LOVELY PROFESSIONAL UNIVERSITY

MATERIALS MANAGEMENT

Edited By

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SYLLABUS

Materials Management

Objectives: The course intends to equip students with updated knowledge of modern materials management concepts and aims to develop their functional expertise in the store and purchase management disciplines.

S. No.	Topics
1.	Introduction: Meaning and Scope, Objectives and Significance of Materials Management, Material Management in Other Areas of Management Functions.
2.	ABC Analysis: Meaning, Advantages, Objective, Purpose and Limitations, Simple Numerical of ABC Analysis.
3.	Codification and Standardization: Basis of Codification, Characteristics of Good Coding System, Types of Coding, Standardization and its Benefits.
4.	Purchasing Management: Objectives and Functions of Purchasing Department, Purchase Policy and Procedure, Negotiations, Purchase of High Capital Equipment and their Feasibilities. Supply Chain Management, Implementation of Supply Chain Principles within a Company.
5.	Suppliers Selection, Vendor Rating and Vendor Rating Techniques, Vendors Development and Vendors' Relationship.
6.	Inventory Management: Different Costs of Inventory, Optimal Order Quantity, EOQ, Inventory Models with Purchase Discounts, Buffer Stocks, Fixed Order Period Model, Safety Stocks, Optimum Level of Safety Stock, Inventory Control, Elements of Effective Inventory Control, Advantages, Procedure for Setting up an Efficient Inventory Control System, V.E.D. Analysis, S.D.E. Classification, F.S.N. Analysis, X.Y.Z. Analysis, Logistics Management and Its Link with Inventory Control and other Areas.
7.	Value Analysis: Purchasing Research, Price Forecasting, Forward Buying, Make or Buy Decision.
8.	Stores Management: Purpose of Store Management, Location and Layout, Cost Aspects and Productivity, Problems and Developments, New Developments in Storing.
9.	Evaluation of Materials Management: Organization, Difficulties, Process and Criteria, Reporting and Purchasing.
10.	Computers in Material Management Electronic Computer, Integrated Computer System for Materials Management, Material Planning.

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Unit 1: Materials Management: An Introduction

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Objectives

Introduction

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1.4.3 Materials Management and Sales

1.4.4 Materials Management and Finance & Accounting

1.5 Summary

1.6 Keywords

1.7 Review Questions

1.8 Further Readings

Objectives

After studying this unit, you will be able to:

- Explain the Meaning of Materials Management
- Discuss the Scope of Materials Management
- Discuss the Objectives and Significance of Materials Management
- Discuss the Role of Materials Management in Other Areas of Management Functions

Introduction

In this unit you will study about meaning and scope of materials management. The sections and sub sections of this unit will also summarize the objectives and significance of materials management.

Materials management is a specialized area of management which concerns itself with the management of Material Resources. What we are attempting to do in managing materials is to reduce and control the cost relating to this important resource, which normally accounts for about 50 per cent on average, of the cost of production. In other words if it costs ₹ 100 per cent to produce an item one may take it for granted than ₹ 50 is likely to be related to material which, it will be appreciated, is a very high percentage of the total cost.

Traditionally, we are used to thinking of the cost of materials which is the price we have paid to acquire the materials, i.e., the basic cost of the materials. This is the figure usually displayed in a company statement of annual accounts. Materials management concerns itself not with this cost, which as we have seen is very high, but also with a large number of other costs which add

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to the price. These costs are called 'cost in materials' as distinct from 'cost of materials'. When we speak of materials management, we are not merely referring to the control of the cost of materials but of each and every type of cost that is incurred on materials, as indicated above, which have to be reduced and controlled.

1.1 Meaning and Scope of Materials Management

Materials management is an essential business function. It is concerned with planning, acquisition and flow of materials within the supply chain. Material is one of the four basic resources.

Example: Labor, Material, Equipment and Capital of any industrial or business activity.

For a long time, it was regarded as a routine function with less importance. But over the years, with accelerating economic, technological, societal and environmental changes, this function has become more important, more complex, and more professional.

Notes Materials management creates a competitive edge by delivering quality product(s) or service on time and offering lower cost by cutting its own cost as well as cutting purchased item costs, which account for over fifty per cent of the sales revenue, thus imparting superior value.

However, it is complex as it confronts various issues including outsourcing, global sourcing, size of supply base, shorter Lead time, smaller lot size, price determination, mode/carrier selection, maintaining long-term relationship with suppliers, choosing the right type of information technology, legal issues, etc. The following definition of Materials Management has been accepted by the International Federation of Purchasing and Materials Management.

"The materials management is a total concept involving an organizational structure unifying into a single responsibility, the systematic flow and control of material from identification of the need through customer delivery."

Included within the concept are the material functions of planning, scheduling, buying, storing, moving and distributing. These are logically represented by the disciplines of production and inventory control, purchasing and physical distribution. The objective of materials management is to contribute to increased profitability by coordinated achievement of least materials cost. This is done through optimizing capital investment, capacity and personnel, consistent with the appropriate customer service level.

Another definition adopted by the National Association of Purchasing Management (USA) reads as follow:

Materials Management: It is an organizational concept in which a single manager has authority and responsibility for all activities principally concerned with the flow of materials into an organization. (Purchasing, production, planning and scheduling, incoming traffic, inventory control, receiving and stores normally are included.)

In these definitions of materials management one will notice the concept that all authority and all responsibility for the acquisition and control of materials should be coordinated through one executive authority, the materials manager. The different scopes of materials management can be viewed from three perspectives as discussed below:

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As a Basic Function of the Firm: Materials management is one of the following six functions performed by any firm:

Design	:	Converts concept into specification
Finance	:	Acquires and controls capital
Personnel	:	Manages human resources
Materials	:	Planning, acquisition and logistics of materials, service and equipment
Production	:	Converts materials into goods and services
Marketing	:	Distributes goods and services to buyers

The contents, supervision and importance of materials management differ from industry to industry.

As a Manager of Outside Manufacturing: The parts that go into making of end products can come from two sources: in-house production or purchase from outside. Earlier, firms themselves produced most parts that they needed for assembly of end products. Gradually, firms started identifying, cultivating and exploiting their core competencies "doing the things they knew how to do the best" and outsourcing the rest. This marked a significant increase in the percentage of purchased parts.

Notes Materials manager is answerable for purchase of items manufactured outside just as production manager is answerable for parts produced in-house. Hence, materials manager is rightly called manager of outside manufacturing.

As a Controller of Cost: Major costs related with material include ordering or set-up costs, carrying costs, logistics costs (transportation and warehousing) and shortages or surpluses costs, besides the cost of purchased items. Historically these costs were not accounted separately and were generally included in overheads. As such, their impact was not felt. But now their combined contribution is measured, which is quite significant and provides good scope for cutting cost.

Self Assessment

Fill in the blanks:

1. Materials management is an essential …….. function.
2. Materials management creates a competitive edge by delivering ……. product.
3. Material is one of the four basic …….. of any industrial or business activity.
4. It is an organizational concept in which a single manager has ……. and ……. for all activities principally concerned.

1.2 Objectives of Materials Management

Materials management's considerable effect on profits demands that its objectives be derived from the general business objectives "maintaining competitiveness" and "satisfactory profitability". The main objectives of materials management are as follows:

- To ensure continuous uninterrupted production or operation or project work by maintaining a steady flow of materials;

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- To achieve the above objective in an efficient and economical manner;
- To effect economies in the cost of materials by purchasing materials of the right quality, in the right quantity, at the right time, from the right source, at the right price;
- To affect economies in the costs incurred on materials after they have been purchased, through storage, processing and warehousing, till the finished goods ultimately reach the customer. These economies contribute towards cost thereby leading to higher profits;
- To reduce working capital requirements through proper and scientific inventory control;
- To be alive to the changes in the market in respect of new products; and consequently;
- To improve the quality of manufactured goods by use of better raw materials or components and thereby the increase the competitiveness on such goods put of sale;
- To increase the competitiveness of manufactured goods by making it possible to reduce their prices through cost reduction, especially by value analysis;
- To save foreign exchange through import substitution and economizing on foreign purchases;
- To ensure cooperation among all departments of the enterprise to meet materials management objectives both at the corporate and functional levels and to ensure proper coordination in respect of such activities;
- To conserve materials resources within enterprise, thereby contributing to the conservation of national resources.

Self Assessment

Fill in the blanks:

5. Materials management's effect on profits demands that its objectives be derived from the general business objectives …… and …….. .
6. Material management's objective is to save ……. through import substitution and economizing on foreign purchases.

1.3 Significance of Materials Management

The importance of materials management cannot be overemphasized in this complex industrial world. It affects not only a particular industry but the entire economic activity of a whole nation. Material contributes to the quality of the end product. The amount spent on materials is increasing in relation to the expenditure on other inputs. Materials add value to a product.

Did u know? The margin between the values of raw materials and the finished products is known as the value added by production.

Conservation of materials and their availability for prosperity is one of the social responsibilities of business hence, materials management is one of the centers of accountability for performance. Reduction in the materials cost by about 5 per cent is always possible through an efficient management of materials. Evidence is there to prove that skilful and imaginative management had been able to save even more than 5 per cent of the total cost of the final product.

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Task Assume yourself as a material manager, what are the functions you would perform and how?

Materials form the largest single expenditure item in most of the manufacturing organizations. They usually represent 50 to 60 per cent of the total cost of the final product. An analysis of the financial statement of a large number of manufacturing organizations reveals the fact that on an average about 60 per cent of the total expenditure is locked up in materials.

Materials management determines three cost categories within the company which, in most cases, have a substantial effect on company profits. In team, these are:

Materials Costs: These are those costs which arise for the procurement of raw materials, indirect materials, fuels, semi-finished and finished products (goods), including delivery costs. In the manufacturing industry they constitute the largest percentage of the costs of Management of Materials.

Capital Costs: These cover primarily interest which accrues for the capital tied up in the stocks of materials, semi-finished and finished products (good), including depreciation for value adjustments which have to make.

Overhead Expenses: They cover the overhead expenses and/or cost centre expenses of all the separate areas within materials management, including the sometimes considerable costs of transport and packaging, electronic data processing and disposal.

Integrated materials management which is conceived as a comprehensive supply system can substantially contribute to a company's profits, via its systematic influence upon these cost categories.

Caution The impact of the materials management department on company profits depends on the importance of materials costs, the degree of which materials management can control inventories of semi-finished products and work in process as well as finished goods, and the amount of personnel assigned to materials management.

Materials management must nowadays make an active contribution to improving profit by taking advantage of all opportunities for:

- Reducing costs (materials costs, capital costs, overheads), and
- Setting free the capital tied up in inventories and indeed in the whole pipeline from the suppliers to the consumers in the market.

This inevitably calls for an integrated approach to materials management in the interest of the company's profitability:

- Purchasing must make its contribution to optimise the costs of materials:
- Directly by making full use of its opportunities in the procurement markets, i.e., systematic procurement marketing, and
- Indirectly by early introducing its market knowledge into design and development processes, i.e., even at the stage of determining the materials and parts to be used.
- The cost of tied up capital and overheads must be reduced by an integrated approach to planning, controlling and handling of the flow of materials and goods in the entire supply system from the suppliers to the customers, namely:

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- Directly by making full use of every opportunity for reducing stocks at all stages.
- Indirectly by efficiently coordinating the processes from customer order processing to purchasing processing.
- Market-oriented purchasing, on the one hand, and a comprehensive approach to planning, controlling, and handling the flow of materials and goods, using logistical instruments, on the other hand, is thus the two pillars of Integrated Materials Management.

The two of them used in combination have the power to make a substantial contribution in improving company profits.

Caselet

Materials Management Plans Promote Sustainability

Many business and institutional campuses have cluttered, noisy, and oftentimes inefficient service environments. Delivery trucks compete with pedestrians, loading docks are in plain sight, trash dumpsters sprout up, and lobbies, hallways, and stairwells are cluttered with unplanned storage.

Most owners understand the importance of efficient materials management, but they rarely think about these systems as opportunities to promote sustainability. However, with forethought and creativity, these systems can reduce energy use and carbon emissions, minimize traffic congestion, streamline operational flows, and enhance esthetics.

For instance, materials management plans can include developing a better circulation infrastructure. Service points can be clustered to reduce the number of loading docks and track parking, thus reducing redundancy and increasing effectiveness. An effective materials management program can also resolve "island" approaches to shipping, receiving, and vehicle movement, a situation where each building developed its own system for vendors, logistics, and delivery. Solutions can include creating a new central loading location, as well consolidating service areas and docks from separate buildings into one.

Developing better campus circulation infrastructure also means reevaluating truck delivery and service vehicle routes. Vehicle type, size, and schedules are studied to make these more compatible with surrounding neighborhoods. This will reduce truck traffic, creating a safer environment for pedestrians and a more attractive environment for other uses.

Reevaluating solid and hazardous waste removal, storage, and recycling is another aspect of an effective materials management plan. This includes creating efficient waste management guidelines and increased recycling initiatives.

Source: http://enr.construction.com/opinions/viewPoint/archives/081002.asp

Self Assessment

Fill in the blanks:

7. Material contributes to the quality of the…… .
8. The margin between the values of raw materials and the finished products is known as the …… by production.

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9. Reduction in the materials cost by about 5 per cent is always possible through a/an ……. of materials.

10. In the manufacturing industry …….. constitute the largest percentage of the costs of management of materials.

1.4 Materials Management in Other Areas of Management Functions

Materials management as a company's supply system has manifold interdependencies with its neighbour function and is thus of great importance in industrial management. It must therefore be the business maxim of materials management to make as optimum contribution of the company's profits by goods cooperation with its neighboring departments. Costs for materials and overheads can be effectively reduced just as much inventories by means of cooperation and sufficiently intensive communication. Only in this way can the interface problems between Materials Management and its neighbour functions be solved, which exist in a company regardless of how responsibilities are divided up. This of course presupposes a climate of mutual trust, understanding, and recognition of the achievements of the other functions and also consensus as to common goals instead of departmental egoism.

1.4.1 Materials Management and Design/Development

Good cooperation is absolutely necessary between Materials Management and design development in the interest of advantageous materials costs and low level of capital being tied up in inventories. Measures taken by design and development determine the structure of a company's materials and parts requirements and hence materials and parts requirements and hence material costs as well to a quite considerable extent. Cooperation between materials management and design/development is therefore necessary in several respects:

- To coordinate product development and supply;
- In alteration service;
- In buying new assembly parts;
- In carrying out value analysis;
- In the setting of norms, standardization and analysis of the materials and part purchases;
- In quality control;
- In determining component parts to be used;
- In formulating enquiries to suppliers;
- In making or buying decisions; and
- In updating the bills of materials.

1.4.2 Materials Management and Production

The task of materials management and production are closely related. Derived from marketing, it is in production where materials requirements originate and it is up to materials management to cover the requirements.

The two functions overlap within the spheres of scheduling, production program planning and production control i.e. in those sub-functions which are also assigned in different ways organizationally within the company to materials management and production.

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Close cooperation is required above all in:

- Planning production and materials requirements;
- Coordinating production control and materials scheduling;
- Solving bottleneck problems by subcontracting measures;
- Deciding about call-off inventories to be held by suppliers and consignment inventories kept in-house.

By means of effective cooperation between materials management and production, one can succeed in reducing the level of capital tied up in inventories as well as reducing materials costs. This sort of cooperation is an imperative prerequisite for total control of the flow of materials from the suppliers to the user within the company and via the processing points in production to the users within allocation for marketing and thus for fast order processing.

1.4.3 Materials Management and Sales

Integrated materials management is not least of all a supply system for sales. It is oriented towards fulfilling the customer orders obtained by the sales department, at the lowest possible cost. If one regards materials management in this light, then it in fact exhibits manifold connections with sales which necessitate close cooperation here as well, indeed in several respects:

- In deciding on customer service towards the market;
- In formulating the sales plan and pursuing fulfillment of the plan;
- In deciding about transport facilities and also transport and traffic processing;
- In the administration of customer orders which must be linked with materials management;
- In deciding about commissioning, packaging and dispatching to the customers.

Effective cooperation between materials management and sales is a prerequisite on the one hand for the lowest possible level of capital tied up in stock, and on the other hand, for high customer services in the face of a nowadays volatile market demand and for flexibility in supplying customers. Examples from practical experience show that close cooperation between sales and materials management and the latter being geared towards the company's marketing strategy can provide a company with important competitive advantages.

1.4.4 Materials Management and Finance & Accounting

Connections between materials management and the finance and accounting departments arise as a result of the fact that materials management is mostly responsible for the greatest bulk of costs within a company and has a considerable influence on the level of its current assets. From this importance of materials management to the company profitability and liquidity and hence to the key factors of finance and accounting, comes the necessity for coordination with both departments. In details, this involves:

- Planning justifiable levels of inventory investments for the purpose of annual budgeting;
- Controlling inventory status during the course of the years;
- Implementing inventory reduction projects;
- Carrying out analysis for make or buy decisions;
- Deciding on investments in transport and storage facilities;

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- Implementing plans for the reduction of overhead expenses;
- Routine coordination between invoice checking and credit control; and
- Exchanging information and data for the purpose of planning and control.

Self Assessment

Fill in the blanks:

11. Materials management as a company's ……. system is of great importance in industrial management.
12. Costs for materials and overheads can be effectively ……. just as much inventories by means of cooperation and sufficiently intensive communication.
13. ……. is absolutely necessary between Materials Management and design development in the interest of advantageous materials costs and low level of capital being tied up in inventories.
14. The task of ……. and ……. are closely related.
15. From the importance of materials management to the company's …….. and …….. comes the necessity for coordination with materials management & finance and accounting.

Case Study

Business Process & Materials Management at Lamprell Energy Services

Lamprell instigated an initiative to review, and where necessary upgrade, the business processes within their Contracts and Purchasing Departments. Chris Hand, Senior Quantity Surveyor, was given the responsibility of leading this project, and absolute (an independent business and technology solutions provider based in Dubai) was appointed to assist in the evaluation process, and identify the appropriate technological tools and systems required that would further consolidate Lamprell's position as an industry leader.

One area which both parties felt could be significantly improved was the materials procurement process – with the Matrix materials management system being the recommended solution. A demonstration was given to senior Lamprell management, followed by a review of procedures and discussions with key personnel to establish how Matrix would seamlessly integrate with the existing systems, as well as bespoke software that was under development.

The decision to proceed only took four days, and the installation process commenced immediately with the initial version of the software. A tight schedule was imposed on the installation of Matrix, but with the enthusiasm of the Lamprell staff and the cooperation of management, the time taken from being given the go ahead to producing the first purchase order was an impressive thirty-two days.

Reflecting on the project, Chris Hand is very positive: "The implementation of Matrix has been a great success. Every aspect went smoothly with minimum business disruption and

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the system integrated seamlessly into our existing processes. We have been able to establish some sound commercial improvements very quickly."

Company President, Steve Lamprell, is equally convinced his company made the right choice with Matrix. He said

"At Lamprell, we pride ourselves in being at the forefront of our industry and intend to be there for a long time to come. I believe that the acquisition of Matrix is consistent with that vision and provides us with an essential competitive edge. It has been developed by people who not only understand the processes involved but who also demonstrate a distinct practical knowledge of how things need to be done."

Market research had identified the requirement for a feature rich, cost effective materials management system, which would also provide a rapid return on investment. The decision to proceed with Matrix was taken following an extensive investigation of the very best systems available worldwide.

The materials procurement process is now managed and controlled by using ProcuremaX (one of the applications in the MatriX suite of products) with other MatriX systems assisting in most areas of the company's business and operational processes. EstimaX (estimating), QuantimaX (material take-off), ControlmaX (project material control) and StockmaX (inventory and stock management) were also implemented at Lamprell Energy early in 2003 with associated benefits and return on investment being realised in these areas of the business.

Peter Jamieson, managing director of absolute, explains the reasons for selecting Matrix: "I believe that an investment in Matrix not only provides all the customary benefits associated with automating processes such as: reduction in costs; improved efficiency; global availability of information and enhanced management control. Matrix also includes a myriad of user friendly industrial strength features, making it 'the' choice for materials management professionals".

The list of benefits that Matrix provides is too large and varied to list fully, but they include:

- Utilisation of the latest web technology
- Global availability of information on demand
- Comprehensive automation of the procurement process
- Business driven not technology led
- Combines functionality with practicality
- Enhances management control
- Eliminates outdated and restrictive practices
- Improves efficiency
- Streamlines end-to-end purchasing and material management
- Microsoft recommended solution

And it is benefits like these which have secured endorsement from Paul Kirwan, Microsoft managing consultant Middle East & North Africa, who has included Matrix in the Middle Eastern version of the Microsoft 'Industry Solutions Catalogue'.

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Matrix is designed and developed by a British software house, Pinnacle Business Solutions, and is the result of a unique partnership between materials management, information technology and financial management professionals. It is a product that utilises the latest technological advances, including Internet and e-mail facilities, but is widely recognised as being 'business-driven not technology-led'.

Questions

1. Study and analyze the case.
2. Write down the case facts.
3. What do you infer from the case?

Source: http://www.absolute-it.com/aboutus/casestudies/CSPage.aspx?PageID=39

1.5 Summary

- Materials management is a specialized area of management which concerns itself with the management of Material Resources.
- Materials management is an essential business function. It is concerned with planning, acquisition and flow of materials within the supply chain.
- The objective of materials management is to contribute to increased profitability by coordinated achievement of least materials cost.
- The parts that go into making of end products can come from two sources: in-house production or purchase from outside.
- Materials management's considerable effect on profits demands that its objectives be derived from the general business objectives "maintaining competitiveness" and "satisfactory profitability".
- Materials add value to a product. The margin between the values of raw materials and the finished products is known as the value added by production.
- Materials management determines three cost categories within the company which, in most cases, have a substantial effect on company profits. These costs are: material cost, capital cost & overhead cost.
- Materials management as a company's supply system has manifold interdependencies with its neighbour function and is thus of great importance in industrial management.
- Costs for materials and overheads can be effectively reduced just as much inventories by means of cooperation and sufficiently intensive communication.
- Good cooperation is absolutely necessary between Materials Management and design development in the interest of advantageous materials costs and low level of capital being tied up in inventories.
- Integrated materials management is oriented towards fulfilling the customer orders obtained by the sales department, at the lowest possible cost.
- Connections between materials management and the finance and accounting departments arise as a result of the fact that materials management is mostly responsible for the greatest bulk of costs within a company and has a considerable influence on the level of its current assets.

Notes

1.6 Keywords

Acquisition: The act of acquiring or gaining possession.

Capital Investment: It refers to funds invested in a firm or enterprise for the purposes of furthering its business objectives.

Carrying Costs: This is the cost a business incurs over a certain period of time, to hold and store its inventory.

Competitive Edge: Competitive Edge is having a clear advantage over the competition in terms of one or more elements of the market mix that is valued by potential customers.

Inventory Control: Inventory Control is the supervision of supply, storage and accessibility of items in order to ensure an adequate supply without excessive oversupply.

Lead Time: The time between the initiation and completion of a production process.

Materials Management: Material management is an approach for planning, organizing, and controlling all those activities principally concerned with the flow of materials into an organisation.

Outsourcing: Outsourcing is the contracting out of an internal business process to a third party organization.

1.7 Review Questions

1. What do you mean by materials management?
2. Discuss the scope of materials management.
3. Explain the main objectives of materials management.
4. What is the significance of materials management?
5. Describe materials management in design and development.
6. How will you interrelate production and material management?
7. How does cooperation between sales and materials management affect company's marketing strategy?
8. Which are the three cost categories determined by materials management?
9. Is material management considered a routine function? If yes, explain why?
10. How can working capital requirements be reduced through materials management?

Answers: Self Assessment

1. Business
2. Quality
3. Resources
4. Authority, responsibility
5. Maintaining competitiveness; satisfactory profitability
6. Foreign Exchange
7. End product
8. Value added
9. Efficient management
10. Materials Costs
11. Supply

Notes

12. Reduced
13. Good cooperation
14. Materials management; production
15. Profitability; liquidity

1.8 Further Readings

Books

Ramakrishnan. R V, Tony Arnold. J R (2007). "*Introduction to Materials Management*". Pearson

K. Shridhar Bhat, "*Production and Materials Management*". Himalaya Publishing House

Chary. S.N., "*Production and Operations Management*". Tata McGraw Hill

Gopalkrishanan. P, Sundaresan. M, "*Materials Management: An Integrated Approach*". PHI Learning Pvt. Ltd.

Online links

http://www.ginyt.com/scopeofmater.html

http://www.productivity.in/knowledgebase/Material%20Management/Scope%20and%20functons%20of%20materals%20management.pdf

http://expertscolumn.com/content/importnce-effective-materials-management

http://www.technicalchange.com/production-materials-management.html

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Unit 2: ABC Analysis

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2.1 Meaning of ABC Analysis

2.2 Objective/Purpose of ABC Analysis

2.3 Advantages of ABC Analysis

2.4 Limitations of ABC Analysis

2.5 Simple Numerical of ABC Analysis

2.6 Summary

2.7 Keywords

2.8 Review Questions

2.9 Further Readings

Objectives

After studying this unit, you will be able to:

- Explain the Meaning of ABC Analysis
- Discuss the Objective of ABC Analysis
- Explain the Advantages of ABC Analysis
- Discuss the Limitations of ABC Analysis
- Discuss the Numerical of ABC Analysis

Introduction

In the previous unit, we dealt with the meaning and scope of materials management. The unit also discussed about the materials management in other areas of management. This unit will help you to understand the concept of ABC Analysis. The various section and sub section of this unit will also summarize the objectives and limitations of ABC analysis. Activity Based Costing, or ABC, is a method of allocating overhead and direct expenses related to the most important activities of the company first. This process allows business owners and managers an opportunity to better define the areas of manufacturing or sales that generate the most profit for the company. Inventory analyzed under the ABC method is classified in order of profitability to the company. Class A inventory accounts for 80 percent of revenue, class B inventory for 15 percent of revenue and class C inventory for 5 percent of revenue.

ABC analysis is a technique for ordering causes or problems from the most to the least significant. In this way, the most significant aspects are identified (what Juran calls 'the vital few') and the efforts can be concentrated on those, thus getting the maximum benefit with the least effort. The analysis makes use of the ABC diagram, which is a special case of the bar chart, and is used in conjunction with brainstorming, cause and effect analysis and cumulative line charts. The diagram displays, in decreasing order, the relative contribution of each cause (for problem) to the total.

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The relative contribution can be based on the number of occurrences, the quality damage or the cost associated with each cause (or problem).

2.1 Meaning of ABC Analysis

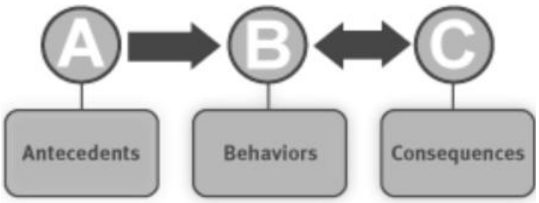
ABC analysis (sometimes referred to as the 80/20 rule and as ABC analysis) is a method of classifying items, events, or activities according to their relative importance. It is frequently used in inventory management where it is used to classify stock items into groups based on the total annual expenditure for, or total stockholding cost of, each item. Organizations can concentrate more detailed attention on the high value/important items. ABC analysis is used to arrive at this prioritisation.

Caselet

ABC Analysis / E-TIP Analysis in CLG

While behaviour is, on the surface, a simple overall process, it is influenced at almost every step. Managing employee and organizational behaviour is a result of understanding these influences, and determining the outcomes that are necessary to your company's success.

ABC Analysis



CLG employs the ABC Analysis to dissect the structure of common behaviours. This tool helps managers to understand why behaviours occur, and to identify the strategies for encouraging desired behaviours and discouraging undesired behaviours.

The ABC Analysis is comprised of three elements (Antecedents, Behaviours and Consequences) in a simple formula: *Antecedents trigger Behaviours, and Behaviours are followed by Consequences*. By understanding the characteristics that impact each of these elements, the ABCs can be used to emphasize desired behaviour.

Antecedents

- Are events that precede or prompt behaviour
- Have only short-term effects unless paired with consequences
- Have much less impact on behaviour than consequences
- Are overused compared to consequences

Behaviour

- Consists of what a person says or does
- Pinpointed behaviours correlate with business results

Contd...

Notes

Consequences

- Are events that follow the behaviour
- Increase, maintain or decrease the behaviour
- Have great influence on whether behaviour occurs again
- Positive, encouraging consequences are the most desirable and effective

In business settings, and even in family life, antecedents are used much more frequently than consequences to guide behaviour – most often with undesired results. By understanding that consequences are directly linked to behaviour, leaders will be equipped to affect whether or not the desired behaviour will recur. Antecedents have only about a 20 percent influence over what we say or do. Consequences have about an 80 percent influence and are much more powerful influencers of behaviour than antecedents.

Developing E-TIPs

In addition to the ABCs, CLG conducts an E-TIP Analysis^{SM} to study the effect of consequences upon the performer. This helps in understanding which consequences are most likely to encourage or discourage the recurrence of behaviour. Every consequence possesses four fundamental characteristics:

Effect

- Does the consequence encourage or discourage the behaviour?
- To determine whether the consequence encourages or discourages behaviour, the following can be asked.

Timing

- Are the consequences experienced immediately, or are they delayed?

Importance

- Is the consequence of high or low importance to the performer?

Probability

- Is the consequence likely or unlikely to occur?

Contd...

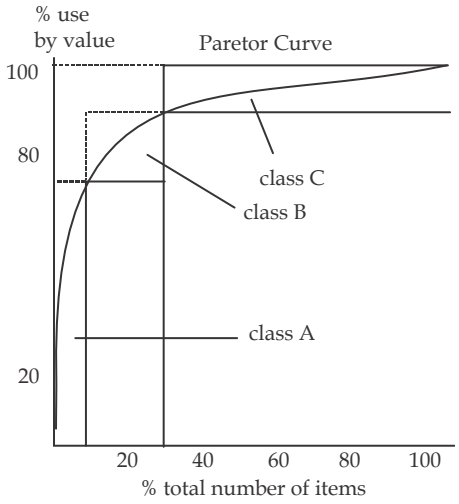
Notes

To help someone change their behaviour, it is a simple matter to develop consequences that are encouraging, immediate, highly important and consistently applied. CLG teaches the E-TIP Analysis to clients to help them determine which encouragers or discouragers are going to have the most effect.

Source: http://www.clg.com/Science-Of-Success/CLG-Methodology/Behavior-Change-Tools/ABC-ETIP.aspx

Pareto (ABC) Analysis can be used to classify stock groups. Stock items are ranked in descending order of usage value, and plotted on a cumulative frequency curve. It is common to find that 20% of items account for 80% of usage value, the next 30% has 15% of value. The final 50% have 5% of value.

Figure 2.1: ABC Curve



Source: Lall.Madhurima, Sahai.Shikha(2008), *"Entrepreneurship"*. Excel Books Pvt. Ltd.

ABC or Pareto analysis points the way to where control efforts are best directed. Judgement is needed on critical inventory items or security matters that Pareto analysis in itself does not reveal.

Taking inventory as an example, the first step in the analysis is to identify those criteria which make a significant level of control important for any item. Two possible factors are the usage rate for an item and its unit value. Close control is more important for fast moving items with a high unit value. Conversely, for slow moving, low unit value items the cost of the stock control system may exceed the benefits to be gained and simple methods of control should be substituted.

Task Choose a manufacturing concern of your choice and classify its stock in A, B and C categories.

These two factors can be multiplied to give the Annual Requirement Value (ARV) - the total value of the annual usage. If the stock items are then listed in descending order of ARV, the most important items will appear at the top of the list. If the cumulative ARV is then plotted against number of items then a graph known as an ABC curve is obtained.

Notes

Self Assessment

Fill in the blanks:

1. Two possible factors are the usage rate for an item and its …… value.
2. Close control is more important for ……. moving items with a high unit value.
3. ABC Analysis can be used to classify …… groups.

2.2 Objective /Purpose of ABC Analysis

ABC Analysis allows inventory/purchasing managers to segregate and manage the overall inventory/suppliers into three major groups. This allows different inventory/supplier management techniques to be applied to different segments of the inventory/suppliers in order to increase revenue and decrease costs. In terms of Pareto Analysis, it separated the critical few from the trivial many.

Notes The object of carrying our ABC analysis is to develop policy guidelines for selective controls. Normally, once analysis has been done, the following broad policy guidelines can be established in respect of each category.

"A" Category items generally represent approximately 15%–20% of an overall inventory by item, but represent 80% of value of an inventory.

Example: If you were running a restaurant. Approximately 20% of the menu items would account for 80% of the profit taken in by the restaurant. By using a Pareto Analysis, the owner of restaurant would know which menu items to focus his business around.

By paying close attention in real-time to the optimization of these items in inventory, a great positive impact is possible with minimal increase in inventory management costs. 'A' items merit a tightly controlled inventory system with constant attention by the purchase manager and stores management.

'A' items: High Consumptions Value

1. Very strict control
2. No safety stock
3. Frequent ordering
4. Weekly control statements
5. As many sources as possible for each item
6. Rigorous value analysis
7. Accurate forecast in materials planning
8. Minimization of waste obsolete and surplus
9. Maximum efforts to reduce lead time

"B" Category items represent 30%–35% of inventory items by item type, and about 15% of the value. These items can generally be managed through period inventory and should be managed

Notes

with a formal inventory system. 'B' items formalized inventory system with periodic attention by purchase and stores management.

'B' Items: Moderate Value

1. Moderate control
2. Low safety stock
3. Once in 3 weeks
4. Monthly control reports
5. Two or more reliable sources
6. Moderate value analyses
7. Estimate based on past data on present plans
8. Quarterly control over surplus and obsolete items
9. Moderate efforts

"C" Category items represent 50% of actual items but only 5% of the inventory value. Most organizations can afford a relatively relaxed inventory process surrounding these items. 'C' items use a simpler system designed to cause the least trouble for the purchase and stores department.

'C' items: Low Consumptions Value

1. Low control
2. High safety stock
3. Bulk ordering once in 6 months
4. Quarterly control reports
5. Two reliable sources for each item
6. Minimum value analysis
7. Rough estimates for planning
8. Annual review over surplus and obsolete materials
9. Minimum clerical efforts

Self Assessment

Fill in the blanks:

4. The object of carrying our ABC analysis is to develop policy guidelines for …… controls.
5. ABC Analysis allows inventory managers to …… and …….. the overall inventory into three major groups.
6. A category items are of …… consumptions value.
7. 'B' items formalized …….. system with periodic attention by purchase and stores management.

Notes

2.3 Advantages of ABC Analysis

A Pareto analysis is an observation of causes of problems that occur in either an organization or daily life, which is then displayed in a histogram. A histogram is a chart that prioritizes the causes of problems from the greatest to the least severe. The Pareto analysis is based on the Pareto Principle, also known as the 80/20 rule, which states that 20 percent of effort yields 80 percent of results.

Example: If an individual sells items on eBay, he should focus on 20 percent of the items that yield 80 percent of sales.

According to Mindtools.com, a Pareto analysis enables individuals to make effective changes. Following are the advantages of ABC analysis:

Organizational Efficiency

A Pareto analysis requires that individuals list changes that are needed or organizational problems. Once the changes or problems are listed, they are ranked in order from the biggest to the least severe. The problems ranked highest in severity should become the main focus for problem resolution or improvement. Focusing on problems, causes and problem resolution contributes to organizational efficiency.

Did u know? Companies operate efficiently when employees identify the root causes of problems and spend time resolving the biggest problems to yield the greatest organizational benefit.

Enhanced Problem-Solving Skills

You can improve your problem-solving skills when you conduct a Pareto analysis, because it enables you to organize work-related problems into cohesive facts. Once you've clearly outlined these facts, you can begin the planning necessary to solve the problems. Members of a group can conduct a Pareto analysis together. Arriving at a group consensus about the issues that require change fosters organizational learning and increases group cohesiveness.

Improved Decision Making

Individuals who conduct a Pareto analysis can measure and compare the impact of changes that take place in an organization. With a focus on resolving problems, the procedures and processes required to make the changes should be documented during a Pareto analysis. This documentation will enable better preparation and improvements in decision making for future changes.

Self Assessment:

Fill in the blanks:

8. Companies operate ……. when employees identify the root causes of problems.
9. The Pareto analysis is also known as the ……. rule.
10. Once the changes or problems are listed, they are ranked in order from the ……. to the …… severe.

