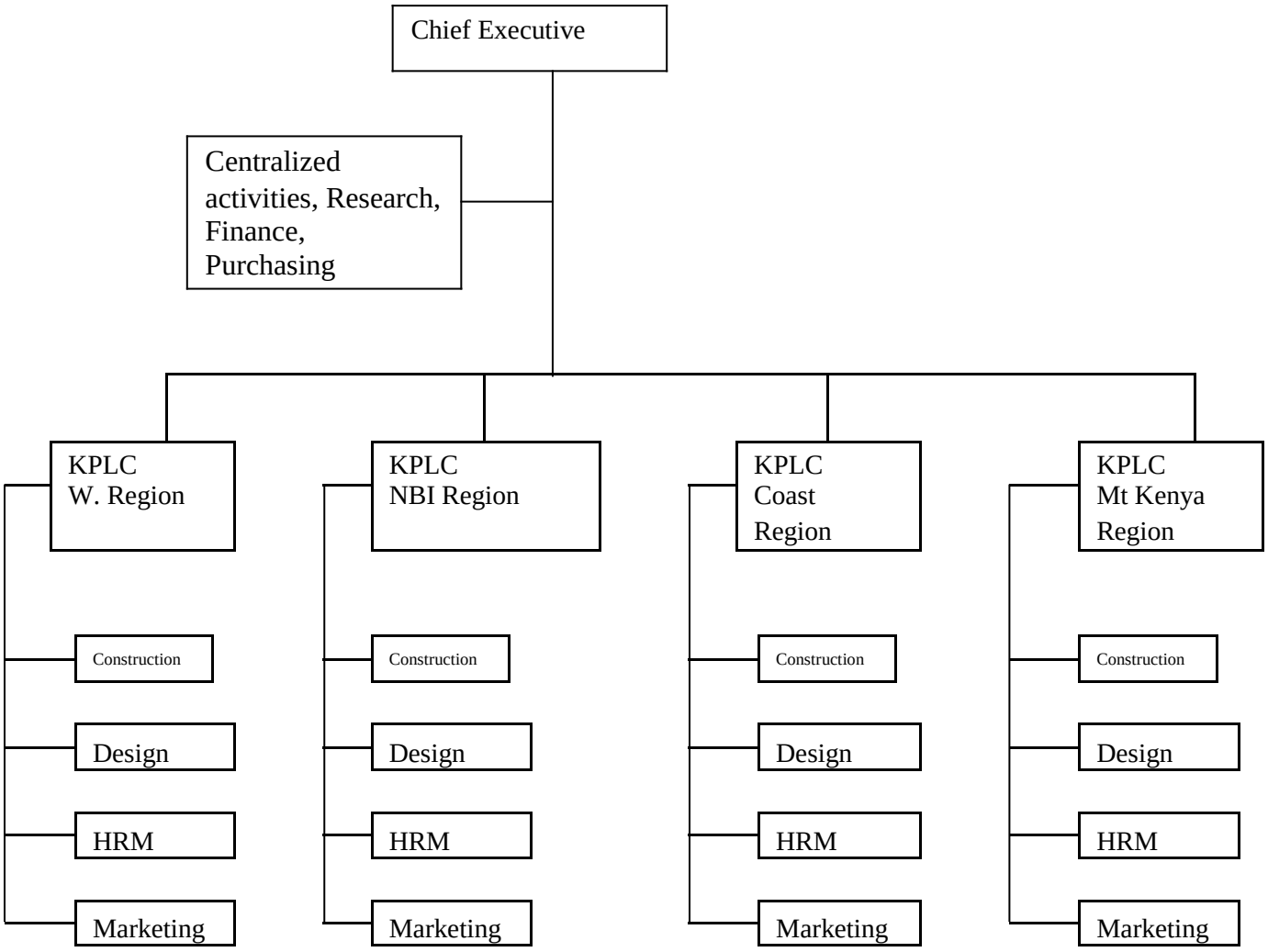
vi) Development of broadly trained managers is limited

vii) Satisfaction of external and internal customers and suppliers may be low.

b) Divisional Organizational Structures

These are based on the outputs of the organization i.e. products or services. Other bases for divisionalization include geographical areas or processes. It is the organizational pattern for large, highly diversified organizations, often operating in several regions or countries. At some level, a divisionalized structure will be split into

functionally based departments each responsible for a particular function or process. As shown in the illustration below;



Advantages of a Divisional Organizational Structure

i) It concentrates on a product, services, geographical area, etc

ii) It allows units to adapt to local circumstances.

iii) It adapts to local legal, political and cultural factors.

iv) It allows general managers to attend to strategies.

v) It provides a training ground for general management development.

Disadvantages of a Divisional Organizational Structure

i) There is a possible confusion over whether authority and responsibility is centrally or divisionally located.

ii) There is a possible conflict between divisions.

iii) There is duplication of functional activities.

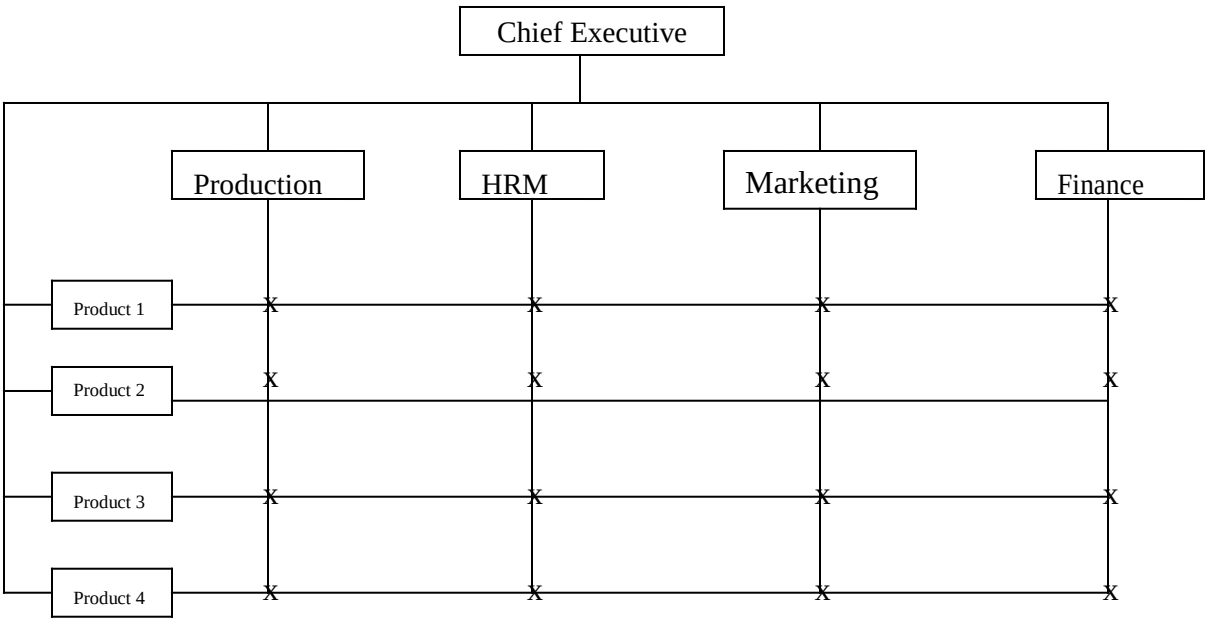
iv) It requires a number of general managers.

v) It is expensive (high cost).

vi) Co-ordination may be complex where there are two many divisions.

c) Matrix Organizational Structures

These are based on two forms of departmentalization: Functional and divisional members of matrix organizations are therefore simultaneously members of two sources of authority. A functional structure is shown below



Advantages of a Matrix Organizational Structure

i) It establishes one person as the focal point for all matters of the organization.

ii) It makes it possible to respond to the needs of several projects simultaneously.

iii) It makes maximum use of a limited pool of function specialists.

iv) It ensures that functional expertise is equally available to all projects

v) It provides excellent training for running a diversified organization.

Disadvantages of a Matrix Organizational Structure

i) Unity of command is lost (members report to more than one head).

ii) Authority and responsibilities of managers overlap causing conflicts and gaps in efforts across units and respect of priorities.

iii) Places a premium on teamwork

iv) Slows down decision making

v) It is difficult to explain to team members

Purchasing and Supply Department Internal Organization in a Single Plant Firm

Purchasing and supply work naturally divides into five district classifications. This permits a high degree of specialization without creating motivational problems for the purchasing personnel. These classifications are;

i) *Management*- emphasizes in development of policies procedures control and the mechanic of co-ordination of the purchasing depth

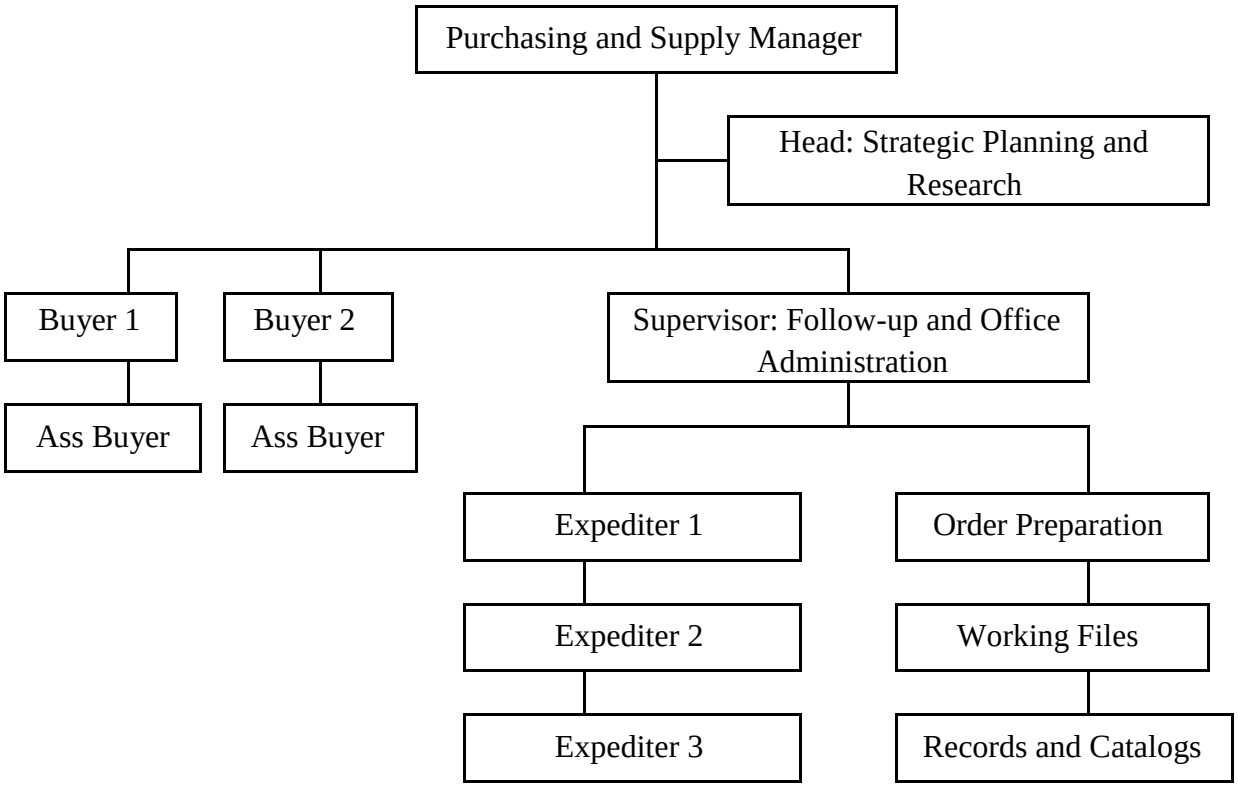
ii) *Buying*- includes working with users to come up with specifications investigating suppliers studying costs negotiations analysis bids and selecting suppliers

iii) *Follow-up and expediting*- includes supplier lesson work such as reviewing the stats of orders writing and phoning suppliers and occasionally visiting supplier plants.

iv) *Strategic planning and research work*- activities in this area include supply market studies, development of materials buying strategic development of supply base and partnering players, product research and vale analysis work and operating and information system analysis.

v) C*lerical activities*- writing purchase order, main training fuels, catalogue and library materials, records for commodities supplies, prices and so on.

A Typical Structure of the Internal Organization of a Single-Plant Purchasing Department



Note: buyer one, two and three may be assigned different products of the firm

Purchasing and Supply Department Internal Organization in a Multi-Plant Firm

A Multi-plant firm faces an additional organizational questions not faced by single-plant firms. This is the determination of the extent to which purchasing and supply should be centralized at the corporate level or decentralize the function to individual plants giving them full authority to conduct all of their purchasing activities.

Advantages of Multi-plant Centralization

i) *Greater buyer specialization*- permit greater technical specialization leading to development to more knowledgeable and more highly skilled buying personnel

ii) *Economics of scale*- by consolidating requirement large purchases are made leading to quantity discounts, rebates and favorable prices.

iii) *Easier purchasing, coordination and control*- this permits control and administration of important policies and consistency of purchasing ethics, budgets compliance, supplier relations and consistency of purchasing practices.

iv) *Effective planning and research work*- centralization of firm wide purchasing requirements provide the staff with know-how to improve purchasing and supply research work. This allows greater strategic materials planning with more depth and greeter efficiency.

v) *Lower administration cost*- since less staffing is required in a centralized structure is less costly than the decentralized structure.

vi) *Holding and ordering costs will be lower*

Advantages of Multi-plant Decentralization

i) *Easier co-ordination with operating departments*- decentralization allows the buyer to be close to the user thus, coordination becomes easier. It becomes easier to form buyer-user teams.

ii) *Speed of operation*- transmittal of information from plant to headquarters makes the purchasing procedure long than when the purchasing department is located a the plant.

iii) *Effective use of local sources*- with the plants geographically dispersed it is difficult for a centralized purchasing department to locate and develop potentially good supplier near each plant.

iv) *Plant autonomy*- fundamental principal of management holds that the delegation of responsibility must be accompanied by delegation of adequate authority to carry out that responsibility. This is crucial especially where plant contribution to a company's bottom-line is the responsibility of the plant manager.

v) *Allows integrated problem solving* instead of functional specialization.

Note: advantages of each are the disadvantages of the other

Factors affecting Feasibility and Desirability of Centralization

i) Similarity of materials usage

ii) Plant department size

iii) Geographical dispersion of plants

iv) Volume to be materials used

v) Availability of storage space

vi) Urgency of material requirements

Review Questions

i) *Define the following terms:*
   a) *Purchasing*
   b) *procurement*
   c) *supplies management*
   d) *supply chain management*

ii) *Explain the role of purchasing and supply department in an organization*

iii) *Using the ROI framework describe the contribution of purchasing and supply department to the overall firm's performance*

iv) *Describe the relationship between purchasing and supply department and other departments in the organization*

v) *Discuss the approaches to purchasing and supply department internal organization in a single plant firm*

vi) *Discuss the factors influencing centralization of the purchased and supply department*

vii) *Explain the advantages of matrix organizational structures*

Suggested Further Readings

Arjan Van Weele (2004), *Purchasing and Supply Chain Management*, PVT publishers, New Delhi

Benton W C (2007), *Purchasing and Supply Management*, Routledge, London

CHAPTER TWO

PURCHASING PROCEDURES

Learning Objectives

By the end of this chapter the learner should be able to:

a) *Describe the purchasing cycle*
b) *Explain the requirements that specification must satisfy*
c) *State the various types of specifications*
d) *Explain the different types of purchasing and supply department records*
e) *Explain what is meant by the term rush orders*
f) *Describe the "small-order problem"*
g) *Identify typical fraudulent activates in purchasing and supply and methods of prevention*
h) *Describe the impact of information technology on daily operations in the purchasing and supply department*

2.0 Introduction

A typical purchasing cycle consists of the following steps:

1. Recognition of the need
2. Definition and description of the need
3. Transmission of the need
4. Receipt and inspection
5. Invoice audit and completion of the order

2.1 Recognition of the Need

A purchase need may originate from the firm's user departments or the inventory control section. The notification of the need is usually in two methods.

i) Standard purchase requisitions.

ii) Materials requirement planning (MRP) schedule.

i) Standard Purchase Requisition

This is an internal document comparable to the purchase order which is an external document. Most firms have standard purchase requisition which is serially numbered and

produced in duplicate. The user department retains one copy while the other is sent to he purchasing dept.

A requisition has the following information; Description of the materials, quantity, and date required, estimated unit cost, operating account to be charged, date and authorized signature. Most big firms have logged the necessary information on the firm's mainframe or it's Local Area Network. Thus, requisitions can be produced electronically by scanning for the necessary data. A computer maintained inventory monitoring system automatically produces or generates requisition when the inventory level has reached re-order point.

ii) ***Materials Requirement Planning (MRP) Schedule.***

When a design engineer completes the design part he/she produces an engineering bill of materials (BOM)- a list of materials and quantity of each required to manufacture the item. In firms using computerized inventory planning systems, the engineering bills of material is reconfigured into a structured multi level bill of materials which is used to determine the specific material requirements for the item at a specific time period. This schedule is then sent to purchasing for direct use in obtaining the required materials. The schedule eliminates the necessity of preparing numerous purchases requisitions.

2.2 Definitions and Description of the Need

Purchase description serves a number of purposes among them to;

i) Communicate to the buyer in the purchasing department what to buy.

ii) Communicate to the prospective supplier what is required.

iii) Serve as the heart of the resulting purchase order.

iv) Establish the standard against which inspections test and quantity checks are made.

a) Detailed specification

b) Other purchase descriptions

a) <u>Detailed Specification</u>

This is description that tells the seller what the buyer needs to buy in exact terms. Design and engineering desires features of design excellence but which may contribute to

less sales potential, operation may on the other hand favor easy to work on design that have low unit cost. It is estimated that 75-80% avoidable total cost may be controlled at design stage by reconciling the need of engineering, operations, marketing and purchasing in order to come up with balanced or optimal specifications that solve the interdepartmental conflict of interest. To develop specifications that properly balance product quality characteristics, and product cost, four approaches can be used:

i) Early Purchasing Involvement (EPI) and Early Suppler Involvement (ESI)

ii) Formal committee approach, representatives come from all the functional area. No design becomes final without the committee approval

iii) The informal approach emphasizes the concept of buyer to challenge requests. Management urges designers to seek continual advice from buyers. Person to person communications and co-operation between designers and individual buyers is encouraged.

iv) The purchasing co-ordinate approach– one or more positions are created in the purchasing department usually called materials engineers to serve in a liaison capacity with the designers department.. The approach is highly structured, expensive but effective.

Specification Requirements

To meet the need of all departments, specification must satisfy many requirements**;**

i) Design and marketing requirements for functional characteristics and other properties e.g. appearance.

ii) Manufacturing requirement for workability, and produceability with the specifications.

iii) Stores requirements to use, store and receive the materials economically.

iv) Inspections requirements to test materials with compliance with the specifications

v) Purchasing and supply management requirement to procure materials without difficulty and with adequate competition from reliable sources of supply.

vi) Productions control-purchasing requirements to substitute materials when necessary.

vii) The firm’s requirements for suitable quality at lowest overall cost.

viii) The firm's requirements to use commercial and industrial standard materials whenever possible and to establish company standard in all other cases.

Note: precision and clarity is of most importance when writing specifications

Types of Detailed Specifications

There are three types of detailed specifications.

a) ***Commercial standards***- this is complete description of an item standardized.

Advantages of Commercial standards

i) Description can be set forth accurately and easily

ii) Highly competitive and readily available at reasonable prices.

iii) No need for specific sale commitments before productions.

iv) Contribute to simplification of design, purchasing procedure, inventory management and cost reduction.

b) ***Design specifications***- for materials that are not covered by standard specification, firms prepare their own specifications. The cost of inspection to assure compliance with the company-made specifications can be high. To avoid ambiguity, such specifications are accompanied by engineering drawings, which provides a more precise and accurate description, permit wide range of competition (what is wanted can be easily communicated to a wide range of suppliers) and clearly establishes the standards of inspection.

c) ***Materials and method of manufacture specifications***- in this method the supplier is instructed precisely as to the specific materials to be used and low they are to be processed. The buyer assumes full responsibility for the performance. It is common in the defense industry.

Advantages

i) Widest competition possible thus good pricing assured.

ii) Since product is non-standard, anti-discriminatory barrier is removed.

Disadvantages

i) Puts a lot of responsibility on buyer.

ii) Specifications of this type are expensive and difficult to prepare.

iii) Inspection is generally very expensive

b) Other Purchase Descriptions

Performance specifications- instead of describing an item by its design performance specification, it describes in words and quantitatively what the item is required to do. The primary advantage of the kind of specification is that it assures obtaining the precise desired performance and ease of preparing specifications. it also assures inclusion of all applicable new development, competition also ensures quality and fair prices.

Function and fit specification- with this approach the function and the way the item is going to fit in the whole system is described. This is common in the computer and automobile industry where ESI is essential.

Brand or trade names- branding a product is done to develop reputation and thus gain repeat sales. Consumers develop preferences for brands. The branded products may attract higher prices than unbranded products. Branding ensures or pledges consistent quality from one purchase to the next. Describing brand names is quite simple, inspection cost are low. This however eliminates competition and the prices are relatively high.

Samples- samples are neither the cheapest nor the most satisfactory method of purchases. Money saved on description costs is usually exceeded in inspection costs. Samples should be used if other methods are not feasible

Markets grades- grading is a method of determining quality of commodities. A grade is determined by comparing a commodity standards previously agreed. Grading is restricted to natural commodities e.g., hides, cotton, tobacco etc. The grades are developed by commodity exchanges, trade associations, government agencies etc. The inspection of grades is expensive in terms of time, effort and money

Qualified products- where it's necessary to determine in advance of purchase whether a product can meet specification then it is crucial to qualify products. This exists in cases where:

- it takes too long to conduct post purchase inspection
- testing equipment is not commonly or immediately available
- purchase concerns safety equipment, life support equip, research equipment etc

After qualification products of approved suppliers can be put in a qualified product list

Combination of methods- many products can't be adequately described by a single method as such many or a combination of methods may be used

2.3 Transmission of the Need

i) ***The Stock Check***

Apart from the requisition originating from the stock/ inventory control section, in all other requisitions are checked to see if the requested items are carried in stock .if adequate stock is on hand, no purchase is necessary. If not, the requisition is adjusted to accommodate the inventory levels.

ii) ***Suppliers Selection and Preparation of the Purchase Order***

When the need has been adequately and precisely described the buyer begins an investigation of the market to identify potential sources of supply. For routine items for which supplier relationships have been already developed, little additional investigation may be required to select a good source. For high value items on the other hand, a lengthy investigation of the potential suppliers is mandatory

The firm may use cross functional teams to qualify a preliminary group of suppliers through supplier evaluation/appraisal procedures. The firm may then use the techniques of competitive bidding or negotiation or both to select the desired supplier

With the supplier selected the purchasing department proceeds to prepare and issue a serially numbered purchase order. This order in most cases becomes a legal contract document. For this reason, the quality and quantity requirements, price, delivery and shipping requirements etc. must be accurately and precisely specified. Conditions of acceptance should also be stated or referenced on the order.

Each firm should develop its terms and conditions of purchase in accordance with it own unique need. This condition is printed on the back of the purchase order. Several copies of each order are prepared and distributed to the relevant department e.g. accounts, receiving department, user, suppliers and purchasing

iii) ***Acknowledgement and Follow-up of the Order***

Normally the purchase order sent to the seller constitutes a legal offer to buy. A contract will only exist; when the seller accepts the buyer's offers. The seller acceptance can be in two forms

a) Performance of the contract

b) A formal notification that the contract is accepted

An acknowledgement form usually sent with the order indicates acceptance of the offer and whether the supplier will be able to meet the specified delivery dates. It is customary for the supplier to indicate its terms and conditions of sale on the order acceptance. In the view of the posture adopted by courts on this matter, it is crucial to review suppliers order acceptances with great care to rule out conflicting terms and conditions.

The purchasing department bears full responsibility for an order until the material is received and accepted, for this reason, active follow-up and attention is necessary to the orders meet their specific delivery dates. Expeditors may be used for follow-up activities.

2.4 Receipt and Inspection

The receiving agent/clerk uses the packing slip from the supplier that describes the contents of the shipment in conjunction with his/her purchase order copy to verify that the correct material has been received. After the inspection of the shipment for quantity and general condition, the receiving clerk issues a receiving report. This report is also copied to the relevant department i.e. purchasing, accounting and inspection.

The distribution of the inspection report is withheld until a technical inspection is done and only then is the shipment accepted. With the use of the certified suppliers for J-I-T and some partnering purchase arrangements the receiving and inspection function have been eliminated.

2.5 Invoice Audit and Completion of the Order

A typical invoice audit procedure involves the simultaneous review of the purchase order, receiving report and invoice. Comparing the purchasing order and receiving report ensures the material ordered was actually received. The invoice and purchasing order and receiving report ensure that the supplier bill is priced correctly and it covers proper quantity of material received.

Invoice, verifying its arithmetic accuracy ensures correctness of the total invoice figure. Invoice auditing should be conducted soon after receipt of the invoice to ensure prompt payment to obtain applicable cash discounts and maintain good supplier relationships.

Invoice auditing is an accounting function but in some instances it is performed by the purchasing department.

Closing the ordered entails consulting all documents in the closed order file will constitute; purchase requisition open-order file copy of the purchase order, acknowledgement and receiving report, inspection report and any correspondence pertaining to the order.

2.6 Purchasing and Supply Department Records

The following records are essential for the effective operation of most purchasing departments.

i) ***Records of open orders-*** Although practice varies widely each open order records contains; purchase requisitions working copy of purchase order, acknowledgement information, follow up data, notes and correspondence pertaining to the order.

ii) ***A record of closed orders-*** Provides a historical record of all completed orders,

iii) ***Purchase log-*** Provides a record of all purchase order issued. It constitutes or contains the purchase order number, status of the order, supplier's name, and brief description of the materials and total value of the order. In the event that the working copy of the purchase order is lost, basic draft concerning the purchase can be found in the log. The log can be recoded in journal or in the computer data base.

iv) ***Commodity record-*** Typically it include a complete description of the materials or service, with full reference to engineering drawings and specifications, approved supplier list and their price schedules, competitive quotations etc. This information is invaluable in repetitive purchase investigations.

v) ***Supplier record-*** It includes the address, telephone, names of contacts persons, selling terms and routing instructions for shipping purchases etc. This provides

a quick access to information about suppliers. This record additionally summarizes the supplier's delivery and quality performance.

vi) ***Contract record-*** In addiction to providing immediate access to all contract documents this file apprises buying persons of the materials purchased in this manner.

vii) **Special tool records-** Most firms have no need for this record. It is however necessary for firms that purchase items that requires special tooling for their manufacture. The records will show at a glance the special tools owned, age and location, and the essential mounting and operation characteristics.

2.7 Rush Orders

Rush orders are those made in urgency. Even in cases of emergency it's unwise to accept oral requisitions, too much chance for erroneous interpretation exist. A special procedure for handling rush requisitions is needed. The buyer should process the written rush requisitions immediately and phone emergency order to the supplier then mail a confirming purchase order

Only justifiable requests should receive rush order service since rush purchases attract higher prices and premium in transportation. As such efforts should be made to discourage all rush order that arise due to poor planning. This can be done by:

i) Coordinating the activities of the user dept or production scheduling and purchasing.

ii) Seeking the approval of the general management executive for requisition.

iii) Levying the requisitioning department a predetermined service charge for each emergency requisitions processed.

2.8 The Small-order Problem

An examination of the firms order file reveals that up to 80% of its purchase involves low expenditure items. Clearly no manger wants to devote more buying and clerical efforts to the expenditure of less than 20% of his/her buying funds than to the other 80%. The following are methods that a purchasing manager can use to minimize the small order problem.

i) Centralized Stores System

Items are ordered in large quantities and placed in an inventory system for withdrawal when needed. Economic order quantity may be used where item usage is relatively stable. There is a limit to the financial investment that a firm can place in inventory.

ii) Blanket Order System

Include a description of the item, unit price and other contract provisions. The quantity is however not noted. It notes the usage period usually 1-3 yrs and states that all requirements are to be delivered upon receipt of a release order from the buyer or other authorized person. When a requisition is made the buyer sends a brief release to the suppliers. Receiving reports are filled with the original order and checked against the supplier invoice at the end of the month.

This system;

a) Reduces clerical work in purchasing, accounting and receiving by reducing the purchasing orders

b) Releases buyers from routine work to concentrate on major issues.

c) Permit volume pricing by consolidating and grouping requirements.

d) Reduces buyers lead times and inventory levels.

e) Develops long term buyer-supplier relationships.

The system is subject to petty fraud and this requires effective control.

a) Numbered purchasing orders

b) Authorized delivery releases

c) Bona fide evidence of receipt of items

iii) System Contracting

This is a more sophisticated extension of the blanket order purchasing concept. It's sometimes called "stockless" purchasing. It is often a 1-5 yr contract with a supplier to purchase a large group of related materials which are described in detail in a catalog that becomes part of the contract. Estimated sage and fixed price for each item is included and as agreement by the supplier to a carry a stock of each item adequate to meet buyer's needs.

Through variations exists the users in the buying form will sally send requisitions directly to the suppliers holding the contract item. The supplier maintains a "tally sheet "identifying each by the requisition number and periodically submits the tally sheet to the buyer for payment with invoices attached.

iv) Term Contracting Coupled with MRP

First the buyer establishes a long term contract with a supplier then sends the supplier weekly or monthly MRP schedule. The MRP schedule acts as a purchase requisition and a purchasing order, suppliers simply devices to the schedule.

v) Telephone /Fax Order System

Under this system when the purchasing dept receives a requisitions, it does not prepare a formal purchasing order instead the order is placed by fax or phone and the requisitions is send in the receiving procedure. The price is determined during in had telephone conversation and is recorded in the requisitions. When the item is received as ordered the A/C dept users payment on the basic of purchase requisitions. This system goes a step further in elimination of the paper work.

vi) Electronic Ordering Systems

With this system the buyer places a purchase requisitions, in magnetic card form in the reader and deals the suppliers phone number then transmits the requisitions data over phone lines to the supplier's interpretation unit. Another approach is to have the buyer se a computer as an impact device and transmit data over phone lines to the supplier's computer which works as an output terminal. Clearly the use of electronic ordering system requires a blanket order or similar contractual arrangement with the supplier.

vii) Petty Cash and Cash on Delivery

Most firms use a petty cash fund to make small one-time purchases, some firms also find it economical to make small one-time purchase on cash on delivery basis material may be order by phone and payment made on arrival.

viii) Purchase Credit Card

Use of corporate credit card by employees for Maintenance Repair and Operations (MRO) purchases has become common over the recent years e.g. fuel cards. It reduces purchasing cycle time, improves purchasing relations with operating dept and makes the payment faster. The credit cards are issued to operating dept personal selected

by their supervisor. Through beneficial the credit card system offers exposure to risks for the firm;

a) Loss of control over what is actually purchased.

b) Possible disregard of departmental authorization and control.

c) Opportunity for petty fraud.

Control can be affected in the following ways

a) Select the suppliers where the cards can be used.

b) With the help of supervisors determine who receives credit cards.

c) Selecting purchases limits for such card.

ix) **Supplier Stores/Consignment System**

In this system if a buyer makes large volume purchases from the supplier, the supplier may staff a small store in the buyers premises and operate it an a consignment basis. Users can then go to the store and sign for their purchases. At the end of the month the firm is filled for its purchases. This is not a short term arrangement.

x) **Supplier Delivery System**

This system is somehow similar to the supplier stores system but it's more feasible for firms with small volume purchases. The buyer accumulates purchase requisitions and the supplier delivery person picks them on a specified day while at the same time delivery materials ordered in the proceeding requisitions. This recharges buyers paper work and in voluntary problems.