Notes

2.4 Limitations of ABC Analysis

The Pareto chart is based on the research of Villefredo Pareto. He found that approximately 80 percent of all wealth of Italian cities he researched was held by only 20 percent of the families. The Pareto principle has been found to apply in other areas, from economics to quality control. Pareto charts have several disadvantages, however. Following are the main limitations of ABC analysis:

Easy to Make but Difficult to Troubleshoot

Based on the Pareto principle, any process improvement should focus on the 20 percent of issues that cause the majority of problems in order to have the greatest impact. However, one of the disadvantages of Pareto charts is that they provide no insight on the root causes. For example, a Pareto chart will demonstrate that half of all problems occur in shipping and receiving.

Caution Failure Modes Effect Analysis, Statistical Process Control charts, run charts and cause-and-effect charts are needed to determine the most basic reasons that the major issues identified by the Pareto chart are occurring.

Multiple Pareto Charts May Be Needed

Pareto charts can show where the major problems are occurring. However, one chart may not be enough. To trace the cause for the errors to its source, lower levels of Pareto charts may be needed. If mistakes are occurring in shipping and receiving, further analysis and more charts are needed to show that the biggest contributor is in order-taking or label-printing. Another disadvantage of Pareto charts is that as more are created with finer detail, it is also possible to lose sight of these causes in comparison to each other. The top 20 percent of root causes in a Pareto analysis two to three layers down from the original Pareto chart must also be compared to each other so that the targeted fix will have the greatest impact.

Qualitative Data versus Quantitative Data

Pareto charts can only show qualitative data that can be observed. It merely shows the frequency of an attribute or measurement. One disadvantage of generating Pareto charts is that they cannot be used to calculate the average of the data, its variability or changes in the measured attribute over time. It cannot be used to calculate the mean, the standard deviation or other statistics needed to translate data collected from a sample and estimate the state of the real-world population. Without quantitative data and the statistics calculated from that data, it isn't possible to mathematically test the values. Qualitative statistics are needed to know whether or not a process can stay within a specification limit. While a Pareto chart may show which problem is the greatest, it cannot be used to calculate how bad the problem is or how far changes would bring a process back into specification.

Self Assessment

Fill in the blanks:

11. Pareto charts can only show …….. data that can be observed.
12. …… cannot be used to calculate how bad the problem is.

Notes

13. Pareto charts cannot be used to calculate the average of the data, its …… or changes in the measured attribute over time.

2.5 Simple Numerical of ABC Analysis

In its simplest terms, Pareto analysis will typically show that a disproportionate improvement can be achieved by ranking various causes of a problem and by concentrating on those solutions or items with the largest impact. The basic premise is that not all inputs have the same or even proportional impact on a given output. This type of decision-making can be used in many fields of endeavor, from government policy to individual business decisions.

Bulchand & Co. Company inventories 20 items. The company decided to setup an ABC inventory system with 10% of A items, 20% of B items and 70% of C items. The company records provide the information, which is as follows:

Table 2.1: Company Records

Item Code	Annual usage in units	Cost per unit (Rs)
G	2,500	150
H	15,000	90
I	12,000	100
J	8,000	50
K	1,00,000	50
L	25,000	300
M	80,000	500
N	2,000	300
O	3,000	70
P	6,500	60
Q	10,000	75
R	6,000	20
S	20,000	50
T	40,000	90
U	1,20,000	350
V	20,000	200
W	1,500	350
X	4,000	100
Y	4,500	200
Z	7,000	40

Source: http://cde.annauniv.edu/CourseMat/mba/sem2/dba1651/abc.html

Now we need to analyze the above items into ABC categories on the basis of information.

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Table 2.2: Ranking of Items as Per Consumption Value

Item code	Annual usage in units	Cost per unit (Rs.)	Consumption Value	Ranking
G	2,500	150	3,75,000	17
H	15,000	90	13,50,000	7
I	12,000	100	12,00,000	8
J	8,000	50	4,00,000	14
K	1,00,000	50	50,00,000	4
L	25,000	300	75,00,000	3
M	80,000	500	400,00,000	2
N	2,000	300	6,00,000	12
O	3,000	70	2,10,000	19
P	6,500	60	3,90,000	16
Q	10,000	75	7,50,000	11
R	6,000	20	1,20,000	20
S	20,000	50	10,00,000	9
T	40,000	90	36,00,000	6
U	1,20,000	350	420,00,000	1
V	20,000	200	40,00,000	5
W	1,500	350	5,25,000	13
X	4,000	100	4,00,000	15
Y	4,500	200	9,00,000	10
Z	7,000	40	2,80,000	18

Source: http://cde.annauniv.edu/CourseMat/mba/sem2/dba1651/abc.html

Table 2.3: Classification of Items in ABC

Ordered Ranking	I Item Code	Consumption Value	Cumulative consumption value	Percentage of Cumulative consumption value	Class
1	U	420,00,000	420,00,000	37.90	A
2	M	400,00,000	820,00,000	74.14	
3	L	75,00,000	895,00,000	80.92	B
4	K	50,00,000	945,00,000	85.44	
5	V	40,00,000	985,00,000	89.05	
6	T	36,00,000	1021,00,000	92.31	
7	H	13,50,000	1034,50,000	93.53	C
8	I	12,00,000	1046,50,000	94.62	
9	S	10,00,000	1056,50,000	95.52	
10	Y	9,00,000	1065,50,000	96.33	
11	Q	7,50,000	1073,00,000	97.01	
12	N	6,00,000	1079,00,000	97.55	
13	W	5,25,000	1084,25,000	98.03	
14	J	4,00,000	1088,25,000	98.39	
15	X	4,00,000	1092,25,000	98.75	
16	P	3,90,000	1096,15,000	99.10	
17	G	3,75.000	1099,90,000	99.44	
18	Z	2,80,000	1102,70,000	99.70	
19	O	2,10,000	1104,80,000	99.89	
20	R	1,20,000	1106,00,000	100	

Source: http://cde.annauniv.edu/CourseMat/mba/sem2/dba1651/abc.html

Hence, the items can be classified in A, B and C categories as shown in the above tables.

Notes

Self Assessment

Fill in the blanks:

14. The basic premise is that not all inputs have the same or even ..... impact on a given output.

15. ABC analysis type of ..... can be used in government policy as well as individual business decisions.

Case Study

Super Sounds, Inc.

Super Sounds, Inc. (Super Sounds) is a leading speciality retailer founded more than 60 years ago in Cleveland, Ohio. The store provides a vast array of items to inspire accessories of all kinds. The company aims to meet its customers' needs not only with its products but also with the services and advice to help with their needs. Thus, customer service is an essential element of Super Sounds' successful retail model.

The shop is in a storefront location on a busy street and it has limited storage space for inventory. Recently, as demand for its few products has increased, management has had difficulty in managing the inventory. They frequently run out of some crucial products but seem to have endless supply of others. Hence the management of Super Sounds understood the value of managing inventory to satisfy customers and to bring down inventory costs. Obviously, having excess inventory will have huge inventory costs. To reduce costs in an inventory system, the focus should be on certain important high valued items. In this context, a management trainee provided a solution to the problem, by suggesting ABC analysis for their needs. This ABC classification process helped manage the inventory properly. The implementation of the ABC Analysis became a key element of supply chain and inventory management across Super Sounds stores.

Questions

1. How ABC analysis is used in inventory management in the above case?
2. Perform a SWOT analysis of the above case.

Source: http://www.ibscdc.org/Case_Studies/Operations%20and%20Project%20Management/Operations%20Management/OM0002.htm

2.6 Summary

- ABC analysis (sometimes referred to as the 80/20 rule and as ABC analysis) is a method of classifying items, events, or activities according to their relative importance.
- While using ABC analysis organizations can concentrate more detailed attention on the high value/important items.
- ABC Analysis allows inventory/purchasing managers to segregate and manage the overall inventory/suppliers into three major groups.
- "A" Category items generally represent approximately 15%–20% of an overall inventory by item, but represent 80% of value of an inventory.
- "B" Category items represent 30%–35% of inventory items by item type, and about 15% of the value.

Notes

- "C" Category items represent 50% of actual items but only 5% of the inventory value.
- The Pareto analysis is based on the Pareto Principle, also known as the 80/20 rule, which states that 20 percent of effort yields 80 percent of results.
- One of the disadvantages of Pareto charts is that they provide no insight on the root causes.
- Another disadvantage of Pareto charts is that as more are created with finer detail, it is also possible to lose sight of these causes in comparison to each other.
- Qualitative statistics are needed to know whether or not a process can stay within a specification limit.

2.7 Keywords

ABC Analysis: The ABC analysis is a business term used to define an inventory categorization technique often used in materials management.

Annual Requirement Value (ARV): It is calculated by multiplying the unit (monetary) value of an item by its annual usage. The higher the annual requirement value of an item, the greater the level of control that is called for.

Usage Rate: Quantity of a good or service used in a given period and expressed in a suitable unit of measurement.

Consumption: The process in which the substance of a thing is completely destroyed, used up, or incorporated or transformed into something else.

Inventory System: It is the software used to plan and track inventory balances and activities.

Obsolete: A thing is obsolete when it is no longer in use.

Safety Stock: Safety stock (also called buffer stock) is a term used by logisticians to describe a level of extra stock that is maintained to mitigate risk of stock-outs due to uncertainties in supply and demand.

Histogram: A histogram is a chart that prioritizes the causes of problems from the greatest to the least severe.

2.8 Review Questions

1. What do you mean by ABC analysis?
2. What is the main objective of ABC analysis?
3. Discuss the various advantages of ABC analysis.
4. Explain the limitations of ABC analysis.
5. How Pareto analysis helps you to improve your problem-solving skills?
6. Differentiate between qualitative data and quantitative data.
7. Discuss the importance of ABC analysis.
8. Give a diagrammatic representation of A, B and C categories.
9. What is ABC curve? What does it represent?
10. What is the main focus of problem resolution or improvement?

Notes

Answers: Self Assessment

1.	Unit	2.	Fast
3.	Stock	4.	Selective
5.	Segregate, Manage	6.	High
7.	Inventory	8.	Efficiently
9.	80/20	10.	Biggest, Least
11.	Qualitative	12.	Pareto chart
13.	Variability	14.	Proportional
15.	Decision-making		

2.9 Further Readings

Books

Ramakrishnan. R V, Tony Arnold. J R (2007). "*Introduction to Materials Management*". Pearson

K. Shridhar Bhat, "*Production and Materials Management*". Himalaya Publishing House

Chary. S.N. "*Production and Operations Management*". Tata McGraw Hill

Gopalkrishanan. P, Sundaresan. M, "*Materials Management: An Integrated Approach*". PHI Learning Pvt. Ltd.

Online links

http://www.citeman.com/7537-advantages-and-purpose-of-abc-analysis.html

http://www.ims-productivity.com/page.cfm/content/ABCPareto-analysis/

http://www.ehow.com/list_6744752_benefits-pareto-analysis_.html

http://www.ehow.com/list_6831238_disadvantages-pareto-analysis.html

http://cde.annauniv.edu/CourseMat/mba/sem2/dba1651/abc.html

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Unit 3: Codification and Standardization

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Objectives

After studying this unit, you will be able to:

- Define Codification and Standardization
- Discuss the Various Bases for Codification
- Explain the Characteristics of Coding Systems
- Discuss the Different Types of Coding
- Explain the Benefits of Standardization

Introduction

Previous unit dealt with the concept of ABC analysis and its purpose and advantages in materials management. In this unit, you will study about codification and standardization in the context of inventory.

Codification/cataloguing is basically an identification system for each item of the inventory. Standardization supports the fundamental precepts of build-to-order and mass customisation. Standardization makes it easier for parts to be pulled into assembly (instead of ordering and waiting) by reducing the number of part types to the point where the remaining few standard parts can receive the focus to arrange demand-pull just-in-time deliveries.

3.1 Basis of Codification

Codification of materials can also be termed as the identification of materials. This deals with uniquely identifying each item in the inventory. It is useful in requisitioning items or the operational departments, in placing of orders by the purchase department, in receiving and expediting the items on receipt from the supplier, in having a unique record of each of the items in stores and in work-in-process or in warehouse so as to facilitate the control over the inventory

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levels, and also in having a good control over the loss, deterioration, obsolescence, non-movement, or pilferage of the items in the inventory. Unique identification of the materials – whether they are raw materials, work-in-process or finished goods – is the first step towards a good materials management system. Without it, the control over inventory by rigorous exercises such as inventory techniques is not very effective. Without it, confusion might prevail in the operational departments. Moreover for a good quality control system a unique identification is a prerequisite. There are many other advantages such as variety reduction and standardization, etc.

The various bases for the codification of inventory are:

- Who will be the user?
- To what use is the codification going to be put?
- What degree of mechanization will be needed to use the codification system?

3.1.1 Codification by Group Classification

What do we mean by coding? By this, we give a unique number to a particular item in the inventory. For instance, 010237 might mean a specific item in inventory such as a particular kind of gasket, of a certain material, of a certain shape, and of certain dimensions. Of course, each of these numbers or groups of numbers (within the total identification number) should convey some unique information.

For instance, classification of materials in an inventory by providing numbers to them:

01 – Raw materials

02 – Purchased components

03 – Spare parts

04 – Tools

05 – Fixtures and Patterns

06 – Other supplies

The next classification may be based on the 'shape' of the items. For instance:

1. Wire
2. Tubing
3. Rod
4. Bar
5. Sheet
6. Strip

Another classification can be on the basis of material of construction. For instance:

1. Mild Steel
2. Stainless Steel
3. Bronze
4. Aluminum
5. Special alloy

6. PVC
7. Polypropylene

Self Assessment

Fill in the blanks:

1. Codification is basically a/an …….. system for each item of the inventory.
2. Without …… the control over inventory by rigorous exercises such as inventory techniques is not very effective.
3. For a good quality …… system a unique identification is a prerequisite.

3.2 Characteristics of a Good Coding System

A few points to be taken into consideration while codifying the items in the inventory are given below:

(a) ***Brevity:*** The codification system should avoid long and unwieldy description. This implies that the codes should consist of minimum possible number of digits. The size of the code would normally be dictated by the number and range of items and the number and types of applications of the data pertaining to the item.

Example: For the pencil code 07.39.1236, the last digit representing the price range may be deleted if such information is not needed.

(b) ***Logical:*** The coding system should be logically fit for the needs of the users and the methods of data processing employed. For the example of pencil code, the last digit representing price range should have an increasing price range with the value of the digit increasing, that is, a value of digit as 8 may indicate a higher price range of say ₹ 2.00-2.25.

(c) ***Flexibility:*** The code design should be flexible to accommodate changes without disturbing existing codes. We are familiar with the library coding system in which codes do never get disturbed by addition of new books and all books to come in future are easily accommodated by the existing code structure.

(d) ***Uniqueness:*** Each code must be a unique representation for the item it identifies. For instance, an inventory item number or employee identification code must identify one and only one inventory item or employee.

Notes The code structure must be easily understood by various users. It should be as simple, practical and meaningful as possible.

(e) ***Proper Choice of the Coding Symbols:*** While a code may have numbers, alphabets or a mixture of both, certain precautions should be taken in selection of the symbols. Characters with similar appearances should be eliminated. For example, the letters 0, Z, I, S and V may be confused with the numbers 0 (zero), 2, 1, 5 and U, respectively. Where possible, letters that sound the same should be avoided (for example, B, C, D, G, P and T or M and N).

(f) ***Layout of Codes:*** The layout of code should be equal in length. For example, a code 001-199 should be preferred over 1-199. Codes longer than four alphabetic or five numeric characters should be divided into smaller segments for human judgments.

Notes

(g) ***Capacity of a System:*** When calculating the capacity of a given code for covering all situations while still maintaining code uniqueness, the following formula applies:

$$C=S^P$$

where C is total available code combinations possible, S is the number of unique characters in the set, and p is the number of code positions.

Example: A 3-digit code with numbers 0 to 9 will have 10^3=1,000 unique code combinations. The size of code structure, therefore, should be decided before hand by anticipating the requirements of the unique combinations.

Self Assessment

Fill in the blanks:

4. The codification system should avoid …… and unwieldy description.
5. The coding system should be …… fit for the needs of the users and the methods of data processing employed.
6. The code design should be flexible to accommodate …… without disturbing existing codes.
7. Characters with ……. appearances should be eliminated.
8. In calculating the capacity of a given code for covering all situations while still maintaining code uniqueness, the formula used is …….. .

3.3 Types of Coding

The following are the three important methods of codification:

1. Numerical Method
2. Alphabetical Method
3. Numerical Cum Alphabetical Method

1. ***Numerical Method*:** Under this method, each number or numerical digit is allotted to each item or material.

   For example, in printing press following codes may be assigned:

Paper	145
Ink	155
Gum	165

   There are various universal decimal classification of codification used in libraries may be indicated for identification of items.

   This method is used where materials accounting is to be mechanized by use of punched cards or computers.

Caution Each code should uniquely indicate one item.

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2. ***Alphabetical Method*:** In this method alphabets or letters are used for codification of each category of materials. Accordingly each letter or alphabet is allotted for each item or material. For example: 'C' for copper, 'S' for steel and so on.

3. ***Numerical cum Alphabetical Method*:** This method is done by a combination of numerical and alphabetical method. Under this method both numerical along with alphabet is allotted for each item. For example, IR 5 may indicate Ink Red of Grade 5, Steel wire 6 may be denoted by SW 6 etc.

Task Formulate a coding system which you think can be effective in inventory management and has all the characteristics that a good coding system should have.

Self Assessment

Fill in the blanks:

9. Under ……. method, each number or numerical digit is allotted to each item or material.

10. ……. method is used where materials accounting is to be mechanized by use of punched cards or computers.

11. Under …… method both numerical along with alphabet is allotted for each item.

3.4 Standardization and Its Benefits

Standardization enables the materials manager to achieve overall economy and ensures interchangeability of parts. With standardization more than one manufacturer can supply and this will imply better availability, better price and better delivery. Standardization also implies routinising purchase efforts, less stock and hence less obsolete items. It also means less inspection efforts; as a matter of fact, many organizations do not check routine items bearing ISI marks in a very detailed manner, but resort to inspection of only a small fraction of items. It is also possible to enter into rate/running contract with standard items. This facilitates the production planning and economic lot-sizing at the supplier's end.

Did u know? The process of standardization logically leads to simplification or variety reduction. This implies reducing unnecessary varieties and standardizing to the most economical sizes, grades, shapes, colors, types of parts and so on.

Caselet

The Problem with Cloud Computing Standardization

Cloud computing has become an increasingly popular approach in recent years, with seemingly nothing but ongoing growth in its future. However, some industry observers say that the rapid growth has caused, and is also threatened by, the failure of comprehensive cloud-computing standards to gain traction, despite the many groups working on them.

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They say the lack of standards could make cloud computing trickier to use. It could also restrict implementation by limiting interoperability among cloud platforms and causing inconsistency in areas such as security and interoperability. For example, the lack of standardization could keep a customer trying to switch from a private to a public cloud from doing so as seamlessly as switching browsers or e-mail systems. In addition, it would keep users from knowing the basic capabilities they could expect from any cloud service.

"Interoperability between offerings and the portability of services from one provider to another is very important to the customer to maximize the expected [return on investment] from cloud computing," explained IBM vice president for software standards Angel Luis Diaz. Moreover, interoperability would keep users from being locked into a single cloud provider.

A lack of security standards – addressing issues such as data privacy and encryption – is also hurting wider cloud-computing adoption, said Nirlay Kundu, senior manager at Wipro Consulting Services.

With potentially sensitive information stored off-site and available only over the Internet, security is a critical concern, explained Vishy Narayan, principal architect with the System Integration Practice at Infosys Technologies, a vendor of consulting, technology, engineering, and out-sourcing services.

According to Lynda Stadtmueller, program director for cloud computing at market research firm Frost & Sullivan's Stratecast practice, an effective lack of standardization makes it difficult for buyers to compare and evaluate cloud offerings.

Of course, cloud computing is relatively young, so the lack of standardization - which usually occurs with more mature technologies - is not altogether surprising. And some experts say the market's immaturity makes it too difficult for any one organization to mandate standards.

There may be challenges to cloud-computing standardization along the way, and overcoming them could determine just how bright cloud computing's future will be, said Winston Bumpus, director of standards architecture at VMware, a virtualisation and cloud infrastructure vendor. He is also president of the Distributed Management Task Force (DMTF), an industry-based standards consortium.

Source: http://www.infoq.com/articles/problem-with-cloud-computing-standardization

The important benefits of standardization are summarized as follows:

1. Standardization helps reduce inventory items,
2. It helps in evolving better means of communication about an item in the company,
3. It forms a base for further inventory analysis,
4. The specification of items can be more clearly spelt out, making quality control firm,
5. In a developing economy like ours, where the need is to promote exports, insistence on standards helps in creating confidence in the international market.

By using national standards, it is easier to locate sources of supplies and in the case of machine parts, the replacements can be obtained easily. It could also be used in advertising for the products as well as spare parts.

Self Assessment

Notes

Fill in the blanks:

12. Standardization enables the materials manager to achieve overall economy and ensures …… of parts.
13. The process of standardization leads to simplification or…… .
14. …….. helps reduce inventory items.
15. …… could also be used in advertising for the products as well as spare parts.

Case Study

Data Standards in the Supply Chain

Interested in cutting costs and improving patient safety? Visit your organization's supply room or station and take a product from the shelf. Ask your materials management director if the product's origins can be traced. Can the item's contracted price be captured from the packaging bar codes? In a product-recall situation, could all of the affected items throughout your health system be located quickly and accurately?

The likely answer is "No."

Lack of data standards in the healthcare supply chain make it difficult to track and trace products, creating inefficiencies that raise cost and impact patient safety.

"Today we don't know if a product has been used and on which patient," says Jean Sargent, past president of the Association for Healthcare Resource & Materials Management. "It's a significant patient safety issue." For instance, Sargent says, data standards will streamline the recall process. Organizations will be able to identify and trace recalled products and remove them promptly. In the case of certain medical devices, hospitals will be able to track which patient received a recalled product and proceed accordingly.

Bar-code technology has been in place for more than 35 years, but healthcare has resisted adopting it. "I came to healthcare seven years ago and was shocked that we couldn't use bar codes on products," says Brent Johnson, vice president of supply chain and imaging services and chief purchasing officer at Intermountain Healthcare, Salt Lake City. "The healthcare supply chain is complex and costly. The No. 1 problem is not being able to use data standards and product identification information."

One of the challenges has been a lack of perceived value in standards adoption. That's changing. "Hospitals now see clearly the need for data standardization," says Siobhan O'Bara, vice president of healthcare for GS1 Healthcare U.S. in Lawrenceville, N.J. "The need is even greater under health reform. It's driving the demand for standardization higher and higher." Data standards will help to ensure that hospitals get the right product in the right quantity to the right place at the right time and at the right (or contracted) price.

The onus is on providers. "We haven't demanded standards adoption and we have a credibility issue with the use of supply chain information," says Vance Moore, senior vice president of operations for Sisters of Mercy Health System in Chesterfield, Mo. Sisters of Mercy, along with Geisinger Health System, Intermountain Healthcare, Kaiser Permanente

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and the Mayo Clinic formed a collaboration in 2010 called the Healthcare Transformation Group that seeks to facilitate the adoption and implementation of GS1 Standards. GS1 is a voluntary, global standards group that brings together all relevant stakeholders, including hospitals, manufacturers, distributors and group purchasing organizations.

Hospitals may need to update their materials management information systems and enterprise resource planning systems to be able to accept and use supply chain standards. Most newer systems already have the capabilities. Joseph Dudas, vice chair of supply chain management at the Mayo Clinic, Rochester, Minn., says two things will drive standards adoption: the desire to improve patient safety and regulations that demand it. The Food and Drug Administration is poised to roll out a unique device identification system for medical devices. "If organizations are not mobilizing and preparing now to adopt these standards, the cost to implement quickly will increase," says O'Bara. "The requirement to do this is coming."

Dudas urges CEOs to challenge supply chain leaders to spur adoption. "Every dollar saved in the supply chain goes right to the bottom line," he notes. "CEOs need to recognize the importance of the supply chain and treat it as a strategic function. They need to ask hard questions of supply chain leaders and set aggressive goals."

Question:

1. What do you understand from the given case?
2. Write down the case facts.

Source: http://www.hhnmag.com/hhnmag/jsp/articledisplay.jsp?domain=HHNMAG&dcrpath= HHNMAG/Article/data/06JUN2012/0612HHN_FEA_dataGATE

3.5 Summary

- Codification/cataloguing is basically an identification system for each item of the inventory.
- Standardization supports the fundamental precepts of build-to-order and mass customisation.
- Unique identification of the materials – whether they are raw materials, work-in-process or finished goods – is the first step towards a good materials management system.
- In codification system, the codes should consist of minimum possible number of digits.
- The coding system should be logically fit for the needs of the users and the methods of data processing employed.
- The code design should be flexible to accommodate changes without disturbing existing codes.
- Numerical Method is used where materials accounting is to be mechanized by use of punched cards or computers.
- In numerical cum alphabetical method both numerical along with alphabet is allotted for each item.
- Standardization enables the materials manager to achieve overall economy and ensures interchangeability of parts.
- By using national standards, it is easier to locate sources of supplies and in the case of machine parts, the replacements can be obtained easily.

Notes

3.6 Keywords

Assembly: Assembly refers to the action of fitting together the component parts of a machine or other object.

Codification: The process of detailing a new standard is known as codification.

Coding System: Coding system is the process or system of assigning codes, abbreviations or labels to represent a letter, item or message.

Inventory Analysis: Inventory analysis is the technique for determining the optimum level of inventory for a firm.

Inventory: Inventory is the entire stock of a business, including materials, components, work-in-progress, and finished products.

Just-in-time: Just-in-time denotes a manufacturing system in which materials or components are delivered immediately before they are required in order to minimize inventory costs.

Mass Customisation: A process whereby small lots of individualized parts or products are produced is referred to as mass customisation.

Punched Cards: A card perforated according to a code, for controlling the operation of a machine, used in voting machines and formerly in programming and entering data into computers is known as a punched card.

Standardisation: Standardisation means to establish rules or principles, within a specified business sector, as an acceptable way of doing business.

Variety Reduction: Variety reduction is the analysis of the range of products or components manufactured by a company with a view to minimizing the variety of products, parts, materials or processes.

3.7 Review Questions

1. What do you understand by codification? Give the various bases on which codification is done.
2. Explain the characteristics of a good coding system.
3. Explain the different types of coding systems used in inventory management.
4. Briefly discuss the numerical cum alphabetical method of coding.
5. Define standardization.
6. Discuss the benefits of standardization.
7. Out of the three types of coding systems, which one, do you think, is the most efficient and why?
8. How does codification and standardization reduce the complexity which is otherwise observed in inventory management?
9. Differentiate between the numerical method and the numerical cum alphabetical method of coding.
10. Write a short note on:
    (a) Brevity
    (b) Flexibility

Notes

(c) Layout of codes

(d) Capacity of a system

Answers: Self Assessment

1.	Identification	2.	Codification
3.	Control	4.	Long
5.	Logically	6.	Changes
7.	Similar	8.	$C=S^P$
9.	Numerical	10.	Numerical
11.	Numerical Cum Alphabetical Method	12.	Interchangeability
13.	Variety reduction	14.	Standardization
15.	Standardization		

3.8 Further Readings

Books

Ramakrishnan. R V, Tony Arnold. J R (2007). "*Introduction to Materials Management*". Pearson

K. Shridhar Bhat, "*Production and Materials Management*". Himalaya Publishing House

Chary. S.N., "*Production and Operations Management*". Tata McGraw Hill

Gopalkrishanan. P, Sundaresan. M, "*Materials Management: An Integrated Approach*". PHI Learning Pvt. Ltd.

Online links

http://www.citeman.com/4466-codification-in-materials-management.html

http://www.citeman.com/4486-characteristics-of-good-coding-system.html

http://www.materialsmanagement.info/inventory/inventory-cataloguing.htm

http://www.build-to-order-consulting.com/Standardization.htm

Unit 4: Purchasing Management

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Objectives

After studying this unit, you will be able to:

- Explain the Meaning and Objectives of Purchasing Management
- Discuss the Functions of Purchase Department
- Explain the Purchase Policy and Procedure
- Discuss the Purchase of high Capital Equipment

Notes

Introduction

In the previous unit, we studied about the concept of codification and standardization in materials management. This unit will help you learn about the purchase department, its functions, purchasing management, the different purchase policy and procedures and the purchase of high capital equipments.

Purchasing is the function of procuring materials, tools for stores, (or supplies) and services required for the manufacture of a product, maintenance of the machines and uninterrupted running of manufacturing plant in a manner that guarantees marketing of the company's products in the quantities desired at the time agreed upon and at the competitive price, consistent with quality desired.

4.1 Meaning of Purchase Management

In the words of Alford and Berry "Purchasing is the procuring of materials, supplying machine tools and services required for the equipment maintenance and operation of manufacturing plant". Purchasing in a sense is the task of buying goods of right quality, in the right quantities, at the right time, at the right sources, and at the right price.

Traditionally, purchasing was regarded as one of the activities of the production management. However, much progressive management have already realized that in view of changing business conditions, growing competition continual escalation in the cost of inputs, purchasing must be given status equal to that of other major functions (i.e., production, sales and finance). The purchase department is headed by the purchase manager/officer. In some firms, the head of the purchase department is also called commercial manager or purchase chief.

Purchasing management encompasses a group of applications that controls purchasing of raw materials needed to build products and that manages inventory stocks. It also involves creating purchase orders/contracts, supplier tracking, goods receipt and payment, and regulatory compliance analysis and reporting.

Purchasing management directs the flow of goods and services in a company and handles all data relating to contact with suppliers. To be effective, it requires knowledge of the supply chain, business and tax laws, invoice and inventory procedures, and transportation and logistics issues. Although a strong knowledge of the products and services to be purchased is essential, professionals in this field must also be able to plan, execute, and oversee purchasing strategies that help their company be more profitable.

Sourcing reliable suppliers is a crucial part of purchasing management. Managers, agents, and buyers usually learn about new products and services from Internet searches, trade shows, and conferences. They meet with potential suppliers in their plants whenever possible. Skills in foreign languages may be helpful for sourcing suppliers in other countries. Individuals who work in this area must always assess potential suppliers in terms of the supplier's ability to deliver quality merchandise at a suitable price and on time.

Purchasing management professionals must be good negotiators, understand technical product information, have good mathematical ability, understand spreadsheet software, understand marketing methodology, and be outstanding decision makers. To get ahead in this field requires good leadership skills, and higher positions often require a master's degree in a business related subject. Entry level positions, such as junior buyers, assistant buyers, and purchasing clerks, often require a college degree and some product knowledge.

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Self Assessment

Fill in the blanks:

1. …… in a sense is the task of buying goods of right quality, in the right quantities, at the right time, at the right sources, and at the right price.
2. Purchasing was regarded as one of the activities of the …….. management.
3. The purchase department is headed by the …….. .

4.2 Objectives of Scientific Purchasing

Scientific purchasing is the technic of purchasing goods of right quality, in the right quantities, at the right price, at the right time and from the right source. By adopting suitable purchasing methods in centralized or decentralized environment the objectives of the scientific purchasing can be successfully achieved.

Where the Replenishment method merely replaces inventory that has been sold, Scientific Purchasing uses sophisticated calculations to forecast your inventory requirements. This method will ensure that you order only what is in demand and that you don't replace stock that is unpopular or out-of-season. In order to accomplish this, Scientific Purchasing uses a combination of statistical tools to measure trends and then predict future requirements based on those trends. Linear regression is used to determine average daily demand for past periods. This average is then used to predict how much stock you will sell until your next order is received. Changes in the retail price due to promotions or price increases are also considered, as are current inventory on hand, orders due to arrive, bonus sizes, case packs and seasonal fluctuations in demand. To summarise, the objectives of Scientific purchasing are:

1. To procure the needed materials at a competitive price of the right quality, in the right quantity and at the right time.
2. To maintain continuity of supply to ensure production schedule at minimum inventory investment.
3. To ensure the production of goods of better quality at a competitive price by procuring materials that best suit the product and the purpose for which they are intended.
4. To suggest better substitutes to materials which are currently being used with a view to lower the cost and maintain quality of products.
5. To render assistance in standardization, variety reduction, value analysis, make or buy decisions and other cost reduction programs.
6. To assist in fixing probable price and delivery schedule.
7. To create a goodwill and enhance the company's reputation for being fair and maintaining integrity through its dealings with the suppliers.
8. To enable the company, to maintain competitive position and earn a fair return on its investment.

Self Assessment

Fill in the blanks:

4. One of the objectives of scientific purchasing is to maintain continuity of supply to ensure production schedule at …… inventory investment.

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5. The purpose of scientific purchasing is to create a …… and enhance the company's reputation for being fair and maintaining integrity through its dealings with the suppliers.
6. A function of purchase department is to scrutinizing …… and deciding the method of purchase.
7. Acquisition and analysis of supplier's proposals is a …… function of purchase department.

Caselet

Purchasing Software: Procurement Management

With all the discussion of procurement and how it works in businesses, the biggest question is does it actually save money? After all, that's the real bottom line. One large company that had an annual purchasing expenditure of about $10 billion was able to shave over 15% off that amount annually just by leveraging the buying power of all their worldwide divisions. Those numbers clearly illustrate that, when done correctly, a procurement system can definitely save a company money, as well as provide a number of other benefits, particularly to large companies that spend a sizable chunk of their revenue on puchasing goods and services for their business.

Besides the impressive cost savings, procurement management can also save valuable time and can streamline the workforce. With procurement systems, many of the steps involved in purchasing are either not necessary or are automated so that the entire process runs smoother and faster. Also, because most corporations divide up the purchasing responsibilities among their multiple divisions, they typically have several staff members who are technically doing the exact same job in different locations. By centralizing all of a company's procurement needs into a single department or firm, these redundant job positions can be eliminated. Additionally, the excess office space and equipment can either be liquidated or used for more productive business endeavours.

In order to achieve these and the other benefits procurement management offers, companies must be willing to go through many steps. Implementation does require some changes both in technology, in personnel, and in attitude. Without these changes, the procurement system simply won't be effective.

One of the first of these changes is to adopt a positive sourcing methodology. Many corporations simply place orders; they don't form relationships with suppliers. While the distinction may not seem great, the reality is that these sellers are critical components of a business's success, and they need to be treated that way. The overall goal of a strong sourcing methodology is to achieve a mutually satisfying agreement that will provide the buyer with the goods he needs at a reasonable price and that will secure the seller a steady customer in the future.

Another change with procurement is the workforce. Employees who will be dealing directly with vendors need to be highly trained and experienced in the industry in which the business is involved. For example, a pharmaceutical company would need to hire individuals who are familiar with the types of chemicals used in the creation of prescription drugs. By hiring individuals who are experts in their field and who are then trained in the procurement process of the company, suppliers feel more comfortable doing business with the buying firm.

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With a more centralized approach to procurement, large corporations are also in the position to have their purchasing team specialize in certain areas of procurement. An automobile manufacturer may have one team responsible for purchasing machinery, another for raw materials, and a third for temporary employees. This type of specialization would be too costly if all of the purchasing was spread out across the globe but when dealing with billions of dollars in goods and services being handled in one area, specialization is almost a necessity.

Tracking suppliers, using reverse auctions, and evaluating costs are all other important parts of the procurement system. By tracking suppliers, the buyer is able to determine whether or not they continuously live up to expectations. Through reverse auctions, buyers are able to keep prices lower while selecting from a wide array of potential sellers. Plus, continually evaluating costs prevents companies from losing sight of the biggest benefit of procurement management: its cost-effectiveness.

Source: http://www.epiqtech.com/Purchase-Procurement-Management.htm

4.3 Functions of Purchasing Department

Some important functions of purchasing department are:

1. Locating, selecting and developing qualified sources of supply.
2. Scrutinizing purchase indents and deciding the method of purchase.
3. Floating enquires, processing quotations, conducting negotiations and realizing purchase orders.
4. Pre-delivery, follow-up and shortage chasing.
5. Coordinate with inward inspection including timely return of defective materials back to suppliers.
6. Endorsing suppliers invoices for payment.
7. Processing suppliers' request for price increase including renegotiation of price.
8. Attending on to suppliers' representatives and traveling salesman.
9. Arranging for meeting between suppliers' representatives and company officials.
10. Disposal of surplus, obsolete and scrap materials.
11. Advising the management with regard to new materials, new products, forward buying, etc.
12. Acting as a link between company finance department and supplier for timely settlement of supplier's bills.
13. Attending the periodical activities like applying for import licensing quota.
14. Study the market conditions and enter into rate contract with the large suppliers to ensure availability of materials all the time.

4.3.1 Responsibilities of the Purchase Department

Given below is the list of responsibilities of the purchase department. Some of which are wholly its own, and some of which it shares with other departments.

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1. Responsibilities which belong exclusively to the purchase department:
   (a) Selecting the right suppliers.
   (b) Obtaining materials at the best price. (Quite often the lowest price need not necessarily be the best price or the right price.)
   (c) Placing purchase orders with the suppliers.
   (d) Following up with the suppliers to ensure timely delivery.
   (e) Ensuring that the relationship with the suppliers is always cordial.
   (f) Enquiring into complaints both from customers and user departments.
   (g) Selecting the appropriate managers and staff for the purchasing function. (One of the prime considerations is integrity of the highest order.)
   (h) Imparting training to purchase personnel to improve efficiency.
2. Responsibilities which the purchase department shares with other departments:
   (a) Obtaining technical information and advice on materials.
   (b) Establishing and developing specifications for materials. (That main object is assuring that quality is just right – neither too high or nor too low, both of which will affect cost and profitability.)
   (c) Scheduling orders for materials on suppliers and fixing delivery dates for suppliers.
   (d) Specifying mode of delivery and transportation.
   (e) Inspecting materials received and ensuring that the specifications laid down have been compiled with.
   (f) Accounting of materials purchased, including payment of bills.
   (g) Inventory Control.
   (h) Receiving, store-keeping and warehousing.
   (i) Entering into construction contracts or service contracts or agreement.
   (j) Sale of scrap, surplus and salvaging.
   (k) Transportation of materials including clearing of goods.
   (l) Determining whether to make or buy.

4.3.2 Duties of Purchasing Department

Some important duties of purchasing department are:

1. ***Finding and Approving Suppliers:*** In this context the term suppliers refer to those who supply services. This should be done not only by discussions with representatives and perusal of catalogues and samples, but also by visiting supplier's premises. The approval in the technical aspects of the vendor's product or services may be the responsibility of the quality or the design department, but the purchaser should be convinced that the source of the supply is stable, reliable, and will be able to fulfill the demands made upon it.
2. ***Purchasing at Least Total Cost*:** While the quality and quantity of goods or services may be specified elsewhere, the purchaser must purchase the materials at the most advantageous terms. He must be prepared to assist in or lead all discussions on under quantities, and

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give advice on imponderables–such as anticipated services from the supplier-which can affect the decision on the choice of vendor.

3. ***Receipt of Quotations*:** A purchaser should obtain a list of satisfactory suppliers and should send out as convenient, requesting information on quality, price, delivery, etc.

Notes These enquiries must be marked clearly "FOR QUOTATION ONLY".

Quotations received should be examined for such items as delivery charges, discount structures (e.g. Discount for prompt payment), supplementary charges and any restriction. The use of the learning curve as a negotiating tool is advocated by some, while the practice of incorporating a purchaser into a value analysis team is well established and a useful practice.

4. ***Ensuring Delivery of Goods and Services at Right Time:*** This involves contacting suppliers before the date of dispatch of items and ensuring timely dispatch. It must be realized that deliveries which are too early a source of embarrassment, not only because payment may be demanded early, but also because excessive space might be occupied in stores. In practice in some organizations, the delivery date and indeed even the time of delivery may have to be specified to avoid congestion.

5. ***Warning all Concerned against Delay in Delivery:*** If it's clear that a delivery date could not be met, the appropriate departments must be informed so that work can be rescheduled, if necessary.

6. ***Verifying invoice presented by suppliers:*** The Purchase department verifies and ensures that all conditions like price, quantity, and quality, etc., that were earlier agreed upon are in order to a further need for verification of invoices arises from the problem of defective material being supplied. To help resolve this problem, a note of every rejection should be passed to purchasing. The recording of these rejected materials will also help in building up a case against the supplier, and this may as well affect the placing of future orders.

7. ***Speculative buying:*** Speculative buying is sometimes the duty of purchase department and it implies purchasing of goods, not from reasons of immediate need because of favorable market condition. Thus it may seem to the purchaser, from his intimate knowledge of market, that a particular commodity is likely to become difficult to obtain or that its price is likely to rise sharply. Buying in the first case will guard against a hold up, whilst in the second case it may permit material bought cheaply to be resold at a profit.

Caution Speculative buying is both difficult and potentially dangerous, and can result in a company carrying huge stocks which are difficult to clear.

8. ***Assisting in pricing:*** Advising on prices for materials or services to be used in new markets or in modified design of a product. This aspect can be of substantial value since it may help deciding major policy matters–for example, the feasibility of meeting a marketing requirement on price, the likely cost of reequipping a unit etc.

9. ***Acting as a "window to the world":*** Purchasing brings continual contract with outside organizations, and this can prove a valuable channel of communication whereby news of novel process, materials, services and equipment are brought to the notice of the departments concerned.

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4.4 Purchase Parameters – Eight Rs of Purchasing

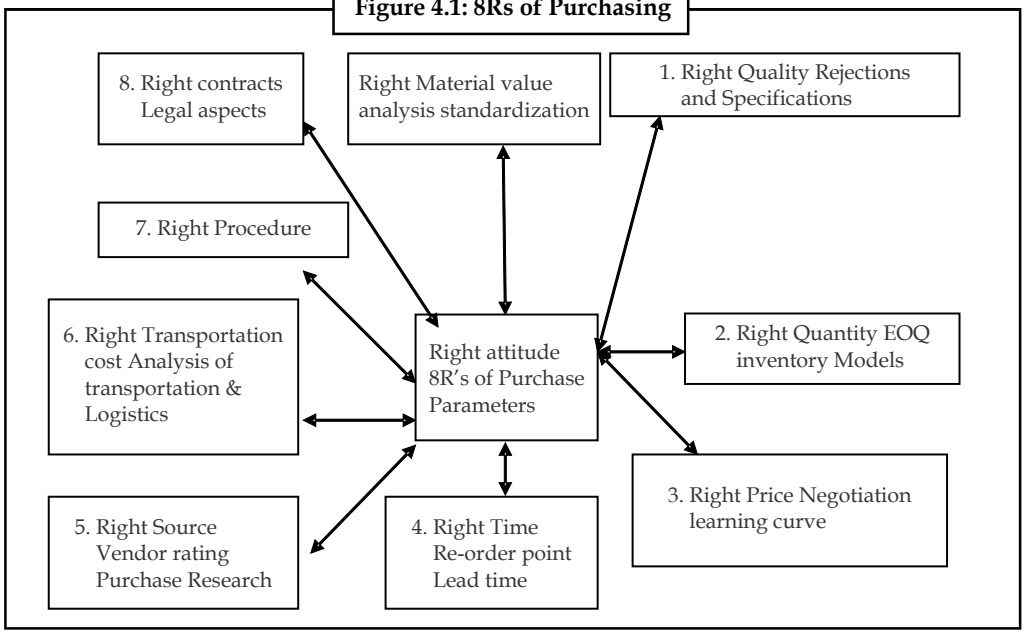
Scientific Purchasing is not a mere procurement of needed materials at the lowest price but procuring them in a way that minimizes the overall cost of the product. To ensure this, scientific purchasing is governed by eight well known parameters called Basic elements of scientific purchasing or also called Principles of purchasing or "simply' 8Rs buying"-Right Quality, Right Quantity, Right Price, Right Time, Right Source, Right Place of Delivery, Right Procedure and Right Contract.

1. ***Right Quality*:** Quality of a product is measured in terms of its design, chemical composition, heart treatment, surface treatment, manufacturing process, mechanical and electrical properties, workmanship, etc. Two distinct but closely inter related aspects of quality are quality of design or quality of conformance.

   Quality of design for purchased items refers to the quality specified by the company's design department in the form of specifications while quality of conformance refers to the extent to which the goods and services purchased compiles with the specification laid down.

   To determine the quality of conformance of purchased items, sampling plans are used. Different methods of providing quality specifications are – brand or trade name, commercial standard, performance standard, blue print, samples, etc.

Figure 4.1: 8Rs of Purchasing



Source: R. Punitha (2008). "Materials Management". Excel Books Pvt. Ltd.

2. ***Right Quantity*:** Right quantity is yet another important parameter in buying. Quantity decision is influenced by "Relationship methods" and "Buying methods". Replenishment method such as reorder level, "two-bin system", "review system-optional replenishment", and "review system compulsory replenishment" help to provide broad guide lines.

Example: Order quantity under first three replenishment system is fixed and is generally the economic order quantity, yet the same might have been modified in the light of constraints. However, the reorder quantity under the fourth system (i.e. review period-compulsory

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replenishment) varies and it equals the difference between the maximum level less the sum of stock "stock on hand" and "stock on pipeline"–

- Hand to mouth buying is too small.
- Scheduled buying can be either economic order quantity or small or larger than EOQ.
- Forward buying is generally very large, covering a long period of consumption.
- Contract buying is receiving in staggered lots, each lot at times may equal EOQ.

Besides the above mentioned factors, consumption, market conditions, lead time, source of supply (indigenous or foreign), etc., too influence the decisions of right quantity.

3. ***Right Price***: Right price does not lower the price but the price minimizes the overall cost. Right price is not very easy to determine. To arrive at the right price, the following techniques are employed:

   Negotiation is used:

   (a) When there are limited vendors,

   (b) When time available to purchase is short and,

   (c) When items belongs to a fixed price category:

   - Tender system is followed in public sector undertakings to identify the lowest potential bidder.
   - Learning curve is employed to determine the price of items with high labor content.

4. ***Right Time***: Right time and lead time are closely related. Right time implies that time at which the goods requested should be received while lead time refers to the time between the communication of the need for an item to be purchased by the indenter till the item is actually received and is made available for consumption. The buying department has the sole responsibility for developing lead time information for all items and make it available to those concerned-mainly planning and stores-so that they indent their requirements well in the advance and avoid the need for rush purchases.

   Basic elements of lead time are:

   (a) Time required by the indenter to communicate the requirement to purchase.

   (b) Time required by the purchase to locate, select and develop the qualified sources of supply including finalization of agreement, etc.

   (c) Transit time for the purchase order to reach supplier.

   (d) Time required by the supplier to route buyer's order through his administrative channels.

   (e) Time required by the supplier to fill buyers order.

   (f) Transportation time for the goods to reach buyers destination.

   (g) Time required by buyers receiving department to collect materials from transporters godowns, verify the quantity received and prepare necessary documents.

   (h) Time required by the buyer's inward inspection section to verify the quality of the goods.

Notes

(i) Time required by the main stores to take possession of the goods, deposit them into appropriate bins and update inventory.

(j) Issuing materials and carrying them to the place of work.

Since the inventory investment of an item to a large extent is influenced by it, the buyer must analyze each of the above mentioned elements and try to reduce them to the extent possible this is especially important for items of A and B categories under A, B, C classification of inventories.

Occurrence of one or two contingencies, namely, strike or lock out, flood, etc., at supplier's plant may require the purchase department to make rush purchase from local suppliers at a higher prices, this being possible for the following items:

(a) Produced to commercial standards,

(b) When new suppliers are approached and develop the item,

(c) To ensure the continuity in production, buyer must maintain sufficient inventory in case of single source items.

5. ***Right Sources:*** Only the right sources can give quality of materials in the right quantities at the right price and at the right time. Right source aspect involves decisions as to:

   (a) The kind of item to be purchased directly from the manufacturers,

   (b) From which dealer,

   (c) From which open market.

   Right sources require the analysis of transportation costs along with the basic price to make selection between a distant supplier and a local one.

6. ***Right Place of Delivery/Transportation:*** In most of the cases, items have to be supplied directly consuming units, which may be located at distant places from the headquarters. The place of delivery should be clearly mentioned in the supply order.

7. ***Right Procedure:*** The right procedure to be adopted has to be formally developed for the pre-purchase, ordering, and post purchase system. Pre-purchase means initiating the purchase through requirement of indent, planning, selection of suppliers, obtaining quotations and evaluating them. Along with the purchase order, an acknowledgement copy is also sent to the supplier, who returns the same duly signed as a token of acceptance of the purchase order and to abide by the terms and conditions mentioned in the order.

8. ***Right Contract:*** Purchase order is a legal document that binds the selling company with the buying company. Various terms and conditions about insurances, sales, octroi tax, excise, customs, breach of contract, settlement of dispute, etc., are clearly mentioned. Case of international purchase INCOTERMS 1990 such as F.O.R, F.O.B, C.I.F., etc.

The selection of particular availability of sources must be based on such factors as reliability, technical ability, after sales service buying convenience, past experience, location financial position, labor relations, reciprocal relations etc.

4.5 Kardex System

This system is widely used by the purchase officers and following information can be obtained from it:

1. What should be purchased?

Notes

2. From whom purchase should be made?
3. At what rate?
4. When the material can be delivered?
5. Has it been delivered?
6. Whether payment has been made?

For each item of purchase, a separate card is maintained to keep record of a purchase order till receipt of material. When requisitioner sends an indent; it is entered in the card along with the details of enquiry and quotations and last date of receipt, etc.

When the order is placed then details of the purchase order are recorded in another card, such as:

1. Order Number
2. Date
3. Quantity
4. Rate accepted
5. Delivery Period
6. Name of the supplier

This above information is very useful, if a repeat order is required to be placed.

Self Assessment

Fill in the blanks:

8. Selecting the supplier is the responsibility of …… department.
9. …….. must be prepared to assist in or lead all discussions on under quantities, and give advice on imponderables–such as anticipated services from the supplier-which can affect the decision on the choice of vendor.
10. Scientific Purchasing means procuring materials in a way that …….. the overall cost of the product.
11. Quality of …… for purchased items refers to the quality specified by the company's design department in the form of specifications.
12. Quality of …….. refers to the extent to which the goods and services purchased compiles with the specification laid down.
13. To determine the quality of conformance of purchased items …… plans are used.

4.6 Purchasing Policy and Procedure

Every authority delegated with the financial powers of procuring goods in public interest shall have the responsibility and accountability to bring efficiency, economy, and transparency in matters relating to public procurement and for fair and equitable treatment of suppliers and promotion of competition in public procurement.

The procedure to be followed in making public procurement must conform to the following yardsticks:

- The specifications in terms of quality, type etc., as also quantity of goods to be procured, should be clearly spelt out keeping in view the specific needs of the procuring

Notes

organizations. The specifications so worked out should meet the basic needs of the organization without including superfluous and non-essential features, which may result in unwarranted expenditure. Care should also be taken to avoid purchasing quantities in excess of requirement to avoid inventory carrying costs.

- Offers should be invited following a fair, transparent and reasonable procedure.
- The procuring authority should be satisfied that the selected offer adequately meets the requirement in all respects.
- The procuring authority should satisfy itself that the price of the selected offer is reasonable and consistent with the quality required.
- At each stage of procurement the concerned procuring authority must place on record, in precise terms, the considerations which weighed with it while taking the procurement decision.

4.6.1 Authorities Competent to Purchase Goods and their Purchase Powers

- An authority which is competent to incur contingent expenditure may sanction the purchase of goods required for use in public service in accordance with schedule V of the Delegation of Financial Rules, 1978, following the general procedure contained in this Manual.
- A demand should not be split into small quantities for the sole purpose of avoiding the necessity of taking approval of the higher authority required for sanctioning the purchase of the original demand.

4.6.2 Purchase through a Central Purchase Organization

In case a Ministry/Department does not have the required expertise or manpower, it may send its indent to the Central Purchase Organization (e.g., DGS&D) with the approval of its Secretary. The indent form to be utilized for this purpose will be as per the standard form evolved by the Central Purchase Organization.

Depending on the nature of the required goods, the quantity and value involved and the period of supply, the purchase organization is to decide the appropriate mode of purchase. The various modes of purchase to be adopted for this purpose are indicated in the subsequent paragraphs.

4.6.3 Approval of the Competent Authority to the Purchase

Demand for Goods should not be divided into smaller quantities for making piece meal purchases for the sole purpose of avoiding the necessity of obtaining the sanction of higher authority required with reference to the estimated value of the total demand.

4.6.4 Purchase of Goods without Quotation

Purchase of goods up to a value of ₹ 15,000 (Rupees Fifteen Thousand only) on each occasion may be made without inviting quotations/bids by the competent authority on the basis of a certificate to be recorded by him in the following format:

I, _____ am personally satisfied that these goods purchased are of the requisite quality and specification and have been purchased from a reliable supplier at a reasonable price.

Notes

4.6.5 Purchase of Goods by Purchase Committee

Purchase of goods costing above ₹ 15,000 (Rupees Fifteen Thousand) and up to ₹ 1,00,000 (Rupees One lakh) on each occasion may be made on the recommendations of a duly constituted Local Purchase Committee consisting of three members of an appropriate level as decided by the Head of Department. The committee will survey the market to ascertain the reasonableness of rate, quality and specifications and identify the appropriate supplier. Before recommending placement of the purchase order the members of the committee will jointly record a certificate as under:

Certified that we _____, members of the purchase committee are jointly and individually satisfied that the goods recommended for purchase are of the requisite specification and quality, priced at the prevailing market rate and the supplier recommended is reliable and competent to supply the goods in question.

4.6.6 Purchase of Rate Contracted Goods

The Central Purchase Organization (e.g. DGS&D) will conclude rate contracts with the registered suppliers, for goods and items of standards types which are identified as common user items and are needed on recurring basis by various Ministries/Departments. The Central Purchase Organization (e.g. DGS&D) is to post the specifications, prices and other salient details of different rate contracted items, appropriately updated, on its website for use by the procuring Ministries/ Departments. The Ministries/Departments are to operate those rate contracts to the maximum extent possible. In case a Ministry/Department directly procures Central Purchase Organization's (e.g. DGS&D's) rate contracted goods from suppliers, the prices to be paid for such goods shall not exceed those stipulated in the rate contract and the other salient terms and conditions of the purchase should be in line with those specified in the rate contract. The Ministry/Department shall make its own arrangement for inspection and testing of such goods where required.

4.6.7 E-Procurement

Purchase of goods through electronic mode of interface with tenderers and IT enabled management of the entire procurement process (notice inviting tenders, supply of tender documents, receipt of bids, evaluation of bids, award of contract, and execution of contract through systematic enforcement of its various clauses and tracking of claims, counterclaims and payments) is gradually gaining popularity. In order to cut down transaction costs and improve efficiency and transparency, the Government aims to make it mandatory for all the Ministries/ Departments including the Central Public Sector Undertakings under their administrative control to conduct all their procurements electronically beyond 31st December, 2006. The Ministries/ Departments have been advised to fix appropriate cut-off points in terms of the size of procurement to switch over to e-procurement. The Director General (Supplies & Disposal) has made significant progress in this direction and the National Informatics Centre is engaged in pilot projects to design a secure IT solution addressing concerns like encryption/decryption of bids, digital signatures, secure payment gateways, date/time stamp for activities, access control etc. The Ministries/Departments have already been directed to publicize all their tenders on their websites as the first step towards full-fledged e-procurement. The Ministries/Departments are advised to proactively engage themselves in articulating user needs in the development of IT systems for e-procurement. The system should be secure, capable of maintaining complete confidentiality at appropriate stages of the bidding process, so that the tenderers feel confidence in electronically transmitting their queries and bids.

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However, as all the tendering firms may not have the facility of transmitting their quotations through e-mail, the Ministry/Departments should allow the receipt of quotations through hard copies as well as by e-mail. The closing date and time for receipt of tenders should be identical for both types of tenders.

Task Make a visual presentation on the purchase policy and procedures.

Self Assessment

Fill in the blanks:

14. Care should be taken to avoid purchasing quantities in excess of requirement to avoid ……. costs.
15. At each stage of procurement the concerned procuring authority must place on record the …… which weighed with it while taking the procurement decision.
16. Depending on the nature of the required goods, the quantity and value involved and the period of supply, the purchase organization is to decide the appropriate mode of…… .

4.7 Purchase of High Capital Equipment

In general major equipment includes machinery required for production operations. There are peculiar problems and considerations involved in non-repetitive purchases mainly purchase of major capital equipment. For accounting purposes it is considered as fixed assets to be capitalized and depreciated over the period of economic life of the equipment.

Capital equipment is defined as non-expendable equipment with a system acquisition cost of $5,000 or more and a life expectancy of at least two (2) years.

Did u know? A Capital Equipment purchase is equal to or greater than $5,000 and has a useful life span of one or more years.

Equipment purchases usually involve a substantial financial commitment – the purchase price of the equipment and the cost to service and repair it. The primary reason to lease rather than buy an item is because the needed item is so expensive that its direct purchase is not possible and other financing mechanisms are unavailable or more expensive than leasing. In order to be considered for leasing, the item must have a value of at least $50,000 and must have CEA approval.

Complete a Purchase Request listing the items and/or system(s) with a recognizable description. The approval will be the person having signature authorization specifically for capital equipment in your program area. The Deliver-to field refers to the building and room where the equipment will be delivered and used.

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Notes With the amount of information required for capital equipment purchases, please do not submit other extraneous information. It does not replace required information, and it either impedes the progress of the procurement or does not help. Information on the PR includes:

- List items and/or systems with a recognizable description and manufacturer's catalog numbers
- PR signature authorization for capital equipment for the listed center number.

4.7.1 Information to be Submitted as Part of the PR Package

- ***Product Literature:*** Vendor literature of the equipment being requested.
- ***Quotes:*** All quotes obtained during market research.
- ***Routing Slip:*** signed by the appropriate Building Coordinator.
- ***Limiting Competition:*** A justification is required if competition is to be limited or no competition is anticipated. The Justification for Other than Full and Open Competition (JOFOC) form, CG3, must be completed and submitted with the PR, which documents the facts leading to this conclusion.
- ***Other Forms:*** Two other forms, the Worksheet for Limited Competition and the Product Comparison Worksheet may also be used to capture pertinent market research information.
- ***Essential Features:*** If limiting to one manufacturer, list those features that determined the decision.
- ***Acceptable Manufacturers:*** List acceptable manufacturers as part of the PR package, if applicable.
- ***Trade-in – for Trade-in of Government:*** Owned property, indicate the decal number/ serial number of the equipment and list the trade-in allowance on the PR.
- ***Standardized Equipment Checklist:*** Submit appropriate checklist for standardized equipment category form, if applicable (see Campus Forms, ALS).
- ***Alternate Models for Standardized Equipment:*** Submit justification for equipment if requesting a manufacturer/model other than those on the Standard Equipment Checklist Form.

Self Assessment

Fill in the blanks:

17. Capital equipment is defined as …… equipment with a system acquisition cost of $5,000 or more and a life expectancy of at least two (2) years.
18. A …… purchase is equal to or greater than $5,000 and has a useful life span of one or more years.
19. The ……. refers to the building and room where the equipment will be delivered and used.

Notes

Case Study

Last Minute Ordering

The Scenario

Members were presented with a case study in which buyers regularly amend daily orders and sometimes cancel orders altogether.

Context: A farm in Kenya produces fresh produce for a UK retailer. The farm has an annual contract with the retailer. Produce is flown overnight every night to be on the shelves for the next day. The farm has thousands of workers whose families rely on the income that is generated through this work.

Buying Practice: The UK buyer forecasts orders on a weekly basis. However, the daily requirements are amended throughout the week according to daily sales data, UK weather, promotional competition and department wastage targets. On average, orders are revised (up or down) three days a week and the change is faxed through to the supplier by mid-afternoon. The changes in volume are often around 50% more or less than the forecast. When demand is sufficiently low, the order is cancelled altogether (this happens approximately ten times a year).

The Supplier and Worker Scenario: Any changes to the daily order are received at the grower's pack house in the late afternoon. If the order is increased, underproduction is addressed by asking workers to do overtime. Women workers rely on company transport to take them home because it is unsafe to walk and, as buses do not leave until the later shift is finished; many workers have little choice but to continue working overtime.

Furthermore, supervisors sometimes intimidate the women to stay and help meet the order. As a result, people who work in the pack house have to work longer hours in cold conditions to meet the increased order. In addition, the farm manager is unable to negotiate a higher price for the additional stock, and so does not pay the workers a higher hourly rate for overtime. If the order is decreased or cancelled, the lost revenue has to be factored into the suppliers' costs. As a result, the supplier sends workers home early and does not pay them fully for the hours worked.

Impacts along the Supply Chain

Members discussed the case study and explored the way in which the retailer's ordering practices might affect working conditions along the supply chain. A number of impacts were identified, as set out below.

Impacts on Workers: The retailer's practice of changing orders at short notice results in a number of breaches of the Base Code, including the following:

- Workers experience harsh or inhumane treatment (intimidation to stay and finish order from supervisors).
- Forced overtime occurs (without buses there is no safe means of leaving the worksite).
- There is no premium for working overtime.
- There is non-payment of wages (when orders are cancelled).
- Working conditions are not safe (longer working in the cold store).

Contd...

Notes

- It also appears that freedom of association and collective bargaining are not taking place on this site.

Breaches of ETI's Principles: The retailer's buying practices also go against the Principles of Implementation. In particular, the following Principles are not applied:

- The code and the implementation process are not integrated into the core business relationships and culture.
- Negotiations with suppliers do not take into account the costs of observing the code.

What went Wrong?

From the information given, it appears that a number of factors led to these breaches occurring, including the facts that:

- There is fluctuating consumer demand.
- The retailer and supplier have not agreed a minimum order value or volume, which means that significant order reductions or cancellations can occur without compensation.
- No notice is given to suppliers for changes to orders.

It also appears that there is no collective bargaining of workers with the employer to agree overtime, transport and shift arrangements.

What could be Done in Future?

ETI members identified a range of measures that retailers, in conjunction with suppliers, could adopt to prevent this kind of breach occurring in future. This is not an exhaustive or prioritised list, but a set of potential solutions which individual companies would need to explore for themselves.

Raise Awareness among Buyers: Raise awareness amongst buyers of the impact their decisions have on suppliers. Emphasise the importance of making changes as early as possible (eg the day before) so that workers have notice and can volunteer for overtime.

Agree Minimum Orders: Set out minimum order volumes or values with suppliers to give more stability to the supplier.

Model Wastage Costs: Work with suppliers to find ways of reducing waste, model the cost to the producer of unavoidable waste, and build this in to retailers' cost models.

Improve Forecasting: Explore improvements to forecasting, such as:

- Sharing real-time sales data with suppliers.
- Where possible, holding buffer stocks in cold storage to deal with peaks in demand.
- Researching the peaks and troughs of demand to identify any improvements that can be made to forecasting systems.
- Training forecasters to ensure they are using the best available forecast methods.

Encourage Actions by Suppliers: Members also identified a number of actions that could be taken by suppliers, including:

- engaging with workers to explore solutions, such as setting up shift patterns; and
- making buses available for workers to leave at the end of the standard working day, as well as at the end of an overtime period.

Contd...

Notes

Question:

According to you, what steps could be taken to avoid last minute ordering?

Source: http://www.ethicaltrade.org/sites/default/files/resources/Purchasing%20practices,%20case% 20studies%20and%20 report_0.pdf

4.8 Summary

- Purchasing is the procuring of materials, supplying machine tools and services required for the equipment maintenance and operation of manufacturing plant.
- The functions to be performed by the purchase department may be classified as Primary and Secondary functions of purchase department.
- Some of the responsibilities of the purchase department are wholly its own, and it shares some of them with other departments.
- The approval in the technical aspects of the vendor's product or services may be the responsibility of the quality or the design department, but the purchaser should be convinced that the source of the supply is stable, reliable, and will be able to fulfill the demands made upon it.
- The Purchase department verifies and ensures that all conditions like price, quantity, and quality, etc., that were earlier agreed upon are in order to a further need for verification of invoices arises from the problem of defective material being supplied.
- Scientific purchasing is governed by eight well known parameters called Basic elements of scientific purchasing or also called Principles of purchasing or "simply' 8Rs buying"- Right Quality, Right Quantity, Right Price, Right Source, Right Time, Right place of Delivery, Right Procedure and Right contract.
- Replenishment method such as reorder level, "two-bin system", "review system-optional replenishment", and "review system compulsory replenishment" help to provide broad guide lines.
- Right sources require the analysis of transportation costs along with the basic price to make selection between a distant supplier and a local one.
- In case a Ministry/Department does not have the required expertise or manpower, it may send its indent to the Central Purchase Organization (e.g., DGS&D) with the approval of its Secretary.
- The Ministries/Departments have been advised to fix appropriate cut-off points in terms of the size of procurement to switch over to e-procurement.
- A Capital Equipment purchase is equal to or greater than $5,000 and has a useful life span of one or more years.

4.9 Keywords

Capital Equipment: Capital equipments are the assets such as vehicles that generally depreciate, or lose value over time.

Forward Buying: The placement of an inventory purchase order earlier than required in order to take advantage of a special price offer, or similar is referred to as forward buying.

INCOTERMS: INCOTERMS or international commerce terms are agreed rules which set out the delivery terms for goods which are traded internationally.

Notes

Invoice: Invoice is an itemized statement of money owed for goods shipped or services rendered.

***Lead Time*:** Lead time is the time interval between the initiation and the completion of a production process.

Purchase Department: The purchasing department is responsible for acquiring the inventory that a company sells.

Purchase Indents: It is an internal company document used in the purchasing process to authorize the requisition of materials prior to initiating a purchase order.

Purchasing Management: Purchasing management directs the flow of goods and services in a company and handles all data relating to contact with suppliers.

Purchasing: The acquisition of something for payment is known as purchasing.

Quality of Conformance: It is the degree to which a product or service meets or exceeds its design specifications and is free of defects or other problems that mar its appearance or degrade its performance.

Reorder Level: The point at which the buying department places its order for replacement materials is known as reorder level.

Scientific Purchasing: Scientific purchasing is the technique of purchasing goods of right quality, in the right quantities, at the right price, at the right time and from the right source.

Stock on Pipeline: Goods that have left a firm's warehouse(s) but have not been bought by the ultimate consumers, customers, or users, and are therefore still within the firm's distribution chain are known as stock on pipeline or pipeline stock.

Two-bin System: Two bin system is a replenishment system where parts are pulled from one bin only after a second bin has been emptied; the empty bin is the signal to have it refilled.

4.10 Review Questions

1. What do you understand by purchasing management? How is it important in materials management?
2. Explain the objectives of scientific purchasing.
3. Write a short note on the functions of purchase department.
4. Briefly discuss on the responsibilities of the purchase department.
5. Elaborate on the duties of the purchase department.
6. Explain the 8 Rs of purchasing with the help of a suitable diagram.
7. What do you understand by Kardex system? Why is it used?
8. Explain the fundamental principles of public buying.
9. How has e-procurement changed the current scenario of purchase management?
10. Discuss the procedure in the purchase of high capital goods.

Answers: Self Assessment

1.	Purchasing	2.	Production
3.	Purchase Manager	4.	Minimum

Notes

5. Goodwill
6. Purchase Indents
7. Primary
8. Purchase
9. Purchaser
10. Minimizes
11. Design
12. Conformance
13. Sampling
14. Inventory Carrying
15. Considerations
16. Purchase
17. Non-expendable
18. Capital Equipment
19. Deliver-to Field

4.11 Further Readings

Books

Ramakrishnan. R V, Tony Arnold. J R (2007). "*Introduction to Materials Management*". Pearson

K. Shridhar Bhat, "*Production and Materials Management*". Himalaya Publishing House

Chary. S.N., "*Production and Operations Management*". Tata McGraw Hill

Gopalkrishanan. P, Sundaresan. M, "*Materials Management: An Integrated Approach*". PHI Learning Pvt. Ltd.

Online links

http://www.mbaknol.com/operations-management/purchase-management-and-methods-of-buying/

http://smallbusiness.chron.com/functions-purchasing-department-organization-158.html

http://polaris.umuc.edu/~bgoodale/admn626/0209/Lesson12.htm

http://www.practicalecommerce.com/blogs/post/785-Purchasing-Department

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Unit 5: Negotiation

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Objectives

After studying this unit, you will be able to:

- Explain the Meaning of Negotiation
- Discuss the Objectives of Negotiation
- Explain the Techniques of Negotiation
- Define the Negotiator
- Discuss the Tactics and Strategies of Negotiation
- Describe the Phases of Negotiation
- Explain the Concept of RFQ

Introduction

In the previous unit we dealt with the objectives and functions of purchasing department. The unit also discussed about the purchase policies and procedures. This unit will help you to further your knowledge about negotiation in purchasing process. The various section and sub section of this unit will also summarize the techniques and tactics of negotiation.

Negotiation is, indeed, a battle of wits and an Art of embodying sophisticated tactics and maneuvers by both the buyer and the seller. Normally buyers should not be opportunist and try

Notes

to function as arbitrators between the factory and the supplier. The buyer must enable his supplier to make a reasonable profit in the short run and survive as well as grow in the long run. He should remember that he is buying not only for today's price, but for tomorrows cost as well. In this process, the buyer helps the suppliers towards finding more economical ways of working rather than squeezing out the profit margin.

5.1 Meaning of Negotiation

Negotiation has been accepted as a policy by some material managers, since perfect competition does not exist in Indian situations and hence the concept of lowest bid does not always work. Selling at a loss will drive the supplier out of business reducing the Sources of supplies. Art of negotiation is treated as a forum for exchange of views rather than cut throat buying. In negotiating both the buyer and seller try to evaluate each other with regard to price and quality.

The word Negotiation is derived from Latin civil laws. It refers to 'Trading and Deliberations' leading to purchase or sale agreement of goods and services. Negotiation may be defined as "what passes between the parties incident to the making of a contract". According to another definition negotiation means "to discuss or arrange business transactions." For Harold bloom, "Negotiation is essentially a communication."

Thus, a negotiation is essentially a discussion on business transactions leading to finalization of purchase and sale contract of goods and services. It is not a discussion on price only; it is only one of the important points of discussion in any negotiation between the parties who deliberate to make a contract. A negotiation is a discussion on all aspects of a contract. It includes deliberations between trading parties on:

1. quality
2. quantity
3. price
4. time of delivery
5. place of delivery
6. mode of transportation
7. packing and packages
8. after sale service
9. mode of payment, etc.

Did u know? The bargaining power will definitely be influenced by the preparedness of the buyer as well as the place and time of negotiation.

It is not uncommon to find negotiations taking place over a cup of tea or beer.

Self Assessment

Fill in the blanks:

1. …….. refers to 'trading and Deliberations' leading to purchase or sale agreement of goods and services.

Notes

2. A negotiation is a discussion on all aspects of a ……..
3. The ……. power will definitely be influenced by the preparedness of the buyer as well as the place and time of negotiation.

5.2 Objectives of Negotiation

The basic objectives of negotiation are not only to purchase materials on favorable terms but to maintain the continuity of supply of raw materials and at the same time to reduce the cost of production. It is the primary concern of the negotiator to react at proper agreements regarding price, quality, time, etc. Negotiation leads to an agreement, an agreement results into a contract which becomes both legally and morally binding on the parties to the agreement. Therefore, it is necessary to know what to negotiate and how to negotiate. The negotiator should be very clear as to:

1. What for the negotiation is being planned?
2. What is planned to be achieved through such a negotiation?
3. What are the assumptions upon which the negotiation is going to be negotiated?
4. What is going to form the basis of negotiation?
5. What is intended to be negotiated?

The objectives of negotiation in each case will also differ sometimes materially. But fundamentally the objective of negotiation will obviously be:

1. To see that the interest of the organization is not bartered out.
2. To see that the organization is not put in a disadvantageous position.
3. To see that the organization gets all the benefits which can easily and comparatively come to it in normal circumstances?
4. To see that distant future is not bargained for the present.
5. To see that long as well as short term effects are properly measured and pros and coins are fully weight.
6. To see that times, etc. are settled in unambiguous terms and nothing is left to interpretations which may lead to misunderstanding and bitterness.

Self Assessment

Fill in the blanks:

4. Negotiation leads to an agreement, an agreement results into a contract which becomes both legally and morally binding on the …… to the agreement.
5. The basic objective of negotiation is to maintain the continuity of supply of raw materials and at the same time to reduce the cost of …….

5.3 Techniques of Negotiation

Negotiation is referred to as the style of discussing things among individuals in an effort to come to a conclusion satisfying all the parties involved. Discussions should be on an open forum for everyone to not only participate but also express their views and reach to an alternative acceptable to all.

Notes

It is important how we negotiate with each other. One must know the difference between negotiating and begging. Do not stoop too low to get a deal closed. Negotiation must be in a dignified way. One has to be extremely patient and also understand the second party's needs and interests as well. Never impose your ideas on anyone. Let everyone speak their mind and decide something which would favor one and all.

Task Conduct a mock negotiation session in your class for a purchase of 100 units of refrigerators.