2.9 Purchasing Fraud

Examples of purchasing supply related fraud

i) Buyer/supplier collusion leading to approval for payment for fictitious charges.

ii) Presentation of false invoices.

iii) Re-presentation of genuine invoices that have not been cancelled at the time the cheque was signed for second payments.

iv) Arranging for lowest tender to come from a desired source.

v) Premature scrapping of assets in return for a "kick back" from a scrap dealer

vi) Computer based fraud that takes advantage of inadequate contort or limited understanding of computers on the part of fines management.

Prevention of purchasing fraud involves three methods:

a) Internal control

i) Ensuring separation between recording and custodian duties

ii) Delegation of requisition power to specified employees with authorized limits which increases with level of authority

iii) The requisitioning department may act as a control to purchase department since each order placed may be traced to a requisition. Goods inwards should be received at designated area preferably the gate or entrance and receipt of all good recorded. The record should be then distributed to the accounting and purchasing departments.

iv) Random invoice check

v) Institute system development control, organizational control and procedural controls with respect to computers

b) External auditing

Contrary to popular belief it's not an auditor's primary function to prevent fraud but to make an independent examination of the books, accounts, and vouchers of a business for purpose of reporting whether the balance sheet and profit and loss account reflects a true and fair view of the firm affairs. But in doing so external auditing serves as deterrents for fraud. External auditing is necessary under the companies Act.

c) Give away signs

i) Unfold invoices that have not come through post.

ii) Too many orders to one supplier other than those with single sourcing arrangements.

iii) Loss of supporting documentations

iv) Sudden unexplained affluence.

v) Unwillingness of employees to take holiday or accept transfers or promotion to other work.

2.10 Purchasing and Information Technology (IT)

Information Technology is the acquisition, processing, storage and dissemination of vocal**,** pictorial, textual and numeric information a microelectronics-based combination of computing and telecommunications. The major components of I.T. are therefore computers and telecommunications.

Information technology and its impact on daily operations

i) There will be lower costs of shopping in links to suppliers

ii) IT equipment will make records and reports available from a single recording of information.

iii) Peak loads and end of month overtime with the minimized or eliminated

iv) Items needed repeatedly and in large amounts will be purchased with greater efficiency.

v) Better management can be made because of the speed and accuracy with which information is available.

vi) It will relieve buyers and purchasing personnel of detailed work, permitting them to spend more time in activities requiring judgment.

vii) It will ensure prompt delivery of critical items on major capital projects.

viii) Exceptions requiring special handling will be handled well by the computer, reducing errors and delays.

ix) The computer will eliminate defensive records keeping on purchased items from which government contracts require proof that the buyer obtained adequate price quotations and paid prices consistent with the market.

x) It will reduce the cost o f accomplishing necessary manual clerical work in purchasing and related activities.

Disadvantages of IT

i) The procedure is inflexible and must be followed exactly while manual program permit deviations.

ii) Errors or omissions in putting information into the computer are more likely than when the information is manually posted.

iii) Since IT involves special equipment a company cannot use conventional equipment when the computer breaks down. Some major companies have

contract with data processing centers or other companies for emergency processing of data, but the arrangements are not ideal.

iv) A good IT programmer or department head must be well informed about company procedure and problems. It is difficult to hire or replace such employees.

Decision process on whether to computerize

When carrying out investigation to find out whether to computerize the system, the following questions should be addressed:

i) Will automation of purchasing and related activities lower the net cost of performing the function.

ii) Will it process all or most purchasing clerical function?

iii) Can it handle orders for complex as well as simple parts and materials and multiple items as well as single item orders?

iv) Will it handle rush orders as well as routine deliveries?

v) Will it be easy to install and operate, or will the conversion process and maintenance be difficult.

vi) Will it be compatible with other IT operations of the company or division?

vii) Does the information provided by the system have value?

viii) Will the cost of obtaining information for management be commensurate with its usefulness, or could it be obtained in a more economical way.

ix) Is the information to be provided by the system already available from some existing secondary source?

x) What personnel problems and needs will be generated by the conversion?

xi) Are many clerks involved in processing data at the moment (present?)

xii) What areas of application should be most rewarding? (This information will help establish a priority time –table or conversion schedule)

xiii) What changes in organization, policies and practices must be made.

xiv) Will purchasing be able to use the computer on a regular schedule

xv) What is the volume (percentage) of repetitive work (items ordered) as compared to non-repetitive work?

xvi) Will the program provide management by exception, freeing executives from the need to work through voluminous reports and allowing them instead to attend to matters requiring immediate action?

xvii) What are the intangible values that should result from timely information and reports to management goodwill from on-time deliveries or reports of order status, reduction in emergency orders as a result of grouping needs by product, family and improved trade relations by virtue of regularly monthly reports of specific commodity purchases by vendor?

xviii) What equipment would provide the desired information at the lowest cost with proper consideration given to future needs?

xix) What cost and savings will result from the automation of purchasing and related activities?

Data Capture

Data capture refers to the collection of data for input into a computer. A wide variety of methods are available, including the following:

i) Bar codes and light pens

ii) Concept Keyboards

iii) Digital cameras

iv) Electronic point of sale registers

v) Graphic pads

vi) Laser scanners

vii) Magnetic ink character recognition

viii) Magnetic stripe cards

ix) Mark sensing and optical character recognition

x) Questionnaires

xi) Scanners

xii) Sensors

xiii) Voice recognition.

It is important to ensure that the data capture is accurate.

Bar codes

Invented in the 1950s, bar codes accelerate the flow of product and information throughout the business community. The bar code is read by a laser scanner and sent to the computer. The description of the item is stored in the computer and in the case of supermarkets, the information is instantly sent back to the checkout where it is printed on the receipt.

Bar code applications

Some production applications of bar coding are:

i) Counting raw materials and finished goods inventories.

ii) Automatic sorting of cartons and bins and on conveyor belts.

iii) Lot tracking.

iv) Production reporting

v) Automatic warehouse applications including receiving, put away, picking and shipping

vi) Identification of production bottlenecks

vii) Package tracking

viii) Access control

ix) Tool cribs and spare parts issues

Benefits of bar coding

i) ***Faster data entry***- bar code scanners can record data 5- 7 times as fast as skilled typists

ii) ***Greater accuracy***- keyboard data entry creates an average of one error in 300 keystrokes. Bar code entry has an error rate of about 1 in 3 million.

iii) ***Reduces labour costs-*** through time saving and the increased productivity.

iv) ***Elimination of costly over-or-under stocking-*** and the increased efficiency of just-in-time inventory systems.

v) ***Better decision making***- Bar code systems can easily capture information that would be difficult to collect in other ways. This helps managers to make fully informed decisions.

vi) ***Faster access to information***

vii) ***The ability to automate warehousing***

viii) ***Greater responsiveness*** to customers and suppliers

Electronic Point of Sale (EPOs)

The most important purpose of using an EPOs system is to scan and capture information relating to goods sold. An EPOs system verifies, checks an d changes transactions, provides instant sales reports, monitors and changes prices, send intra and inter stores messages and stores data. The most familiar example of EPOs is the recording of retail stores sales by scanning product bar codes at the check out tills. In the context of retailing, the benefits of EPOs to customers and sellers include:

i) Reduced checkout times

ii) Provision of information to customers relating to products and prices

iii) Facilitation of payments by credit cards

iv) Reduction in labour costs by eliminating the need to mark products individually

v) Electronic article surveillance (EAS) can assist in the detection and prevention of shoplifting.

vi) Smart shelves which read and transmit data through the internet to store manages and manufactures notifying them when stocks are low, managers are thereby relieved of checking inventory or placing orders since automatically generated purchase orders enable suppliers to produce and replenish goods sold.

vii) EPOS also has applications in production supply chain management including vendor managed inventory (VMI) and collaborating planning, forecasting and replenishment (CPFR).

Captured data is fed into the computer using such devices as a keyboard, mouse, voice or scanner. Care must be taken to avoid mistakes when inputting data.

Electronic Data Interchange (EDI)

It is the technique based on agreed standards, which facilitates business transactions in standardized electronic form in an automated manner directly from computer application in one organization to an application in another. Data elements and codes are described in a directory relating to the message standard used. By the use of EDI, national and international organizations can trade electronically.

The advantages of EDI

i) The replacement of the paper documents e.g. purchase orders, acknowledgment, invoices etc used by buyers and sellers in commercial transactions, by standard electronic message conveyed between computers often without the need for human intervention.

ii) Reduction in lead times through buyers and suppliers working together in a real-time environment.

iii) Reduction in costs of inventory and release of working capital.

iv) Promotion of such strategies as Just-In-Time approach of purchasing

v) Better customer service

vi) Facilitation of global purchasing through international standards

vii) Facilitation of invoice payments by the computer-to-computer transfer of money (EFT) which eliminates the need for the preparation and posting of cheques.

viii) The integration of functions, particularly marketing, purchasing product and finance.

ix) EDI tends to promote long-term buyer-supplier relationships and increase mutual trust.

Factors to consider before adopting EDI

i) Ensure that exchanging information electronically supports the overall organizational strategy.

ii) Consider the cost and ramifications of EDI standard tools and techniques including implementation, software maintenance, manpower and participant training and how to promote systems and applications integration.

iii) Consider the organizational and process changes involved.

An organization can comfortably use EDI in a purchasing environment where the following factors exist:

i) There is a high volume of paperwork transaction documents

ii) There are numerous suppliers

iii) There is a long internal administration lead time associated with the purchasing cycle

iv) There is a desire for personnel reductions, new hire avoidance or both.

v) There is a need to increase the professionalism of purchasing personnel.

Limitations of EDI

i) It is an expensive system to install

ii) It is a cumbersome, static and inflexible method of transmitting data most suited to straightforward business transactions such as the placement of purchase orders for known requirements.

Review Questions

i) Describe the purchasing cycle

ii) Explain the requirements that specification must satisfy

iii) State the various types of specifications

iv) Explain the different types of purchasing and supply department records

v) Explain what is meant by the term rush orders? How can departments be discouraged from it?

vi) Describe the "small-order problem" and the approaches that an organization can employ to solve it

vii) Identify typical fraudulent activates in purchasing and supply and methods of prevention

viii) Describe the benefits bar coding and EDI for the purchasing and supply department

Suggested Further Readings

Michael Quayle (2005), *Purchasing and Supply Chain Management: Strategies and Realities*, Routledge, London

Benton W C (2007), *Purchasing and Supply Management*, Routledge, London

CHAPTER THREE

SOURCING

Learning Objectives

By the end of this chapter the learner should be able to:

i) Explain the various Sourcing levels

ii) Explain how a supplier assessment and appraisal is conducted

iii) Explain how a supplier performance rating is done

iv) Describe the factors considered in Make or buy decisions

v) Define the term outsourcing and explain the considerations made in deciding what to outsource

vi) Explain the benefits and limitations of international sourcing

vii) Describe the factors considered in deciding where to buy

3.1 Introduction

A ***source*** is a place from which something comes from or is obtained from. ***Sourcing*** is therefore a process of determination and selection of places/firms from with to acquire materials or services.

3. 2 Sourcing levels

a) Strategic sourcing

This is the process of creating a vale adding (or optional) mix of supply relationships to provide a competitive advantage. It is concerned with to-level, long term decisions relating to high-profit, high-supply-risk strategic items and low-profit, high-supply-risk both neck items. It is concerned with promotion of long-term policies relating to core competences, strategic make or buy decisions, partnerships sourcing, purchase of capital equipments, ethical issues etc.

b) Tactical and operational sourcing

It is concerned with lower level decisions to high-profit, low-risk non-critical items. It also involves short term adaptive decisions as to how and from where specific supplier requirements are to be met. As such suggestions may be made to top management regarding temporary tactical deviations from strategic decisions e.g. in light of supplier failure or reversed conditions of stock.

3.3 Sourcing Considerations

1. Sourcing information
2. Sourcing strategies, tactics and sourcing decisions

Sourcing Information Sourcing information relates to:

i) Analysis of market conditions

ii) Directives

iii) Suppliers sources

iv) Suppliers assessment

v) Supplier performance rating.

i)Analysis of Market Conditions

Why is this necessary?

a) Helps in forecasting the long term demand of products.

b) Assist in forecasting price trends of terms.

c) Indicates what alternative goods and supply sources are available.

d) Provides guidance on security of supply sources.

a) Primary data i.e. field research, company data e.g. on market shares etc.

b) Secondary data i.e. statistical data and report issued by external organization e.g. government sources such as census and gazette notices, non-government sources such as professional organizations e.g. KAM

ii) Directives

A directive is a general instruction. Typical directives relating to sourcing are to be issued by central and local governments, the European Union and companies. Mainly such directives are issued with regard to;

a) Health and safety issues

b) Establishment of common procedures

c) Competition

d) Equal opportunities for all EU suppliers

e) Companies top management also issues directives regarding inter company relations, reciprocal trading, etc for strategic reasons or otherwise.

iii) Supply sources

Sources of information relating to supply sources are: catalogues, trade directories, database, sales persons, exhibitions, trade journals, yellow pages, informal exchange of information between buyers, information provided by prospective suppliers etc. Buyers may require prospective supplier's fill questionnaires with the following subheadings to gain information from them:

a) General-firm names, address, turnover etc

b) Personnel-name of directors and responsibilities, no of workers and shop area covered

c) experience-products or services offered, previous orders placed, etc

d) facilities-major plants and equipments, communications facilities etc

iv) Supplier assessment and appraisal

Supplier appraisal may arise when:

a) A prospective vendor applies to be placed on the buyers approved list

b) Buyers wishes to assure him/herself that a supplier can meet requirements reliably

c) Items to be purchased are of critical importance

d) It is intended to adopt a policy of single sourcing based on partnership purchasing

Supplier appraisal can be undertaken through:

Desk research- this uses published or unpublished data already existing e.g. company reports, balance sheet reports, strike records etc

Field research- this will help additional data on technical production, management capacities etc. Field research is undertaken during visits to suppliers in order to ensure that important questions are not overlooked. A check list is invaluable during supplier visits; the check list should include the following

Personal attitudes:- Atmosphere of harmony among good workers; Degree of interest to customer service; Degree of energy displayed in getting work done; Use of man power- economical or extravagant.

Adequacy and ease of production equipment:- Modern or antiquated; Well care for by operators or neglected; Sufficient capacity to produce desired quantities; Technology know how of supervisory personnel.

Means of controlling quality:- Frequency of inspection during the product cycle; Employment of such techniques as statistical quality control

House keeping:- Is the plant orderly and clean

Competence of technical staff:- Knowledge of latest materials, tools and processes related to products and anticipated developments in their industry

Competence of management

v) Supplier Performance Rating

The purpose supplier performance rating is to:

a) Evaluate performance with respect to such factors as price, quality delivery service etc

b) Provide objective information on which judgment can be based relating to source selection.

c) Assist the buyer with information on areas where the supplier can improve.

Types of rating

a) Subjective rating

Subjective ratings have to do with the buyer's personal impression of the supplier. Subjective ratings have a tendency to be biased since they may be based on irrelevant impression or estimate of the supplier.

b) Quantitative rating

These have to do with actual data analysis. It aims to remedy deficiencies of subjective rating.

Categories under which suppliers are assessed and ranked

a) *Quality*- Declared/undeclared Non-conformance, Responsiveness, Administration

b) *Delivery*- Areas, Promise credibility, Early delivery, Responsiveness.

c) *Commercial*- Cost reduction, Competitiveness, Risks sharing Administration

d) *Technologies*- Process control, Computing links, Capital investment, Production capacity

e) Management-Task, People, Delegated authority.