The known techniques for negotiations are price analysis, persuasion, discussion, interrogation, investigation, staging walk out, prolonged silence, weighing pros and cons, offensive strategy, blow hot and cold, suggesting complicated formula and learning curve. A successful negotiator has to possess the qualities of patience, persistence, persuasiveness, clear thinking, logical analysis, optimism, knack of getting along with people, ability to plan and be thick skinned while negotiating, the buyer should hope for the best and at the same time be prepared for the worst. He should not adopt a strategy of hard choices and soft options. Care should however be taken to adopt negotiations on a selective basis as the seller will easily identify the individuals or Mr. five per cent or Mr. ten per cent and inflate the prices accordingly.

Let us go through some negotiation techniques in detail:

- The first and the foremost technique for an effective negotiation is one should be well informed with everything related to the deal. Find out even the minutest detail you think is important and you might require at the time of negotiation. Be prepared for everything. Remember the second party might ask you anything.

Example: Janet wanted to purchase a new laptop. She checked out the prices of almost all the leading brands along with their features before going to the outlet. She went well prepared and thus managed to crack the best deal and took the best quality laptop with the maximum possible discount.

- ***Take good care of your posture as well as your body movements:*** Look confident. While speaking, don't look around or play with things. It's just a discussion, no one will kill you if you are not able to close the deal.

Caution Don't stammer in between or start sweating in front of others. The second party will take undue advantage if they find you nervous.

  Take care of your dressing as well. Don't wear anything which is too casual. If you dress casually people will not take you seriously.

- ***Be much focused:*** One should be very specific what he wants. First ask yourself what is the purpose of this negotiation? What do you actually want? What is the affordable price for you? Be firm and stick to it. Be very specific and clear.

- ***Never keep things to yourself and crib later:*** Don't assume that the other person can read your mind on his own. One needs to ask for what he wants. A mother will not feed her child unless and until he cries. Speak your heart out. If you are not satisfied with the deal, show your displeasure to others. Express them that you are not very happy with the price and it needs to be revised.

Notes

- ***Be a patient listener:*** Listen to others as well. Think about their interest and needs as well. Don't ask for anything which would not benefit the second party. Don't jump to conclusions and never interfere when the other person is speaking. Listen to the other party's proposal as well; he might come up with something unique which you could not even think.
- ***Be realistic:*** Don't ask for something you yourself know is not possible. Don't quote anything just for the sake of it. One should be a little practical in his approach. Don't ask for irrational discounts. Be logical. It's nothing bad to think about your personal interests, but one should not be mad for it. If you want to purchase something, also remember that the store owner has to earn his profits as well.
- ***Don't be in a hurry to close the deal:*** Take your time to discuss things among yourselves. Make sure you are deciding something which would be a win-win situation for all. Never drag any discussion and make the conversation too long. Too much of pleading and persuasion result in a big zero and no conclusion can be drawn out of it.
- ***Know where to compromise:*** An individual has to compromise sometimes to come to an output. If you feel that if you accept some terms and conditions, things would be better and it would not harm you much, go ahead. Everyone needs to compromise sometimes or the other. Even in marriages, one partner needs to negotiate with the other for better understanding.
- ***Communication is also important in negotiation:*** Speak clearly and precisely. One should not confuse others. Playing with words is one of the biggest threats to negotiation. Don't use derogatory or lewd remarks against anyone.
- ***For a third party it's always better to sign a contract or have something in black and white so that no body backs out later:*** It's always better to sign agreements in the presence of both the parties for better transparency.

Notes After every discussion and negotiation, emails or minutes of the meeting must be circulated among all the team members for everyone to get a clear and the same picture.

Caselet

Is it Ethical to "Lie or Bluff' in Negotiations?

The answer, of course, is that it depends on one's values, one's culture, and the situation. The issue is not to confuse bluffing with misrepresentation. In our culture, our "rules" forbid and should penalize outright lying, false claims, bribing an opponent, stealing secrets, or threatening an opponent. While there may be a fine line between legitimate and illegitimate withholding of facts, there is a line and again we are distinguishing between the careful planning of when and how to reveal facts vs. outright lying. Bluffing, while it may be employed, does entail risk. You may lose credibility or it could get out of hand. It is also dangerous ground to tread if you carry it out with people with whom you will have a continual relationship. While bluffing may be expected, our culture does not condone outright lying.

Source: http://polaris.umuc.edu/~bgoodale/admn628/0402/lesson8.html

Notes

Self Assessment

Fill in the blanks:

6. One must know the difference between negotiating and ……...
7. It's always better to sign agreements in the presence of both the parties for better ……

5.4 Negotiator

The Negotiator is a person who carries through the negotiation plan as directed, applying his own knowledge, skill and wisdom. He analyses the value and price of the materials. He enters into discussion with the other party. He tries to persuade and bring the other party round to his view point. He interrogates to asses and to know what is going in the mind of the other party. He is a strategist and adopts both offensive and defensive strategies in order to come to terms and bring success to his efforts. He weights carefully the pros and cons blows hot and cold, suggests and investigates and tries to learn and lets the other party learn before either settling for the terms or rejecting the terms. A negotiator, therefore, is a thick skinned personnel of the organization who goes all out to bring successful terms to his organization in a bid to enter into a contract with the party.

5.4.1 Qualities of a Good Negotiator

The purchase manager or sales manager should be good negotiator and posses the following qualities:

1. He should be a person who can go along with the people with ease and enthusiasm.
2. He should be an optimist and should never let an opportunity slip out of his hands. He should be a man who can see light in darkness. He should be a person who looks always to the bright side of things one who sees light even in darkness.
3. He should posses the quality of persuasiveness and must be a logical man.
4. He should be a man of clear thinking and broad ideas.
5. He should be a man of patience and persistence.
6. He should be well conversant with the market conditions and should have full knowledge of the materials for the purchase or sale of which he has planned the negotiation. He must know the policies of his organization and the attitude of the top management.
7. He must be fully equipped with all the technicalities of negotiation.
8. He should be an intelligent man, must have learnt from others experiences and must be able to utilize the experience he has already gained in the field.

Self Assessment

Fill in the blanks:

8. A negotiator is a strategist and adopts both …….. and …… strategies.
9. A negotiator should be a man of ……. and persistence.
10. A negotiator analyses the value and price of the ……
11. A negotiator should be a man of clear …… and broad ideas.

Notes

5.5 Tactics and Strategies in Negotiation

Sometimes the words tactics and strategy used in negotiation are confused. They should not be taken as one. In martial terminology strategy refers to a basic plan of action chosen to achieve a given objectives 'whereas' tactics refers to the means which is adopted to translate the plan into action. Strategy is a plan of action but tactics is a means for its implementation. Strategy and tactics are both needed in negotiation. They are considered an integral part of negotiation. Strategy is concerned with the planning and directing of the negotiations to achieving the goals and objectives.

"Tactics" deal with the moves and maneuvers employed to implements strategy. Both strategy and tactics are accepted as integral part of a negotiation. While strategy once chalked out is followed during the whole course of negotiation. It is seldom altered during the course unless urgently required to do so. But tactics are thought out on the spot and undergo a change time and again even during the course of negotiation.

In fact, tactics do not depend upon the tactics of the other party which cannot easily be thought of before hand nor it can be strictly adhered to even if during planning the strategy it has been discussed and thought over. The negotiation must have powers to change the tactics according to the demand of the situation.

5.5.1 Factors Influencing Tactics

1. Personal characteristics of the negotiator.
2. Briefs given to the negotiator.
3. Power which a negotiator enjoys.
4. Strategy set out by the management.
5. History of past negotiations between the parties evidently on negotiation table.
6. Responses of the negotiator.
7. Ability of the negotiator.
8. Inherent dangers in a particular approach.
9. Potential results expected of a particular approach.
10. Necessity of psychological and motivational approach.

The negotiator tries to pressurize the seller to downcast his prices and on the other hand the seller tries to resist all such pressure. However, it all depends upon the nature of goods and services being negotiated. A monopoly seller can easily afford to stick to his point and brings round the purchaser to his view point.

While exporting or importing goods outside the country not much negotiation is possible as certain laws and conditions beyond one's control governing these trades come to the fore and they cannot obviously be by passed neither they can be over ridden. A negotiator should also be cautious enough that where compromise or change is neither possible nor desirable it is fertile to negotiate on that score. Certainly in such cases no strategy will work. All tactics will come to a naught similarly on all aspects at all times and in all circumstances negotiation is not possible. Quality cannot be negotiated when its conforms to a national or international standard or it is an conformity with the buyers specifications, service, quality, price, and other terms are certainly negotiable, provided of course, the materials are not scarce or not being transacted by a monopolistic strategy and later tactics may pay good dividends provided each of the party is ready to understand the view point of the others and have mutual confidence in each other.

Notes

5.5.2 Preparation for Negotiation

The negotiator must prepare him for the unpending negotiation in order to be effective. Lack of time should not come in his way for preparation. An effective negotiation may result in a long term benefit to the organization on the other hand in effective negotiation may cost time, money and energy landing the organization into trouble. Pressure of work may not leave sufficient time with the negotiator and he may tempted to take urgent decision while on the negotiation table leaving the important one to fade out from in his mind which may land him, his department and his organization on some irreparable loss. 'Urgent' should never take priority over the important. Urgency is bad and no decision should be taken in haste much less on the negotiation table. In order to avoid such a haste and urgency some home task is required before going to negotiation table. Such a home task in preparation to negotiation brings better understanding of the organization's requirements and policies, confidence, easy solution to the problems in hand and better negotiable results.

"A useful rule of thumb" say Peter Baily and David Farmer, "adopted by many experienced negotiators suggests that for every hour spent in negotiation, six should have been spent in preparation. No matter how well you perform during the meeting phase, unless your preparation has been at least adequate you will probably under achieve."

Self Assessment

Fill in the blanks:

12. Strategy is a plan of ……

13. ……. is a means for its implementation.

5.6 Phases of Negotiation

It may prove beneficial if negotiation is divided into the following three phases:

1. Pre-negotiation phase or the preparatory phase
2. Meeting phase
3. Post-negotiation phase

In the pre-negotiation phase, information is received and analyzed, objectives for negotiation are defined, strategies are developed and preliminary tactics are discussed.

The meeting phase is the stage of actual discussion and negotiation. During this phase explanatory information are collected and analyzed. This bargaining is done and agreement is arrived at. The meeting phase may not be completed in one sitting. The negotiation may linger on and subsequent meetings may be required. If a number of meetings are necessitated it may further be phased out into the following:

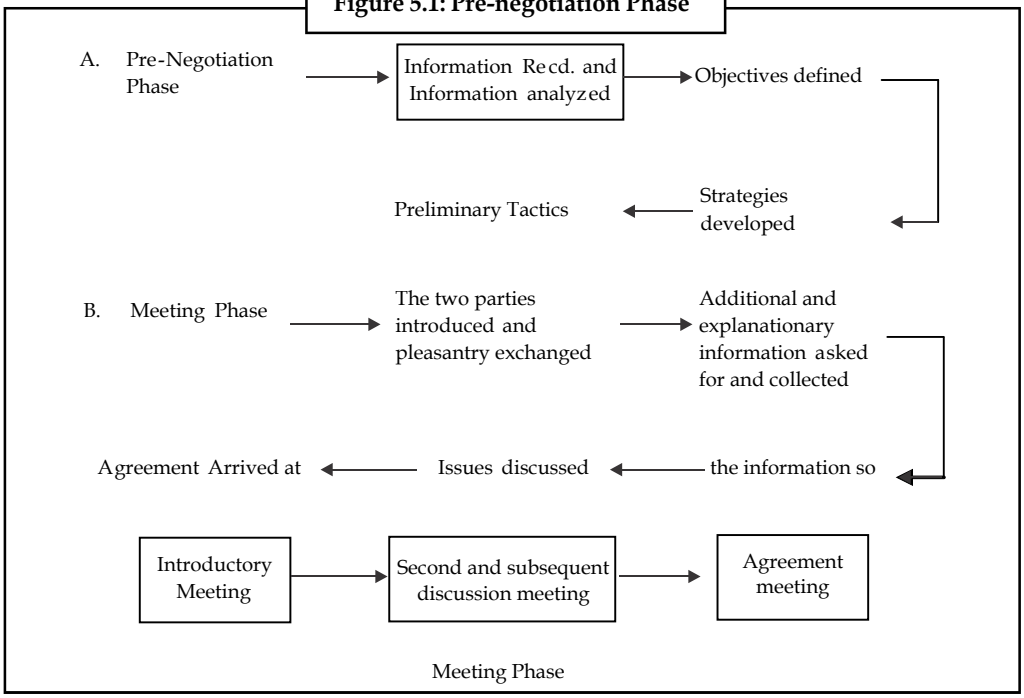
1. The introductory meeting phase or the explanatory meeting phase in which addition explanatory information may be collected and the meeting be adjourned for analysis, inner circle discussions, evolution by strategies and discussions on preliminary tactics.
2. After such a meeting another meeting-called decision. Meeting may be called at a mutually convenient date and time. This meeting may be utilized for full length discussion and sorting out many problems arising out of discussion and further analysis. Such discussions are held with a view to arrive to a certain decision so that agreement may be drafted and contract signed.

Notes

3. When all the clarifications have come through and all the problems are sorted out obviously there remains only drafting of agreement the points of which are decided at the discussion meeting. A meeting for the purpose of signature on the drafted agreement may then be arranged so that the parties may enter into a contract. This is the completion stage of negotiation so far as meeting phase is concerned.

The above three phases may be depicted with the help of following figures:

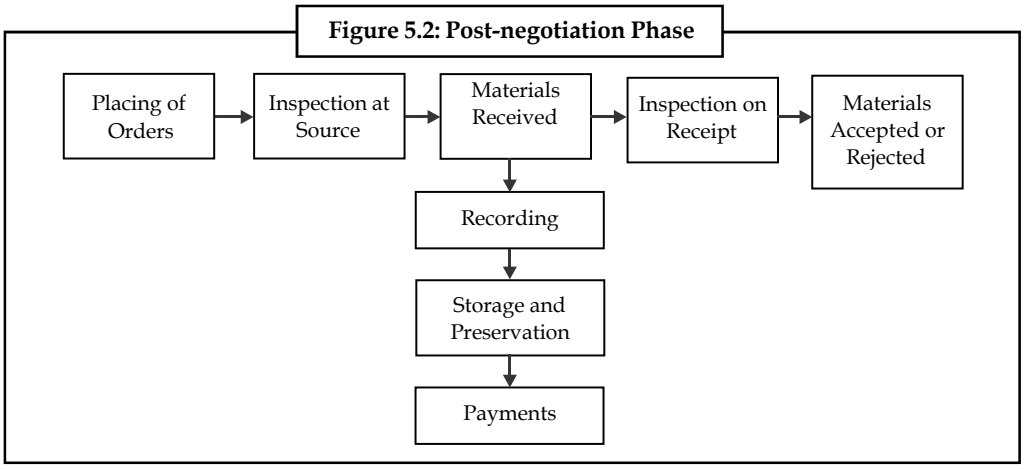
Figure 5.1: Pre-negotiation Phase



Source: R.Punitha(2008)."*Materials Management*". Excel Books Pvt. Ltd.

The post-negotiation phase may also be called executive phase. Here in execution is done of what has to be negotiable and contracted. Placing of orders, inspection at supplier's place, receiving of materials, storage and prevention and payments are the actions. In an organization post-negotiation stage takes a much longer period then the first two phases discussed above. The post-negotiation phase may be shown diagrammatically as under:

Figure 5.2: Post-negotiation Phase



Source: R.Punitha(2008)."*Materials Management*".Excel Books Pvt. Ltd.

Notes

5.7 Request for Quotation (RFQ)

Non-government purchasing departments continue to offer a range of prequalified vendors a Request for Quotation (RFQ) for items or services that it wishes to purchase. The competitive bid process can produce a range of bids and conditions that the purchasing department will evaluate and then award the business. This may or may not involve some form of negotiation. Most negotiated business will involve items or services that are not necessarily definable by an RFQ. The purchasing department and the vendor will negotiate more than a price. The negotiation will usually cover what is to be manufactured or what is the extent of the service to be provided, the warranty, the transportation services, technical assistance, packaging alternative, payment plans, etc. Purchasing items or services of significant cost will require extended negotiations to arrive at a final contract.

Purchasing professionals are required to participate in these types of negotiation to ensure their companies obtain the best price with the most favorable terms, and staff may need to be trained in negotiation methods as it becomes more commonplace in a difficult economic climate.

Self Assessment

Fill in the blanks:

14. The …… phase is the stage of actual discussion and negotiation.
15. The post negotiation phase may also be called …… phase.
16. Purchasing items or services of significant cost will require extended …… to arrive at a final contract.

Case Study

Paving the Way for Greater Negotiation Power at Delphi Delco Electronics Systems

At Delphi Delco Electronics Systems, the need to stop suppliers from pitting engineering against purchasing was evident if the company wanted to remain competitive at the bargaining table. With the help of a unique training programme, the company mapped out a strategy to team purchasing, engineering — and actually everyone who talks to outside suppliers — to achieve greater negotiation power.

The Challenge

In the past, the purchasing road was paved with suppliers and manufacturing representatives who were well entrenched with the engineering community. Unfortunately, it was impacting the company's leverage to negotiate the best value.

"Our suppliers grew up with our company — embedded in our purchasing process — and greatly influenced the purchasing decisions to their advantage," according to Mark Hosking, purchasing manager at Delphi Delco. He explained that a positive result of the Worldwide Purchasing Process was to put a little more distance between the supplier and purchasing, and the supplier and engineering. That's when it was determined to educate everyone who interfaces with salespeople to understand that they are involved in the negotiation process.

Contd...

Notes

"We've had many engineers unknowingly give information to our suppliers, thinking they were helping them and our sales people, but what they were doing was cutting out our legs from under us when we were in the battle of negotiations," said John Glass, purchasing manager for the Electrical Passive Components Group.

A unique training program, called 'Dealing with the Highly Skilled Salesperson,' was brought in by the purchasing department to "even up" the training between engineers and the suppliers who call on them. Developed by Robert Benedict, President of Benedict Negotiating Seminars, the videotape-based program helps non-purchasing people understand a subtle fact-seeking process used by sales people called "Back-Door Selling." The training program consists of a fast-paced videotape, small group experiences, role playing, and other practical training resources. Hosking explained that "the program is very interactive with a user friendly training manual. The tape itself gets you involved and laughing as it helps build teamwork between engineering and purchasing."

Mapping out a Strategy

The target audience for this new training concept at Delphi Delco initially focused on engineers. That's why the primary communications strategy was to approach senior-level engineering, purchasing and other executives about the advantages of helping the engineering staff to deal with the so-called 'back-door selling' suppliers. After all, purchasing works hand-in-hand with engineering in winning business and getting the best prices. Glass went to the top of the organization with an assertive message: "Here's something that we believe will not only help purchasing to do it's job, but also engineering as an integral part of our success." Soon after, senior executives were invited to hear Robert Benedict, a national negotiating specialist, talk about the power of knowledge as a bargaining tool. They, in turn, went back to their staffs and recommended the program based on their own positive experiences.

Based on several options for rolling out the program offered by Benedict Negotiating Seminars, Delphi Delco selected the lowest price, highest value option, said Hosking. "Bob Benedict trained our people who, in turn, trained others."

Key to the roll-out strategy throughout the company was a team approach: A senior purchasing manager and senior engineering manager presented the class together to employees within all engineering disciplines: design, software, mechanical, electrical, manufacturing, process, and system design engineers.

"The one thing that really surprised us as we started rolling this out was the enthusiasm from our engineering group," says Hosking.

Evie Van Rens is an engineering analyst in the Milwaukee Design Center of Delphi Delco who believes that the 'Dealing with the Highly Skilled Salesperson' training was needed years ago. She explained: "Engineering has interfaced with suppliers for years to get specialized tooling and other products. By not having this training sooner, we as an organization may have unwittingly disclosed valuable company information without being aware of it, thus overpaying for the end product.

"Val Hoffmann from Delphi Delco's Purchasing in Kokomo, Indiana did an excellent job presenting the educational materials in an articulate and professional manner within the context of our business environment. He used the video and training manual, and challenged the participants to get involved in order to get the most out of the workshops. By using our real situations, asking penetrating questions and suggesting responses, it was time well spent — and meaningful on a career Performance Development Plan (PDP) as training," according to Van Rens.

Contd...

Notes

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"Finally somebody other than the Purchasing Department sees 'back-door selling' as an issue — and this gives me more ammunition to continue or to strengthen what is being done through this program," said Glass. He believes the training is a tool to arm Delphi Delco people so they are successful in their jobs and capable of knowing what information to share with whom.

Before the program from Benedict Negotiating Seminars, "it was an uphill battle when we were trying to negotiate and a supplier already knew all the details behind the project; who was going to get the business or the fact that the customer will not change whatever they were bidding on and that the timing was in their favor," said Glass. "It makes us stronger as buyers across the table when we know how to deflect a question, fog it or to just not answer it."

Now before any big negotiation, the Purchasing Department ensures that the Delphi Delco people have gone through the 'Dealing with the Highly Skilled Salesperson' program.

Contd...

Notes

Hosking concluded: "There is no question in my mind that this program has had an impact on the bottom line — and it's in the millions."

Questions

1. Study and analyze the case.
2. Write down the case facts.
3. What do you infer from the case?

Source: http://www.backdoorselling.com/negotiation-case-studies.php

5.8 Summary

- Negotiation has been accepted as a policy by some material managers, since perfect competition does not exist in Indian situations and hence the concept of lowest bid does not always work.
- Thus, a negotiation is essentially a discussion on business transactions leading to finalization of purchase and sale contract of goods and services.
- The bargaining power will definitely be influenced by the preparedness of the buyer as well as the place and time of negotiation.
- Negotiation leads to an agreement, an agreement results into a contract which becomes both legally and morally binding on the parties to the agreement.
- One has to be extremely patient and also understand the second party's needs and interests as well. Never impose your ideas on anyone.
- A successful negotiator has to possess the qualities of patience, persistence, persuasiveness, clear thinking, logical analysis, optimism, knack of getting along with people, ability to plan and be thick skinned while negotiating, the buyer should hope for the best and at the same time be prepared for the worst.
- He weights carefully the pros and cons blows hot and cold, suggests and investigates and tries to learn and lets the other party learn before either settling for the terms or rejecting the terms.
- Quality cannot be negotiated when its conforms to a national or international standard or it is an conformity with the buyers specifications, service, quality, price, and other terms are certainly negotiable, provided of course, the materials are not scarce or not being transacted by a monopolistic strategy and later tactics may pay good dividends provided each of the party is ready to understand the view point of the others and have mutual confidence in each other.
- An effective negotiation may result in a long term benefit to the organization on the other hand in effective negotiation may cost time, money and energy landing the organization into trouble.
- It may prove beneficial if negotiation is divided into the following three phases: Pre-negotiation phase or the preparatory phase, Meeting phase and Post-negotiation phase.

5.9 Keywords

Negotiation: It is a discussion aimed at reaching an agreement.

Negotiator: He is a person who negotiates.

Notes

Request for Proposal (RFQ): A request for proposal (RFP) is a solicitation made, often through a bidding process, by an agency or company interested in procurement of a commodity, service or valuable asset, to potential suppliers to submit business proposals.

Agreement: A negotiated and typically legally binding arrangement between parties as to a course of action.

Contract: A written or spoken agreement, especially one concerning employment, sales, or tenancy that is intended to be enforceable by law.

Meeting: Formal or informal deliberative assembly of individuals called to debate certain issues and problems, and to take decisions.

Bid: An offer made by an investor, a trader or a dealer to buy a product or service.

Persuade: It means to induce to undertake a course of action or embrace a point of view by means of argument or reasoning.

5.10 Review Questions

1. Define negotiation.
2. "Negotiation is essentially a communication". Comment on this statement.
3. What are the objectives of negotiation?
4. What is the difference between negotiating and begging?
5. What role does body language play in negotiation?
6. What is the role of a negotiator in the task of negotiation?
7. What are the good qualities possessed by a negotiator?
8. What is the difference between tactics and strategies of negotiation?
9. Discuss the factors influencing tactics of negotiation?
10. What are the phases of negotiation.

Answers: Self Assessment

1.	Negotiation	2.	Contract
3.	Bargaining	4.	Parties
5.	Production	6.	Begging
7.	Transparency	8.	Offensive, defensive
9.	Patience	10.	Materials
11.	Thinking	12.	Action
13.	Tactics	14.	Meeting
15.	Executive	16.	Negotiations

5.11 Further Readings

Notes

Books

Ramakrishnan. R V, Tony Arnold. J R (2007). "*Introduction to Materials Management*". Pearson

K. Shridhar Bhat, "*Production and Materials Management*". Himalaya Publishing House

Chary. S.N., "*Production and Operations Management*". Tata McGraw Hill

Gopalkrishanan. P, Sundaresan. M, "*Materials Management: An Integrated Approach*". PHI Learning Pvt. Ltd.

Online links

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http://logistics.about.com/od/tacticalsupplychain/a/Negotiations.htm

http://polaris.umuc.edu/~bgoodale/admn628/0402/lesson8.html

http://en.wikipedia.org/wiki/Request_for_quotation

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Unit 6: Supply Chain Management

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6.2.2 Develop Needed Supply Chain Capabilities

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6.3 Implementation of Supply Chain Principles in a Company

6.4 Summary

6.5 Keywords

6.6 Review Questions

6.7 Further Readings

Objectives

After studying this unit, you will be able to:

- Explain the Concept of Supply Chain Management
- Discuss the Implementation of Supply Chain Management in a Company

Introduction

Previous unit dealt with the concept of negotiation in materials management. It also covered the various techniques and strategies used in negotiating. In this unit, you will study about supply chain and its effective implementation in a company.

A supply chain is a system of organizations, people, technologies, activities, information and resources involved in moving a product or service from supplier to customer. Maintaining a flawless supply chain across all its operations thus becomes absolutely necessary for any business. Importance of supply chain management need not be over emphasized as it has become the cutting edge of business, after product quality and manufacturing capabilities of any business firm. Supply chain activities transform natural resources, raw materials and components into a finished product that is delivered to the end user. In sophisticated supply chain systems, used products may reenter the supply chain at any point where residual value is recyclable.

Supply chains encompass the companies and the business activities needed to design, make, deliver, and use a product or service. Businesses depend on their supply chains to provide them with what they need to survive and thrive. Every business fits into one or more supply chains and has a role to play in each of them. The pace of change and the uncertainty about how markets will evolve has made it increasingly important for companies to be aware of the supply chains they participate in and to understand the roles that they play. Those companies that learn how to build and participate in strong supply chains will have a substantial competitive advantage in their markets.

Notes

6.1 Evolution of Supply Chain Management

The 1990s were a decade that brought in a quantum jump in many areas of management. One major area of great change was in the fields of Materials Management, Procurement, Physical Distribution Management and Business Logistics. These disciplines went through several evolutionary stages.

Traditional Procurement, Physical Distribution Management and Materials Management in the 1970s, evolved into Logistics Management in the 1980s. Logistics Management consolidated the traffic and transportation activities of the firm. Logistics then evolved into Supply Chain Management in the 1990s. Supply Chain Management combined the activities of Materials Management and Logistics.

This change began in the 1960s and 1970s. With growth of computer capabilities new systems to handle material requirements were devised. The first of these was Material Requirement Planning (MRP). This was followed by Manufacturing Resource Planning (MRP II). These systems brought about recognition of the importance of the impact of high levels of inventories on manufacturing and storage costs. As the sophistication of inventory tracking software grew, it became possible to further reduce inventory costs.

Did u know? The concept of the supply chain had already been proposed by Forrester in 1958. However, the first widely recorded use of the term supply chain management came about in a paper published by Keith and Webber in 1982.

Globalization and intensified competition, in the 1990s, finally made organizations realize the potential benefits and importance of strategic and cooperative supplier-buyer-customer relationships. The concept of these partnerships or alliances emerged as US manufacturers tried to compete with the Japanese and experimented with Just-in-time (JIT) and Total Quality Management (TQM).

This led manufacturers to purchase from a select number of certified, high-quality suppliers with excellent service reputations. As this strategy became successful, they started giving only their best suppliers most of their business, and in return, they expected these relationships to help generate more sales through improvements in delivery, quality, and product design and to generate cost savings through closer attention to the processes, materials, and components they used in manufacturing their products. With quality suppliers, firms also found it beneficial to involve them in their new product design and development activities as well as in cost, quality, and service improvement initiatives.

The success in the materials function led companies to understand the necessity of integrating all key business processes among the supply chain participants. This encompassed the distribution network. As finished goods are the value added products of the supply chain, they constituted a huge investment in inventory, often greater than that of raw materials and components. This encouraged the thought of enabling the supply chain to act and react as one entity, from suppliers to the retailers.

Companies saw the benefits in the creation of alliances or partnerships with their customers. In time, when market share improved for its customers' products, the result was more business for the firm. Developing these long-term, close relationships with customers meant holding less finished product safety stock (as discussed earlier about the Forrester effect) and allowed firms to focus their resources on providing better products and services to these customers. Today, logistics is viewed as one important element of the much broader supply chain management concept.

Notes

Supply chain management, as explained above, has evolved along two parallel paths:

1. The materials and supply management emphasis from industrial buyers, and
2. The transportation and logistics emphasis from wholesalers and retailers.

For the manufacturing firm, the supply chain management focus is on the impact of high levels of inventories on manufacturing and storage costs. For the wholesaling and retailing industries, the supply chain management focus is on location and logistics issues more often than on manufacturing.

Sharing information with supply chain partners through EDI and the Internet has enabled firms to integrate stocking, logistics, materials acquisition, shipping, and other functions to create a more proactive and effective style of business management and customer responsiveness starting out from the source of raw materials right up to the user of the final product.

One major change that has taken place is in the manner in which management now treats functions and processes. From the functional view, i.e. viewing it as a departmental activity; management studies started looking at these functions as parts of business processes.

What are the differences between a function and a business process? The distinctions between functions and processes are explained below.

A business function is:

- A group of business activities that together completely support one aspect of furthering the mission of the business.
- It is ongoing and continuous.
- It reflects the organizational component responsible for the activities.
- It is concerned with what has to be done to operate the business.

A business function does not include how the work is carried out.

Example: Purchasing, stores, receipt, materials management, etc.

In contrast, a business process is:

- A task or group of tasks carried out to furthering the mission of the business.
- It is executed repeatedly.
- It has a beginning and an end.
- It is only concerned with what has to be done.
- It is described in terms of inputs and outputs.

A business process addresses the question of how work is organized and managed across the organization i.e. grouping similar activities together. A business process does not include the organizational component responsible.

Example: Aggregate Planning, Material Requirement Planning, Supply Chain Management, etc.

Supply chain relationships can be quite complex. Instead of the process view, we will start with the functional view. It is easier to understand the workings of Supply Chain Management if we start with this traditional view of supplier-buyer relationships as reflected by the materials function.

Notes

Self Assessment

Fill in the blanks:

1. …… activities transform natural resources, raw materials and components into a finished product that is delivered to the end user.
2. The first widely recorded use of the term supply chain management came about in a paper published by ……. in 1982.
3. The success in the materials function led companies to understand the necessity of …….. all key business processes among the supply chain participants.
4. For the wholesaling and retailing industries, the supply chain management's focus is on …….. and logistics issues.

6.2 Understanding the Supply Chain Management

The traditional concept of business is obsolete. Companies, both manufacturing and service, are creators of value, not simply makers of products. Supply Chain Management (SCM) focuses on globalization and information management tools which integrate procurement, operations, and logistics from raw materials to customer satisfaction. Future managers are prepared to add product value, increase quality, reduce costs, and increase profits by addressing the needs and performance of: supplier relations, supplier selection, purchasing negotiations, operations, transportation, inventory, warehousing, benchmarking, third-party vendors, electronic commerce, recycling, supply chain electronic software, and customer relations.

A "supply chain" consists of interconnected components required to transform ideas into delivered products and services. Supply Chain Management is a business approach that focuses on integration, and partnerships, in order to meet customers' needs on a timely basis, with relevant and high quality products, produced and delivered in a cost effective manner. Current interest in supply chain management stems from the need of world-class organizations to purchase, produce, move, and market goods and services on a global basis.

Supply Chain Management is involved in the process of planning, implementing and controlling operations for serving customers as efficiently as possible. It encompasses all activities involved in sourcing, procurement, conversion and logistics. The supply chain is based on two core concepts:

- The first, practically every product that reaches an end user represents the cumulative effort of multiple organizations. These organizations are referred to collectively as the supply chain. A supply chain consists of multiple firms, both upstream (suppliers) and downstream (distribution).
- The second, organizations have to minimize conflicts in objectives outside their "four walls" and manage the entire chain of activities that ultimately delivers products to the final customer in order that each stage of the supply chain and all its constituents can maximize profits.

Historically built on Procurement, Operations and Logistics foundations; Supply Chain Management exceeds these traditional concepts. Supply Chain Management is involved with integrating three key flows, between the different stages, across the boundaries of the companies:

- Flow of information,
- Product/materials,
- Funds

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Members of the supply chain act as partners who are "linked" together through both physical and information flows. It is this that makes an effective supply chain. The flows that involve the transformation, movement, storage of goods and materials and money are called 'physical flows'. These flows are easily visible.

The physical flows are reinforced by information flows. Information flows are used by the various supply chain partners to coordinate their long-term plans, as well as efficiently control the day-to-day flow of goods and material to the supply chain.

In essence, the supply chain enables the flow of products, services, and information goes both up and down the chain. Successful integration or coordination of these three flows produces improved efficiency and effectiveness for business organizations.

'Supply Chain Management' can be defined as the active management of supply chain activities to maximize customer value and achieve a sustainable competitive advantage. It represents a conscious effort by the supply chain firms to develop and run supply chains in the most effective and efficient ways possible.

There can be various types of supply chains. There is a basic supply chain, and an extended supply chain. The definition of a basic supply chain is: a set of three or more companies directly linked by one or more of the upstream or downstream flows of products, services, finances and information from a source to a customer.

An extended supply chain includes suppliers of the immediate supplier and customers of the immediate customer, all linked by one or more of the upstream and downstream flows of products, services, finances, and information.

A supplier typically participates in numerous different supply chains, which may involve a wide variety of industries and customers. In the case of the mail order business, such as Amazon.com, the company maintains an inventory of product from which it fills customer orders. In the case of retail stores, the supply chain may also contain a wholesaler or distributor, the store and, the manufacturer. The final consumer is always considered a member of the supply chain.

6.2.1 Need for Supply Chain

The need of every supply chain is to maximize the overall value generated. The value a supply chain generates is the difference between what the final product is worth to the customer and the effort the supply chain expends in filling the customer's request. For most commercial supply chains, value will be strongly correlated with supply chain profitability, the difference between the revenue generated from the customer and the overall cost across the supply chain.

Example: A customer purchasing a computer from Dell pays $2,000 represents the revenue the supply chain receives.

Dell and other stages of the supply chain incur costs to convey information, produce components, store them, transport them, transfer funds, and so on. The difference between the $2,000 that the customer paid and the sum of all costs incurred by the supply chain to produce and distribute the computer represents the supply chain profitability. Supply chain profitability is the total profit to be shared across all supply chain stages. The higher the supply chain profitability, the more successful the supply chain.

Caution Supply chain success should be measured in terms of supply chain profitability and not in terms of the profits at an individual stage.

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Main need of SCM is to optimize the overall performance of the entire network of the supply-chain. The word "entire" is very important here. With experience in enterprise-research, we have realized that despite each factory, distribution centre and other elements of supply-chain operating at the best levels, the supply-chain as a whole may operate sub-optimally. Let us examine this issue.

All the constituents of supply-chain have their own short-term and long-term needs. Their operating decisions are based on these needs. It is very common that the decisions of the constituents may not be aligned to the overall strategic goal of the entire supply chain.

Example: The optimal strategy for the logistics may be bulk shipments, one-time order, selection of nearest vendor/supplier, etc.

In many situations, when entire chain performance is considered, these individual strategies fail to deliver the best. It is, therefore, an integrated-holistic view of supply-chain, which is essential. Many situations force management to go for incurring more than the double cost in order to build up inventories to support some increase in customer's service.

Companies in any supply chain must make decisions individually and collectively regarding their actions in five areas:

Production

What products does the market want? How much of which products should be produced and by when? This activity includes the creation of master production schedules that take into account plant capacities, workload balancing, quality control, and equipment maintenance.

Inventory

What inventory should be stocked at each stage in a supply chain? How much inventory should be held as raw materials, semi finished, or finished goods? The primary purpose of inventory is to act as a buffer against uncertainty in the supply chain. However, holding inventory can be expensive, so what are the optimal inventory levels and reorder points?

Location

Where should facilities for production and inventory storage be located? Where are the most cost efficient locations for production and for storage of inventory? Should existing facilities be used or new ones built? Once these decisions are made they determine the possible paths available for product to flow through for delivery to the final consumer.

Transportation

How should inventory be moved from one supply chain location to another? Air freight and truck delivery are generally fast and reliable but they are expensive. Shipping by sea or rail is much less expensive but usually involves longer transit times and more uncertainty. This uncertainty must be compensated for by stocking higher levels of inventory. When is it better to use which mode of transportation?

Information

How much data should be collected and how much information should be shared? Timely and accurate information holds the promise of better coordination and better decision making. With

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good information, people can make effective decisions about what to produce and how much, about where to locate inventory and how best to transport it.

The sum of these decisions will define the capabilities and effectiveness of a company's supply chain. The things a company can do and the ways that it can compete in its markets are all very much dependent on the effectiveness of its supply chain. If a company's strategy is to serve a mass market and compete on the basis of price, it had better have a supply chain that is optimized for low cost. If a company's strategy is to serve a market segment and compete on the basis of customer service and convenience, it had better have a supply chain optimized for responsiveness. Who a company is and what it can do is shaped by its supply chain and by the markets it serves.

6.2.2 Develop Needed Supply Chain Capabilities

Once you know what kind of markets your company serves and the role your company does or will play in the supply chains of these markets, then you can take this last step, which is to develop the supply chain capabilities needed to support the roles your company plays. This development is guided by the decisions made about the five supply chain drivers. Each of these drivers can be developed and managed to emphasize responsiveness or efficiency depending on the business requirements.

Production

This driver can be made very responsive by building factories that have a lot of excess capacity and that use flexible manufacturing techniques to produce a wide range of items. To be even more responsive, a company could do their production in many smaller plants that are close to major groups of customers so that delivery times would be shorter. If efficiency is desirable, then a company can build factories with very little excess capacity and have the factories optimized for producing a limited range of items. Further efficiency could be gained by centralizing production in large central plants to get better economies of scale.

Inventory

Responsiveness here can be had by stocking high levels of inventory for a wide range of products. Additional responsiveness can be gained by stocking products at many locations so as to have the inventory close to customers and available to them immediately. Efficiency in inventory management would call for reducing inventory levels of all items and especially of items that do not sell as frequently. Also, economies of scale and cost savings could be gotten by stocking inventory in only a few central locations.

Location

A location approach that emphasizes responsiveness would be one where a company opens up many locations to be physically close to its customer base.

Example: McDonald's has used location to be very responsive to its customers by opening up lots of stores in its high volume markets.

Efficiency can be achieved by operating from only a few locations and centralizing activities in common locations. An example of this is the way Dell serves large geographical markets from only a few central locations that perform a wide range of activities.

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Transportation

Responsiveness can be achieved by a transportation mode that is fast and flexible. Many companies that sell products through catalogs or over the Internet are able to provide high levels of responsiveness by using transportation to deliver their products, often within 24 hours. FedEx and UPS are two companies who can provide very responsive transportation services. Efficiency can be emphasized by transporting products in larger batches and doing it less often. The use of transportation modes such as ship, rail, and pipelines can be very efficient. Transportation can be made more efficient if it is originated out of a central hub facility instead of from many branch locations.

6.2.3 Typology of Supply Chains

In most organizations, some products or services are produced internally or others are purchased. The supply chain concept covers both internal as well as external parts. Therefore, there are (a) Internal Supply Chains, and (b) External supply chains.

Internal Supply Chains

The flows of the supply chain that occur within the individual organization are called the internal supply chain. The first step in moving towards supply chain management is to develop these internal chains. Given the multidivisional, international organizational structures found in many businesses, internal supply chains can be quite complex. In transnational companies that have globalized operations, the internal part of a supply chain often has multiple "links" that span the globe.

Complications in multidivisional and globalized companies are created, when the employees of one division view the 'other' divisions in much the same manner as they would external suppliers or customers. In some cases, this creates competition and conflict of interest between divisions. The supply chain initiative in such structures should start from the organization's internal supply chain. Developing an understanding of this is often an appropriate starting point. This makes integrating cross-divisional functions and processes simpler.

The supply chain is a set of interrelated processes and should not be visualized as a series of discrete, independent activities. Process maps are developed to understand the overall internal supply chain linkages. These maps provide the basic information required to link the different entities. Some of the key processes and their extensions include order preparation by purchasing, different activities related to manufacturing, order information from sales, order entry for materials planning, warehousing and distribution operations, and order shipment for transportation and delivery. Each of these key processes needs to be documented along with current performance information.

In order to establish an effective and successful supply chain it is necessary that supply chain process maps (flow charts) are developed for major supply chains and their related processes. This is a basic requirement. It helps when the different divisions understand the steps in their portion of the supply chain and also have an appreciation of "what happens" outside their part of the process.

External Supply Chains

The decisions, to purchase a product or service from external suppliers, are the basis for the external supply chain. From the supply chain point of view, the external portion of the supply chain (i.e., key suppliers and customers) is an extension of the internal supply chain. The firm's

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external networks, including suppliers, complement its internal capabilities in the pursuit of offering products and services at competitive prices and quality.

The processes involved in the analysis of the external supply chain are similar to that of the internal supply chain. Therefore, by understanding the internal supply chain, it is relatively easy to extend the concept of the analysis to the external supply chain. Extending this analysis, and then including the internal supply chain in the analysis, is an important step in the development of supply chain management. In this composite picture there are multiple organizations involved and their representatives are now also participating and a part in the analysis.

However, the extension of the analysis to the external supply chain from the internal supply chain adds a greater level of complexity. Considering that the task is enormous, most organizations focus their efforts on those supply chains that are most important to their success. An organization, therefore, has to determine which linkages need to be considered as important.

The most significant opportunities for improvement in a supply chain are often at the interfaces between the various supply chain member organizations. An example is cross-docking applied to warehousing which can improve the efficiency of transportation as well as reduce the costs of warehousing and inventory. There are numerous such opportunities at the different interfaces. Identifying and implementing these opportunities provides a challenge to supply chain managers.

Internal or External Solutions

The costs that must be considered when investing in and using internal or external solutions to the supply chain include not only the cost of running and maintaining the systems, but also the cost of purchasing and implementing the functionalities (transition cost) e.g. linking internal processes or systems to the supplier.

In addition to these costs, which can be measured relatively easily, the firm must also consider the opportunity cost of not running efficient supply chain processes. This cost is termed competitive cost. The competitive cost can be thought of as the opportunity cost of using inefficient (relative to the firm's competitors) supply chain processes for serving customers and suppliers.

Lastly, the firm should realize a long-term benefit from the acquisition of capabilities (salvage value). The salvage value reflects the benefit the firm realizes from building long-term capabilities either internally or externally. The benefits derived from this are reflected in a decrease in the competitive and/or the running and maintenance costs.

The firm's decision has to be one that seeks supply chain efficiencies through internal capabilities, through the participation of external supply chain members, or through a combination of both.

Self Assessment

Fill in the blanks:

5. In ……. companies that have globalized operations, the internal part of a supply chain often has multiple links that span the globe.
6. The ……. reflects the benefit the firm realizes from building long-term capabilities either internally or externally.
7. A supply chain consists of ……. components required to transform ideas into delivered products and services.

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8. ……. management encompasses all activities involved in sourcing, procurement, conversion and logistics.

9. Members of the supply chain act as partners who are "linked" together through both physical and …… flow.

10. The need of supply chain is to maximize the overall ……. generated.

Caselet

Five Supply Chain Trends that Shaped 2012

Supply chain technology continued to evolve throughout 2012 as companies realize that a highly visible supply chain is necessary for success in today's business climate. But there are other trends specific to supply chain that came to the forefront in 2012:

1. ***Improved Customer Service Levels Over Cost Cutting:*** This was the foremost trend during 2012 and will continue through 2013. Supply chain costs have been continuously cut since the recession began four year ago but customers have begun pushing back on the cost cutting measures that negatively affected service levels. Companies are now focusing on how to improve service levels while simultaneously decreasing costs.

2. ***Execution Moves Ahead of Demand & Supply Planning:***Demand and supply planning has been rightly focused on as this is a critical point for supply chain success. However, the ability to execute on the plan when forecast errors occur – a constant issue – results in the need to focus more and more on execution. Forecast errors, or the difference between what is planned and what occurs, are driven by every day issues of "abnormal" supply chain events that can cause major disruptions. The ability to react efficiently and effectively is critical to every supply chain and primarily relies upon end to end supply chain process visibility at the transaction level. This was a theme that came up again and again in 2012.

3. ***Resurgence of Contingency Planning:***As supply chains have gotten leaner, the reduced inventory levels require the ability to react quickly when abnormal events occur or stock outs will increase exponentially. Because these events are occurring more frequently, responding to them in an effective manner is a must or companies will face severe revenue losses. The result is that we have seen resurgence in contingency planning this year to ensure that supply chain functions continue even in emergency situations. Companies are focused on developing contingency plans, executing those plans and understanding in real time if their plans are effective.

4. ***End-to-End Partner Communication & Collaborative Execution:*** All partners in the supply chain from retailers through raw material providers must constantly collaborate on what events are occurring, the data behind those events and how they can execute as a unified group to respond to the challenges as they unfold. Solving a problem by pushing costs to another supply chain partner is an antiquated proposition as companies realize that cost shifting is not a sustainable, competitive solution.

5. ***Big Data is Becoming Mandatory:*** Big data was the big IT story in 2012. And combining the data of multiple supply chain partners, turning that data into information and being able to react and execute accordingly requires a lot of data.

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Big data solutions combined with Complex Event Processing (CEP) solutions are being used more than ever this year to digest the enormous magnitude of available data and turn it into executable actions. Leveraging these tools with supply chain visibility solutions will quickly become a "must have" rather than a "nice to have" as companies utilizing these tools set the bar for the new normal in supply chain performance.

Source: http://www.scmr.com/article/five_supply_chain_trends_that_shaped_2012/

6.3 Implementation of Supply Chain Principles in a Company

Managers increasingly find themselves assigned the role of the rope in a very real tug of war—pulled one way by customers' mounting demands and the opposite way by the company's need for growth and profitability. Many have discovered that they can keep the rope from snapping and, in fact, achieve profitable growth by treating supply chain management as a strategic variable.

Our analysis of initiatives to improve supply chain management by more than 100 manufacturers, distributors, and retailers shows many making great progress, while others fail dismally. The successful initiatives that have contributed to profitable growth share several themes. They are typically broad efforts, combining both strategic and tactical change. They also reflect a holistic approach, viewing the supply chain from end to end and orchestrating efforts so that the whole improvement achieved—in revenue, costs, and asset utilization—is greater than the sum of its parts.

Adherence to the seven principles transforms the tug of war between customer service and profitable growth into a balancing act. By determining what customers want and how to coordinate efforts across the supply chain to meet those requirements faster, cheaper, and better, companies enhance both customer satisfaction and their own financial performance. But the balance is not easy to strike or to sustain.

Notes Each company—whether a supplier, manufacturer, distributor, or retailer—must find the way to combine all seven principles into a supply chain strategy that best fits its particular situation. No two companies will reach the same conclusion.

Principle 1: Segment customers based on the service needs of distinct groups and adapt the supply chain to serve these segments profitably.

Segmentation has traditionally grouped customers by industry, product, or trade channel and then taken a one-size-fits-all approach to serving them, averaging costs and profitability within and across segments. The typical result, as one manager admits: "We don't fully understand the relative value customers place on our service offerings."

But segmenting customers by their particular needs equips a company to develop a portfolio of services tailored to various segments. Surveys, interviews, and industry research have been the traditional tools for defining key segmentation criteria. Today, progressive manufacturers are turning to such advanced analytical techniques as cluster and conjoint analysis to measure customer tradeoffs and predict the marginal profitability of each segment. One manufacturer of home improvement and building products bases segmentation on sales and merchandising

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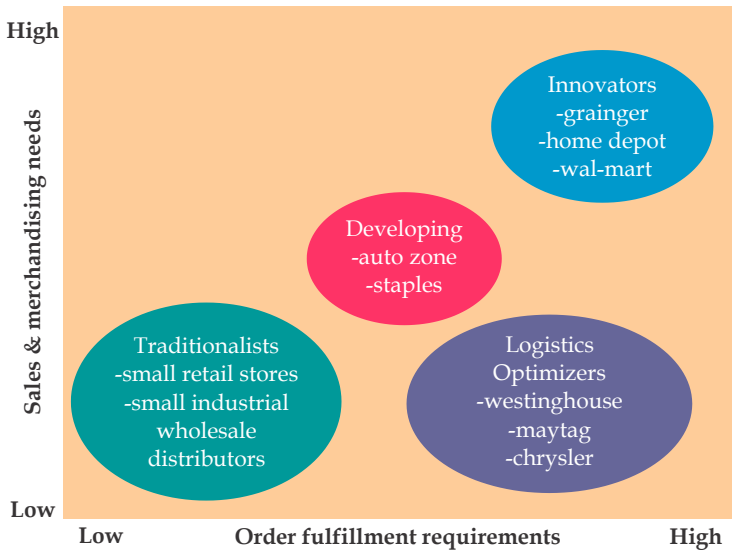
needs and order fulfillment requirements. Others are finding that criteria such as technical support and account planning activities drive segmentation.

Research also can be established by the services valued by all customers versus those valued only by certain segments. Then the company should apply a disciplined, cross-functional process to develop a menu of supply chain programs and create segment-specific service packages that combine basic services for everyone with the services from the menu that will have the greatest appeal to particular segments. This does not mean tailoring for the sake of tailoring. The goal is to find the degree of segmentation and variation needed to maximize profitability.

Figure 6.1: Need-based Segmentation



Source: Anderson Consulting

All the segments in Figure 6.1 value consistent delivery. But those in the lower left quadrant have little interest in the advanced supply chain management programs, such as customized packaging and advance shipment notification, that appeal greatly to those in the upper right quadrant.

Most companies have a significant untapped opportunity to better align their investment in a particular customer relationship with the return that customer generates. To do so, companies must analyze the profitability of segments, plus the costs and benefits of alternate service packages, to ensure a reasonable return on their investment and the most profitable allocation of resources. To strike and sustain the appropriate balance between service and profitability, most companies will need to set priorities—sequencing the rollout of tailored programs to capitalize on existing capabilities and maximize customer impact.

Principle 2: Customize the logistics network to the service requirements and profitability of customer segments.

Companies have traditionally taken a monolithic approach to logistics network design in organizing their inventory, warehouse, and transportation activities to meet a single standard. For some, the logistics network has been designed to meet the average service requirements of all customers; for others, to satisfy the toughest requirements of a single customer segment.

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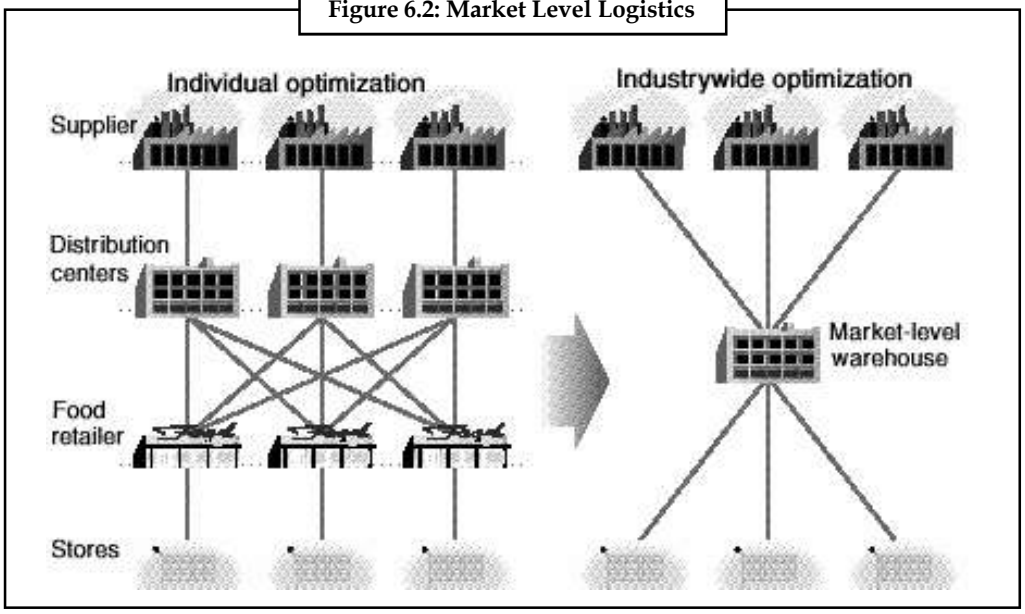
Figure 6.2: Market Level Logistics



Source: Anderson Consulting

Neither approach can achieve superior asset utilization or accommodate the segment-specific logistics necessary for excellent supply chain management. In many industries, especially such commodity industries as fine paper, tailoring distribution assets to meet individual logistics requirements is a greater source of differentiation for a manufacturer than the actual products, which are largely undifferentiated.

One paper company found radically different customer service demands in two key segments—large publishers with long lead times and small regional printers needing delivery within 24 hours. To serve both segments well and achieve profitable growth, the manufacturer designed a multilevel logistics network with three full-stocking distribution centers and 46 quick-response cross-docks, stocking only fast-moving items, located near the regional printers. Return on assets and revenues improved substantially thanks to the new inventory deployment strategy, supported by outsourcing of management of the quick response centers and the transportation activities.

Principle 3: Listen to market signals and align demand planning accordingly across the supply chain, ensuring consistent forecasts and optimal resource allocation.

Forecasting has historically proceeded silo by silo, with multiple departments independently creating forecasts for the same products—all using their own assumptions, measures, and level of detail. Many consult the marketplace only informally, and few involve their major suppliers in the process. The functional orientation of many companies has just made things worse, allowing sales forecasts to envision growing demand while manufacturing second-guesses how much product the market actually wants.

Such independent, self-centered forecasting is incompatible with excellent supply chain management, as one manufacturer of photographic imaging found. This manufacturer nicknamed the warehouse "the accordion" because it had to cope with a production operation that stuck to a stable schedule, while the revenue-focused sales force routinely triggered cyclical demand by offering deep discounts at the end of each quarter. The manufacturer realized the need to implement a cross-functional planning process, supported by demand planning software.

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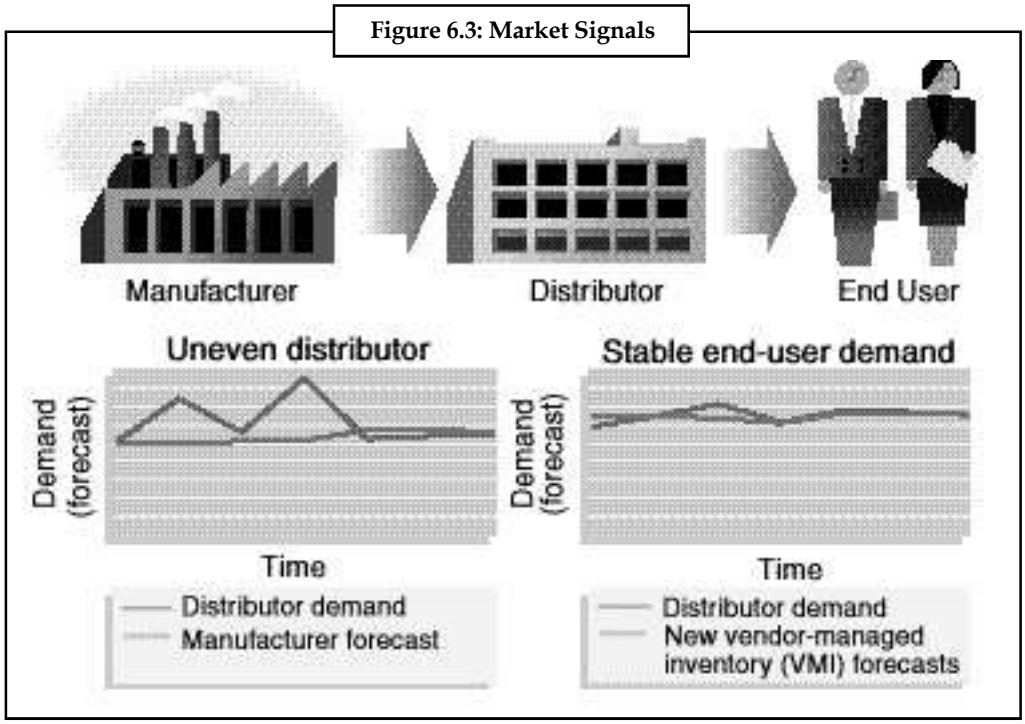
Initial results were dismaying. Sales volume dropped sharply, as excess inventory had to be consumed by the marketplace. But today, the company enjoys lower inventory and warehousing costs and much greater ability to maintain price levels and limit discounting. Like all the best Sales and Operations Planning (S&OP), this process recognizes the needs and objectives of each functional group but bases final operational decisions on overall profit potential.

Excellent supply chain management, in fact, calls for S&OP that transcends company boundaries to involve every link of the supply chain (from the supplier's supplier to the customer's customer) in developing forecasts collaboratively and then maintaining the required capacity across the operations. Channel-wide S&OP can detect early warning signals of demand lurking in customer promotions, ordering patterns, and restocking algorithms and takes into account vendor and carrier capabilities, capacity, and constraints.

Figure 6.3: Market Signals



Source: Anderson Consulting

Figure 6.3 illustrates the difference that cross supply chain planning has made for one manufacturer of laboratory products. As shown on the left of this exhibit, uneven distributor demand unsynchronized with actual end-user demand made real inventory needs impossible to predict and forced high inventory levels that still failed to prevent out-of-stocks. Distributors began sharing information on actual (and fairly stable) end-user demand with the manufacturer, and the manufacturer began managing inventory for the distributors. This coordination of manufacturing scheduling and inventory deployment decisions paid off handsomely, improving fill rates, asset turns, and cost metrics for all concerned.

Such demand-based planning takes time to get right. The first step is typically a pilot of a leading-edge program, such as vendor-managed inventory or jointly managed forecasting and replenishment, conducted in conjunction with a few high-volume, sophisticated partners in the supply chain. As the partners refine their collaborative forecasting, planned orders become firm orders. The customer no longer sends a purchase order, and the manufacturer commits inventory from its available-to-promise stock. After this pilot formalizes a planning process, infrastructure, and measures, the program expands to include other channel partners, until enough are

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participating to facilitate quantum improvement in utilization of manufacturing and logistics assets and cost performance.

Principle 4: Differentiate product closer to the customer and speed conversion across the supply chain.

Manufacturers have traditionally based production goals on projections of the demand for finished goods and have stockpiled inventory to offset forecasting errors. These manufacturers tend to view lead times in the system as fixed, with only a finite window of time in which to convert materials into products that meet customer requirements.

While even such traditionalists can make progress in cutting costs through set-up reduction, cellular manufacturing, and just-in-time techniques, great potential remains in less traditional strategies such as mass customisation. For example, manufacturers striving to meet individual customer needs efficiently through strategies such as mass customisation are discovering the value of postponement. They are delaying product differentiation to the last possible moment and thus overcoming the problem described by one manager of a health and beauty care products warehouse: "With the proliferation of packaging requirements from major retailers, our number of SKUs (stock keeping units) has exploded. We have situations daily where we backorder one retailer, like Walmart, on an item that is identical to an in-stock item, except for its packaging. Sometimes we even tear boxes apart and repackage by hand!"

Realizing that time really is money, many manufacturers are questioning the conventional wisdom that lead times in the supply chain are fixed. They are strengthening their ability to react to market signals by compressing lead times along the supply chain, speeding the conversion from raw materials to finished products tailored to customer requirements. This approach enhances their flexibility to make product configuration decisions much closer to the moment demand occurs.

Consider Apple's widely publicized PC shortages during peak sales periods. Errors in forecasting demand, coupled with supplier inability to deliver custom drives and chips in less than 18 weeks, left Apple unable to adjust fast enough to changes in projected customer demand. To overcome the problem, Apple has gone back to the drawing board, redesigning PCs to use more available, standard parts that have shorter lead times.

Principle 5: Manage sources of supply strategically to reduce the total cost of owning materials and services.

Determined to pay as low a price as possible for materials, manufacturers have not traditionally cultivated warm relationships with suppliers. In the words of one general manager: "The best approach to supply is to have as many players as possible fighting for their piece of the pie—that's when you get the best pricing."

Excellent supply chain management requires a more enlightened mindset—recognizing, as a more progressive manufacturer did: "Our supplier's costs are in effect our costs. If we force our supplier to provide 90 days of consigned material when 30 days are sufficient, the cost of that inventory will find its way back into the supplier's price to us since it increases his cost structure." While manufacturers should place high demands on suppliers, they should also realize that partners must share the goal of reducing costs across the supply chain in order to lower prices in the marketplace and enhance margins. The logical extension of this thinking is gain-sharing arrangements to reward everyone who contributes to the greater profitability.

While the seven principles of supply chain management can achieve their full potential only if implemented together, this principle may warrant early attention because the savings it can realize from the start can fund additional initiatives. The proof of the pudding: creating a data

warehouse to store vast amounts of transactional and decision-support data for easy retrieval and application in annual negotiations consolidated across six divisions cut one manufacturer's operating costs enough in the first year to pay for a redesigned distribution network and a new order management system.

Principle 6: Develop a supply chain-wide technology strategy that supports multiple levels of decision making and gives a clear view of the flow of products, services, and information.

To sustain reengineered business processes (that at last abandon the functional orientation of the past), many progressive companies have been replacing inflexible, poorly integrated systems with enterprise-wide systems. One study puts 1995 revenues for enterprise-wide software and service, provided by such companies as SAP and Oracle, at more than $3.5 billion and projects annual revenue growth of 15 to 20 percent from 1994 through 1999.

Too many of these companies will find themselves victims of the powerful new transactional systems they put in place. Unfortunately, many leading-edge information systems can capture reams of data but cannot easily translate it into actionable intelligence that can enhance real-world operations. As one logistics manager with a brand-new system said: "I've got three feet of reports with every detail imaginable, but it doesn't tell me how to run my business."

This manager needs to build an information technology system that integrates capabilities of three essential kinds. For the short-term, the system must be able to handle day-to-day transactions and electronic commerce across the supply chain and thus help align supply and demand by sharing information on orders and daily scheduling. From a mid-term perspective, the system must facilitate planning and decision making, supporting the demand and shipment planning and master production scheduling needed to allocate resources efficiently.

Notes To add long-term value, the system must enable strategic analysis by providing tools, such as an integrated network model, that synthesize data for use in high-level "what-if" scenario planning to help managers evaluate plants, distribution centers, suppliers, and third-party service alternatives.

Despite making huge investments in technology, few companies are acquiring this full complement of capabilities. Today's enterprise-wide systems remain enterprise-bound, unable to share across the supply chain the information that channel partners must have to achieve mutual success.

Many companies that have embarked on large-scale supply chain reengineering attest to the importance of information technology in sustaining the benefits beyond the first annual cycle. Those that have failed to ensure the continuous flow of information have seen costs, assets, and cycle times return to their pre-reengineering levels, which undermines the business case for broad-based supply chain programs.

Principle 7: Adopt channel-spanning performance measures to gauge collective success in reaching the end-user effectively and efficiently.

To answer the question, "How are we doing?" most companies look inward and apply any number of functionally oriented measures. But excellent supply chain managers take a broader view, adopting measures that apply to every link in the supply chain and include both service and financial metrics.

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First, they measure service in terms of the perfect order—the order that arrives when promised, complete, priced and billed correctly, and undamaged. The perfect order not only spans the supply chain, as a progressive performance measure should, but also views performance from the proper perspective, that of the customer.

Second, excellent supply chain managers determine their true profitability of service by identifying the actual costs and revenues of the activities required to serve an account, especially a key account. For many, this amounts to a revelation, since traditional cost measures rely on corporate accounting systems that allocate overhead evenly across accounts. Such measures do not differentiate, for example, an account that requires a multifunctional account team, small daily shipments, or special packaging. Traditional accounting tends to mask the real costs of the supply chain—focusing on cost type rather than the cost of activities and ignoring the degree of control anyone has (or lacks) over the cost drivers.

Deriving maximum benefit from activity-based costing requires sophisticated information technology, specifically a data warehouse. Because the general ledger organizes data according to a chart of accounts, it obscures the information needed for activity-based costing. By maintaining data in discrete units, the warehouse provides ready access to this information.

Task Develop a method for evaluating the performance of the supply chain in an organization. Mention the factors which you will take into consideration.

Self Assessment

Fill in the blanks:

11. Surveys, interviews, and industry research have been the traditional tools for defining key …… criteria.
12. The goal of research is to find the degree of …….. and variation needed to maximize profitability.
13. Companies have traditionally taken a ……. approach to logistics network design in organizing their inventory, warehouse, and transportation activities to meet a single standard.
14. Sales volume …….. sharply, as excess inventory had to be consumed by the marketplace.
15. The 4th principle in implementation of supply chain management in an organization is to …….. product closer to the customer and speed conversion across the supply chain.

Notes

Case Study

Pepe Jeans

This is the story of Pepe Jeans, a company renowned for its range of Jeans styles, offering a better fit than others, especially for its female customers. The company began to produce and sell denim jeans in the early 70s in the United Kingdom. Their range of basic styles was modified each season, in keeping with the fashion trends, but each style maintained its identity.

Sales of Pepe jeans was primarily through its 1,500 independent outlets throughout the United Kingdom. The company maintains contact with its independent retailers via a group of approximately 10 agents who are self employed and work exclusively for Pepe. Each agent is responsible for retailers in his area. Each agent takes orders from his retailers for a six-month period. The retailer can, if he wants, modify/cancel the order but within a week. After the orders have been transmitted to Pepe, they cannot be changed.

The orders are sent by Pepe to their sourcing agent in Hong Kong. The sourcing agent handles all the details associated with materials, fabrication, manufacturing and shipping the completed jeans to Pepe. Pepe has a very strong designing team which designs the jeans and provides the complete specifications. They also ensure that the jeans are made exactly as per these specifications and the material used is of the highest quality.

Of late there has been a slump is sales which has the Pepe management worried. They have been told that they have become less of a trendsetter in recent times. An outside consultant was engaged, who outlined the following scenario to the management:

Pepe has been enjoying considerable financial success in the past – the retail price of its jeans was around $80, much higher than its nearest rival, Levi Strauss of USA. Sales last year was approximately $320 million. Cost of sales was approximately 40%, operating expenses 28% and the rest was profits. The company had no long-term debt and enjoyed a healthy cash position.

After extensive dialogue, the consultant said that the lead times were very high. Fashion industry is highly volatile and the six month order lead time was too long; this resulted in the retailers having considerable non-moving inventory. They wanted a system of exchange with Pepe to liquidate their non-moving and slow moving inventory.

The sourcing agent said that lead time could be shortened considerably, possibly to as low as six weeks, but this would increase costs considerably. Currently, the agent collects orders over a period of time and every two weeks, puts these orders out on bid to potential suppliers. The suppliers are then selected and manufacturing process begins. By shortening the lead time to six weeks, the price could go up by 30%. There would be a constant pressure on delivery schedules too and failures could be ruled out.

The sourcing agent suggested to the consultant that Pepe should build a finishing operation in UK. The basic jeans (where wash has not been applied) could be supplied from Hong Kong and the finishing operation could apply the different washes to the jeans to get different looks, and send them directly to the retailer.

The consultant found this to be an interesting idea. He felt that since the quantity of the basic jeans would be increased, he could probably get a 10% reduction in price. But Pepe would have to invest $1,600,000 worth of equipment. Even if the facility is located in the basement of their headquarters, it would cost another $480,000 for installations, etc.

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It would also cost $800,000 each year to operate the equipment. Cost of labour in UK is twice that of Hong Kong. Moreover, they would have to keep in hand about six month supply of inventory of basic jeans and the inventory carrying cost is presently pegged at about 30%.

Questions

1. Evaluate the case just as the consultant would have done. What is your recommendation?
2. Can you think of any other alternatives that Pepe should consider?

Source: Narayan.P, Subramanian.Jaya (2008). *"Inventory Management: Principles and Practices". Excel* Books Pvt. Ltd.

6.4 Summary

- A supply chain is a system of organizations, people, technologies, activities, information and resources involved in moving a product or service from supplier to customer.
- Traditional Procurement, Physical Distribution Management and Materials Management in the 1970s, evolved into Logistics Management in the 1980s.
- Companies saw the benefits in the creation of alliances or partnerships with their customers. In time, when market share improved for its customers' products, the result was more business for the firm.
- A business process addresses the question of how work is organized and managed across the organization i.e. grouping similar activities together. A business process does not include the organizational component responsible.
- Supply Chain Management (SCM) focuses on globalization and information management tools which integrate procurement, operations, and logistics from raw materials to customer satisfaction.
- Supply Chain Management is involved in the process of planning, implementing and controlling operations for serving customers as efficiently as possible.
- The value a supply chain generates is the difference between what the final product is worth to the customer and the effort the supply chain expends in filling the customer's request.
- The things a company can do and the ways that it can compete in its markets are all very much dependent on the effectiveness of its supply chain.
- The flows of the supply chain that occur within the individual organization are called the internal supply chain.
- The decisions, to purchase a product or service from external suppliers, are the basis for the external supply chain.
- The effective implementation of a supply chain management in an organization requires adherence to the 7 principles of supply chain.

6.5 Keywords

***Aggregate Planning*:** Sales, revenue, inventory and production planning done at total organization, facility or family levels is known as aggregate planning.

Notes

Competitive Cost: Competitive cost a cost lower than that offered by the competitors, or a price made more attractive because of added incentives.

Customer Value: Quantification of the perceived value of the product or service from a customer's view is known as customer value.

Just-in-time: Just-in-time denotes a manufacturing system in which materials or components are delivered immediately before they are required in order to minimize inventory costs.

Logistics: Handling an operation that involves providing labor and materials be supplied as needed is referred to as logistics.

Manufacturing Resource Planning: MRP is a computer-based system for the planning and allocation of work among employees.

Reengineering: Reengineering is a fundamental rethinking and radical redesign of business processes to achieve dramatic improvements in performance.

Sales and Operations Planning: Sales and operations planning is a formal planning process used to determine the sales and operations strategy that best meets all aspects of the enterprise's objectives.

Salvage Value: Salvage value the amount that can probably be obtained from a damaged item or for the components of the item.

Segmentation: Segmentation is dividing customers into groups, each with common demographic attributes.

Stock Keeping Units: A number given to each item (by category and brand) stocked in a retail outlet for inventory and tracking purposes is known as stock keeping units.

Supply Chain: The network created amongst different companies producing, handling and/or distributing a specific product is known as supply chain.

Total Quality Management: TQM is a system of management based on the principle that every staff member must be committed to maintaining high standards of work in every aspect of a company's operations.

6.6 Review Questions

1. Define supply chain management.
2. Describe the evolution of supply chain management.
3. Explain supply chain management and the various processes it is involved in.
4. Why do you think is there a need for supply chain in today's scenario?
5. Mention the five areas in which an organization needs to take decisions in case of supply chain.
6. Differentiate between internal supply chain & external supply chain.
7. Mention the seven principles of supply chain.
8. Why is segmentation necessary for fulfilling their needs profitably? Explain with the help of examples.
9. How does forecasting help in efficient implementation of supply chain?
10. Why is the performance evaluation of the supply chain necessary and important? Explain.

Notes

Answers: Self Assessment

1.	Supply chain	2.	Keith and Webber
3.	Integrating	4.	Location
5.	Transnational	6.	Salvage Value
7.	Interconnected	8.	Supply Chain
9.	Information	10.	Value
11.	Segmentation	12.	Segmentation
13.	Monolithic	14.	Dropped
15.	Differentiate		

6.7 Further Readings

Books

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Unit 7: Selection of Suppliers

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Objectives

After studying this unit, you will be able to:

- Explain the Concept of Suppliers Selection
- Discuss Vendor Rating and Its Techniques
- Explain Vendors Development
- Discuss the Vendors' Relationship

Introduction

In the previous unit we dealt with the concept of Supply Chain Management (SCM). The unit also discussed about the implementation of SCM principles within a company. This unit will help you to explain vendor rating and selection of suppliers. The various section and sub section

Notes

of this unit will also summarize the various techniques used for vendor rating. Picking up a vendor is perhaps one of the most nerve wracking but critical activities a business should embark on. Your vendors will be delivering your direct purchases – those that you use to produce the products you sell and your indirect purchases – those that keep your business running effectively.

When you are selecting a budding vendor, you are selecting a partner in your business and you will trust them to work with you in a professional and profitable manner. It is significant that you chose a company that can supply your requirements now and for the near future.