A vendor-rating form is designed with the above categories. The categories ay be ranked out of a possible maximum of 20 to then added up to 100 or any other means as the firm may choose.

3.4 Sourcing Strategies and Tactics and Sourcing Decisions *The Supplier Base*

This relates to the range, location and characteristic of vendors from whom the external supply requirements of an undertaking are obtained. Factors influencing the supply base of an enterprise include

i) The core competences of an enterprise

ii) Make, buy, outsourcing and subcontracting decisions

iii) Single, multiple and partnership sourcing decision

iv) Tiering

v) International and global sourcing

vi) Counter trade inter-company trading and reciprocal trade

vii) Miscellaneous factor, large, small and local supplies

i) Core competences

Core competences are concerned with identifying particular strengths that give a firm an advantage over competitors and areas of weakness that need to be avoided. Finding out what the firm does best and enterprising to others needed goods and services that they do best is the key to strategic make or buy decisions.

ii) Make, buy, outsourcing and subcontracting decisions

a) Make or buy strategies and tactics

Make or buy decisions compare the best of producing a component or providing a service from an external supplier. There are three levels of make or buy decisions all of which are linked to the overall organizational strategy.

Strategic make or buy decisions

These decisions influence the firms manufacturing operation shape and capacity by determining;

- What product to make

- What investments to make in plant and equipment
- The framework for short term tactical and component decisions.
- Development of new products.

Tactical make or buy decisions

This deal with the issue of temporary imbalance in manufacturing capacity e.g. changes in demand may make it possible to make everything in house.

Components make or buy decisions

Made at the design stage this decisions have to do with whether a particular component should be made in-house on bought. Cost factor in make or buy decisions after require the application of marginal costing and break-even analysis

Marginal Costing- this is a principle whereby valuable costs are charged to cost units and the fixed costs attributable to the relevant period written off in full against the contributions for that period.

Contribution = Purchase Price minus Variable Cost per item

Illustration;

D.T. Dobie requires 10,000 shock absorbers for the assembly of Nissan pick-ups in Kenya. The company could make these shock absorbers or buy them from Monroe Shock Absorbers Ltd which sells its shocks at Ksh 1560. Only 30% of the fixed costs are recoverable if the component is bought. The following are the costs that D.T. Dobie would incur should it decide to make the shocks:

Items	***Ksh***
Materials	900
Labour	400
Variable. overheads	100
Fixed overheads	200

Should D.T Dobie buy or make the shocks?

	Make	***Buy***	***Difference***
Valuable costs *(900 + 400 + 100)*	1,400	1,560	160
Volume *(10,000)*	14,000,000	15,600,000	1,600,000
Fixed *(30 % of 200 × 10,000)*	600,000	600,000	-
	14,600,000	16,200,000	1,600,000

In consequences, buying instead of making profits would reduce by Ksh 1,000,000 i.e. (1,560,000 – 1,460,000). It is therefore advisable to make the shocks. This decision is made in light of the fact that fixed costs of Ksh 600,000 would likely continue since the capacity would be unused the fixed overheads would not be absorbed into production.

Question; If the buying price was reduced from 1560 to 1450 should the firm make the shocks or buy them?

	Make	***Buy***	***Difference***
Valuable costs	1,400	1,450	50
Volume *(10,000)*	14,000,000	14,500,000	500,000
Fixed costs	600,000	600,000	-
	14,600,000	15,100,000	500,000

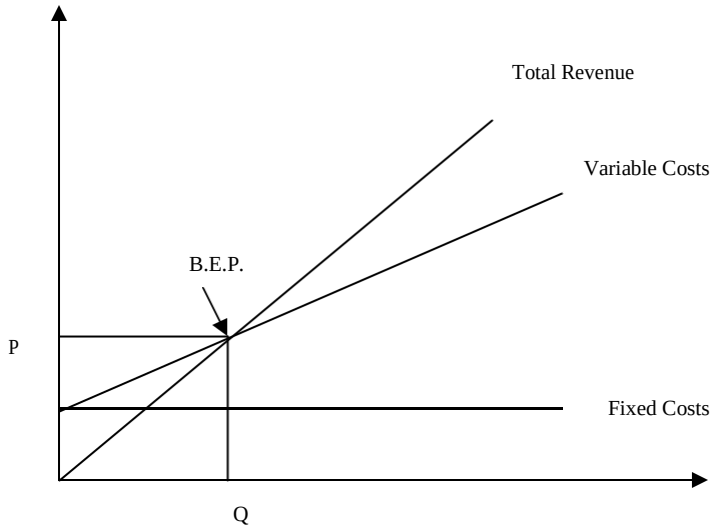
D.T Dobie should buy the shocks since by buying the firm will reduce the costs attributable to the shocks by 100,000 thereby earning the firm a profit of the same amount *(a shilling saved is a shilling earned)* i.e. if the firm was to make the final costs of the shock will be Ksh14,600,000, but it could buy them at Ksh. 14,500,000.

Break-even analysis- This is the determination of the level of activity in units or value at which total revenues equal total costs. Break even point (B.E.P) is given by

$$B.E.P = \frac{\quad}{P - V}$$

Where; F = Fixed Costs, P = Purchase Price and, V = Valuable Cost per Unit.

A Graphical Illustration of Break even point



$$B.E.P(Units) = \frac{Total\ Fixed\ Costs}{Selling\ Price - Variable\ Costs\ per\ Unit}$$

$$B.E.P(Kshs) = \frac{Fixed\ Costs}{Contribution\ Ratio} = \frac{Fixed\ Costs}{P/V}$$

$$Contribution\ Ratio = \frac{Sales - Variable\ Costs}{Sales} = 1 - \frac{Variable\ Costs}{Sales} = P/V$$

Calculate the B.E.P. using the D.T Dobie example;

$$B.E.P = \frac{F}{P - V} = \frac{600{,}000}{1{,}560 - 1{,}400} = \frac{600{,}000}{160} = 3750\ Shocks$$

This means that;

a) If only 3750 shock are required then one are will be indifferent on whether to make or buy

b) If more than 3750 shocks are required as is the case then it is wise to make

c) If less than 3750 shocks are required then buying is a better alternative.

Why is this so?

3750 Units	*3000 units*	*4000 units*
Make 5,250,000	4,200,000	5,600,000
Buy 5,850,000	4,680,000	6,240,000
600,000	480,000	640,000
Fixed cost- 600,000	600,000	600,000
0	- 120,000	+ 40,000

Example II

What would be the decision points if the price of the shocks were reduced from Ksh.1560 to Ksh 1450 using break even analysis?

$$B.E.P = \frac{F}{P - V} = \frac{600,000}{1,450 - 1,400} = \frac{600,000}{50} = 12,000 \ Shocks$$

They would need to produce 12,000 shocks to break even since the firm needs 10,000 shocks then they would rather buy.

Opportunity Cost- This is the potential benefit that is foregone because one course of action has been chosen over another, i.e. if the production facilities used in making the item had been applied to some alternative purpose.

Illustration

Using the D.T Dobie example, if instead of producing the shocks the facilities could be used to make suspension springs with a contribution of Ksh 175 each. Should D.T Dobie make the shocks or buy?

Making	***Buying but production capacity not used***	***Buying less opportunity cost***
Ksh 14,000,000	15,600,000	15,600,000
		- 1,750,000
		13,850,000

D.T Dobie should in this case buy the shocks why?

If D.T. Dobie buys the shocks and uses the facilities to make suspension springs the cost structure for both activities will be 13,850,000/= against a cost structure of

14,000,000 were the firm to make the shocks instead. Thus in buying the shocks D.T. Dobie will have made/ earned Ksh 150,000 (14,000,000 – 13,850,000)

Example II

Valuable D.T Dobie makes or buy the shocks if

i) The contribution of the suspension springs reduce of from 175/= to 160/= 1,560, 000– 1,600,000- ***(Same cost structure thus they would be indifferent)***

ii) The price of the shocks reduced from 1560/= to 1450/= with the contribution of the suspension springs at *(a)* 175/= and *(b)* 160/=

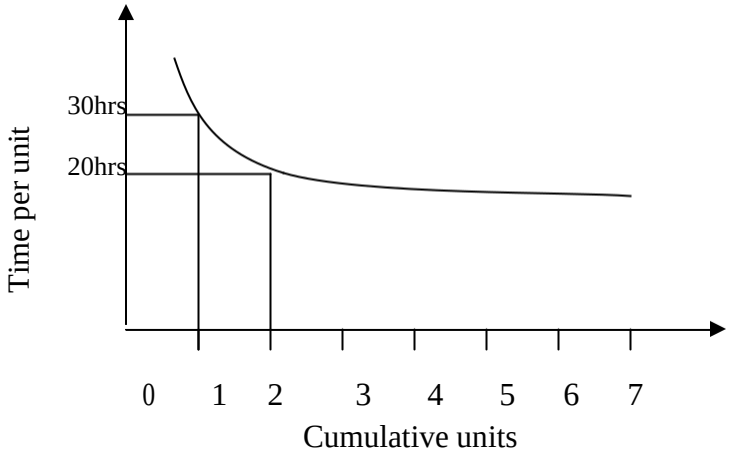
(a) 14,500,000	(b) 14,500,000
1,750,000	1,600,000
12,750,000	12,900,000

(a) They should buy the shocks

(b) They should buy the socks

Learning curves/Skill acquisition/Experience curve- This a graphical representation of the rate at which skills or knowledge is acquired is a period of time. The basis of learning curves is that "skill to do come by doing, i.e. a task is performed more quickly with each subsequence replication until a point is reached where no further improvement is possible and performance levels out.

The learning curve theorem states that each time the number of production units is doubled, the cumulative average labour hours per unit declines by a specific and constant percentage of the previous cumulative average. As shown in the graph below:



The learning curve effect is given by the expression:

$Yx = aX^b$

Where;

Yx = is the cumulative average time taken to produce x units

a = is the time taken to produce the first unit

b = the natural log learning curve improvement rate divided by natural log of doubling, tripping etc i.e. $\frac{\ln(learning\ \text{rate})}{\ln 2}$

Example

Assume that a certain process has an 80% learning curve effect and the first unit took 2000 hrs to produce.

Required:

a) Compute the number of hours required to produce the first 32 units

b) Compute the number of hours required to produce 32nd unit.

c) Assume that the wage rate is Kshs.100 per hour, compute the Labor cost of producing the last 16 units

a) The cumulative average time required to produce first 32 units

$r = 80\%\ or\ 0.8$

$b = \frac{\ln(learning\ \text{rate})}{\ln 2} = \frac{\ln 0.8}{\ln 2} = -0.3219$

$Y_{32} = a\ X^{\ b}$

$= 2000 \times 32^{-0.3219}$

$= 655.42hrs$

$= 655.42\ hrs \times 32$

$=$ ***<u>20,973.44 hrs</u>***

b) The cumulative average time required to produce the first 31 units

$Y_{31} = 2000 \times 31^{\ -0.3219}$

$= 662.16hrs$

$= 662.16 \times 31$

$= 20,526.96$

The cumulative average time taken to produce 32^{nd} unit is

= 655.42 × 32 - 662.16 × 31

= 20,973.44 – 20,526.96

*= **446.48hrs***

c) Assume that the wage rate is Kshs.100 per hour, compute the Labor cost of producing the last 16 units

Cumulative total hours for 32 units = 20,973.44

Cumulative total hours for the first 16 units = $(2000 \times 16^{-0.3219}) \times 16 = 13,108.22$.

Cumulative total hours for the last 16 units = 20,973.44 – 13,108.22 = 7,865.22

*The total labor cost for producing the last 16 units = 7,865.22 × KSh100 = **786,522***

Other considerations in make or buy decisions

a) ***Considerations in favour of making***

i) Cost considerations the major elements of the cost considerations are: Materials and labour costs; Follow on costs stemming from quality related problem; Incremental inventory carry on costs; Incremental factory overhead costs; Incremental management costs; Incremental purchase costs; Incremental costs of capital

ii) Desire to integrate plant operations

iii) Reproductive use of excess plant capacity to help absorb fixed costs

iv) Need to exert direct control over production and or quality.

v) Design secrecy required

vi) Unreliable suppliers

vii) Desire to maintain a stable work force (in periods of low sales)

viii) Potential lead time reduction

ix) Exchange rate risk

x) Greater purchasing power with bulk purchase of materials.

b) ***Considerations in favour of buying***

i) Cost considerations, (less to buy the part) major elements of the cost considerations are: Purchase price of the part; Transportation costs; Receiving

and inspection costs; Incremental purchasing costs; Any follow-on costs stemming from quality or service.

ii) Suppliers research and specialized know how

iii) Small volume requirements

iv) Limited protection facilities

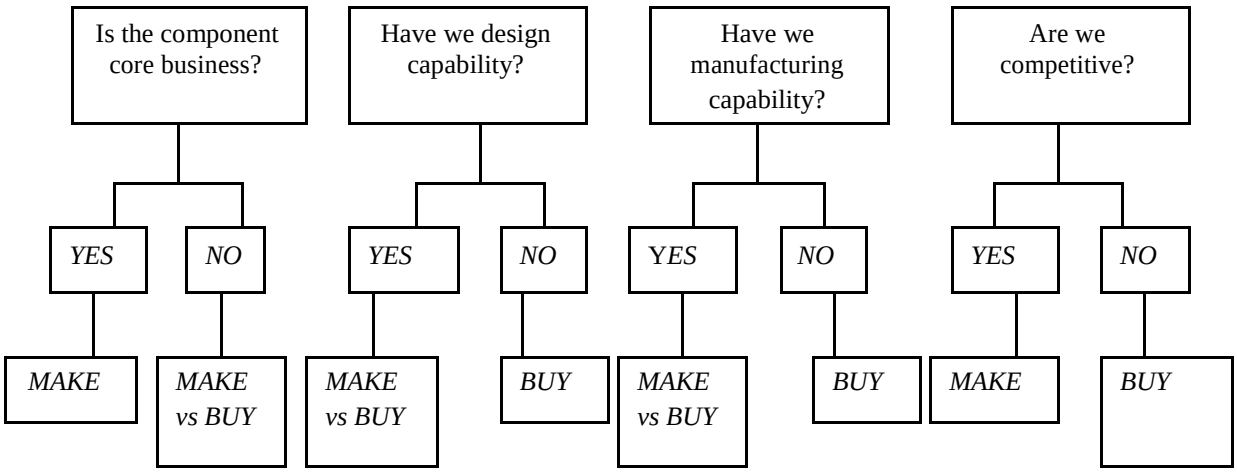
v) Desire to maintain stable work force in periods of increasing sales.

vi) Desire to maintain a multiple-source policy

vii) Indirect managerial control considerations.

viii) Spread of financial risk for purchaser and vendor.

3.5 Decision Process for Make or Buy



3.6 Outsourcing

This is the strategic use of resources to perform activities traditionally handled by international staff and their resources. An alternative definition is the buying in of components, sub-assemblers finished products and service from outside suppliers rather than supplying them internally. It is strategy by which an organization outsources non-core items to specialized efficient providers. Central to outsourcing are;

ix) Make or buy decisions

x) Partnerships between purchasers and suppliers

What should an organization outsource?

Other things being equal enterprises should outsource non-core activities and concentrate on its core activities. Examples of outsourced services include: Car park management; cleaning; building repair and maintenance; catering; security; waste disposal; medical/welfare etc.

Examples of what not to outsource

Management strategic planning; management of finance; control of supplies; supervision of the conformation of regulatory requirements e.g. product liability, public safety

Types of outsourcing

a) ***Body shop outsourcing-*** management uses of outsourcing to meet short-term requirements e.g. temporary shortage of in-house skills to meet temporary.

b) ***Project management outsourcing-*** use of outsourcing for all or part of a particular project e.g. development of new IT project

c) ***Total outsourcing-*** Where the outsourcing suppliers is given full responsibility for a selected area e.g. catering; security etc.

Benefit of outsourcing

a) Trees management time

b) Reduced staff costs

c) Increased flexibility

d) Cost certainty

e) Reduction in staff management problems

f) Improved consistency of service

g) Reduced capital requirements

h) Reduced risk

Problems of outsourcing

a) Redundancy costs

b) Quality of service maintenance problems

c) Long term commitment absent

d) Over dependence on suppliers

e) Lack of suppliers flexibility

f) Lack of management skills to control suppliers

g) Possible loss of competitive advantage particularly in the loss of skills and expertise of staff

h) Insufficient internal investment and the passing of knowledge and expertise to the supplier who may sieve the initiative.

Tiering

This is an aspect of lean supply which is defined as a state of business in which there is dynamic competition and collaboration of equals is the supply chain, aimed at adding value at minimum total cost, while maximizing end customer service and product quality. Lean thinking aims at eliminating waste such as spoiled production, unnecessary processing steps, uneconomic inventors etc. Tiering will therefore involve collaboration of several levels of suppliers to as tiers.

Example

The main feature of supply relationships between the car producers (called assemblers) and their suppliers are:

a) Purchase of whole components from sub-assemblers e.g. seats rather than constituent parts from first tier suppliers.

b) First tier suppliers have teams of second tier suppliers who may engage third or even fourth tier suppliers. Second and other tier companies make individual parts to drawings supplier by first-tier companies.

Reasons for tiering

a) Assemble may require first tier suppliers to integrate diverse technologies not possessed by one organization.

b) Some components required for systems are very specialized and this made by a small number of large firms e.g. electronic chips.

c) Third level of sub-contracted work is simple and low value added.

Consequences of tiering

a) High degree of shared design employing the skills and knowledge of both customers and suppliers.

b) High degree of supplier innovation in both products and process.

c) Close long term relationship btw network members involving a high level of level of trust, profit sharing and openness.

d) Use of rigorous grading systems to give way to suppliers self certification.

e) High degree of supplier co – ordination by the customer company at each level of the tiered structure.

International Sourcing

International, multinational and foreign sourcing are defined as buying outside the firm's country of manufacture in a way that does not co-ordinate requirements among world-wide business units of a single firm. Strategic global sourcing is defined as the integration and co-ordination of purchasing requirements among world-wide business units, looking at common items, process technologies and suppliers.

Why source internationally?

a) Intense international competition

b) Pressure to reduce costs

c) Need for manufacturing flexibility

d) Ever changing technology (reduction in cost and increase in quality)

e) Domestic non-availability (not found within the country.

f) Insufficient domestic capacity to meet demand (locally products goods are not enough)

g) Insurance- to ensure continuity of supply.

h) Competitiveness of oversees sources e.g. lower prices.

i) Reciprocal trading and counter trade due to policy reasons or government pressures (so as to an export orders)

j) To obtain penetration of a growth market.

Problems in international sourcing

a) Contact with suppliers is more difficult.

b) Longer negotiation time

c) Currency difficulties

d) Legal difficulties (rules and regulations)

e) Redress of complaints (jurisdiction issues)

f) Delays in delivery due to weather, dock strikes etc

g) Appointment of agents

Supply partnerships

Many favour establishment of long term relationships between buying and supplying firms. A supply partnership is a collaborative relationship between buyer and seller which recognize some degree of interdependence circle co-operation on a specific project or for a specific purchase agreement. It calls for sharing of forecasted demand and cost data and must contain as element of trust and respect.

Areas that may require partnership sourcing

a) Technically complex components where costs of switching could be prohibitive.

b) Areas where knowing future technology or trend is critical

c) Restricted markets with few reliable or competent suppliers, closer links with suppliers may improve security

Forming successful partnerships requires the following

a) Determination common objectives

b) Consistency of procedures in the development of the supply chain.

c) Gradual integration of functions on the road forwards high level strategic intervention

Problem of partnership sourcing

a) *Termination of relationships*- aim should be amicably

b) *Over-dependence* on the supplier

c) *Confidentiality*- where the supplier is also a competitor's supplier.

d) *Complacency*- To avoid this regular meetings of multi-functional buying team to review competitiveness

e) *Attitudes*- Require retraining of adversarial buyers and sales force to adjust to new philosophy.

f) *Contractual*- Agreements should be letters of interest which are updated depending on forecasts.

Reciprocal Trade

Reciprocity is defined as mutual concession of advantages or privileges as forming basis of commercial relations

Types of reciprocity

a) *External*- suppliers and buyers have no relation

b) *Internal*- suppliers and buys are members of the same group.

Types of external reciprocity

a) *Two-way reciprocity* e.g. firestone agrees to buy forklifts from caterpillar on condition that caterpillar buys types from firestone.

b) *Multi-reciprocity* – e.g. A- *(a building contractor)* agrees to buy from B- *(a block maker)* on condition that B buys from C- *(a cement maker)* who is a substantial customer to A.

Advantages of reciprocity

a) Both buyer and supplier benefit from exchange of orders.

b) Greater understanding of mutual problems thereby increasing goodwill.

c) Elimination of intermediaries and marketing costs.

Disadvantages of reciprocity

a) Costs may rise due to reduced competitive position

b) Marketing efforts may become slack.

c) Disputes may once where volumes are unequal

d) Opportunity to buy cheaper , better quality alternatives may be derived

e) Difficulties may once in finding alternative suppliers during emergencies.

f) In practice it's difficult to terminate reciprocity amicability.

Countertrade

This is a form of international reciprocity in which an order is placed by a purchaser with a supplier in another country on condition that goods to an equal or specified value are sold in the opposite direction

Forms of counter trade

a) ***Barter/swaps-*** Simultaneous exchange of goods or services (no cash)

b) ***Counter purchase-*** Y sells to country X with the understanding that a percentage of the sales proceeds are to be uses on importing goods from country X in cash

c) ***Buy-back/compensation-*** Exporter agrees to accept full or partial payment in products by the importer.

d) ***Switch trading-*** Country X sells goods to country Y, Y credits X with the value of goods that it can buy from Y, but X not willing to buy from Y sells the credit to a third party trading house at a discount . The trading house sells the credits at a profit to any country wishing to buy goods from Y. Switch trading is used to overcome an imbalance of money by a trading partner

e) ***Offset-*** similar to counter purchase only that a percentage of the exchange can be in barter.

Purchasing can play a major part in countertrade by;

a) Identifying low-cost sources of supply for counter trade exploitation.

b) Provision of negotiating expertise in counter trade arrangements

c) Ensuring quality of goods in counter trade.

d) Finding internal uses of counter trade partnerships

Advantages of countertrade

a) Avoid exchange controls

b) Promotes trade with countries with inconvertible currencies

c) Reduces exchange risks of unstable currencies

d) Enables entry to new or formerly closed markets.

e) Reduces foreign protectionism.

f) Finds valuable outlets for declining

products. Disadvantages of counter trade

- Negotiations of counter trade takes long -

Additional expenses erg brokerages fees. -

There may be difficulties in quality

- Pricing problems.

Intra-Company Trading

This applies to large enterprises and conglomerate where the possibility arises of buying certain materials from a member of the group e.g. U.D.V. a member of E.A.B. may source bottles from Central Glass Industries also a member of E.A.B. In intra-company trading the policy is to support internal suppliers to the fullest extent and to develop product and service quality to the same standards as those available in the external market.

Subcontracting

Common in construction industry the client hands over performance of sections of the contract to other parties who will be responsible to the client while the overall contract performance remains with the client. Reasons fro subcontracting include:

a) Over-loading of machinery or labour

b) To ensure completion of work on time

c) Lack of specialist machinery or specialist know-how

d) To avoid acquiring long-term capacity when future demand is uncertain.

e) Subcontracting is cheaper.

3.7 Local Suppliers

What is local is determined bearing in mind the ease of transportation and communication. Advantages of using local suppliers

a) Closer co-operation based on personal relationships is facilitated

b) Social responsibility-" Supporting local industries" is shown

c) Reduced transport costs

d) Improved availability is emergency situations

e) Development of subsidiary industries is encouraged

Deciding whether to use small or large

suppliers Advantages for small suppliers

a) Closer attention to buyers requirements

b) Relationships especially at executive level more personal

c) Special assistance requests from buyers is more rapid

Note: Governments discourage anticompetitive practices that can force small enterprises out of business e.g. delayed payments.

Advantages of large suppliers

a) Reserve capacity to cope with extra work and cope with emergencies

b) Special facilities and knowledge can be made available to the buyers

c) There is less danger of supplier becoming too reliant on the buyers business

3.8 Factors in Deciding Where to Buy

i) ***General considerations***

a) Current and projected level of business for the item

b) Have we sourced the item before?

c) Within what time scale is the item required? etc

ii) ***Strategic considerations***

a) What source will offer greatest competitive advantage in price, quality security if supply? etc

b) Does the source offer possibilities of joint product development reciprocal or counter trade? etc

c) What relationships does the supplier have with our competitors?

d) What risk factors are attached to the purchase?

iii) ***Product factors***

a) Is special tooling required?

b) Is the product special or standardized?

c) In what cost size is the product manufactured?

iv) Supplier factors

a) Performance on delivery, quality etc

b) Size

c) Willingness to share risk etc

v) ***Personal factors***

This relates to psychological and behavioral aspects of those involved in making buying decisions in the firm such as:

a) Background- education, job orientation

b) Satisfaction with past purchase, time pressure, risk etc.

Review Questions

i) *Explain how a supplier assessment and appraisal is conducted and state the situations when it is necessary*

ii) *Explain the rationale for conducting a supplier performance rating*

iii) *Describe the factors considered in Make or buy decisions*

iv)	*Define the term outsourcing and explain the considerations made in deciding what to outsource*
v)	*Explain the benefits and limitations of international sourcing*
vi)	*Describe the factors considered in deciding where to buy*
vii)	*What is the role of the purchasing department in counter trade?*
viii)	*Discus the limitations of partnership sourcing*
ix)	*Why is a market analysis necessary in sourcing?*

Suggested Further Readings

Sudhi Seshadri (2005) *Sourcing Strategy: Principles, Policy and Designs,* PVT publishers, New Delhi

Elizabeth Anne Sparrow (2007), *Guide To Global Sourcing,* Prentice Hall, Chicago

Larry Paquette (2004), *Sourcing Solution,* Routledge, London

CHAPTER FOUR

STOCK AND STOCK CONTROL

Learning Objectives

By the end of this chapter the learner should be able to:

i) State reasons for holding stock

ii) Explain role played by stock records

iii) Describe the various types of inventories/stocks

iv) Identify the costs associates with inventories

v) Describe the economic order quantity concept (EOQ)

vi) Describe the various Stock/inventory control systems

4.1 Introduction

Materials held by the organization in its stores or otherwise constitute its stock. In the ideal would stockholding would not be necessary. Demand and supply would be synchronized and materials would flow o the point of use at a rate matching the speed of consumption. This is however not the case in the real world

4.2 Reasons for Holding Stock

i) Delivery cannot be exactly matched with usage day by day

ii) Economies associates with buying or manufacturing in large quantities more than offset the cost of storage

iii) Operational risks require the holding of stock to guard against breakdown on programme changes

iv) For work in progress where a completely balanced production flow is impracticable

v) For finished goods where the holding of a buffer stock between production and the customer is desirable

vi) Owing to fluctuations is the price of a commodity it is desirable to acquire stocks when prices are low.

vii) In order that materials may appreciate in value through storage e.g. wine, coffee etc.

viii) In order that customers may be attracted by a range of products from which to select.

The weight given to each of these factors depends upon the type of organization and the approach to stock control will naturally be influenced by the nature of the firm's activity. In order to adequately maintain its stock a firm must maintain stock records.

Role played by Stock Records

i) To indicate the amount of stock of any item at any time without it being necessary for the stock to be counted physically.

ii) To establish a link between the physical stock and the stores accounts. All receipts and issues of stock cause adjustments to the stores accounts

iii) To provide a means of provisioning i.e. determining how much should be ordered to maintain stock at the required level.

iv) To supply information for stock taking, i.e matching records with physical stocks for control.

v) to provide a method of informing stores staff of the location of goods in the stores

vi) to serve the purpose of a price list where unit prices are recorded

Definition of Inventories/Stocks

i) ***Production inventories-*** raw materials, parts and components which enter the firm's product in the production process.

ii) ***MRO inventories-*** maintenance repair and operating supplies which are used in the production process but which do not become part of the product e.g. lubricants

iii) ***In-process inventories-*** semi finished products found at various stages of the production operation

iv) ***Finished goods inventories-*** completed goods ready for shipment.

Stock/Inventory Analysis

This is the process of determination and classification of all that is held in stock by the firm. Sound inventory management requires the development of a complete inventory catalogue followed by a thorough ABC analysis

Inventory Catalog

An inventory catalog is some form of classification of inventory items in some type of categories the most common category is the function of the items. For an inventory catalog to be prepared all inventory items have to be completely described , identified by the manufacturers part number and cross- indexed by users identification number if necessary. Inventory catalogs are very useful in:

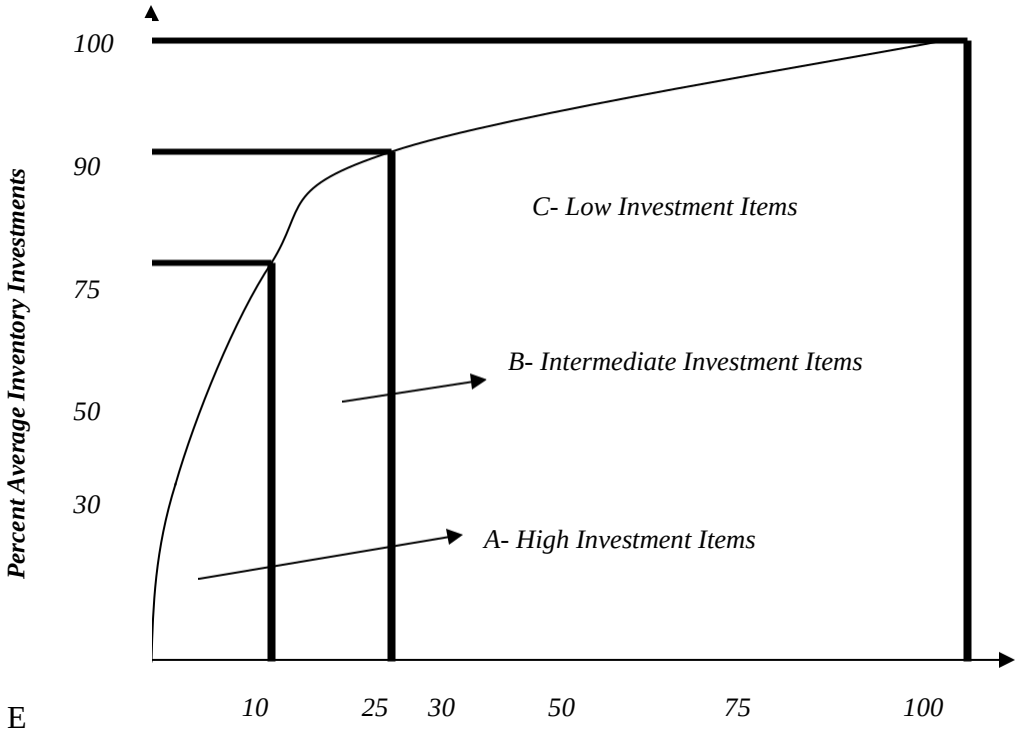
i) Serving a medium of communication by enabling staff to tell which items are carried in the inventory, whether interchangeable items are carried in the inventory for missing items. etc

ii) Acting as an inventory control tool through reduction of duplicate records for identified parts.