7.1 Suppliers Selection

In today's business environment, supplier is an important element in the supply chain. He can provide competitive edge by delivering quality product or services on time, at reasonable price, on a consistent basis. Hence, supplier selection has become one of the most important tasks of purchase. The task calls for identifying possible sources, collecting relevant data, analyzing these data and choosing the right ones.

The process of selection of supplier can be grouped in four stages including:

1. Survey stage
2. Enquiry stage
3. Negotiation and selection stage
4. Experience stage

7.1.1 Survey Stage

There exist a large number of sources to identify prospective suppliers. The major sources include: supplier's purchasing information file, supplier catalogs, trade register and directories, trade journals, trade exhibits – regional, national and Internet.

Supplier's Purchasing Information File

Normally, purchase department maintains records of past and current suppliers. Records may include names and addresses of suppliers, product range, prices, performance history and so on. This could be a starting point in identifying sources for new items.

Supplier Catalog

Each supplier brings out a catalog to show the range of materials, parts, components and services he provides. Usually, buyers maintain a library of such catalogs which are useful potential source.

Trade Registers and Directories

Such registers contain information about commodities, trade names, manufacturers, addresses and so on and are a useful aid in identifying new sources.

Trade Journals

Often each trade brings about its own journal(s). Advertisement and write-ups in such journals provide useful information to buyers about suppliers and their products.

Notes

Trade Exhibits – Regional and National

Regional and national trade exhibits are organized periodically. They exhibit various range of products supplied by suppliers and present excellent opportunity to buyer to locate potential suppliers.

Internet

Internet is the most powerful and handy means to identify a potential source of supply. A list of likely sources is prepared on the basis of the above information. Preliminary screening of the list is carried out, based on some broad consideration such as prior knowledge about suppliers' finances, quality, capability and reputation, type of supplier (manufacturer or distributor), existing governmental regulation, and geographical location and so on to arrive at short listed suppliers.

7.1.2 Enquiry Stage

The components of enquiry stage are discussed as follows:

Preliminary Enquiry

A preliminary enquiry called a request for information (RFI) is sent to all short listed suppliers from the previous stage, to seek information. The RFI is a formal way to request information from a supplier or vendor about a product or service a buyer is about to procure. The RFI can be used as a screening device to further prune the list of potential suppliers. The specific information asked for in RFI normally includes:

1. The name of the firm and principal office
2. Type of company: proprietorship, partnership, private limited or public limited
3. Space currently occupied and expansion plan
4. Technical capabilities: Equipment, process and skilled manpower
5. Experience
6. Sales and profit for last five years
7. Banker's report
8. Other clients
9. Supplier's suppliers
10. Product mix
11. Quality credentials:
    - Whether ISO certified company
    - Quality assurance system (testing facilities, inspection system, use of statistical tools and so on)
    - Level of outgoing quality
    - Process capability
12. Plant history

Notes

Plant Visit

Plant visit is to be organized to observe the further short listed suppliers. Usually, it is done by a cross-functional team on a pre-appointed date.

Caution Specific things to be observed during the plant visit must include the following:

- Modernity and efficiency of equipment and process
- Facility for production control, quality assurance and cost control system
- R&D capability
- Caliber of technical and managerial staff
- Inventory control policy for raw materials, parts and components
- Industrial relations
- Morale of personnel at all levels
- House keeping

Invariably during plant visit, the team should carry a pre-designed form to carry out plant observation. Form ensures that nothing is missed out. Data obtained at enquiry stages and plant visit are summarized and tabulated.

Analysis of Information

Steps involved in evaluating the suppliers are discussed below:

1. A set of key factors is chosen.
2. Weight is assigned to each factor.
3. A nominal scale (say 1-5) is chosen. Here 1 indicates lowest rating and 5 highest rating. Each supplier is rated under each factor using this scale.
4. Net rating of a supplier under a factor is the product of rating under a factor and weight assigned to the factor.
5. Sum total of net rating under each factor for a supplier gives the total rating. In a similar manner, the total net rating of other suppliers is calculated. The highest net rating denotes the best supplier.

Whether to Buy from Local or National Vendors?

Advantages of buying from local vendors include: greater responsiveness, high level of service, increased goodwill from local community, JIT System (Just in Time System). On buying from national vendors, buyers get superior technical service, low price due to economies of size, etc.

Number of Suppliers: Multi/Single

Nowadays, the trend is towards reduced number of supplier base, in some cases single supplier.

Notes

Notes In any case, buyer must maintain a list of qualified suppliers to avoid solo-source situation.

7.1.3 Negotiation and Selection Stage

Based on evaluation of suppliers and considering various other issues, a list of several acceptable suppliers is prepared. These suppliers are called to discuss contract conditions concerning quality, service and price. Trial order at competitive rates is given to selected suppliers.

Task Pick an organization of your preference and define technical and business requirements for the supplier selection.

7.1.4 Experience Stage

In this stage, a close watch is kept on the performance of suppliers in terms of quality, i.e., conformance to specification and on time delivery. Once trial orders are completed, supplier performance is evaluated choosing appropriate evaluation method. A feedback on the performance is given to each supplier. Suppliers who meet the buyer's need get registered and become eligible to receive future orders.

Self Assessment

Fill in the blanks:

1. Normally, ……...department maintains records of past and current suppliers.
2. ……. is an important element in the supply chain.
3. ……. is the most powerful and handy means to identify a potential source of supply.
4. The …….. is a formal way to request information from a supplier or vendor about a product or service a buyer is about to procure.
5. The highest net rating denotes the best …….

7.2 Vendor Rating

Vendor rating is the outcome of a formal vendor evaluation system. Vendors or suppliers are given standing, status, or title according to their attainment of some level of performance, such as delivery, lead time, quality, price, or some combination of variables. The motivation for the establishment of such a rating system is part of the effort of manufacturers and service firms to ensure that the desired characteristics of a purchased product or service is built in and not determined later by some after-the-fact indicator. The vendor rating may take the form of a hierarchical ranking from poor to excellent and whatever rankings the firm chooses to insert in between the two. For some firms, the vendor rating may come in the form of some sort of award system or as some variation of certification.

Notes

Did u know? Much of this attention to vender rating is a direct result of the widespread implementation of the just-in-time concept in the United States and its focus on the critical role of the buyer-supplier relationship.

Most firms want vendors that will produce all of the products and services defect-free and deliver them just in time (or as close to this ideal as reasonably possible). Some type of vehicle is needed to determine which supplying firms are capable of coming satisfactorily close to this and thus to be retained as current suppliers. One such vehicle is the vendor rating.

In order to accomplish the rating of vendors, some sort of review process must take place. The process begins with the identification of vendors who not only can supply the needed product or service but is a strategic match for the buying firm. Then important factors to be used as criteria for vendor evaluation are determined. These are usually variables that add value to the process through increased service or decreased cost. After determining which factors are critical, a method is devised that allows the vendor to be judged or rated on each individual factor.

It could be numeric rating or a Likert-scale ranking. The individual ratings can then be weighted according to importance, and pooled to arrive at an overall vendor rating. The process can be somewhat complex in that many factors can be complementary or conflicting. The process is further complicated by fact that some factors are quantitatively measured and others subjectively.

Once established, the rating system must be introduced to the supplying firm through some sort of formal education process. Once the buying firm is assured that the vendor understands what is expected and is able and willing to participate, the evaluation process can begin. The evaluation could be an ongoing process or it could occur within a predetermined time frame, such as quarterly. Of course the rating must be conveyed to the participating vendor with some firms actually publishing overall vendor standings. If problems are exposed, the vendor should formally present an action plan designed to overcome any problems that may have surfaced. Many buying firms require the vendor to show continuing improvement in predetermined critical areas.

Caselet

7 Tips for Rating and Evaluating Your Suppliers and Vendors

It makes no difference what business you are in, suppliers and vendors play a key role in your company's success. Having a formalized system in place to track and evaluate supplier and vendor performance is essential to the smooth operation and profitability of your company.

Successful companies embrace their suppliers and vendors, viewing them as partners in helping to grow the business. Making sure that this is a mutually beneficial partnership will impact the price you are negotiating today and the quality of service you get in future, says Dennis Wright, a management consultant from the SCORE Orange County office. If a supplier/vendor is a key part or service to your operation invite that supplier or vendor to strategic meetings that involve the product they work with.

A common mistake companies make is to have a combative relationship with their suppliers and vendors. 'That is the opposite of what you want to do,' says Drew Greenblatt, president

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of Baltimore-based Marlin Steel Wire Products, which makes custom stainless steel metal baskets, brackets and other parts. 'A lot of companies will actually have an adversarial relationship where they hire purchasing people who have on brass knuckles and try to beat up on vendors to get better prices or better terms.' That is a very shortsighted way to do business, according to Wright and Greenblatt.

Instead of getting stuck on price, focus on quality of service. A vendor can have the lowest price and the lowest quality of work, too. Your goal is understand what value-add is a given vendor bringing to your company. Your business should have a system in place for evaluating, selecting and then reevaluating the suppliers and vendors it works with.

Here are seven tips and tools you'll need to effectively rate your suppliers and vendors, track their performance, and ultimately increase your company's overall productivity.

1. Establish Performance Indicators
2. Classify Multiple Suppliers and Vendors
3. Devise an Evaluation Method
4. Determine Who's Calling the Shots
5. Maintain Good Relationships
6. Decide When to Issue a Red Flag
7. Cut Loose Weak Links

Source: http://www.inc.com/guides/2010/12/7-tips-to-rate-and-evaluate-your-suppliers-and-vendors_pagen_2.html

7.2.1 Vendor Rating Techniques

As per modern vendor-buyer partnership approach, several tools and techniques are being utilized by organizations to rate and evaluate performance of their vendors. The first move in executing any of the techniques being used in vendor rating some attributes need to be well thought-out. A firm should focus on the attributes that it finds most important. Some attributes are easy to evaluate while others are not. A rule of thumb is to consider the total costs associated with a purchased product/service, not exclusively the purchase price. Some of the metrics that can be considered are:

- Correct quantity
- On-time delivery
- Price/cost of product
- Willingness to participate in your firm's new product development and value analysis
- Willingness to share sensitive information
- Presence of certification or other documentation
- Quality level
- Service level
- Flexibility to respond to unexpected demand changes
- Communication skills/systems (phone, fax, e-mail, Internet)
- Use of Electronic Data Interchange (EDI)

Notes

- Willingness to change their products and services to meet your changing needs
- Quick response time in case of emergency, problem, or special request

Few models are capable of taking total costs into consideration total costs, but they are typically very tricky to implement and time taking. Hence, the resources that are accessible to the firm's purchasing department will drive the firm's model selection.

The three most common approaches are the *categorical system, weighted-point average system and the cost-based system*. The categorical system is the most subjective technique since it does not differentiate between the weights of the attributes considered. The weighted-point average system overcomes this drawback by assigning weights to each attribute. The cost-based system is the most objective of the three methods because it also considers non-performance costs.

7.2.2 Total Cost of Ownership Approach

The Total Cost of Ownership (TCO) approach is very similar to the cost ratio method. However, it is more comprehensive because it considers all the costs associated with quality, delivery and service. These costs include a number of non-value added activities such as service costs, receiving costs, quality costs (inspection, rework, reject costs), failure costs, and administrative costs including management time, maintenance, disposition and life-cycle costs. Lifecycle costs are costs incurred throughout the life of a product or service. These costs may include maintenance, downtime, repair, overhead, and idle time. In a study by Ellram, it was concluded that the price of a piece of production equipment for a firm's operations was only 35 percent of the total cost of that piece of equipment over its life cycle. Despite the high percentage of the non-value added costs, firms tend to either underestimate or completely ignore them.

TCO is a proactive and comprehensive system. Rather than focusing only on price, it examines issues outside of the supplier's cost structure. But using TCO presents the firm with new challenges. The method is complex to implement and maintain. Thus, it consumes a great deal of time.

7.2.3 Weighted Point Method

In the weighted-point method, the relevant attributes are chosen and each are assigned a weight depending on the importance to the overall performance. The firm reaches a consensus on weight assignments to prevent or minimize subjectivity. The weight for each performance category is then multiplied by the performance score that is assigned to it. Finally, these products are totaled to determine a final rating for each supplier.

Firms often use the weighted point system because it is highly reliable and its implementation costs are moderate. In addition, it combines qualitative and quantitative performance factors into a common system. Because users can change the weights assigned to each performance category, or change the performance categories themselves depending on the strategic priorities of the firm, the system is flexible. The weighted-point method overcomes the subjectivity of the categorical system, but it has some drawbacks. It requires the buyer to specify the value of one performance measure relative to another, which is often difficult in practice.

7.2.4 Cost-based System

Using the cost-based system, a buyer is able to quantify the additional costs incurred if a supplier fails to perform as expected. The total cost of doing business with the supplier can be calculated by the Supplier Performance Index (SPI). This index is calculated for each item or commodity provided by the supplier and has a base value of 1. It is represented by the following formula: SPI = (Purchase Price + Non-performance Cost) / (Purchase Price). As derived from the equation, the closer SPI is to 1, the better the supplier. Non-costs should include qualitative factors.

Notes

Benefits a buyer can achieve by using this approach include:

- The ability to source requirements based on total cost consideration
- A methodology to increase supplier accountability and control
- An equitable and consistent evaluation tool
- Definition of supplier performance expectation
- Communication of the firm's buying priorities to suppliers
- The ability to perform sourcing risk assessment
- Enhancement of internal communication for reporting critical supplier sourcing information
- The ability to provide positive supplier reinforcement
- A basis for a supplier award program

This system is the least subjective of the three because it quantifies the total cost of doing business by considering non-performance costs. The main difficulty in the use of the system is its complexity and its requirement that users have a developed cost accounting system. Although this sounds like an ideal way of dealing with costs, it is difficult to identify the costs of supplier non-performance.

Against their subjectivity and drawbacks, the categorical method, the weighted-point method and the cost-ratio method are the most widely used techniques in supplier evaluation due to their ease of use and implementation. Several other models and techniques have been proposed for supplier measurement and evaluation. These include: total cost of ownership approach, analytical hierarchy process (Barbarosoglu and Yazgac, 1997), weighted linear model approaches (Lamberson et al., 1976; Timmerman, 1986; Wind and Robinson, 1968), mixed integer programming (Weber and Current 1993) discreet choice analysis experiments (Verma and Pullman 1998), matrix method (Gregory 1986), human judgment models (Patton 1996), interpretive structural modeling (Mandal and Deshmukh 1994), statistical analysis (Mummalaneni et al. 1996), linear programming models (Pan 1989; Turner 1988), and neural networks (Siying et al. 1997), multi-objective programming (Weber and Ellram 1993). Of these methods, Total Cost of Ownership (TCO) method stands out as a commonly endorsed approach.

7.2.5 Categorical System

In this method, the buyer chooses attributes that are most important to its particular situation. The buyer assigns either a preferred (+), unsatisfactory (-), or neutral (O) rating for each of the selected attributes to every vendor. Then the ratings are totaled for each vendor.

Example: Ratings resulting in scores of two preferred (++), one unsatisfactory (-), and one neutral (O) would total one positive (+). A comparison of total scores reveals the highest rated vendor.

The representatives of the involved divisions agree upon the ratings.

Categorical supplier measurement is the easiest method to implement but suffers from subjectivity. It does not provide a detailed insight into the supplier's true performance because the attributes being measured are weighted equally. Also, because the representatives of the involved divisions assign the ratings, this method relies on an individual's perception about performance and not on quantitative data.

Notes

7.2.6 Frequency of Assessment

Supplier evaluation methods are usually time consuming, so they are not performed frequently. In practice, many firms report supplier performance on a monthly or quarterly basis. In fact, some firms evaluate suppliers only once a year. However, frequent meetings with suppliers facilitate the prevention of inefficient practices at an early stage and encourage continuous improvement of suppliers. These assessments, however, are mutually beneficial only if both parties are willing to cooperate and provide the necessary inputs.

7.2.7 How Measurements are Used

The information gained from supplier evaluation is valuable only when both buyer and supplier use it to improve their partnership. Supplier measurement systems are most commonly used for the following purposes: (1) Track performance of supplier; (2) identify supplier improvement opportunities; (3) develop supplier; (4) benchmark suppliers against best practices.

Self Assessment

Fill in the blanks:

6. Vendor rating is the outcome of a formal vendor ……. system.
7. The vendor rating may take the form of a …….. ranking from poor to excellent.
8. The …… system must be introduced to the supplying firm through some sort of formal education process.
9. The categorical system is the most …… technique.

7.3 Vendors Development

It has to do with creating or making new vendors land not referring out or the already established ones in the market). This is a continual and an important activity of the purchasing manager. Traditionally, one of the reasons for developing new vendors is to build more competition in the supply market (eliminating monopoly or oligopoly). The company can then buy a material from a number of sources. Another traditional reason for such multiple source buying (and therefore also for vendor development) is to spread the risk of non-availability or shortage of input materials over a number or suppliers. In case, one of the supplier's employees go on strike (or if there is an explosion or fire in the supplying company) the other suppliers can be relied upon to compensate for the shortage. Therefore, in traditional organizations, which most Indian organizations are spreading risk over a number of suppliers is the main motive behind vendor development.

However, international standards are premised on the thinking that single source buying provides some advantages which multiple source buying does not. One of the obvious advantages of single source buying is that of close rapport between the two companies and the loyalty established with the supplier. This goodwill might yield benefits in a number of ways in times of difficulties or crisis for the buying company. Also, the supplying company might *even* do some information gathering work for the buying company and therefore, keep it appraised of the recent market trends (what may be termed as "intelligence" information). Reliability, lack of uncertainty, quick and faithful response to the needs and, therefore, a general improvement in quality and reduction in inventory and purchase related costs are the long-term benefits for both organizations.

Notes

However, the present Indian situation is far away from such world class thinking. In the present socio-economic milieu prevailing in our country where trust and concern are found somewhat wanting, the Indian companies seem to find more advantages in multiple-source buying. But still the choice between single source and multiple source buying is quite situational. Vendor development can be seen as an attempt to get the advantages of both spreading risk, building competition and at the same time establishing a good rapport. Vendor development involves helping or building up the vendor by various means such as:

- Lending money for part of his capital equipment working capital requirement, etc.
- Lending technical help by making company engineers and technicians available to the vendor to help him tide over the initial technical problems.
- Help in R&D, by again lending technical help to not only to establish the company, but also to help improve its products and services on a continuous basis.
- Guaranteeing him a certain amount of business (This is particularly needed during initial stages of setting up the vendor)

Such efforts on the part of the buying company will produce a kind of goodwill and rapport between the two companies. Such a vendor will be willing to listen to the special problems of the buying company and, therefore will be an asset to the buying company.

Some of the vendor companies may be large and established companies who may not need financial, technical or R&D assistance. But such companies can still be cultivated in many other ways by collaborating with them in various projects of interest to them, jointly investing in a project to produce common raw material required by the supplying and the buying companies, etc.

Self Assessment

10. One of the reasons for developing new vendors is to build more …….. in the supply market.
11. The supplying company might even do some ……. gathering work for the buying company.
12. The choice between …….. source and …… source buying is quite situational.

7.4 Vendors Relationship

Another important objective in purchasing management is that or maintaining good relation, with vendor. A good vendor is an asset to the company; and, therefore, just at customer goodwill it is considered as important. A good relationship with the vendor should also be treated likewise. A vender who supplies the proper quality material in proper amounts in proper time is not very easy to find. Moreover, there are many situations where materials are required in a hurry. There are situations where materials are in shortage in the supply market. In all such situations, good relationships with the vendors pay dividends, this may entail: personal relationship as well as professional relationship:

(a) By helping the vendor in times of stress and strain with financial aid, technical aid, by providing management skills if necessary, and

(b) Maintaining a healthy professional relationship by fair negotiations, fair evaluations and fair compensation.

Notes

The modern management theory and world-class manufacturing call for a long-term, almost a lifetime, association with the vendor. This also means that there will be fewer vendors but these will be dedicated venders—almost as a part at the organisational family.

Until the present and even now, the Indian Industry has not given/is not giving much attention and importance to vendor relations. The emphasis, if any, has been on vendor selection and on monitoring the performance of the vendors through a vendor rating system. Vendor is an entity that is, generally, taken for granted. The attitude is: All said and done, the vendors for the company may change over a period of time. They may change to another business; some of them may not give the desired performance in quality, delivery and price, and therefore, one should always expect a drop-out rate in the vendors' list of the company. In any case, a continuous programme of developing vendors and of selecting new vendors, if and where necessary, should be in existence in any organisation.

Self Assessment

Fill in the blanks:

13. A good vendor is an …… to the company.
14. Good relationships with the vendors pay …….
15. The ……. for the company may change over a period of time.

Case Study

Turning Vendors into Partners

Sepaton, a data protection company based in Marlborough, Mass, was about to take off, and COO and CFO Bob Iacono needed a new headquarters. The new space had to be about three times larger than his current one, furnished, and move-in ready, with all of the special electrical and air-conditioning facilities that high-tech firms require. And he wanted his rent to remain more or less the same. Who would help him find it?

He began meeting with brokers from some large corporate real estate firms. But in meeting after meeting, Iacono came away feeling as if they were reading from a script, one in which his role—the scrappy little fellow thrilled that the big-shot real estate executives could remember his name—had been plotted out ahead of time. Every office they showed him was wrong. "I was looking for 20,000 square feet, and they were used to renting in 100,000-square-foot increments," Iacono says. After two months and eight brokers, Iacono began to wonder if he'd ever find what he was looking for.

Then, his banker and lawyer recommended him to talk to an outfit called T3 Realty Advisors. Iacono had never heard of T3. But he liked what he saw. For one thing, T3 worked only as a buyer's broker—so it had no built-in incentives to fill its own buildings and no need to scratch the back of financing and construction partners. What's more, it sent at least two brokers to meetings, ensuring that more than one person was on the case.

Assigning multiple brokers to each client is part of self-defense, says Roy Hirshland, T3's CEO and cofounder. "Early-stage clients tend to be very frenetic and require a ton of handholding," he says. Having more than one person assigned to each account means more hands to do the holding. Entrepreneurs also need more support than larger companies because they often have no one working on facilities management and may not even have an office manager.

Contd...

Notes

In fact, Hirshland created T3 to function like a real estate department for technology start-ups. It handles interior and exterior architectural issues, finds and manages contractors, advises on lease negotiations, and even manages the leases for clients—it purchased a document-management system specifically for that purpose. "If we can't make the smallest three-person company happy about T3, we've failed," Hirshland says. The logic, he adds, is simple: Successful small companies don't stay small for long.

In Sepaton's case, T3's brokers found six spaces that met Iacono's criteria. He picked the top two and told Hirshland to get a deal done. Days later, Sepaton signed a three-year lease on a new 21,000-square-foot home. Hirshland also managed to get some new office furniture thrown in free of charge. Following the frustration of dealing with the large corporate brokers, Iacono found the experience satisfying—as well as comfortably familiar. "It was the kind of service we hope we give our customers," he says.

Questions

1. What was the most satisfying thing that Iacono found about T3?
2. Critically analyze the case and do a SWOT analysis of the case.

Source: http://www.inc.com/magazine/20050801/vendors.html

7.5 Summary

- Supplier selection has become one of the most important tasks of purchase in modern times.
- The process of selection of supplier can be grouped in four stages including: the survey stage, the enquiry stage, negotiation and selection stage and experience stage.
- A preliminary enquiry called a Request for Information (RFI) is sent to all short listed suppliers from the previous stage, to seek information. The RFI can be used as a screening device to further prune the list of potential suppliers.
- Suppliers who meet the buyer's need get registered and become eligible to receive future orders.
- The vendor rating may take the form of a hierarchical ranking from poor to excellent and whatever rankings the firm chooses to insert in between the two.
- Most firms want vendors that will produce all of the products and services defect-free and deliver them just in time.
- Once established, the rating system must be introduced to the supplying firm through some sort of formal education process.
- The first move in executing any of the techniques being used in vendor rating some attributes need to be well thought-out. A firm should focus on the attributes that it finds most important.
- The three most common approaches are the categorical system, weighted-point average system and the cost-based system.
- International standards are premised on the thinking that single source buying provides some advantages which multiple source buying does not.
- Vendor development can be seen as an attempt to get the advantages of both spreading risk, building competition and at the same time establishing a good rapport.

Notes

- A good vendor is an asset to the company; and, therefore, just at customer goodwill it is considered as important.
- A vender who supplies the proper quality material in proper amounts in proper time is not very easy to find.
- Until the present and even now, the Indian Industry has not given/is not giving much attention and importance to vendor relations. The emphasis, if any, has been on vendor selection and on monitoring the performance of the vendors through a vendor rating system.

7.6 Keywords

Vendor: A person or company whose principal product lines are office supplies and equipment.

Competitive Edge: It is the ability of an organization to produce goods and services more effectively than competitors do, thereby outperforming them.

Request for Information (RFI): The RFI is a formal way to request information from a supplier or vendor about a product or service a buyer is about to procure.

Just-in-Time (JIT) System: It is an inventory strategy companies employ to increase efficiency and decrease waste by receiving goods only as they are needed in the production process, thereby reducing inventory costs.

Vendor Rating: It is a method of measuring and evaluating the performance of suppliers.

Lifecycle Costs: Lifecycle costs are costs incurred throughout the life of a product or service.

Electronic Data Interchange (EDI): Electronic data interchange is a method for transferring data between different computer systems or computer networks.

Attributes: A quality or feature regarded as a characteristic or inherent part of someone or something.

7.7 Review Questions

1. How can a supplier provide competitive edge to the company?
2. What are the stages involved in the process of suppliers' selection?
3. What do you mean by RFI?
4. Discuss the contents of RFI.
5. Who are the eligible suppliers?
6. What is vendor rating? Discuss the review process for rating of vendors in short.
7. What are the attributes that need to be considered while rating vendors?
8. Briefly discuss categorical system.
9. Write a short note in lifecycle costs.
10. What is weighted point method of vendor rating?
11. What are the benefits of a buyer under cost-based system?
12. Why do companies build new vendors?

Notes

Answers: Self Assessment

1. Purchase
2. Supplier
3. Internet
4. RFI
5. Supplier
6. Evaluation
7. Hierarchical
8. Rating
9. Subjective
10. Competition
11. Information
12. Single, multiple
13. Asset
14. Dividends
15. Vendors

7.8 Further Readings

Books

Ramakrishnan. R V, Tony Arnold. J R (2007). "*Introduction to Materials Management*". Pearson

K. Shridhar Bhat, "*Production and Materials Management*". Himalaya Publishing House

Chary. S.N., "*Production and Operations Management*". Tata McGraw Hill

Gopalkrishanan. P, Sundaresan. M, "*Materials Management: An Integrated Approach*". PHI Learning Pvt. Ltd.

Online links

http://www.enotes.com/vendor-rating-reference/vendor-rating

http://scm.ncsu.edu/scm-articles/article/performance-measurements-and-metrics-an-analysis-of-supplier-evaluation

http://www.inc.com/resources/retail/articles/200608/hurlbut.html

http://www.purchasing-procurement-center.com/selecting-a-vendor.html

Notes

Unit 8: Inventory Management

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Introduction

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Objectives

After studying this unit, you will be able to:

- Explain the Different Inventory Costs
- Discuss Inventory Models and EOQ
- Explain Safety Stock and Its Optimum Level

Introduction

Previous unit dealt with the concept of suppliers' selection in materials management. It also covered the topics of vendor rating techniques and vendors' relationship. In this unit, you will study about inventory management, EOQ, buffer stocks, safety stocks and its optimum level.

Inventory is the major source of cost in the supply chain and also the basis for improving customer service and enhancing customer satisfaction.

Example: High inventory at retail outlets may help in making the goods easily available to customers and also result in a growth in sales, but it will also increase costs and bring down profitability. These are two major issues in conflict with each other that need to be resolved, in order to optimize the inventory carried by the organization.

Notes

Excess inventory is a cost burden to industry in terms of capital tied up, the cost of obsolescence and the cost of servicing product in the supply chain. However, having the right amount of inventory to meet customer requirements is critical. Inventory management is about two things: not running out, and not having too much.

8.1 Different Costs of Inventory

The heart of inventory decisions lies in the identification of inventory costs and optimizing the costs relative to the operations of the organization. Therefore, an analysis of inventory is useful to determine the level of stocks. The resultant stock keeping decision specifies:

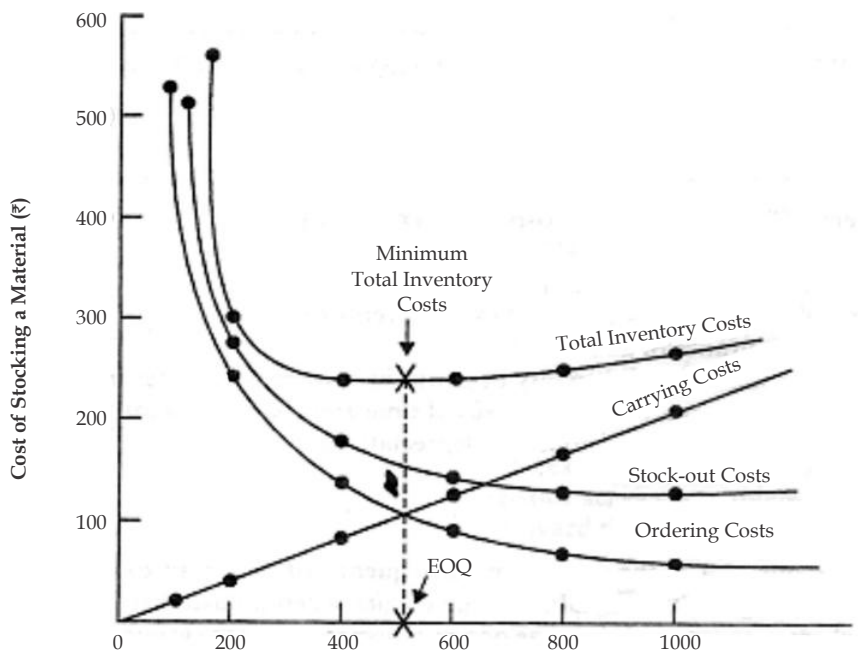
- When items should be ordered.
- How large the order should be.
- "When" and "how many to deliver."

Notes It must be remembered that inventory is costly and large amounts are generally undesirable. Inventory can have a significant impact on both a company's productivity and its delivery time.

Large holdings of inventory also cause long cycle times which may not be desirable as well. What are the costs identified with inventory?

The costs generally associated with inventories are shown in Figure 8.1. The different components of cost are discussed below:

Figure 8.1: Total Inventory Costs



Source: Uddin. Jahir (2010). *"Materials Management"*. Excel Books Pvt. Ltd.

Notes

8.1.1 Holding (or Carrying) Costs

It costs money to hold inventory. Such costs are called inventory holding costs or carrying costs. This broad category includes the costs for storage facilities, handling, insurance, pilferage, breakage, obsolescence, depreciation, taxes, and the opportunity cost of capital. Obviously, high holding costs tend to favour low inventory levels and frequent replenishment.

There is a differentiation between fixed and variable costs of holding inventory. Some of the costs will not change by increase or decrease in inventory levels, while some costs are dependent on the levels of inventory held. The general break down for inventory holding costs has been shown in Table 8.1.

Table 8.1: Fixed and Variable Holding Costs

Fixed Costs	Variable Cost
Capital costs of warehouse or store	Cost of capital in inventory
Cost of operating the warehouse or store	Insurance on inventory value
Personnel costs	Losses due to obsolescence, theft, spoilage
	Cost of renting warehouse or storage space

Source: Uddin. Jahir (2010). *"Materials Management"*. Excel Books Pvt. Ltd.

8.1.2 Cost of Ordering

Although it costs money to hold inventory, it also costs, unfortunately, to replenish inventory. These costs are called inventory ordering costs. Ordering costs have two components:

- One component that is relatively fixed
- Another component that will vary

It is good to be able to clearly differentiate between those ordering costs that do not change much and those that are incurred each time an order is placed. The general breakdown between fixed and variable ordering costs is a follows:

Table 8.2: Fixed and Variable Ordering Costs

Fixed Costs	Variable Costs
Staffing costs (payroll, benefits, etc.)	Shipping costs
Fixed costs on IT systems	Cost of placing and order (phone, postage, order forms)
Office rental and equipment costs	Running costs of IT systems
Fixed costs of vendor development	Receiving and inspection costs
	Variable costs of vendor development

Source: Uddin. Jahir (2010). *"Materials Management"*. Excel Books Pvt. Ltd.

One major component of cost associated with inventory is the cost of replenishing it. If a part or raw material is ordered from outside suppliers, and places orders for a given part with its supplier three times per year instead of six times per year, the costs to the organization that would change are the variable costs, and which would probably not are the fixed costs.

There are costs incurred in maintaining and updating the information system, developing vendors, evaluating capabilities of vendors. Ordering costs also include all the details, such as

Notes

counting items and calculating order quantities. The costs associated with maintaining the system needed to track orders are also included in ordering costs. This includes phone calls, typing, postage, and so on.

Though vendor development is an ongoing process, it is also a very expensive process. With a good vendor base, it is possible to enter into longer-term relationships to supply needs for perhaps the entire year. This changes the "when" to "how many to order" and brings about a reduction both in the complexity and costs of ordering.

8.1.3 Setup (or Production Change) Costs

In the case of subassemblies, or finished products that may be produced in-house, ordering cost is actually represented by the costs associated with changing over equipment from producing one item to producing another. This is usually referred to as setup costs.

Set-up costs reflect the costs involved in obtaining the necessary materials, arranging specific equipment setups, filling out the required papers, appropriately charging time and materials, and moving out the previous stock of materials, in making each different product. If there were no costs or loss of time associated in changing form one product to another, many small lots would be produced, permitting reduction in inventory levels and the resultant savings in costs.

8.1.4 Shortage or Stock-out Costs

The costs that are incurred as result of running out of stock are known as stock out or shortage costs. As a result of shortages, production as well as capacity can be lost, sales of goods may be lost, and finally customers can be lost.

Caution When the stock of an item is depleted, an order for that item must either wait until the stock is replenished or be canceled. There is a trade-off between carrying stock to satisfy demand and the costs resulting from stock out.

In manufacturing, inventory requirements are primarily derived from dependent demand, however, in retailing the requirements are basically dependent on independent demand. Inventory systems are predicated on whether demand is derived from an end item or is related to the item itself. Because independent demand is uncertain extra inventory needs to be carried to reduce the risk of stocking out. To determine the quantities of independent item that must be produced, firms usually use a variety of techniques, including customer surveys, and forecasting. However, a balance is sometimes difficult to obtain, because it may not be possible to estimate lost profits, the effects of lost customers, or lateness penalties.

If the unfulfilled demand for the items can be satisfied at a later date (back order case), in this case cost of back orders are assumed to vary directly with the shortage quantity (in rupee value) and the cost involved in the additional time required to fulfill the backorder (₹/ year). However, if the unfulfilled demand is lost, the cost of shortages is assumed to vary directly with the shortage quantity (₹/unit shortage). Frequently, the assumed shortage cost is little more than a guess, although it is usually possible to specify a range of such costs.

Task Prepare a presentation on the different inventory costs and their similarities and differences.

Notes

Caselet

4 Keys to Inventory Management

Look at the capital sitting on your lot and showroom floor and you'll quickly see that your pre-owned and new-vehicle inventory are your dealership's most valuable assets. So, is your dealership's process for converting these assets into profit extracting the maximum value from every vehicle? If not, there's a four-part inventory strategy that can help jump start growth and ensure your store's inventory is working for the dealership in the form of more deals, more profit, and less waste.

If your dealership is buying and selling on gut instinct, or you don't have a handle on which models turn in 20 days versus which sit for 90, or perhaps your trade-in strategy is to get the customer in a new vehicle instead of considering where you can move his or her old vehicle, you're throwing money away every day.

To be successful in today's market, dealers need to have concrete inventory strategies and processes in place. This means doing much more than just stocking the correct quantity of vehicles. Managing your inventory for profitability consists of four interlocking pieces that make up a comprehensive inventory strategy: inventory analysis, proactive strategy, inventory sourcing, and inventory management systems. Let's take a closer look at each piece of your inventory strategy.

1. ***Inventory Analysis:*** Inventory analysis consists of assessing every vehicle on your lot, including those vehicles you are accepting in trade and those you have planned for disposal. With thorough analysis, you can identify and maintain the right mix of core and non-core inventory. A dealership can also determine the optimal turn cycle to prevent inventory remaining too long on your lot and costing you money, as well as determine the optimal time to buy and sell inventory. It can also help establish pricing parameters that work for your dealership's market.

2. ***Proactive Strategy:*** Once you have a handle on your inventory, you need to create a proactive strategy for actively managing, marketing, buying and selling your vehicles. Your proactive strategy should include plans for buying and selling vehicles that take into account gross profit, Return on Investment (ROI), days to turn, average cost of sale and seasonality. Your strategy should also include best practices for evaluating and appraising trades realistically, establishing a concrete aging plan, and setting a pricing structure that fits your market and region.

3. ***Inventory Sourcing:*** How you source your vehicles is an integral part of inventory management. Your sourcing strategy includes how the dealership determines how often wholesale vehicles are purchased and how trade-in decisions are made. When assessing a trade, many dealerships look at the condition of the vehicle and forget to evaluate the need for the vehicle. A sound remarketing strategy takes into account a particular model's past sales performance and aging history, as well as the current market demand and residual value.

4. ***Inventory Management Systems:*** Inventory management systems were created to help dealerships implement, maintain, and fine-tune their inventory plans. Dealers who use inventory management systems realize quicker vehicle turns and a higher ROI than dealers that don't. Choosing the right system can make a significant contribution to your inventory management efforts.

Source: http://www.fi-magazine.com/Channel/Certification-Training/Article/Story/2009/05/4-Keys-to-Inventory-Management.aspx

Notes

Self Assessment

Fill in the blanks:

1. An analysis of inventory is useful to determine the level of…… .
2. Inventory can have a significant impact on both a company's …….. and its delivery time.
3. …… costs is the cost to hold inventory.
4. One major component of cost associated with inventory is the cost of …… it.
5. The costs that are incurred as result of running out of stock are known as …… costs.
6. There is a trade-off between carrying stock to satisfy …… and the costs resulting from stock out.

8.2 Inventory Models

The primary function of inventory management is to determine:

1. When to order?
2. How much to order?

When to Order?

This problem of inventory control deals with the point of time when the order for fresh inventory is to be given. The problem of 'when to order' is solved by fixing the appropriate re-order level of each type of inventory. It is determined by compromising the cost of maintaining these stocks and the disservice to the customer if this order is not delivered in time.

Re-order Level

'When to order' is an important query which requires a suitable answer.

Buying and issuing the inventories are the foremost tasks of all types of organizations. When the inventories fall below a particular level as decided in advance, they are refilled with fresh procurement. But what should be the quantity of fresh stock is always an important question which requires a suitable answer. In short, the re-order level is the level of inventory at which the order for additional stock should be placed.

Re-order level = Average usage × Lead time

i.e. R	=	Au*L
Re-order Point example		
Demand	=	10000 units/year
Store open	=	320 days/year
Average usage (Au)	=	10000/320 = 33.33 units/day
Lead time (L)	=	10 days
R = Au L = (33.33) × 10	=	333.33 units

Notes

How Much to Order?

After solving the problem of 'when to order' the next immediate issue is 'how much to order'. Considering overbuying can lead to unproductive use of working capital and under-buying leads to unwanted emergency orders and ultimately increases the workload of the purchase department, the issue of 'how much to order' is of vital significance.

Hence, a balance is achieved by selecting the right quantity for each order. This quantity in short is known as Economic Order Quantity (EOQ).

8.2.1 Economic Order Quantity

EOQ is an important technique of inventory management. The EOQ refers to the optimal order size that will result in the lowest total of order and carrying cost for an item of inventory given its expected usage, carrying cost and ordering cost. By calculating an economic order quantity, the firm attempts to determine the order size that will minimize the total inventory cost.

EOQ is simple to understand and use but it has several restrictive assumptions, which are also disadvantages in practice. Even with this weakness, EOQ is a good point to start understanding inventory systems. EOQ assumes:

1. Demand rate is constant, uniform, recurring, and known
2. Lead time is constant and known in advance
3. Price per unit of product is constant; no discounts are given for large orders
4. Inventory holding cost is based on average inventory
5. Ordering or setup costs are constant
6. All demands will be satisfied; no stock outs are allowed

D = Annual demand

C_i = Ordering cost per order

P = Unit price

C_c = Carrying cost per order

$$EOQ = \sqrt{2 \times D \times C_c / P \times C_i}$$

A Basic EOQ Example

A grocery store sells 10 cases of coffee each week. Each case costs ₹ 80. The cost of placing an order is ₹ 10. Holding or carrying cost is estimated to be 30% of the inventory.

D = 520 case/year

C_c = ₹ 10 per order

C_i = 30%

P = ₹ 80 per case

$$Q = \sqrt{2 \times D \times C_c / P \times C_i}$$

Notes

$$Q = \sqrt{2 \times 520 \times 10 / 80 \times 0.3}$$

$$= 20.8 \text{ or } 21 \text{ cases per order}$$

How often is the coffee ordered?

520/21 = 25 orders per year or every 15 days (365/25 = 15)

8.2.2 EOQ Model with Purchase Discount

Because the per-unit price of the items purchased changes as the quantity changes, the purchase price must be included in the calculation of total annual inventory management cost. As the purchase price changes, the inventory-holding cost also may change since the investment in inventory is different. Because each discount category may represent a different inventory holding cost, we must calculate the EOQ for each discount category.

Steps for calculating EOQ with purchase discount are:

Step 1: Calculate the EOQ using the lowest price. If this EOQ is feasible, this is the best order quantity, so stop.

Step 2: Solve the EOQ for the next higher price. If this EOQ is feasible, go to Step 4.

Step 3: If the EOQ found in Step 2. is not feasible, repeat Step 2. for the next higher price until a feasible EOQ is found.

Step 4: Calculate the total annual inventory management cost for the (first) feasible EOQ (found in Step 2.) and for the minimum quantity in all discount categories that are larger than the feasible EOQ.

Select the order quantity with the lowest total annual inventory management cost.

Self Assessment

Fill in the blanks:

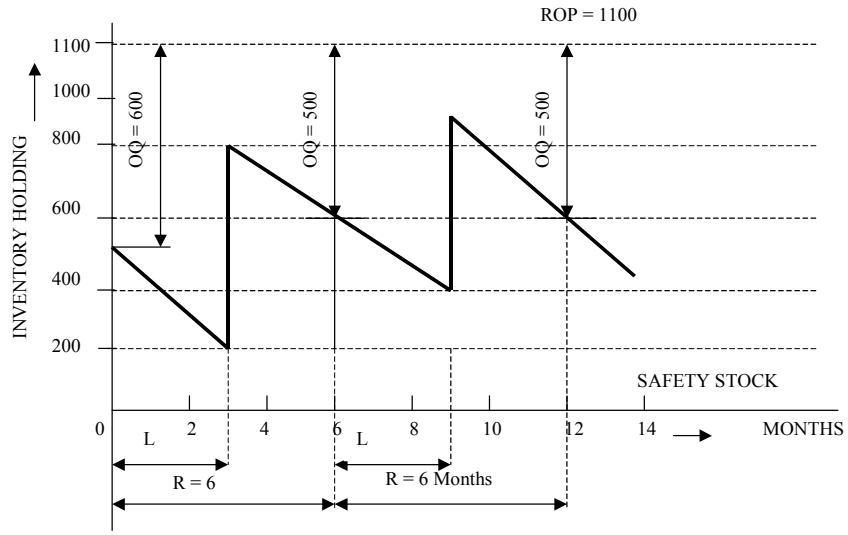
7. The problem of 'when to order' is solved by fixing the appropriate …… level of each type of inventory.
8. Re-order level is equal to average usage times the …… .
9. The re-order level is the level of inventory at which the order for …….. stock should be placed.
10. ……. is an important technique of inventory management.
11. The …… refers to the optimal order size that will result in the lowest total of order and carrying cost for an item of inventory given its expected usage, carrying cost and ordering cost.

8.3 Fixed Order Period Model

Fixed order period model is also known as P-system. In P-System, order period is fixed but Order quantity varies and is equal to replenishment level minus the inventory on hand and on order. Replenishment level is equal to the average demand over Lead time and review period plus safety stock.

Notes

Figure 8.2: P-System – Fixed Order Period System (Review Period = 6 months)



Source: Uddin. Jahir (2010). *"Materials Management"*. Excel Books Pvt. Ltd.

P-System. In Figure 8.2, the Replenishment level is equal to 1100, the review period is 6 months and the Lead time is 3 months. The starting Inventory is 500. Hence, an order of size of 600 (1100 – 500) is placed. As consumption goes on, Inventory level depletes. After 3 months, the Order quantity arrives, raising the Inventory levels to 800. The next review period comes in the sixth month. At this point, the Inventory on hand and on order is equal to 600. Hence, next order of size equal to 500 (1100 – 600) is placed and the process continues.

The differences between Q-System and P-System are shown in Table 8.3.

Table 8.3: Differences between Q-System and P-System

Factors	Q-System	P-System
Order quantity	Constant	Variable
When to place order	When inventory becomes equal to reorder level	When review period comes
Record keeping	Each time a withdrawal/ addition is made	Carried out only at review period
Size of inventory	Less than P-System	
Effort/Time to maintain	More than P-System due to continuous monitoring	
Types of items covered under the system	High priced, critical and important items	Items not considered in Q-System

Source: Uddin. Jahir (2010). *"Materials Management"*. Excel Books Pvt. Ltd.

Self Assessment

Fill in the blanks:

12. Fixed order period model is also known as…… .

Notes

13. ……. level is equal to the average demand over Lead time and review period plus safety stock.

8.4 Safety Stock/ Buffer Stock

Safety stock is the amount of inventory carried in addition to the average demand to take care of fluctuations in demand. In other words, it can be defined as the amount of inventory carried in addition to the expected demand. In a normal distribution, this would be the mean.

Example: If our average monthly demand is 100 units and we expect next month to be the same, if we carry 120 units, then we have 20 units of safety stock.

Four criteria to determine safety stock suggested by Silver et al. are summarized below:

- Safety stock established through the use of a simple minded approach, "supplies for a fixed time period and equal safety factor for all items".
- Safety stock based on minimization of cost (cost per unit short, cost per stock out, etc.).
- Safety stock based on customer service (specified probability of no stock out per replenishment cycle, specified fraction of demand to be met, etc.).
- Safety stock based on aggregate consideration "allocation of total safety stocks for items to minimize the expected total cost of stock out per year, etc.".

Did u know? Regarding calculation of safety stock, we have two approaches – approximate method and optimal method. Approximate method independently calculates the safety stock. It is less involved computationally and offers a near optimal solution. Optimal method is computationally more complex and faced with the problem of data availability.

8.4.1 Optimum Level of Safety Stock

Optimal safety stock is the quantity of safety stock that is expected to minimize the total of the relevant costs (or the total of stock out cost and safety stock carrying cost).

The following formulae are used for these items:

1. Stock out cost= Risk % x Maximum No. of Stock outs x Stock out cost per occurrence
2. Safety stock carrying cost= Safety stock x Carrying cost per unit

Self Assessment

Fill in the blanks:

14. …… is the amount of Inventory carried in addition to the average demand to take care of fluctuations in demand.
15. Optimal safety stock is the quantity of safety stock that is expected to …….. the total of the relevant costs.

Notes

Case Study

Apple Inc – Setting New Inventory Management Standards

Apple Inc, one of the most innovative companies in the world not only sells some of the most popular Gadgets of the century but also manages its inventory well. The company worked on new inventory management strategies which became a benchmark in the electronic industry.

The benchmarks not only minimized inventory costs but also at the same time helped it smoothly sail through the big ticket product launches without giving scope to its competitors, to catch up. The case not only covers the inventory management techniques at Apple but also provide the basis for calculating the internal fund requirement of the company based on the projection on sales.

In 1983, Apple introduced the first commercial computer Lisa. Lisa was incorporated with graphical user interface (GUI), and Windows operating system that allowed several programs to run simultaneously. Lisa was priced at $9,995 and was a commercial failure due to its high price and limited software capabilities. In 1983, John Sculley (Sculley) became CEO of Apple. Sculley had previously been the CEO of Pepsi.

In 1984, Apple launched Macintosh (Mac), which also incorporated GUI and ran of Mac OS (Mac Operating system). It was priced $2,495. At that point of time, Apple estimated that it would sell 80,000 units. However, the company could not achieve its target and sold only 20,000 units.

Due to over production of computers and actual sales being less than the estimated sales, the company piled up large inventory which led to loss of 17% of the net income to the company. In the meeting of April 10 and 11, 1985, Sculley asked Jobs to step down from the position of vice president and general manager of the Macintosh department. In September 1985, Jobs resigned from Apple with some of the employees and started Next.

In 1993, Apple introduced the Newton, a Personal Digital Assistant (PDA), into the market. Newton was a commercial failure. After the Newton's failure, Apple lost market share and its technological edge in its businesses. In mid-1993, Mike Spindler (Spindler) who was the Chief operating Officer (COO) of the company was appointed as CEO and Sculley who was then CEO was promoted to the Chairman. But after 5 months, Sculley resigned from the post.

The period 1993 to 1996 was tough for Apple. Spindler also could not do much. In January 1996, Apple reported a loss of $69 million due to the price war in Japan and mismanagement of inventory. Apple cut prices in an attempt to clear out the bloated inventories of low-end Macs. In February 1996, Gil Amelio (Amelio) became CEO of Apple. Amelio planned to streamline Apple's product line and increase the cash reserves. He wanted Apple to cater to the higher margin segments like servers and Internet access devices. In 1996, Amelio requested Jobs to function as an informal advisor. In 1997, Apple purchased Next for $400 million.

Inventory Management from 1995 to 1997

During 1995 to 1997, the company's revenue growth was declining and in the same line the net profit also declined from $424 million to ($1,045) million from the financial year 1995

Contd...

Notes

to 1997. However, every product or raw material was stocked in a warehouse. The company accumulated inventories of $1,775 million in the financial year 1995.

Inventory Management from 1998 to 2011

In 1998, Timothy D. Cook (Cook) joined Apple. He was in charge of Apple's worldwide operations. Jobs and Cook focused on reducing the inventories of the company. They applied the strategy "slash inventory, shut warehouses, run manufacturing close to the bone. This helped Apple get back on to the path of profit and set a new bar for the electronic industry like competitors like Dell." They closed down factories and warehouses all over the world. They established relationships with contract manufacturers. They were successful and the company generated a net profit of $309 million during the financial year 1998.

Road Ahead

Cook developed a good ecosystem for the company's business. He had gained good experience in operational and inventory management. Under his leadership, Apple developed an entire ecosystem of suppliers, who supported its business operations. The company set itself the goal of obtaining stellar products and services within limited timeframes, at a cost that represented "the best possible value" to both customers and shareholders.

Questions

1. What are the strategies implemented by the Apple Inc to manage its inventory effectively.
2. Critically analyze Apple's strategy of working capital management.

Source: http://www.icmrindia.org/casestudies/catalogue/Finance/FINC079.htm

8.5 Summary

- The heart of inventory decisions lies in the identification of inventory costs and optimizing the costs relative to the operations of the organization. Therefore, an analysis of inventory is useful to determine the level of stocks.
- Carrying costs includes the costs for storage facilities, handling, insurance, pilferage, breakage, obsolescence, depreciation, taxes, and the opportunity cost of capital.
- In the case of subassemblies, or finished products that may be produced in-house, ordering cost is actually represented by the costs associated with changing over equipment from producing one item to producing another. This is usually referred to as setup costs.
- The costs that are incurred as result of running out of stock are known as stock out or shortage costs.
- The problem of 'when to order' is solved by fixing the appropriate re-order level of each type of inventory. It is determined by compromising the cost of maintaining these stocks and the disservice to the customer if this order is not delivered in time.
- A balance between when to order and how much to order is achieved by selecting the right quantity for each order. This quantity in short is known as Economic Order Quantity (EOQ).
- The EOQ refers to the optimal order size that will result in the lowest total of order and carrying cost for an item of inventory given its expected usage, carrying cost and ordering cost.

Notes

- As the purchase price changes, the inventory-holding cost also may change since the investment in inventory is different. Because each discount category may represent a different inventory holding cost, EOQ must be calculated for each discount category.
- Fixed order period model is also known as P-system. In P-System, order period is fixed but Order quantity varies and is equal to replenishment level minus the inventory on hand and on order.
- Safety stock is the amount of inventory carried in addition to the average demand to take care of fluctuations in demand.
- Optimal safety stock is the quantity of safety stock that is expected to minimize the total of the relevant costs (or the total of stock out cost and safety stock carrying cost).

8.6 Keywords

EOQ: EOQ is an inventory model that determines order quantity that meet customer service levels while minimizing total holding costs.

Fixed Cost: Fixed Costs are expenses that don't change based on production or sales volumes. They include salaries, rent, insurance, etc.

Inventory Cost: Cost recorded upon purchase of inventory is known as inventory cost; includes invoice price less cash discounts plus freight and transportation and applicable insurance, taxes and tariffs.

Inventory Holding Costs: Inventory holding cost is the cost associated with acquiring and retaining inventory including cost of storage space, lost, stolen, or damaged merchandise, insurance, personnel and management costs, and interest.

Inventory Management: Inventory management is the process of ensuring the availability of products through inventory administration.

Inventory Model: The evaluation of alternative inventory design characteristics or inventory parameters using analytical or simulation processes to assist management decisions is known as inventory model.

Inventory Ordering Costs: Inventory ordering costs are those costs associated with the acquisition of inventory, such as clerical costs and transportation costs.

Overbuying: Overbuying refers to buy excessively, especially to buy more than one needs or can afford.

Replenishment Level: When the number of units drops below this specified amount, the inventory level is refilled. That is known as replenishment level.

Safety Stock: The inventory a company holds above normal needs as a buffer against delays in receipt of supply or changes in customer demand is known as safety stock.

Set-up Costs: Setup cost is the cost incurred to get equipment ready to process a different batch of goods.

Shortage Costs: Shortage costs are the costs that fall with increases in the level of investment in current assets.

Variable Costs: Costs that vary directly with the level of activity within a short time are referred to as variable costs. Examples include costs of moving cargo inland on trains or trucks, stevedoring in some ports, and short-term equipment leases.

Notes

Vendor Development: Vendor Development can be defined as any activity that a buying firm undertakes to improve a supplier's performance and capabilities to meet the buying firms' supply needs.

8.7 Review Questions

1. Define inventory.
2. Mention the different types of inventory costs. Explain them with a diagram.
3. Write a short note on stock out costs.
4. What are the primary functions of inventory management?
5. What is re-order level?
6. Explain EOQ.
7. Briefly describe EOQ Model with Purchase Discount.
8. What are the Steps for calculating EOQ with purchase discount?
9. Explain Fixed order period model with the help of a diagram.
10. What is safety stock and optimum level of safety stock?

Answers: Self Assessment

1.	Stocks	2.	Productivity
3.	Holding	4.	Replenishing
5.	Shortage	6.	Demand
7.	Re-order	8.	Lead Time
9.	Additional	10.	EOQ
11.	Economic Order Quantity	12.	P-system
13.	Replenishment	14.	Safety Stock
15.	Minimize		

8.8 Further Readings

Books

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K. Shridhar Bhat, "*Production and Materials Management*". Himalaya Publishing House

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Notes

Online links

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http://www.slideshare.net/ShashankV7/economic-order-quantity-models

http://genestarwind2004.tripod.com/id3.html

http://www.inventoryops.com/safety_stock.htm

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Unit 9: Inventory Control

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Objectives

After studying this unit, you will be able to:

- Define Inventory Control
- Discuss Its Elements
- Explain the Process for Inventory Control
- Discuss the Different Inventory Classifications
- Elaborate on Logistics Management

Introduction

Previous unit dealt with the concept of inventory management, the different costs of inventory and economic order quantity. It also discussed the various inventory models and safety stock. In this unit you will study about inventory control, the various elements of an effective inventory control and its advantages. This unit will also discuss the various analysis systems and give you an insight to the logistics management.

Inventory control is a set of policies and operating procedures that are designed to maximize a company's use of inventory, so that it generates the maximum profit from the least amount of inventory investment without intruding upon customer satisfaction levels.

Notes

9.1 Elements of Effective Inventory Control

As a business grows, a software inventory control system becomes necessary for easier retrieval of information, integrated sales and purchase order processing, and real-time inventory valuation. The various elements of an effective inventory control system are:

1. ***Management*:** Inventory management involves making decisions on the appropriate level of inventory to keep on hand. Too much inventory can increase storage costs and the chances of spoilage. However, not having enough inventory might mean losing customers to competitors. Manufacturing companies often use just-in-time inventory control where items are ordered only as needed. Businesses use inventory classification, reordering and minimum levels to manage inventory. Classification groups items according to annual sales volume with a priority on controlling the inventory levels of high-sales-volume items. Reordering is done by factoring in the demand and the lead time required to get the order filled.

Notes Businesses must maintain a minimum inventory level as a buffer to prevent shortages.

2. ***Security*:** Security involves alarm systems for securing warehouses and real-time tracking of inventory items. Radio frequency identification tags, or RFIDs, can be used to track and protect valuable inventory. RFID tags use radio waves to communicate between embedded radio frequency transmitter microchips and reading devices that track tagged items and raise alarms when security has been breached.

Did u know? RFID stands for Radio-Frequency Identification. The acronym refers to small electronic devices that consist of a small chip and an antenna. The chip typically is capable of carrying 2,000 bytes of data or less.

3. ***Quality*:** Inventory quality control involves tracking batches as well as individual items so that if something goes wrong managers can trace the defect all the way to the source.

Example: A defective part or an assembly line failure.

Caution The inventory should be checked periodically for faults, especially for perishable items, because one rotting item can damage others in the batch.

Climate-controlled storage systems and automated tracking can also help with inventory quality control.

Self Assessment

Fill in the blanks:

1. ……. management involves making decisions on the appropriate level of inventory to keep on hand.
2. Manufacturing companies often use ……. inventory control where items are ordered only as needed.

Notes

3. …… is done by factoring in the demand and the lead time required to get the order filled.
4. Security involves alarm systems for securing ……. and real-time tracking of inventory items.
5. Climate-controlled storage systems and automated ……. can help with inventory quality control.

9.2 Advantages of Inventory Control

The various advantages of inventory control are as follows:

1. ***Makes JIT Possible:*** JIT is a frequently used inventory ordering system that requires the use of an effective inventory control system and a solid understanding of the demand of the products a company sells. JIT stands for "just in time," meaning that supplies arrive from the supplier just in time to be made into products and products are produced just in time to fulfill orders.
2. ***Lowers Cash-Flow Pressures*:** When inventory is ordered without a real system in place, it is merely an estimate of what may be needed. An inventory control system based on actual data allows for ordering the right amount of inventory at the right time so that demand is met without carrying excess items in the warehouse.

   A system that can accomplish this will free up the cash that may be unnecessarily spent on the inventory guessing game at a company without an effective system. Having more products on hand than can possibly be sold will only mean there is less cash available to accomplish other goals within the company.
3. ***Fewer Missed Sales Opportunities:*** The flip side of stocking too much inventory because of a lack of inventory control is the absence of a product for the same reasons. Guessing the amount of an item to order from a supplier may leave the company short of what the demand is, meaning the consumer will not be able to buy what she is looking for should she show up when the inventory is lacking a product.

   Most businesses rely on money made from sales in order to be successful. If the company cannot make the sale for any reason, they suffer for it. Having inventory control in place will help eliminate this sort of problem and will improve the reputation of the company among customers who always know they can count on the business to have what they need when they need it.
4. ***Awareness of Discrepancies:*** With a proper inventory control system in place, it is easy to compare physical inventory counts to the numbers in the system. If there is a discrepancy, management will know about it immediately instead of the missing or excess items being overlooked for weeks or months.

   If an employee is stealing or if mislabeling or point-of-sale software glitches are causing an item to ring up as something else, this type of inventory control will help identify the problem so that it can be remedied quickly and have the least possible effect on business.

Self Assessment

Fill in the blanks:

6. …….. is a frequently used inventory ordering system that requires the use of an effective inventory control system.

Notes

7. The flip side of stocking too much inventory because of a lack of ……. is the absence of a product for the same reasons.

Caselet

Why is Inventory Management Critical for a Merchant?

Inventory is often the largest asset on your balance sheet and can account for as much as 75 percent or more of your total assets.

A major expense attributed to carrying inventory is 'shrink.' Shrink is what happens to your inventory as a result of theft and administrative error and/or mismanagement – your inventory shrinks or disappears. It stands to reason, if you can control and limit your loss of inventory, you are saving money or increasing profits.

By having an accurate physical inventory and access to real time data analytics, you can easily monitor stock levels and identify products or items with high levels of shrink. Products identified with high levels of shrink can be monitored closely, packaged or repackaged, marketed or merchandised and distributed differently to help reduce losses.

If you are unable to easily and quickly identify what your poorest and best selling products are, in real time, you could be in for some heartache. Carrying products can be a significant expense for merchants. By knowing what products you should mark down or otherwise discount, you are able to clear out your inventory rather than have slow moving or non-selling products languishing away in the dark recesses of your dusty backroom.

By knowing you are getting low on your best selling product, you can place the restock order in time to ensure you are never without your best selling product on the shelves.

How important can that be? Say your store or chain is being plagued with losses from higher than normal returns due to the poor economy. Let's consider how your inventory control policies can be affected by using an outdated system. Because things seem to be picking up you're very busy and a return takes at least 10 minutes or longer. Typically your process was fraught with the danger of mistakes and fraud, chipping away at your bottom line.

Paper-based management and transactions with receipts that are required to execute returns are a perfect example of how costly mistakes are made. Let's say you capture all of your customer information on handwritten forms at the point of sale. You then transfer that information by typing it into a computer, which produces a new receipt that reflects the return transaction. The customer signs the receipt and you keep all of the paperwork for reconciliation later.

This is a laborious process that is not designed to catch mistakes. Oftentimes customers returning discounted merchandise receive full-price refunds because there are no reports or records to consult.

Receipts should be bar-coded and a simple scan of that bar code pulls up the entire transaction history, as it occurred in real time. The actual sale price is recorded and a receipt cannot be used more than once for a return. A receipt can't be faked and returns can be processed in seconds.

Capitalizing on the available technology to efficiently monitor and control your inventory can be done easily without breaking the bank. In fact, there are solutions that can easily

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Notes

and quickly be implemented by merely downloading an app. The app is priced as an affordable monthly fee enabling an almost instant Return on Investment (ROI). There are no expensive Point of Sale (POS) licensing fees and no heavy investment in POS system equipment or training regimens.

Control and manage your inventory and you will also be controlling and managing your business destiny at the same time.

Thanks to today's affordable technology, you can use POS system features and enjoy the benefits that enable the easy management and control of every aspect of your business and related inventory so you capture every possible profit you're entitled to.

Source: http://www.sitepronews.com/2012/10/09/why-is-inventory-management-critical-for-a-merchant/

9.3 Procedure for Setting up an Effective Inventory Control

An effective inventory control system can be set up by following these steps:

1. Implement policies to limit the amount of people with access to your inventory, and keep a record of who has access to secure areas at specific times throughout each day. According to effectiveinventory.com, managers often underestimate the effect of theft on their inventory costs. Consider installing security cameras and keycard-access points in your inventory storage areas.
2. Implement fool-proof systems for inventory receipt and storage. Section off designated areas for each inventory item; clearly label each section and train new employees on the storage area & layout. Create user-friendly checklists and verification procedures for employees receiving or making shipments of inventory.
3. Create a plan to take advantage of central warehousing and cooperative purchasing techniques. Create a formal system to replenish inventory at one location with excess inventory from another location, when possible, and to combine purchases for several locations into a single purchase order. This can help you to make fewer and larger purchases, allowing you to take advantage of quantity discounts and minimize distribution costs across the supply chain.
4. Estimate demand for each stock item annually. Create demand schedules covering each quarter or month in the coming year. Take seasonal demand fluctuations into account, and plan to stock up on seasonal inventory items early. Established companies can use previous year's sales figures as a starting point when estimating demand; new businesses may have to rely on competitors past revenue figures and management expectations for first year market share. Use these estimates to calculate the ideal re-order points and maximum stock levels for each stock item.
5. Create a database of all stock items. For each stock item, include information on the item's cost, suppliers, current stock level, lead time and inventory classification.
6. Create a notification system to alert employees when an inventory item's re-order point or maximum stock level has been reached. Determine the point at which the system triggers a notification by taking the item's lead time and recent demand into consideration.
7. Establish policies that ensure the timely processing of all paperwork, including purchase orders, receipts and inventory counts as quickly as possible to ensure your records are continually accurate. Establish a manual or computer-aided process to update your stock database at least daily, covering all inventory receipts, sales and transfers.

Notes

Task Divide the class into groups and following the procedures given, set up an inventory control system for a company.

Self Assessment

Fill in the blanks:

8. Implement ……. systems for inventory receipt and storage.
9. Create a formal system to ……. inventory at one location with excess inventory from another location, when possible, and to combine purchases for several locations into a single purchase order.
10. Create a notification system to alert employees when an inventory item's ……. point has been reached.

9.4 Inventory Classification Techniques

The different inventory classification techniques used in inventory control are:

9.4.1 V.E.D. Analysis

VED–vital, essential and desirable is used primarily for control of spare parts. The spare parts can be divided in to three categories vital, essential, or desirable—keeping in view the criticality to production. The spares, the stock out of which even for a short time will stop production for quite some time and where the cost of stock out is very high are known as vital spares. The spares the absences of which cannot be tolerated for more than a few hours or a day and the cost is high and which are essential for the production to continue are known as essentials spares. The desirable spares are those spares which are needed but their absence for even a week or so will not lead to stoppage of production. Some spares, though negligible in monetary value, may be vital for the production to continue and require constant attention.

Such spares may not receives the attention they deserve if they are maintained according to ABC analysis because their value of consumptions us small. So in their cases VED analysis is made to get the effective result. As VED analysis analyses items based on their criticality to production it can also be used for those items of materials which are difficult to procure.

9.4.2 S.D.E. Classification

The SDE analysis is based upon the availability of items and is very useful in the context of scarcity of supply. In this analysis, S refers to scarce items, generally imported, and those which are in short supply. D refers to difficult items which are available indigenously but are difficult items to procure. Items which have to come from distant places or for which reliable suppliers are difficult to come by fall into D category. E refers to items which are easy to acquire and which are available in the local markets.

The SDE classification, based on problems faced in procurement, is vital to the lead time analysis and in deciding on purchasing strategies.

9.4.3 F.S.N. Analysis

FSN analysis is based on movement of items in the store house. The items are classified as Fast moving (F) slow moving (S) and Non-moving (N). This classification is done on the basis of

Notes

consumptions pattern of the items under analysis. This analysis is useful in case of obsolete items previous years issues is the guiding factors for FSN analysis. Previous two three years are taken into consideration for a decision whether the items stocked in the storehouse are fast moving slow moving or non-moving. If there are no issues during past few years naturally they will be classified as Zero issues items and under this method of analysis these items will be classified as N items. Similarly up to certain limit a says 10-15 issues in a year may be classified as S items. Items being issued more than 15 times a year may be placed in F category. Certainly such analysis and limits of issues vary from one organization to another. However this method of analysis is useful in locating and identifying the obsolete items.

Whatever may be the tools of inventory control in the hands of materials manager, he aims at selective control having an eye over the value of consumption, value of inventory cost of obsolescence and the value of performance. He always aims at effective control at every level and at every stage. He selectively but effectively applies his energies to the problem areas in the department so that optimal use of his efforts may result. It is natural for a materials manager to make best use of the tools made available him. He should avoid preferences to one of the tools instead he should be guided by a tunnel vision while making use of one of the tools. It is advisable that a materials manager should go for a tool which in his opinion is the best in the given circumstances and with the help of which he may be expecting the desired result.

9.4.4 X.Y.Z. Analysis

XYZ analysis is one of the basic supply chain techniques, often used to determine the inventory valuation inside a store. It is also strategic as it intends to enable the Inventory manager in exercising maximum control over the highest stocked item, in terms of stock value. Those items, whose inventory investments values are high, are called as X items. Y items consist of those items whose investment inventory values are moderate. While Z items are those items whose investment inventory values are low. Normally XYZ analysis is used along with either the ABC analysis explained in unit 2.

Self Assessment

Fill in the blanks:

11. VED analysis is used primarily for control of…… .
12. The spares which are essential for the production to continue are known as …….. spares.
13. The ……. is based upon the availability of items and is very useful in the context of scarcity of supply.
14. The SDE classification is vital to the ……. analysis and in deciding on purchasing strategies.
15. FSN analysis is based on ……. of items in the store house.

9.5 Logistics Management & Its Link with Inventory Control

Logistics involves the coordination of the movement and storage of inputs and outputs in order to satisfy customer demand in the right place at the right time at the lowest cost. Hence it concerns the analysis of the costs, efficiencies and feasibilities of the various modes of transport and temporary storage needed to move goods to their destinations, safely and with minimal pilferage and materials loss.

Notes

1. ***Procurement or Purchasing:*** It usually initiates the flow of materials by sending a purchase order to a supplier. This means that procurement has to find suitable suppliers, negotiate terms, set conditions, organize delivery, arrange insurance, authorize payment, and do everything needed to get materials into the organization.
2. ***Inward Transport or Traffic:*** It actually moves a material from suppliers to the organization's receiving area. Important decisions concern the mode of transport, policies for outsourcing, choice of transport operator, safety and legal requirements, etc.
3. ***Receiving*** makes sure that materials delivered correspond to the order, acknowledges receipt, unloads delivery vehicles, inspects materials for damage and sorts them.
4. ***Material Handling*** moves material from receiving and puts them into stores. It is responsible for all movement of materials in the organization.
5. ***Warehousing*** takes care of the materials held in stock until they are needed. It makes sure that materials have right conditions, treatment and packaging to keep them in good condition.
6. ***Order*** picking finds and removes materials from stores.
7. ***Outward transport*** takes material from the departure area and delivers them to customers.
8. ***Communication:*** Alongside the physical flow of materials, is the associated flow of information. Coordinating the flow of information can be very difficult, and logistics managers are often considered to process information rather than moving goods.

Self Assessment

Fill in the blanks:

16. …… usually initiates the flow of materials by sending a purchase order to a supplier.
17. ……. takes material from the departure area and delivers them to customers.

Case Study

Managing Inventory Assets for an Online Retailer

Grow into the space you'll need

Whether you start with a tiny shelf in your attic, or a large warehouse, remember that as your business grows, you'll need more space for your inventory.

"I have a wall full of shelves in the attic above my apartment," says Ken Weinstein, co-owner of the Numero Group, a Chicago-based compact-disc label that collects and reissues obscure but high-quality music in a variety of genres. "I pay $25 extra rent per month, and our entire catalogue is stored up there. I've still got a lot of room left on the shelves for more, though."

Sam Meyer's business is different. "We started out as a retail outlet, so my dad decided to buy a building," says the St. Louis-based co-owner of Fog Hollow, one of the largest mail-order suppliers of new and used motorcycle parts in the U.S. "By looking in areas that were somewhat depressed, he found our first warehouse for less than $50,000 in the early 1980s. So, we had a lot of space to grow into for a long time."

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Don't just store it; organize it!

Nothing is more embarrassing – or potentially costly – than having to tell a customer that you can't find the product he or she just purchased online. As an online retailer, you need to find a way to organize your inventory that can make picking orders as simple as possible.

Meyer knows the pain of disorganization well. "In our first warehouse, with only used parts, we have over 600 motorcycles in various stages of dismemberment," he says. "They're all very heavy, so really, only a couple of people know where everything is. But in our other warehouse, with everything entered in a computer, a trained chimp could pick orders."

Consider Outsourcing

Joel Bush believes entrepreneurs are better off letting somebody else handle the headaches of inventory storage and order fulfillment. This view isn't surprising, because Joel is CEO of Amplifier.com, a company that handles inventory storage and shipping for 200 clients in a wide variety of businesses. But his point remains.

"Handling inventory can become a time-consuming exercise that distracts time and attention away from opportunities to keep growing the business," he says. "Common problems include keeping adequate stock of inventory, keeping track of it, arranging it for efficient pick-and-pack operations. All of these problems are magnified during order spikes and periods of rapid growth."

Of course, if you turn over your inventory to a third party, you lose an aspect of control. "If you do it yourself," says Bush, "you have direct access to your inventory, and you know the timing and quality of your fulfillment process. But, we do address these concerns. For example, we deliver a robust suite of reports via the web that allow clients to keep track of the entire process."

The "Perfect" Option

If you can avoid having inventory at all, you have fewer worries. For instance, the Numero Group sells digital downloads of a large number of otherwise unavailable songs.

And Meyer wistfully dreams of entrepreneurs who thrive as middle men. "We have to have a staff of 18 or 20 people to pick our orders," he says, "while other companies can be run by one person online with a couple computers in an apartment, just processing orders to a large warehouse somewhere."