4.3 ABC Analysis: The 80-20 Concept

ABC analysis is also called Pareto analysis after Vilfredo Pareto an Italian economist who developed the concept during the early 20^{th} century. Several studies made of large corporations have shown that 80% of all items carried in the inventory constitute 20% of the total investment while 20%of inventory items constitute 80 of total investment. In practice an ABC analysis can be made on the basis of either the average inventory investment in each item or the arrival shilling usage of each item.

A Graphic ABC Analysis of Production and MRO Inventories



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Each item value is expressed as a percentage of the total inventory investment. Each item can be the fitted on the three classifications A, B, and C depending on the items percentage investments over the total inventory investment. The value of such an analysis so to provide a sound basis on which allocate time and personnel with respect to procurement management and the refinement of control over the individual inventory items. Clearly no manager wants to spent 75% of his time on class C low-value items and spend 25% of his time on class A high-value items

An additional classification dependant on criticalness of each item can be added to the ABC system. This classification is on a three-point scale; 1- critical, 2 medium, 3 non critical. Thus an item can be A1, A2, or A3 etc

Dependent and independent demand

Another part of inventory analysis that enables proper and efficient management to inventory is the determination of whether each of the inventory items is demand

dependant or demand independent. An item exhibits dependant demand characteristics when its use is directly dependant on the scheduled production of a larger component or parent's product of which the item is part e.g. cooking oil or yeast in the making of bread.

An item has independent demand when its use is not directly dependant as the scheduled production e.g. oven repair parts in bread making. Infant generally spacing MRO items are independent demand items. Though such a classification may seem simple it is very crucial for inventory control systems function more effectively with one type of item classification than with the other.

4.4 Costs Associates with Inventories

i) ***Inventory Carrying Costs-*** this costs include:

a) Opportunity cost of invested funds

b) Insurance costs

c) Property taxes – inventories are assets and assets are subjects too properly taxes.

d) Storage costs- square ft used in storage

e) Obsolesce and deterioration

If the firm can estimate its approximate inventory carrying cost as a percentage of inventory valve based on the above costs, then the annual delivery quantities of various sizes can be calculated a follows:

$$CC = \frac{Q}{2} \times C \times I$$

Where:

CC = Carrying cost per year for the material in question

Q = Order or delivery quantity for the material in units (if order is delivered in full use order, if in parts use delivery quantities) C = Delivered unit cost of the material

I = Inventory carrying cost of the material expressed as a percentage of inventory value

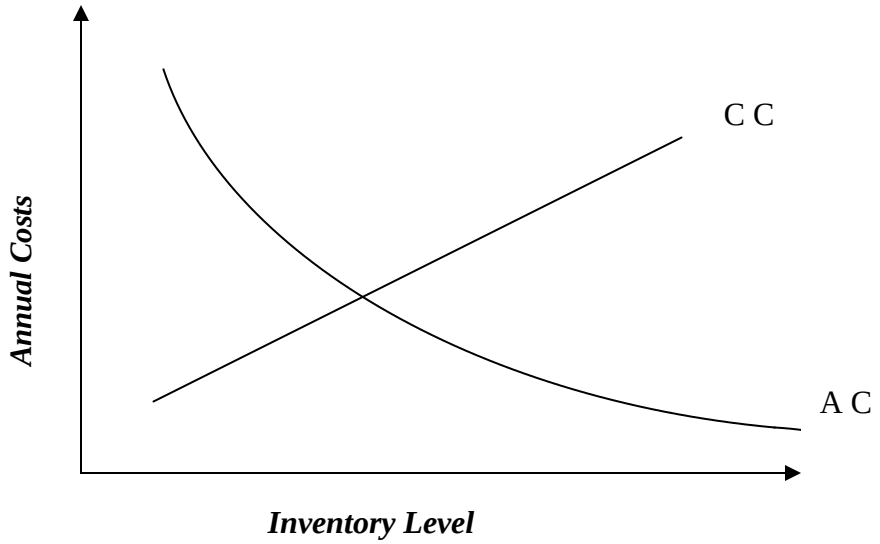
ii) ***Acquisition Costs-*** This are costs that have to do with gathering ,processing and handling an order, they include:

a) A certain portion of wages and operating expenses

b) Cost of supplies e.g. design drawings, receiving, inspection

c) Cost of services e.g. computer time, telephone, fax etc

Acquisition costs behave differently from carrying costs. The acquisition cost reduce an s few large orders are made, while carrying coat increase as large orders are made and delivered.



If a firm's cost accounting departments can estimate its approximate acquisition cost per order, the annual acquisition cost that would be generated by the order quantities as various sizes can be calculated as follows;

$$AC = \frac{U}{Q} \times A$$

Where;

AC = Acquisition cost per year for the material in question

U = Expected annual usage of the material in units

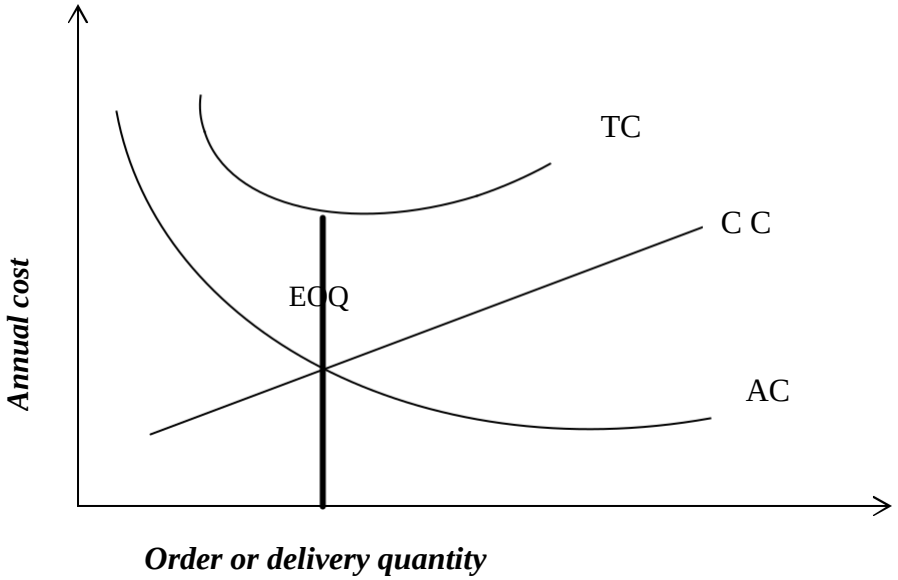
Q = Order or delivery quantity of the material in units

A = Acquisition cost per order or over delivery for the material

4.5 Economic Order Quantity Concept (EOQ)

After understanding the costs associated with inventories, the most important decision facing purchasing managers is the determination of the most economic level of

inventory to carry. This brings out the EOQ concepts. Since the annual carrying costs increase as large orders are delivered and acquisition costs reduce as large orders are delivered. Then at the point where CC = AC this forms the EOQ because it is at this point the total cost are lowest.



Mathematically EOQ will occur when $CC = AC$ i.e. $\frac{QCI}{2} = \frac{UA}{Q}$

Solving for Q, $Q^2CI = 2UA$, $Q = \sqrt{\frac{2UA}{CI}}$

4.6 Inventory Control Systems

There are four types of inventory control systems in use

i) Cyclical or fixed order interval system

ii) The J-I-T approach

iii) The MRP type system

iv) The order point or fixed order quantity system

i) Cyclical or Fixed Order Interval System

This is a time based operation which involves scheduled periodic reviews of the level of all inventory items. If a given item is not sufficient to sustain the production

operation until the next scheduled review an order is placed to replenish supply. The frequency of reviews is determined by the degree of control desired by the management

The stock levels can be monitored by physical inspection, visual reviews of inventory record cards or by automatic computer surveillance. The date on which to order is determined by the quantity previously ordered. If the material usage is relatively stable, an order is usually placed each time the item is reviewed. The quantity to be ordered is determined by three factors:

a) Number of days between reviews

b) The anticipated daily usage during the cycle period

c) The quantity on hand and on order at the time of review

Stock Replacement Level = (Lead Time + Review Intervals) usage + safety stock

Therefore Stock to Order = Replacement Level - stock in hand.

The maximum stock can be determined as follows: $M = W(T + L) +$

S Where;

M **=** Predetermined stock level; ***W*** **=** Average rate of usage; ***T*** **=** Review period

L **=** Lead time; ***S*** **=** Safety stock

Safety stock is given by {(maximum usage × maximum lead time) – average use in maximum lead time}.

Illustrations

a) The relevant data for item Q is shown below:

Normal usage-100 item

Minimum usage-160 items

Maximum usage-25/30) days

Calculate the safety stock

$= 4200 - 3000$

$=$ ***1200 items***

b) What is the maximum stock level given the following data:

Average rate of wage- 120 items per day

Review period - 20 days

Lead time- 25/30 days

Safety stock- 1200 items

M = 120 (20+30) + 1200

*= 600 +1200 =**7200 items***

If at the review period the items are 4,000 then an order would be placed of 3,200 items i.e. 7200 maximum stock minus actual stock at the review date.

Advantages of the Period Review System

a) Greater chance of elimination of absolute items due to periodic review of stock.

b) Purchasing load may spread more evenly with possible economics in placing orders.

c) Large quantity discounts may be negotiable when a range of stock items are ordered from the same supplier at the time.

d) Production economics due to more efficient production panning.

Disadvantages of the Periodic Review System

a) Generally larger stocks are enquired than with other systems.

b) Re-orders quantities not based on EOQ.

c) If usage rate changes shortly after reviews, stock outs may occur.

d) Difficulties in determining review records unless demand is consistent.

ii) Order Point or Fixed Order Quantity System

This system is on order point and quantity factors rather than on the time. This method involves safety min, remedy listening and max. Each inventory item needs two things;

a) The predetermination of an order point- this calls for automatic re-ordering when the stock levels reach this point.

b) The predetermination of a fixed quantity to be ordered.

Under this system the fixed quantity can be determined by EOQ. The most important control levels are calculated as in the following example:

Normal usage	*100 items*
Minimum usage	*60 items*
Maximum usage	*140 items*
Lead time	*25/30 days*

EOQ		*500 items (determined already)*
a)	*Re-order point*	*= MaxUsage × Max Lead Time* = 14 × 30 = 4,200 *Items*
b)	*Safety/buffer stock*	*Re-order point minus average use in maximum lead time* *= 4,200- (100 × 30)* *=1,200 Items*
c)	*Minimum stock*	*= Re-order point minus average use for average lead time* *= 4,200- (100 × 275)* *= 1,450 Items*
d)	*Maximum stock*	*= Re-order point plus EOQ minus minimum anticipated usage in minimum lead time.* *= 4,200 + 500- (60×25)* *= 9,200 - 1,500* *= 7,700 Items*

Usually it may be necessary to take into account items already allocated to back into and scheduled receipt from already placed orders but not yet delivered. The inventory position (I.P), i.e. the items ability to satisfy future demand relying only on the future receipts can be given by:

IP=OH+SR–BO

Where;

I P = The inventory position of the item (in units)
O H= Number of units in on-hand inventory
S R= Schedule receipts (open orders)
B O= Number of units either back ordered or allocated

Example:

Inventory on hand *(OH) =30 items*

Re-order point *(R) =230 items*

Back orders *(B) =20 items*

One open order *(SR) = 400 items*

Should an order be placed?

IP=OH+SR–BO

= 30+400–20

= ***410 items***

Since IP exceeds R i.e. (410-230) it is not necessary to re-order

Two-Bin System

This is a variation of the basic order point system. The distinguishing feature of this system is the absence of a perpetual inventory record. In practice the stock is placed in two containers. Bin A contains stock equal to reorder point figure while B contains stock equal to the difference between the maximum and reorder point stock figures. Stock is used from bin B and when stock is deplete it signal re-ordering. The advantage of this method is the obvious reduction of clerical work, while the disadvantage is that it requires more space due to the separation of stock and also used when consumption rate is constant.

Advantages of the Fixed Order Point System

a) Has lower stocks than with the period review system

b) EOQ is applicable

c) Enhanced responsiveness to demand fluctuations

d) Automatic generation of replacement orders.

e) Reduction in clerical work.

Disadvantages of the fixed order point system

a) Re-ordering system may be over loaded where many items reach the re-ordered point at the same time.

b) Where conditions of varying demand EOQ calculations may be in accurate

iii) The just –in-Time (J-I-T) Approach (Programmed Deliveries)

J-I-T is an operating management philosophy the operating concept of the system is to gear factory output tightly to distribution demand for finished goods to gear individual feeder production units tightly together, and to gear the supply of production inventories tightly to the manufacturing demand schedule. This means that all inventories in the system including production inventions are maintained at absolutely minimal levels.

It should be pointed that as practical matter only a small percentage of materials in firm will utilize the J-I-T approach. Specifically high value items. JIT approach functions much like a flow control operations, only more stringently controlled.

JIT approach works well in a continuous processing or manufacturing operations processing or manufacturing operations. As for when and low much to order the buyer and supply work together on matters of delivery volumes and scheduling. This means the operation of more cooperative relationship e.g. partnering between buyer and supplier.

Advantages of JIT approach

a) ***Parts cost-*** lower scrap costs; Lower inventory carrying costs

b) ***Quality-*** fast detection of and correction of unsatisfactory quality

c) ***Design-*** fast response to engineering change requirements

d) ***Administrative efficiency-*** fewer suppliers; minimal expediting; simplified receiving activities

e) ***Productivity-*** reduced network, reduced inspection delays.

f) ***Capital requirements***- reduced inventories of raw materials purchased parts, work-in-progress and finished goods.

Disadvantages of JIT approach

a) Faculty forecasting may lead to stock outs.

b) JIT requires establishment of system to link p buyers of suppliers

c) lack of safety stocks makes firms highly vulnerable to supply fail

d) Removes advantage of bill buying e.g. reduced prices.

e) Requires much training to break down barriers between functions in the organization.

vi) Materials Requirement Planning (MRP) System

MRP is a product oriented computerized technique aimed at minimizing inventory and maintaining delivery schedules. Through a bill of materials (BOM) or Engineering bill and an aggregation process this system generates on a weekly basis the projected materials requirements for all the finished products. The system then calculates the net requirement by subtracting on-hand inventory and any scheduled receipt for the item as

production is scheduled to programmed the or the planning period. The inventory carried in this system is a functional of three factors;

a) Quantity purchased when each order is placed

b) The purchase lead time

c) Any safety stock that is routinely carried

This system is designed for the use with demand dependent items (production Items)

The aim of MRP is to:

a) Synchronize ordering and delivery of materials with production requirements.

b) Achieve planned and controlled inventory to ensure items are available when needed.

c) To promote planning between buyer and seller

d) Enable repaid responses to materials shortages.

Expansions of MRP

Manufacturing resource planning (MRPII) - It's wider than (MRP) by including all resources entering the production including manpower, machines and money.

Distributions requirement planning (DRP) - DRP uses MRP concept to the distribution of goods. Its aim is to ensure that goods are available on sale when needed. As in MRP, DRP also has DRPII

Logistics requirements planning (LRP) - Successful implementation of LRP are as yet few. The idea of LRP is to combine MRP and DRP system to enable a comprehensive planning system which co-ordinates materials requirements entering the firm, other resources connected with conversion and distributions requirements connecting worth the customers.

Factors Considered When Setting Stock Levels

a) Unit of issue- kg, meter, grammar, tones.

b) Probable requirements –estimates of future usage

c) Availability of supply

d) Frequency of delivery- depending on geographical distance

e) Price discounts for quantities.

f) Cost of ordering

g) Seasonal fluctuations

h) Standard ordering quantities

i) Obsolescence

j) High value items- the largest proportion of stock is composed of a small number of expensive article with high consumption rate and use. Fluctuations affects stock holding by affecting the total stock investments.

Review Questions

i) *State reasons for holding stock*

ii) *Explain role played by stock records*

iii) *Describe the various types of inventories/stocks*

iv) *Identify the various costs associates with inventories*

v) *Describe the economic order quantity concept (EOQ)*

vi) *Describe the various stock/inventory control systems and give their advantages and disadvantages*

vii) *Describe the factors considered when setting stock levels*

Suggested Further Readings

Fiona Biggs (2002), *Storage Solutions*, Routledge, London

Bowersox D. J. (2007) *Supply Chain Logistics Management* 2nd Edition Tata McGraw Hill, New Delhi

Alan Branch (2008), *Global Supply Chain Management And International Logistics*, Prentice Hall, Chicago

CHAPTER FIVE

PHYSICAL DISTRIBUTION

Learning Objectives

By the end of this chapter the learner should be able to:

i) Describe the elements of a physical distribution

ii) Identity the different types of transportation

iii) Explain the functions of warehouses

iv) State the different types of Storage Media

v) Identify the different types of inspections

vi) Identify the different types of storage equipment

vii) Explain the factors considered in deciding on the Location and layout of a warehouse

5.1 Elements of a Physical Distribution

Physical distribution is the set of activities concerned with efficient movement of finished goods from the end of the production operation to the consumer. Physical distribution takes place within numerous wholesaling and retailing distribution channels, and includes such important decision areas as:

i) Customer service,

ii) Inventory control,

iii) Materials handling,

iv) Protective packaging,

v) Order procession,

vi) Transportation,

vii) Warehouse site selection, and warehousing.

Physical distribution is part of a larger process called "distribution," which includes wholesale and retail marketing, as well the physical movement of products. By storing goods in convenient locations for shipment to wholesalers and retailers, and by creating fast, reliable means of moving the goods, business owners can help assure continued success in a rapidly changing, competitive global market. The importance of physical distribution is also based on its relevance to customer satisfaction.

Physical distribution can be viewed as a system of components linked together for the efficient movement of products. Businesses can ask the following questions in addressing these components:

i) ***Customer service-*** What level of customer service should be provided?

ii) ***Order processing-*** How should the orders be handled?

iii) ***Inventory control-*** How much inventory should be maintained at each location?

iv) ***Transportation-*** How will the products be shipped?

v) ***Warehousing-*** Where will the goods be located? How many warehouses should be utilized?

vi) ***Materials handling-*** How can efficient methods be developed for handling goods in the factory, warehouse, and transport terminals?

These components are interrelated: decisions made in one area affect the relative efficiency of others. For example, a business that provides customized personal computers may transport finished products by air rather than by truck, as faster delivery times may allow lower inventory costs, which would more than offset the higher cost of air transport. Viewing physical distribution from a systems perspective can be the key to providing a defined level of customer service at the lowest possible cost.

Customer Service

Customer service is a precisely-defined standard of customer satisfaction which a small business owner intends to provide for its customers. For example, a customer service standard for the above-mentioned provider of customized computers might be that 60 percent of all PCs reach the customer within 48 hours of ordering, 90 percent of all of its units within 72 hours, and all 100 percent of its units within 96 hours. A physical distribution system is then set up to reach this goal at the lowest possible cost.

In today's fast-paced, technologically advanced business environment, such systems often involve the use of specialized software that allows the owner to track inventory while simultaneously analyzing all the routes and transportation modes available to determine the fastest, most cost-effective way to delivery goods on time.

Order Processing

Order processing is another physical distribution function, because it directly affects the ability to meet the customer service standards defined by the owner. If the order processing system is efficient, the owner can avoid the costs of premium transportation or high inventory levels. Order processing varies by industry, but often consists of four major activities:

i) A credit check;

ii) Recording of the sale, such as crediting a sales representative's commission account;

iii) Making the appropriate accounting entries; and locating the item,

iv) Shipping, and adjusting inventory records.

Technological innovations, such as increased use of the Universal Product Code, are contributing to greater efficiency in order processing. Bar code systems give businesses the ability to route customer orders efficiently and reduce the need for manual handling. The coded information includes all the data necessary to generate customer invoices, thus eliminating the need for repeated keypunching.

Another technological discussed earlier innovation affecting order processing is Electronic Data Interchange. EDI allows computers at two different locations to exchange business documents in machine-readable format, employing strictly-defined industry standards. Purchase orders, invoices, remittance slips, and the like are exchanged electronically, thereby eliminating duplication of data entry, dramatic reductions in data entry errors, and increased speed in procurement cycles.

Inventory Control

Inventory control can be a major component of a physical distribution system. Costs include funds invested in inventory, depreciation, and possible obsolescence of the goods. Inventory control analysts have developed a number of techniques which can help small businesses control inventory effectively. The most basic is the Economic Order Quantity (EOQ) model which was discussed earlier.

5.2 Transportation

Transportation is the movement of goods from one point to another. Transportation costs vary by mode of shipping, as discussed below.

Trucking- *It is flexible and growing;* the shipping method most favored by many businesses is trucking. Carrying primarily manufactured products (as opposed to bulk materials), trucks offer fast, frequent, and economic delivery to more destinations in the country than any other mode. Trucks are particularly useful for short-distance shipments, and they offer relatively fast, consistent service for both large and small shipments.

Air freight- *It is fast but expensive;* because of the relatively high cost of air transport, businesses typically use air only for the movement of valuable or highly-perishable products. Owners can sometimes offset the high cost of air transportation with reduced inventory-holding costs and the increased business that may accompany faster customer service.

Water carriers- *It is slow but inexpensive;* there are two basic types of water carriers: inland or barge lines, and oceangoing deep-water ships. Barge lines are efficient transporters of bulky, low-unit-value commodities such as grain, gravel, lumber, sand, and steel. Oceangoing ships, on the other hand, operate in the great lakes, transporting goods among port cities, and in international commerce. Sea shipments are an important part of foreign trade, and thus are of vital importance to businesses seeking an international market share.

Railroads- *long distance inland shipping;* railroads continue to present an efficient mode for the movement of bulky commodities over long distances. These commodities include coal, chemicals, grain, non-metallic minerals, and lumber and wood products.

Pipelines*-specialized transporters;* pipelines are utilized to efficiently transport natural gas and oil products from mining sites to refineries and other destinations. In addition, so-called slurry pipelines transport products such as coal, which is ground to a powder, mixed with water, and moved as a suspension through the pipes.

Intermodal services- businesses often take advantage of multi-mode deals offered by shipping companies. Under these arrangements, business owners can utilize a given transportation mode in the section of the trip in which it is most cost efficient, and use

other modes for other segments of the transport. Overall costs are often significantly lower under this arrangement than with single-mode transport.

Of vital importance to businesses are transporters specializing in small shipments. These include bus freight services, United Parcel Service, Federal Express, DHL International, Additionally, small businesses often rely on freight forwarders who act as transportation intermediaries: these firms consolidate shipments from numerous customers to provide lower rates than are available without consolidation. Freight forwarding not only provides cost savings to small businesses, it provides entrepreneurial opportunities for start-up businesses as well.

5.3 Warehousing

A ***storage warehouse*** holds products for moderate to long-term periods in an attempt to balance supply and demand for producers and purchasers. They are most often used by businesses whose products' supply and demand are seasonal. On the other hand, a ***distribution warehouse*** assembles and redistributes products quickly, keeping them on the move as much as possible.

Modern warehouses are long, one-story buildings located in suburban and semi-rural settings where land costs are substantially less. These facilities are often located so that their users have easy access to major highways or other transportation options. Single-story construction eliminates the need for installing and maintaining freight elevators, and for accommodating floor load limits. Furthermore, the internal flow of stock runs a straight course rather than up and down multiple levels. The efficient movement of goods involves entry on one side of the building, central storage, and departure out the other end.

Computer technology for automating warehouses is dropping in price, and thus is increasingly available for small business applications. Sophisticated software translates orders into bar codes and determines the most efficient inventory picking sequence.

Order information is keyboarded only once, while labels, bills, and shipping documents are generated automatically. Information reaches hand-held scanners, which warehouse staff members use to fill orders. The advantages of automation include low inventory error rates and high processing speeds.

Functions of warehouses

The main function of a warehouse is warehousing –that is the temporary storage of goods Warehouses also perform other functions:

i) Provide temporary storage of goods

ii) Put together customer orders

iii) Serve as a customer service facility

iv) Protect goods

v) Segregate hazardous or contaminated material

vi) Perform value-added services

vii) Inventory

Warehouse functional areas

i) *Receiving*- receive incoming product

ii) *Reserve*- store products efficiently (pallets)

iii) *Value-add*- transform products (labeling, kitting)

iv) *Pick-line*- store product so that it can be picked efficiently (cases/items)

v) *Pack/ship*- package and ship products

A typical warehouse consists of two main elements:

i) A storage medium

ii) A material handling system

There is also a building enclosing the storage medium, the goods, and the storage/retrieval (S/R) system. Warehouses come in different shapes, sizes, and heights depending on such factors –goods stored, the volume, the type of S/R used.

Types of Storage Media

i) Stacking frames

ii) Cantilever racks

iii) Selective rack

iv) Flow rack

v) Racks for Automated Storage and Retrieval Systems

5.4 Receipt Inspection

During receipt inspection, the organization should ensure that special storage instructions have been addressed. Prior to final acceptance of an item, the designated organization should ensure that the necessary purchase order instructions and requirements are completed such as the following:

i) The tickler file has been updated

ii) Appropriate inspection instructions are clearly defined.

iii) Procurement information

iv) Establishment critical parameters and their acceptance criteria

v) Specification unique or special testing requirements/methods

vi) Re-order instructions

vii) Suspect/counterfeit parts information

Non-c onforming items should be:

i) Clearly identified

ii) Segregated from normal items to prevent inadvertent use

iii) Documented on a non-conformance report and/or a defective or substandard material report

iv) Tracked and dispositioned as soon as practical by the applicable authority

Routine Inspections

Routine inspections performed by appropriate personnel should include:

i) Ensuring that packaging is proper (as designated on the purchase order when specified), packaging is undamaged and/or not deteriorated;

ii) Color, count, shape, size, part number, model number, manufacturer/vendor name, etc. are as specified on the purchase order

iii) Shelf-life and other time-environment requirements have not been violated - date and time of receipt are logged for regular follow-up review during the storage period

iv) Specified vendor documentation, in the quantities required by the purchase order exist

Special Inspections

Special inspections should be performed on Safety Class Items and other ite s when designated by the requisitioner. Special inspections should be performed by the department specified on the requisition. Special inspection requirements for items not involving engineering data sheets should be defined by the requisitioner

Special inspections normally require:

i) Formal quality records of all measured data

ii) Date inspection performed

iii) The identification of the individual and the organization performing the inspection

iv) Accept/reject status identification

v) The signature of the applicable authority to approve the status

Items receiving special inspection (especially Safety Class Items) should be appropriately identified and segregated from normal stock to indicate status and ensure proper application. Stored items which are affected by time-environment should be regularly checked by designated personnel, expired or otherwise jeopardized items should be removed from normal storage until dispositioned by the proper authority.

An "Acceptance Tag" should be placed on the item after satisfactory receipt inspection. The tag should be legibly marked to indicate whether an item has any type of special storage requirements. This provides the user, requester, or storeroom personnel with an easy method to ensure special storage control requirements are satisfied. The tag may cross-reference a particular entry in a file system (tickler file) for further instructions.

Materials Handling

Another important component of a physical distribution system is material handling. This comprises all of the activities associated with moving products within a production facility, warehouse, and transportation terminals. One important innovation is known as ***unitizing***- combining as many packages as possible into one load, preferably on a pallet. Unitizing is accomplished with steel bands or shrink wrapping to hold the unit in place. Advantages of this material handling methodology include reduced labor, rapid movement, and minimized damage and pilferage.

A second innovation is ***containerization***- the combining of several unitized loads into one box. Containers that are presented in this manner are often unloaded in fewer than 24 hours, whereas the task could otherwise take days or weeks. This speed allows small export businesses adequate delivery schedules in competitive international markets. In-transit damage is also reduced because individual packages are not handled en route to the purchaser.

The fundamental objective of an effective material receipt, inspection, handling, storage, retrieval, and issuance process should be to ensure the integrity of parts, equipment, and material is maintained and verifiable from the time the item is received until it is placed into service by the owner/operator. This objective requires that appropriate controls be established to ensure that the quality of parts and material is not degraded during purchasing, receipt, storage, and handling. The plant process should clearly define responsibilities, accountabilities, and interfaces for each function supporting each step in the process. Specific controls should be tailored to be consistent with the type, importance, and intended service of individual items.

Storage Equipment

1. Block stacking (no equipment)
2. Selective pallet rack
3. Drive-through rack
4. Drive-in rack
5. Flow-through rack
6. Push-back rack
7. Sliding rack
8. Cantilever rack
9. Stacking frame
10. Shelves/bins/drawers
11. Storage carousel
12. Automatic storage/retrieval system (AS/RS)
    (a) Unit load AS/RS
    (b) Miniload AS/RS
    (c) Man-on-board AS/RS
    (d) Deep-lane AS/RS
13. Split-case order picking system
14. Mezzanine

Storage of Material

A system should be established which ensures the proper storage, segregation, and control of hazardous materials such as;

i) Chemicals

ii) Radioactive/reactive organics

iii) Reagents

iv) Explosives

v) Flammables/combustibles

vi) Corrosives

vii) Pesticide/herbicide

Material and equipment subject to restricted use and distribution such as Safety Class Items, critical spare parts, Bill-of-Material items, certain sealants and compounds, precious metals, etc. should have clearly defined instructions, which provide for:

i) Segregation from normal stock

ii) Access control

iii) Unique identification

iv) Issue only to those on authorized signature lists

v) Stock records maintenance

vi) Purchase order tracking and ready traceability from design drawing through purchasing, storage, and handling, to installation

The quality of stored items should be maintained through the selective and judicious application of clearly defined protection and availability controls. A system for the periodic general inspection of storage areas should exist. Typical storage control observations should verify the following:

i) Corrosive chemicals segregated from sensitive equipment and metal items

ii) Flammables in proper containers and marked

iii) Radioactive substances properly shielded and marked

iv) Stainless steel and other "pedigree" metals segregated from other metals (particularly carbon steel)

v) Motors, pumps, relief valves, and other items are stored on their bases

vi) Stacking of items, crates, boxes, barrels, etc. do not exceed stacking recommendations

vii) Packaging and seals have not been violated leaving contents exposed to degradation caused by the intrusion of foreign materials or environmental conditions

viii) Machined surfaces are left adequately protected

ix) Applicable insect and rodent controls are in effect

x) Applicable shelf-life conditions are in effect

xi) Carcinogens segregated from other materials and equipment

xii) Re-order/restocking is clearly indicated

Processes subject to regulatory requirements regarding storage and disposal of materials should be regularly verified to ensure compliance status. When established, automatic reorder/restock criteria should be implemented. Reorder/restock quantities should be reviewed and adjusted on the basis of;

i) Lead-time

ii) Usage (historical and projected)

iii) Value-added or other established criteria

A shelf-life program should be developed which applies to items stored in warehouses and plants prior to end use. Shelf-life requirements should be specified for (but not limited to) the following types of items:

i) Rubber components

ii) Silicon sealants

iii) Certain paints

iv) Photosensitive chart paper

v) Photographic material

vi) Certain pre-lubed bearings capacitors

vii) Resins

viii) Complete assemblies containing items listed above

ix) Chemicals, reagents, and organics

Periodic inspections should be made to ensure that the general condition of the storage area is acceptable. Examples include cleanliness, vermin control, lighting, preservation, labeling, flooding, fire protection, safety, and segregation of material, including segregation of reactive chemicals.

H andling

Individuals operating cranes, forklifts, and other lifting equipment should be performance-based trained, and appropriately licensed to verify their qualification. Unusual, unique, or deceptive weight, balance, lift points, and other critical information regarding items to be lifted or otherwise handled should require that clearly defined instructions or job plans be communicated to the handler. Items which require special

handling such as vibration isolation, protection from the environment, specific orientation, etc. to ensure integrity should require that clearly defined instructions or job plans be communicated to the handler. Calibrated/certified items should be handled in a manner that ensures their integrity is not jeopardized.

5.5 Retrieval and Issuance

A system should exist to ensure that items are identified and stored to facilitate ready retrieval upon approved request. Items should be selectively and judiciously controlled, on the basis of their risk to safety and/or importance to reliable operations, during the interval between stores issue and installation to ensure intended traceability and/or integrity is not violated prior to installation. Safety Class Items and other controlled items to be issued only to individuals on authorized requester lists should be clearly defined in applicable documents.

Issuance documentation should be handled as quality records. A system should exist which provides for current storage inventory status information to be maintained, to be made available to and usable by authorized individuals upon request. Information on storage inventory lists which may enhance usability should include:

i) Stores catalog number
ii) Noun name
iii) Manufacturer/vendor part number
iv) Application and contact for controlled item disposition
v) Reorder criteria, when applicable
vi) Quantity on-hand
vii) Consideration for configuration managed items etc

5.6 Warehouse Design

Location

Location of the warehouse must address the following main issues

i) The number of warehouses required
ii) The size of each warehouse
iii) The geographical dispersion of customers and sources of supplies

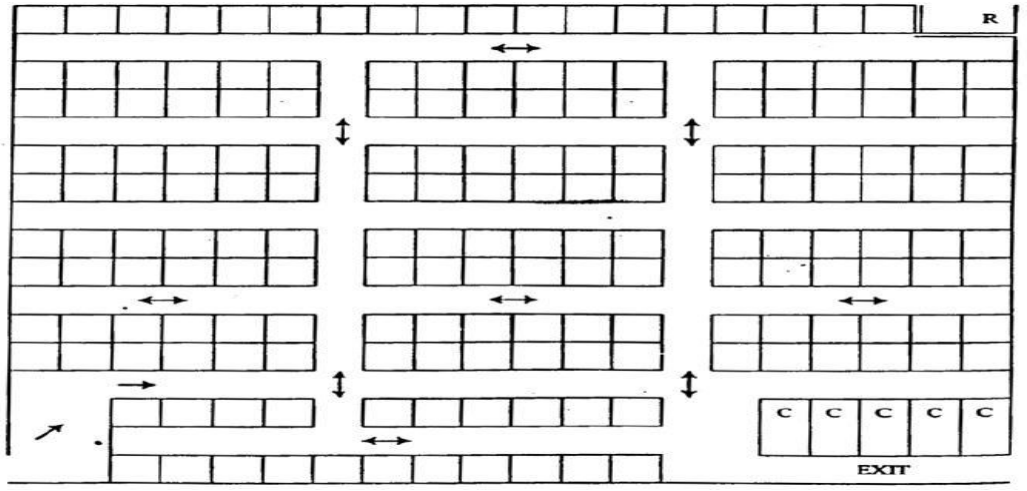
The overall layout of a warehouse depends on:

i) Depends on the items stored, space available, height, storage medium, S/R methods, the layout of road and rail tracks around the warehouse, and other factors.

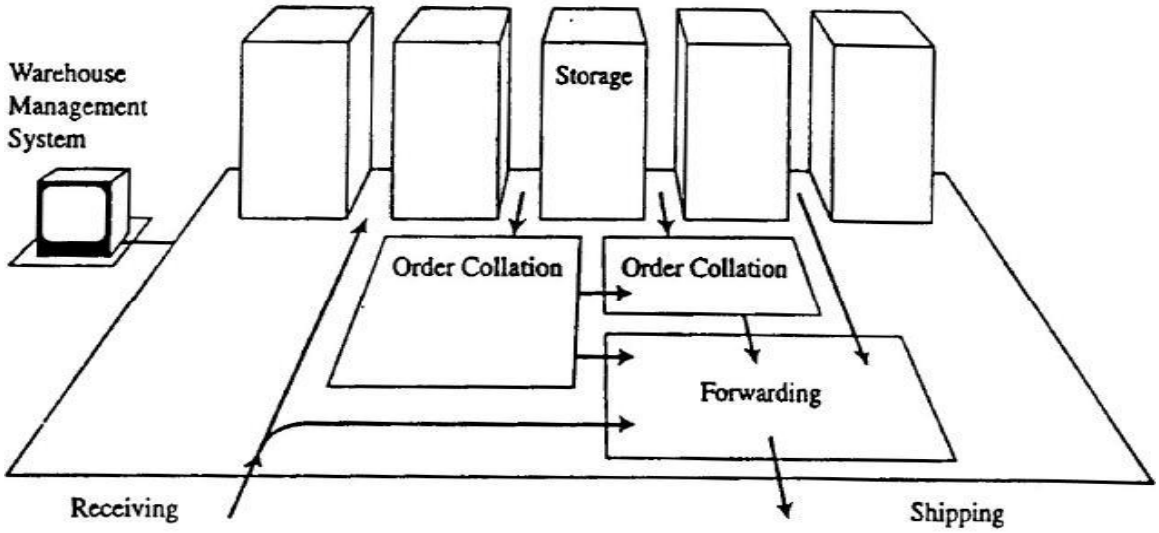
ii) Typical warehouse layout in a member club" store and a high-rise automated warehouse

Examples of common warehouse layouts are shown below:

"Member's Club" Layout Warehouse



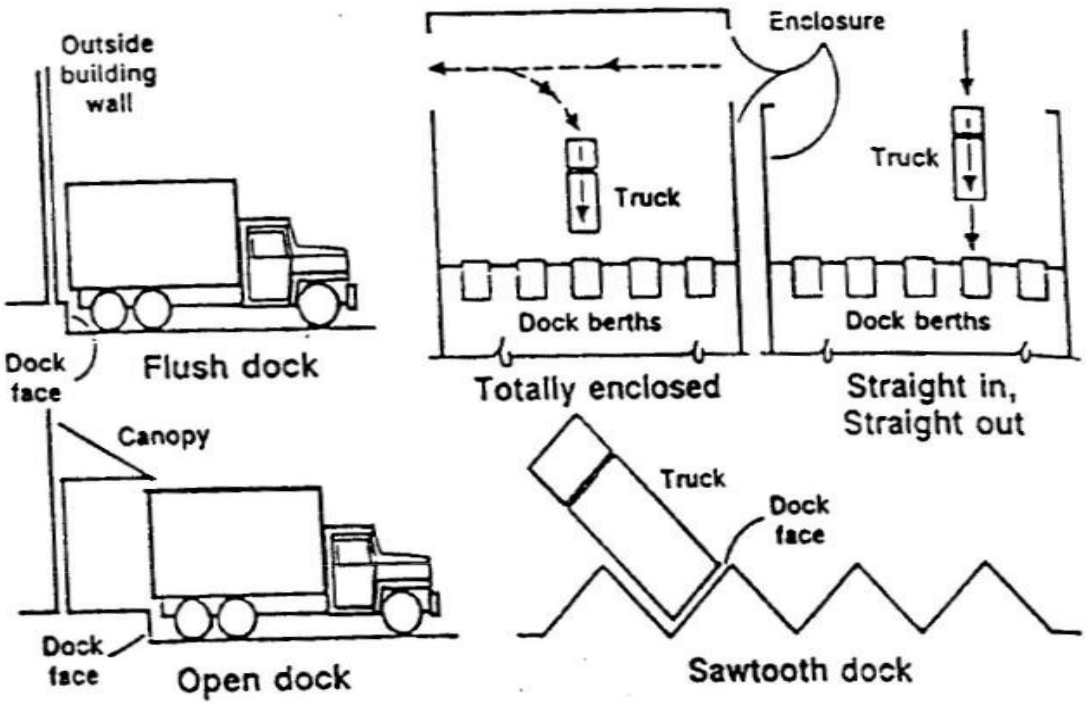
Layout of a high-rise Automated Warehouse



The required length and width of the warehouse depend on the number of items to be

stored, number of storage spaces required, number of rows and columns of racks, and height.

Typical Dock Layouts



Review Questions

i) Describe the elements of a physical distribution

ii) Identity the different types of transportation and give their advantages and disadvantages

iii) Explain the functions of warehouses

iv) State the different types of Storage Media

v) Identify the different types of inspections

vi) Identify the different types of storage equipment

vii) Explain the factors considered in deciding on the Location and layout of a warehouse

Suggested Further Readings

Alan Branch (2008), *Global Supply Chain Management and International Logistics*, Prentice Hall, Chicago

Fiona Biggs (2002), *Storage Solutions*, Routledge, London

CHAPTER SEVEN

ETHICS IN PURCHASING

Learning Objectives

By the end of this chapter the learner should be able to:

i) State the ethical principle on which purchasing and supply is conducted

ii) Explain the social and environmental responsibilities of purchasing and supply profession

iii) The responsibilities of purchasing and supply professional to the profession

6.1 Introduction

Ethics are moral principle and values which govern our beliefs, actions and decisions. They are the rule or guidance of conduct by which we aim to live. Every profession issues its ethical codes and the integrity of any profession is maintained by adherence to their code ethics.

6.2 Ethical principles

The Chartered Institute of Purchasing and the National Association of Purchasing Management have developed ethical principles on which purchasing as a professional is conducted.

Ethical perceptions- Avoid the intent and appearance of ethical or compromising practice in relationship, actions and communications.

Responsibilities to the employer- Demonstrate loyalty to the employer by diligently following the lawful instruction of the employer using reasonable care and only the author granted.

Conflict of interest- Refrain from any private business or professional activity that would create a conflict between personal interest and the interest's of the job or employer.

Gratuities- Refrain from soliciting or accepting money, loans, credit, or prejudicial discounts, and the acceptance of gifts, entertainment, favors or services from present to potential suppliers that might influence or appear to influence purchasing decisions. In international purchasing some cultures consider gifts as courtesy and not

inducements. Similarly some business meals are part of business. But too frequent meals from suppliers should be avoided.

Confidential information- Handle confidential or proprietary information belonging the to employer or supplier with due care and proper consideration of ethical and legal ramifications and governmental regulations e.g. pricing and cost data, bid information, computer software programmes.

Treatment of suppliers- Promote positive suppliers relationship through courtesy and impartially in all phases of the purchase cycle.

Reciprocity- Refrain from reciprocal arrangement that retain competition.

State laws- Know and obey the letter and spirit of laws governing the purchasing functions and remain alert to the legal ramifications of the purchasing decision e.g. patent, copyright and trademark laws.

Small, disadvantaged and minority-owned business- encourage all segments of society to participate by demonstrating support for small, disadvantaged and minority-owned businesses.

Personal purchases for employees- discourage purchasing's involvement in employer sponsored programs of personal purchases that are not business related

Responsibility to the profession- enhance the proficiency and stature of the purchasing professional by acquiring and maintaining current technical knowledge and the highest standards of ethical behavior

International purchasing- conduct international purchasing in accordance with the laws, customer and practices of foreign countries consistent with your country's laws, your organizations policies and purchasing ethics

6.3 Important Areas Requiring Amplification

Avoid Sharp Practices- these are evasions, indirect misrepresentations just short of actual fraud. These unscrupulous practices are used for short-tem gain and ignore long-term implications e.g.

i) Buyer talks of large quantities to encourage price reductions.

ii) Obtain brief from unqualified supplier.

iii) Obscure contract term barred in small type

iv) Preferential treatment of sup

v) Withholding of payment that may force small supplier out of business.

Competitive biding- Follow the roles of competitive bidding to the letter.

Negotiation- inform competitors of factors involved in source selection; give all suppliers equal access to information and accord them same treatment; -negotiate for items which are fair both parties.

Samples- When a sample is accepted ensure that appropriate tests are conducted in timely manner and the supplier informed of the test results and the suitable of the item in meeting the buyer needs.

Treating sales people with respect- -sales people should not be kept waiting for protracted periods of time; there should be a mutually effective policy for purchasing personal to see sale people on their first call.

6.4 Social and Environmental Responsibility

a) Dealing with suppliers who have high ethical standards e.g. avoiding those exploiting workers.
b) Encouraging suppliers to adopt responsible attitude to various community groups e.g. disabled, youth programmes ex-offenders etc.
c) Preparation of environmental policy statement.
d) Waste minimization and recycling maximization
e) Minimum dependency on production and use of ozone depleting substances, and other pollutants e.g. Lead formaldehyde etc.
f) Requiring providers of contract services e.g. clearing, catering and transport to carry to their operations to high standards of environmental performance.

6.5 Ethics Training and Professional Training

Purchasing managers with the assistance of top management, must ensure that appropriate personnel receive periodic training with respect to the firm's ethical and professional standards.

Purchasing managers should also ensure that personnel receive training in current thinking and techniques in the areas of requirement, planning, source selections pricing, cost analysis, negotiation, supplier management as well as ethical and professional standards. Lastly post purchase auditing assures ethical purchasing.

Review Questions

i) *State the ethical principle on which purchasing and supply is conducted*

ii) *Explain the social and environmental responsibilities of purchasing and supply profession*

iii) *What are the responsibilities of purchasing and supply professional to the profession*

Suggested Further Readings

Benton W C (2007), *Purchasing and Supply Management*, Routledge, London

Arjan Van Weele (2004), *Purchasing and Supply Chain Management*, PVT publishers, New Delhi

Mt Kenya University

DEPARTMENT OF BUSINESS AND SOCIAL STUDIES

Main Examination - May - August, 2010

BBM214: INTRODUCTION TO PURCHASING AND SUPPLY MANAGEMENT

Time: 2 Hrs

Instructions to Candidates: *Answer question 1 (Compulsory) and any other TWO questions.*

QUESTION 1

a) Differentiate between purchasing, procurement and material management (9mks)
b) Explain the cause of conflict that may arise as a result of developing purchasing liaison (4mks)
c) What is the importance of inventory records (5mks)
d) Explain the purpose of material specification (4mks)
e) Why is it necessary to analyze market conditions before sourcing (4mks)
f) What are the differences between public and private warehouse (4mks)

QUESTION 2

a) Discuss the various types of specifications used by an organization (15mks)
b) Explain the requirements of a good specification (5mks)

***QUESTION* 3**

a) Discuss various factors that are considered when establishing purchasing liaison (10mks)
b) Explain the relationships that exist between:
  i) Purchasing and production (5mks)
  ii) Purchasing and marketing (5mks)

***QUESTION* 4**

a) What are the basis on which suppliers are assessed and rated (10mks)
b) Explain the factors that favour an organization to buy rather than making in-house (10mks)

***QUESTION* 5**

a) Make short notes on the following:
  i) Two bin system (3mks)
  ii) Just-in-Time (3mks)
  iii) MRP type system (3mks)
  iv) ABC analysis (3mks)
b) Discuss the advantages of bar coding to an organization(8mks)

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DEPARTMENT OF BUSINESS AND SOCIAL STUDIES

Special/Supplementary Examination - May - August, 2010

BBM214: INTRODUCTION TO PURCHASING AND SUPPLY MANAGEMENT

Time: 2 Hrs

Instructions to Candidates: *Answer question 1 (Compulsory) and any other TWO questions.*

QUESTION 1

a) What are the activities involved in purchasing (6mks)
b) Explain the advantages of periodic review system (6mks)
c) What are the limitations of just in time approach of stock control? (6mks)
d) What are the issues involved in environmental and social responsibility in purchasing 6mks)
e) Discuss the various definitions of inventories for a manufacturing concern (6mks)

QUESTION 2

a) Discuss various steps involved in life cycle cost techniques of pricing (10mks)
b) Explain the considerations to be made while analyzing vendors anticipate profit (10mks)

***QUESTION* 3**

Make short notes on the following:

a) Cyclical or fixed order interval system (10 mks)
b) Material Requirement Planning II and Distribution Requirement Planning (10mks)

***QUESTION* 4**

a) Discuss various reasons for holding stock (10mks)
b) What are the applications of ABC (10mks)

***QUESTION* 5**

a) Explain the merits and demerits of counter trade (10mks)
b) Discuss the problems of international sourcing (10mks)