Our Bottom Line

The likelihood is that whether you're selling retail or wholesale online, you'll be dealing with inventory management issues. Take the time to plan out in advance what you'll need for space and organization, and weigh the option of outsourcing your inventory. Your inventory will grow along with your online retail business, so make sure you do it right.

Question

How do you think can an online retailer manage his inventories?

Source: http://www.startupnation.com/business-articles/1314/1/online-retail-inventory-management.asp

9.6 Summary

- Inventory management involves making decisions on the appropriate level of inventory to keep on hand. Too much inventory can increase storage costs and the chances of spoilage.

Notes

- Reordering is done by factoring in the demand and the lead time required to get the order filled. Businesses must maintain a minimum inventory level as a buffer to prevent shortages.
- Radio frequency identification tags, or RFIDs, can be used to track and protect valuable inventory.
- JIT is a frequently used inventory ordering system that requires the use of an effective inventory control system and a solid understanding of the demand of the products a company sells.
- According to effectiveinventory.com, managers often underestimate the effect of theft on their inventory costs. Security cameras and keycard-access points in the inventory storage areas should be installed.
- A notification system should be created to alert employees when an inventory item's re-order point or maximum stock level has been reached.
- VED–vital, essential and desirable is used primarily for control of spare parts. The spare parts can be divided in to three categories vital, essential, or desirable—keeping in view the criticality to production.
- The SDE analysis is based upon the availability of items and is very useful in the context of scarcity of supply. In this analysis, S refers to scarce items, D refers to difficult items which are available indigenously but are difficult items to procure, E refers to items which are easy to acquire and which are available in the local markets.
- FSN analysis is based on movement of items in the store house. The items are classified as Fast moving (F) slow moving (S) and Non-moving (N).
- XYZ analysis is one of the basic supply chain techniques, often used to determine the inventory valuation inside a store. It is also strategic as it intends to enable the Inventory manager in exercising maximum control over the highest stocked item, in terms of stock value.
- Logistics involves the coordination of the movement and storage of inputs and outputs in order to satisfy customer demand in the right place at the right time at the lowest cost.

9.7 Keywords

ABC Analysis: The classification of items in an inventory according to importance defined in terms of criteria such as sales volume and purchase volume is known as ABC analysis.

FSN Analysis: FNS analysis divides the items of stores into three categories in the descending order of importance of their usage rate.

Inventory Control: Supervision of the supply and storage and accessibility of items in order to insure an adequate supply without excessive oversupply is known as inventory control.

Inventory Receipt: The receipt of products at a fulfillment center is known as an inventory receipt. Products are either expected and recorded in expected inventory records, or received ad hoc.

JIT: Just-in-time (JIT) is an inventory strategy that strives to improve a business's return on investment by reducing in-process inventory and associated carrying costs.

Logistics Management: The coordination of various organizations and functions to source, procure, and deliver goods to the client is known as logistics management.

Notes

Point-of-Sale: In an establishment that sells goods or services, the location at which payment for goods is made is known as point of sale.

Reordering: Rearranging the order of items in a compound document. Items in a compound document are typically numbered sequentially in ascending order is referred to as reordering.

RFID: Radio frequency identification systems that use transponders to transmit significant amounts of data to a receiver; often used as part of a real-time locator system.

SDE Analysis: The SDE analysis is based upon the availability of items and is very useful in the context of scarcity of supply.

VED Analysis: It is the Analysis for monitoring and control of stores and spares inventory by classifying them into 3 categories viz., Vital, Essential and Desirable.

9.8 Review Questions

1. What do you understand by inventory control?
2. What are the Elements of an Effective Inventory Control?
3. Discuss the advantages of inventory control.
4. Explain the Procedure for Setting up an Effective Inventory Control.
5. Briefly discuss V.E.D. Analysis.
6. Explain the concept of S.D.E. Classification.
7. Explain F.S.N. Analysis.
8. Why is X.Y.Z. Analysis used?
9. Explain Logistics Management & its link with Inventory Control.
10. Write a note on inventory classification techniques.

Answers: Self Assessment

1.	Inventory	2.	Just-in-time
3.	Reordering	4.	Warehouses
5.	Tracking	6.	JIT
7.	Inventory Control	8.	Fool-proof
9.	Replenish	10.	Re-order
11.	Spare Parts	12.	Essentials
13.	SDE Analysis	14.	Lead time
15.	Movement	16.	Procurement
17.	Outward Transport		

Notes

9.9 Further Readings

Books

Ramakrishnan. R V, Tony Arnold. J R (2007). "*Introduction to Materials Management*". Pearson

K. Shridhar Bhat, "*Production and Materials Management*". Himalaya Publishing House

Chary. S.N., "*Production and Operations Management*". Tata McGraw Hill

Gopalkrishanan. P, Sundaresan. M, "*Materials Management: An Integrated Approach*". PHI Learning Pvt. Ltd.

Online links

http://www.ct-clic.com/newsletters/customer-files/inventory0602.pdf

http://www.accountingtools.com/questions-and-answers/what-is-inventory-control.html

http://strypertech.com/index.php?option=com_content&view=article&id=114&Itemid=178

http://www.expertsmind.com/learning/inventory-classification-models-assignment-help-7342872652.aspx

Unit 10: Value Analysis

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Objectives

After studying this unit, you will be able to:

- Explain the concept of Value Analysis
- Discuss Value Analysis Method
- Explain the Process of Value Analysis
- Discuss the Function Analysis System Technique (FAST)
- Describe the Application of Value Analysis
- Discuss Organization of Value Analysis

Introduction

In the previous unit, we dealt with inventory control system and its elements. The unit also discussed about the procedure for setting up an efficient inventory control system. This unit will help you to understand the concept of Value Analysis. The various section and sub section of this unit will also summarize the process of value analysis and Function Analysis System Technique. The idea behind Value Analysis is not new. The approach to the problem essentially differs from that of the other Cost Reduction techniques. A customer when buying a product weighs its functional and other features (appearance, attractiveness, get-up) against its price and judges the value of the product. Manufacturer in turn, in order to enhance the value of his products must ensure that he offers all the necessary functional features at the lowest possible price. This functional approach is the basic criteria of value analysis.

Notes

Value analysis is a methodical approach to sharpening the efficiency and effectiveness of any process. Often, businesses apply it to the processes used in product creation or service delivery. Paramount to the value analysis is the practice of breaking down a process into each individual component and considering ways to improve that component's value as measured by cost and importance to the process.

10.1 Concept of Value and Value Analysis

Concepts of value and value analysis are explained below:

10.1.1 Value

The value of a product will be interpreted in different ways by different customers. Its common characteristic is a high level of performance, capability, emotional appeal, style, etc. relative to its cost. This can also be expressed as maximizing the function of a product relative to its cost:

Value = (Performance + Capability)/Cost = Function/Cost

Value is not a matter of minimizing cost. In some cases the value of a product can be increased by increasing its function (performance or capability) and cost as long as the added function increases more than its added cost. The concept of functional worth can be important. Functional worth is the lowest cost to provide a given function. However, there are less tangible "selling" functions involved in a product to make it of value to a customer.

Did u know? For the sustained growth of an organization, it is an undisputed fact that the gap between the Price and Cost of production, i.e. the Profit margin should be widened as far as possible without any binding limits.

In any system

PRICE PR (N) = COST C(N) + PROFIT P(N)

Where PR(N), C(N), & P(N) are the price, cost and profit of the Nth manufacturer, such that

PR (N) = C(N) + P(N) = C(N+1)

Where, C (N+1) is the cost to the (N+1)th user or buyer.

If the (N+1)th end user is willing to pay C(N+1), it is in the interest of the manufacturer N to reduce C(N) so that P(N) can be increased for him, provided of course that Performance, Reliability and Quality of the item remains constant, or improved further, if possible. To achieve the above end, there are four approaches available.

(a) Keeping the Cost of Production C(N) constant, increase the selling price PR(N). This has got its own repercussions on the market demand pattern, and any price enhancement is normally linked up with a fail in demand.

(b) Keeping the Selling Price PR(N) constant, reduce the cost of production, by using various conventional methods of cost reduction, like Method Study, Material Management, Preventive Maintenance, and many other Productivity Techniques. It has been observed that more often than not, such a cost reduction approach has resulted in a substandard quality product which again had been rejected in competitive market, in favor of a better performing alternative.

(c) The third alternative is a simultaneous combination of the above two steps.

Notes

(d) Reduce the Price PR(N) and reduce the cost of Production C(N) in a higher proportion. Considering all the above four alternatives and simultaneously taking into account the behaviour of the market, one has to realize that the user wouldn't mind a higher price, if, he is satisfied that the additional performance which he will get, will more than compensate the additional price which he would pay for that product.

10.1.2 Value Analysis

Lawrence Miles conceived of Value Analysis (VA) in the 1945 based on the application of function analysis to the component parts of a product. Component cost reduction was an effective and popular way to improve "value" when direct labor and material cost determined the success of a product. The value analysis technique supported cost reduction activities by relating the cost of components to their function contributions.

Value analysis defines a "basic function" as anything that makes the product work or sell. A function that is defined as "basic" cannot change. Secondary functions, also called "supporting functions", described the manner in which the basic functions were implemented. Secondary functions could be modified or eliminated to reduce product cost.

As VA progressed to larger and more complex products and systems, emphasis shifted to "upstream" product development activities where VA can be more effectively applied to a product before it reaches the production phase. However, as products have become more complex and sophisticated, the technique needed to be adapted to the "systems" approach that is involved in many products today.

The first Value Analysis (VA) program was established in the General Electric, USA by about 1947, since then the programme has received considerable attention and many successful applications have been reported. Though the technique started with analysis of purchased items it has been extended to manufactured items as well.

The idea behind Value Analysis is not new. The approach to the problem essentially differs from that of the other Cost Reduction techniques. A customer when buying a product weighs its functional and other features (appearance, attractiveness, get-up) against its price and judges the value of the product. Manufacturer in turn, in order to enhance the value of his products must ensure that he offers all the necessary functional features at the lowest possible price. This functional approach is the basic criteria of value analysis. It tries to obtain a "function" and "not" the "part", at a lesser cost.

This has the fundamental base, as the user is not at all interested as to how the part looks like, or what it is made of, as long as the desired function is performed to his satisfaction along with the required level of Quality & Reliability.

Self Assessment

Fill in the blanks:

1. Value can be expressed as maximizing the function of a …… relative to its cost.
2. Component cost reduction was an effective and popular way to improve "……".
3. A function that is defined as "……." cannot change.
4. The first Value Analysis (VA) program was established in the …….

Notes

10.2 Value Analysis Method

In all problem solving techniques, we are trying to change a condition by means of a solution that is unique and relevant. If we describe in detail what we are trying to accomplish, we tend to describe a solution and miss the opportunity to engage in divergent thinking about other alternatives. When trying to describe problems that affect us, we become locked in to a course of action without realizing it, because of our own bias. Conversely, the more abstractly we can define the function of what we are trying to accomplish, the more opportunities we will have for divergent thinking.

This high level of abstraction can be achieved by describing what is to be accomplished with a verb and a noun. In this discipline, the verb answers the question, "What is to be done?" or, "What is it to do?" The verb defines the required action. The noun answers the question, "What is it being done to?" The noun tells what is acted upon. Identifying the function by a verb-noun is not as simple a matter as it appears.

Identifying the function in the broadest possible terms provides the greatest potential for divergent thinking because it gives the greatest freedom for creatively developing alternatives. A function should be identified as to what is to be accomplished by a solution and not how it is to be accomplished. How the function is identified determines the scope, or range of solutions that can be considered.

That functions designated as "basic" represent the operative function of the item or product and must be maintained and protected. Determining the basic function of single components can be relatively simple. By definition then, functions designated as "basic" will not change, but the way those functions are implemented is open to innovative speculation.

As important as the basic function is to the success of any product, the cost to perform that function is inversely proportional to its importance. This is not an absolute rule, but rather an observation of the consumer products market. Few people purchase consumer products based on performance or the lowest cost of basic functions alone. When purchasing a product it is assumed that the basic function is operative. The customer's attention is then directed to those visible secondary support functions, or product features, which determine the worth of the product.

Notes From a product design point of view, products that are perceived to have high value first, address the basic function's performance and stress the achievement of all of the performance attributes.

Once the basic functions are satisfied, the designer's then address the secondary functions necessary to attract customers. Secondary functions are incorporated in the product as features to support and enhance the basic function and help sell the product. The elimination of secondary functions that are not very important to the customer will reduce product cost and increase value without detracting from the worth of the product.

The cost contribution of the basic function does not, by itself, establish the value of the product. Few products are sold on the basis of their basic function alone. If this were so, the market for "no name" brands would be more popular than it is today. Although the cost contribution of the basic function is relatively small, its loss will cause the loss of the market value of the product.

One objective of value analysis or function analysis, to improve value by reducing the cost-function relationship of a product, is achieved by eliminating or combining as many secondary functions as possible.

Notes

Self Assessment

Fill in the blanks:

5. This high level of abstraction can be achieved by describing what is to be accomplished with a …….and a ……..
6. Identifying the function in the broadest possible terms provides the greatest potential for …….. thinking.
7. Determining the basic function of ……. components can be relatively simple.
8. Few people purchase consumer products based on ……. or the lowest cost of basic functions alone.

10.3 Value Analysis Process

The first step in the value analysis process is to define the problem and its scope. Once this is done, the functions of the product and its items are derived. These functions are classified into "basic" and "secondary" functions. A Cost Function Matrix or Value Analysis Matrix is prepared to identify the cost of providing each function by associating the function with a mechanism or component part of a product. Product functions with a high cost-function ratio are identified as opportunities for further investigation and improvement. Improvement opportunities are then brainstormed, analyzed, and selected.

The objective of the Function Cost Matrix approach is to draw the attention of the analysts away from the cost of components and focus their attention on the cost contribution of the functions. The Function Cost Matrix displays the components of the product, and the cost of those components, along the left vertical side of the graph. The top horizontal legend contains the functions performed by those components. Each component is then examined to determine how many functions that component performs, and the cost contributions of those functions.

Detailed cost estimates become more important following function analysis, when evaluating value improvement proposals. The total cost and percent contribution of the functions of the item under study will guide the team, or analyst, in selecting which functions to select for value improvement analysis.

A variation of the Function-Cost Matrix is the Value Analysis Matrix. This matrix was derived from the Quality Function Deployment (QFD) methodology. It is more powerful in two ways. First, it associates functions back to customer needs or requirements. In doing this, it carries forward an importance rating to associate with these functions based on the original customer needs or requirements. Functions are then related to mechanisms, the same as with the Function-Cost Matrix. Mechanisms are related to functions as either strongly, moderately or weakly supporting the given function. This relationship is noted with the standard QFD relationship symbols. The associated weighting factor is multiplied by customer or function importance and each columns value is added.

Task Prepare a presentation on the process of value analysis.

These totals are normalized to calculate each mechanism's relative weight in satisfying the designated functions. This is where the second difference with the Function-Cost Matrix arises. This mechanism weight can then be used as the basis to allocate the overall item or product cost. The mechanism target costs can be compared with the actual or estimated costs to see where

Notes

costs are out of line with the value of that mechanism as derived from customer requirements and function analysis.

Self Assessment

Fill in the blanks:

9. The Function Cost Matrix displays the …… of the product.
10. The total cost and ……. contribution of the functions of the item under study will guide the team.

10.4 Function Analysis System Technique

Function Analysis System Technique (FAST) is an evolution of the value analysis process created by Charles by the way. FAST permits people with different technical backgrounds to effectively communicate and resolve issues that require multi-disciplined considerations. FAST builds upon VA by linking the simply expressed, verb-noun functions to describe complex systems.

FAST is not an end product or result, but rather a beginning. It describes the item or system under study and causes the team to think through the functions that the item or system performs, forming the basis for a wide variety of subsequent approaches and analysis techniques. FAST contributes significantly to perhaps the most important phase of value engineering: function analysis. FAST is a creative stimulus to explore innovative avenues for performing functions.

The FAST diagram or model is an excellent communications vehicle. Using the verb-noun rules in function analysis creates a common language, crossing all disciplines and technologies. It allows multi-disciplined team members to contribute equally and communicate with one another while addressing the problem objectively without bias or preconceived conclusions. With FAST, there are no right or wrong model or result. The problem should be structured until the product development team members are satisfied that the real problem is identified. After agreeing on the problem statement, the single most important output of the multi-disciplined team engaged in developing a FAST model is consensus. Since the team has been charged with the responsibility of resolving the assigned problem, it is their interpretation of the FAST model that reflects the problem statement that's important. The team members must discuss and reconfigure the FAST model until consensus is reached and all participating team members are satisfied that their concerns are expressed in the model. Once consensus has been achieved, the FAST model is complete and the team can move on to the next creative phase.

FAST differs from value analysis in the use of intuitive logic to determine and test function dependencies and the graphical display of the system in a function dependency diagram or model. Another major difference is in analyzing a system as a complete unit, rather than analyzing the components of a system. When studying systems it becomes apparent that functions do not operate in a random or independent fashion. A system exists because functions form dependency links with other functions, just as components form a dependency link with other components to make the system work. The importance of the FAST approach is that it graphically displays function dependencies and creates a process to study function links while exploring options to develop improved systems.

There are normally two types of FAST diagrams, the technical FAST diagram and the customer FAST diagram. A technical FAST diagram is used to understand the technical aspects of a specific portion of a total product. A customer FAST diagram focuses on the aspects of a product that the customer cares about and does not delve into the technicalities, mechanics or physics of the product. A customer FAST diagram is usually applied to a total product.

Notes

10.4.1 Creating a FAST Model

The FAST model has a horizontal directional orientation described as the HOW-WHY dimension. This dimension is described in this manner because HOW and WHY questions are asked to structure the logic of the system's functions. Starting with a function, we ask HOW that function is performed to develop a more specific approach. This line of questioning and thinking is read from left to right. To abstract the problem to a higher level, we ask WHY is that function performed. This line of logic is read from right to left.

There is essential logic associated with the FAST HOW-WHY directional orientation. First, when undertaking any task it is best to start with the goals of the task, then explore methods to achieve the goals. When addressing any function on the FAST model with the question WHY, the function to its left expresses the goal of that function. The question HOW, is answered by the function on the right, and is a method to perform that function being addressed. A systems diagram starts at the beginning of the system and ends with its goal. A FAST model, reading from left to right, starts with the goal, and ends at the beginning of the "system" that will achieve that goal.

Second, changing a function on the HOW-WHY path affects all of the functions to the right of that function. This is a domino effect that only goes one way, from left to right. Starting with any place on the FAST model, if a function is changed the goals are still valid (functions to the left), but the method to accomplish that function, and all other functions on the right, are affected.

Finally, building the model in the HOW direction, or function justification, will focus the team's attention on each function element of the model. Whereas, reversing the FAST model and building it in its system orientation will cause the team to leap over individual functions and focus on the system, leaving function "gaps" in the system.

Caution A good rule to remember in constructing a FAST Model is to build in the HOW direction and test the logic in the WHY direction.

The vertical orientation of the FAST model is described as the WHEN direction. This is not part of the intuitive logic process, but it supplements intuitive thinking. WHEN is not a time orientation, but indicates cause and effect.

Scope lines represent the boundaries of the study and are shown as two vertical lines on the FAST model. The scope lines bound the "scope of the study", or that aspect of the problem with which the study team is concerned. The left scope line determines the basic function of the study. The basic functions will always be the first function to the immediate right of the left scope line. The right scope line identifies the beginning of the study and separates the input function from the scope of the study.

The objective or goal of the study is called the "Highest Order Function", located to the left of the basic function and outside of the left scope line. Any function to the left of another function is a "higher order function". Functions to the right and outside of the right scope line represent the input side that "turn on" or initiate the subject under study and are known as lowest order functions. Any function to the right of another function is a "lower order" function and represents a method selected to carry out the function being addressed.

Those function to the immediate right of the left scope line represent the purpose or mission of the product or process under study and are called Basic Function. Once determined, the basic function will not change. If the basic function fails, the product or process will lose its market value.

Notes

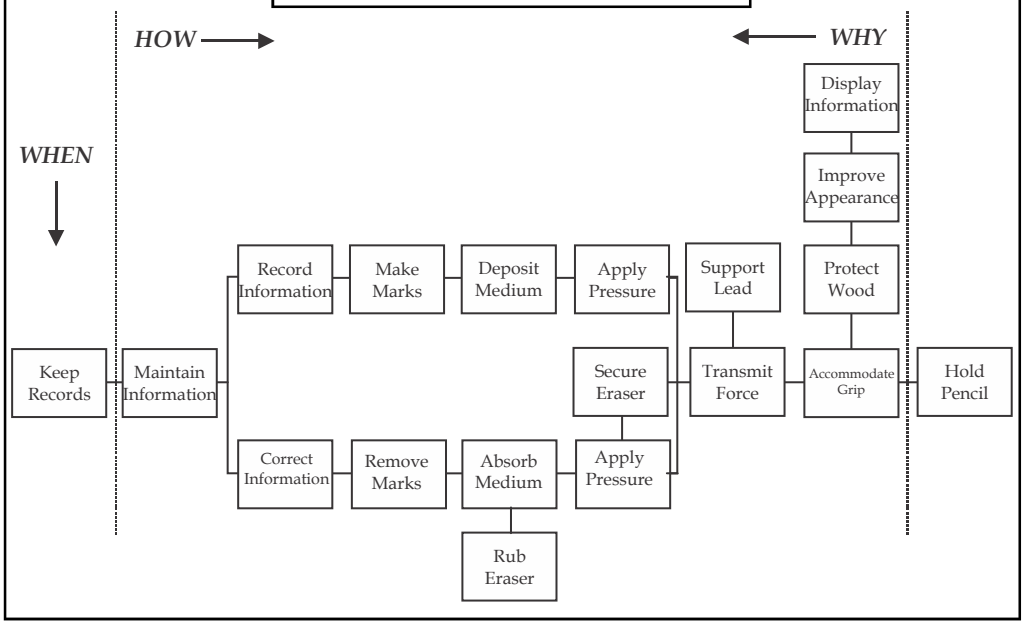
All functions to the right of the basic function portray the conceptual approach selected to satisfy the basic function. The concept describes the method being considered, or elected, to achieve the basic function. The concept can represent either the current conditions (as is) or proposed approach (to be). As a general rule, it is best to create a "to be" rather than an "as is" FAST Model, even if the assignment is to improve an existing product. This approach will give the product development team members an opportunity to compare the "ideal" to the "current" and help resolve how to implement the differences. Working from an "as is" model will restrict the team's attention to incremental improvement opportunities. An "as is" model is useful for tracing the symptoms of a problem to its root cause, and exploring ways to resolve the problem, because of the dependent relationship of functions that form the FAST model.

Any function on the HOW-WHY logic path is a logic path function. If the functions along the WHY direction lead into the basic function, than they are located on the major logic path. If the WHY path does not lead directly to the basic function, it is a minor logic path. Changing a function on the major logic path will alter or destroy the way the basic function is performed. Changing a function on a minor logic path will disturb an independent (supporting) function that enhances the basic function. Supporting functions are usually secondary and exist to achieve the performance levels specified in the objectives or specifications of the basic functions or because a particular approach was chosen to implement the basic function.

Independent functions describe an enhancement or control of a function located on the logic path. They do not depend on another function or method selected to perform that function. Independent functions are located above the logic path function, and are considered secondary, with respect to the scope, nature, level of the problem, and its logic path.

Example:

Figure 10.1: FAST Model for a Pencil



Source: Uddin. Jahir (2010). *"Materials Management"*. Excel Books Pvt. Ltd.

The next step in the process is to dimension the FAST model or to associate information to its functions. FAST dimensions include, but are not limited to: responsibility, budgets, allocated target costs, estimated costs, actual costs, subsystem groupings, placing inspection and test

Notes

points, manufacturing processes, positioning design reviews, and others. There are many ways to dimension a FAST model. The two popular ways are called Clustering Functions and the Sensitivity Matrix.

Clustering functions involves drawing boundaries with dotted lines around groups of functions to configure subsystems. Clustering functions is a good way to illustrate cost reduction targets and assign design-to-cost targets to new design concepts. For cost reduction, a team would develop an "as is" product FAST model, cluster the functions into subsystems, allocate product cost by clustered functions, and assign target costs. During the process of creating the model, customer sensitivity functions can be identified as well as opportunities for significant cost improvements in design and production.

Following the completion of the model, the subsystems can be divided among product development teams assigned to achieve the target cost reductions. The teams can then select cost sensitive subsystems and expand them by moving that segment of the model to a lower level of abstraction. This exposes the detail components of that assembly and their function/cost contributions.

Self Assessment

Fill in the blanks:

11. …… permits people with different technical backgrounds to effectively communicate and resolve issues that require multi-disciplined considerations.
12. FAST is a creative stimulus to explore …….. avenues for performing functions.

10.5 Application of Value Analysis

Value analysis can be applied universally, i.e., to everything materials, methods, processes, services, etc., where it is intended to bring about economics. One should naturally start with items where the maximum annual saving can be achieved. This immediately suggests that items whose total annual consumption in Rupees is high should receive top priorities in the application of Value Analysis. In the same manner, scarce materials, imported materials, or those difficult to obtain should also receive the attention of the value analyst. Bearing this in mind, Value Analysis can be systematically applied to categories of items, such as those listed below in order to bring about substantial cost reduction.

- Capital goods: plant, equipment, machinery, tools and appliances;
- Raw and semi-processed material, including fuel;
- Sub-contracted parts, components, sub-assemblies, etc;
- Purchased parts, components, sub-assemblies, etc.,
- Maintenance, repairs and operational items;
- Finishing items such as paints, oils, varnishes, etc.
- Packing materials and packaging;
- Printing and Stationery items;
- Miscellaneous items of regular consumptions;
- Power, water supply, compressed air, steam and other utilities (services), and
- Materials handling and transportation costs.

Notes

As mentioned earlier, items where the saving can be substantial should obviously be taken up first. Also, items which are imported, or difficult to obtain, and monopoly items, should receive high priority.

However, even if no economy can be effected immediately by Value Analysis on any particular item, then usefulness of the technique should not be forgotten altogether. The item should be taken up again for value analysis after six months or a year, the period being dictated by the findings of the investigation.

Caselet

Accenture Organization Value Analysis for Analytics

The Accenture Organization Value Analysis for Analytics (OVAA) helps you quickly and objectively understand your organization's readiness and capability to achieve its analytic aspirations by holistically measuring your strategic clarity and alignment, leadership effectiveness, workforce engagement, and capacity to change—all critical components to becoming an analytical competitor, or to simply better leveraging analytics in your business and increasing the impact of your decisions.

The OVAA is used throughout the lifecycle of an organization's analytic efforts, including as an up-front assessment of initial organization readiness. The results are then used to determine which areas require focused attention—such as talent engagement, workforce effectiveness, or the role of leadership.

Our professionals in Talent & Organization Performance and Analytics work with you to gain insight into the degree of alignment between your organization's culture and its analytical strategy and operating model. Through combination of executive interviews and proprietary survey tools, we dig beneath the surface to gain deeper understanding of employee interpretations of mindsets, values and practices. This enables us to collaboratively surface, understand and influence elements that help enable employees to understand, accept, adopt and sustain the new mindsets and behaviors needed to build a successful analytical culture.

Source: http://www.accenture.com/SiteCollectionDocuments/PDF/Accenture_The_Accenture_ Organization_Value_ Analysis_for_Analytics.pdf

New ideas may come to your mind at some other time. Also, it should be noted that the conditions in the market keep on changing fast, and new materials, new suppliers, and new processes come into existence rapidly as a result of phenomenal technological progress taking place at present.

A frequent and systematic review of the items already value analyzed, with advantage, may result in further economies.

10.6 Organization for Value Analysis

Value analysis is a staff function like, for instance, Industrial Engineering, and should be organized as much. It should be directly under a high-ranking officer from the Senior Management of an undertaking. This is necessary because value analysis concerns all departments, and the analyst must have access to them and to their records, performance, costs, etc. Depending upon the size of the undertaking and its scale of operations, there can be a Central value analysis cell to coordinate the work of individual analysts attached to the design, purchase, production, and engineering departments. Where there is only one value analyst, he may be attached to the Industrial Engineering Department or to the Purchase Department.

Notes

Value Analysis is essentially a team effort. What particular items to be taken up for value analysis, and what action is to be taken is usually decided by a small committee comprising representatives from the Design, Production, Purchase and Accounts Departments. Any other departmental representative can be co-opted if and when necessary.

It is the Purchase Manager (or Material Manager) who has to initiate action, convene meetings at regular intervals, and see that substantial results are obtained. A large share of the initial phase of the Value Analysis work will be done by the Purchase Manager, or by other departments, at his instance. It is his responsibility to seek the maximum value when a product requirement comes upto the point of purchase. It is his duty to challenge wasteful and avoidable costs inherent in the items he is asked to buy. It is, therefore, inevitable that a large part of whatever Value Analysis work is done is initiated by the Purchase Manager.

Self Assessment

Fill in the blanks:

13. Value analysis can be applied ……

14. Items which are imported, or difficult to obtain, and …….. items, should receive high priority.

15. Value analysis is a ……. function.

Case Study

An Evaluation of Value Analysis

The focus of corporate performance had been on reporting higher profits rather than shareholders wealth maximization. The ability to report such higher profit was a reflection of corporate efficiency even to the detriment of other crucial organizational objectives ranging from customer retention through improved product quality to employee satisfaction. All these are expected to be achieved within the framework of the industry regulation. Today, profitability alone had been adjudged as an inadequate measure of corporate efficiency. This therefore calls for a more pragmatic approach of producing goods/services at lower costs without a reduction in value (Value analysis). The efficiency of this approach supersedes the traditional approaches of cost reduction and cost control in achieving other organizational multifarious objectives.

Recently, the common concern to every participant in a market economy is the magnitude at which prices of goods multiplied in recent times in Nigeria. This is in addition to the multiplier effect associated with the process of transacting business in Nigeria; for instance, as customers complain bitterly of exorbitant prices, likewise sellers and manufacturers remain worried about low profitability returns in the face of ever increasing competition in both domestic and international markets that are characterized by differentiated products while investors remain skeptical about investment returns. As a result, customers shift from one product to another in search of value that rarely comes despite their readiness to purchase. All they are confronted with are higher prices, low quality, and at times temporary scarcity in place of value for money objective they pursue. The management of companies also seeks for cover everywhere to justify low profitability returns while trying to checkmate competition and its resultant effect on sales (revenue and profitability reduction) caused by product proliferation and imitation.

Contd...

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The new world order marked by global uncertainty with hard economic times had made every potential buyer to seek value for every unit of his expenditure and the ability to report higher profit had failed the litmus test for corporate performance measurement for manufacturing companies due to its highly subjective nature. In addition, the value of company's product is a factor that cannot be dispensed with, as emphasized by International Standard Organization (ISO) in performance measurement. To satisfy the above multifarious requirements, companies have adopted a new strategy called value analysis. This means a reduction in cost without necessarily reducing the value of the product. This can be achieved through a systematic analysis of every work performed in every department in order to formulate the most effective way of obtaining an ideal system of utilizing people, machines and material in the work places. Therefore, if cost management is to be really effective, there should be an integration of all functions within the business in such a way that costs should add up and be managed by competent hands. This is perhaps the bedrock of value analysis.

The need to satisfy the conflicting demands of various stakeholders while operating within the regulatory framework is an issue that continues to bother the management of manufacturing companies in their quest to attain greater heights. The management is thus placed in a difficult position that hinders high returns in terms of dividends to shareholders. High profits and dividends can be achieved through increased prices that customers are not ready to pay. Worse still, customers equally demand for high quality products at reduced prices while providers of funds lend at prohibitive interest rates and for shorter repayment period while regulatory bodies such as International Standard Organization and National Agency for Food, Drug and Administration and Control (NAFDAC) set minimum standards below which companies' products must not fall. But manufacturing must of course continue if human existence is to be guaranteed. What then is the way out? This calls for an approach that is capable of achieving organizations multi-faceted objectives in the face of competing socio-economic demands as constraints. This vacuum can be filled by value analysis. Cost reduction should not be confused but differentiated from cost control. Olowokure (1981) defined cost reduction as a "systematic approach to the achievement of real and permanent reduction in the unit cost of producing goods or rendering services without impairing the quality and functional elements of outputs". It starts with an assumption that current or planned cost levels are too high, even though cost control might be good and efficiency levels high.

Cost Control on the Other Hand

The regulation of the cost of operating a business and is concerned with keeping cost within acceptable limits, the limit will usually be specified as a standard cost in a formal operational plan or budget. If the actual cost differ from planned cost by an excessive amount, cost control action will be necessary (Ayinde, 1999).

Cost is any consideration given up in exchange for a benefit while profit is revenue less controllable divisional costs and apportioned central administration costs (Lucey, 1988). Profit can be improved either by increasing the sale value/quantity or reducing the cost or both, but in most cases, sales revenue depend on market forces which can seldom be substantially influenced by manager and even a real increase in cost cannot be passed on fully to customers because if demand falls and there is the need to reduce price to boost sales, hence a portion of the costs is borne by the manufacturer. In this spirit, Ayinde, (1999) therefore was of the view that it is not always possible to improve profit by increasing the sales value but believe that cost reduction is generally the only alternative for improving the profitability of a product. David and Kogan (2001) had identified the problem involved in cost control in industries as always complex and became further complicated due to

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international competition, fast changing technology and paradigm shift in information and communication. They observed that traditional budgeting mechanisms are more mechanical and trend based because decision are taken at the top and there is parroting back syndrome, which inhibits critical analysis.

Arunajatesan (2001) was skeptical about the efficacy of corporate rushing to information technology if made without analyzing the cost compatibility, staff competence and problem of obsolescence. However, he opted for the pursuit of cost improvement as a permanent objective to guide the management in daily business and not just an ad-hoc effort of cutting cost and get distracted with main focus of customers' retention. Many companies are retrenching in the face of economic downturn or reduce cost to maintain financial stability because they see cost reduction as an end in itself, but they need to broaden their vision by recognizing that cost reduction is only one component of cost management (Courtney 2002). A virile tool of cost management is value analysis, which is needed to achieve sustained growth because it addresses other components of the company's management structure, process and technology (David and Kogan 2001). In the operation of value analysis, product design features are evaluated relating to cost and construction while elements not contributing to functions are eliminated (Jarvis, 2002).

According to Courtney (2002), value analysis takes a company through three levels in evolutionary cycle. These cycles are:

1. ***Business Function (Tactical):*** Here, a company's processes are concentrated on the business function within a single department. Manager tends to fixate on isolated cost centers such as human resources, real estate, training or research and development.

2. ***Business Aligned:*** The Company's processes are focused on cost-enterprise efforts that involve the whole value chain. For example, a company creates a business to cross-sell to customers through online and traditional channels, realize cost efficiencies, build customers loyalty and increase sales.

3. ***Ecosystem aligned:*** At this highest level, a company moves beyond its own boundaries into the connected world. Its processes are highly involved, enabling it to develop alliances and partnerships with other companies to better manage cost. Here, cost management is fully integrated into a company's culture, strategies and operations that bring benefits of sharing centralized facilities and resources such as corporate headquarters, top management, and research and product development (Adekanola, 2007). Companies at this level see cost management not only in terms of reducing expenditures or increasing operating efficiencies, but also in term of doing things in new, different and imaginative ways.

   Courtney (2002) concluded that the growth of the ecosystem had opened up more opportunities for the formation of organizations that can adapt quickly to change, deliver predictable value and efficiency, achieve significant competitive advantage, and realize significant cost saving but it requires imagination and bold leadership.

Value Analysis Process

Jarvis (2002) asserted that value analysis is based on the application of a systematic work plan that may be divided into six steps namely orientation, information, analysis, innovation, evaluation, implementation and monitoring. At orientation stage, what to be analyzed is identified and this will typically be one of manufactured items, a process or service while information stage identifies and prioritize the customer of the item. Analysis phase is the stage when functions of the product are analyzed by functional analysis,

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which aimed at identified functions given by a product or part of it. Functions have an important (weight) and a cost. These costs are quantified and this leads to a list of functions ordered by their importance and value.

At innovation phase, alternatives are generated starting from the analysis of functions and cost, as well as a search for means that allow elimination, change or improvement and functions. The evaluations stage represents a confrontation of ideas, a collection of information about the feasibility and cost of those ideas and measures the values of the best idea. The implementation and monitoring phase summarizes and concludes the work that has been done here along with specific proposal. Action plans for implementation are equally described. Some of the major advantages of using value analysis according to Jarvis (2002) can be summarized into a high customer orientation focusing on those aspects of the product/service that better satisfy customers' needs. Value analysis equally brings cost reduction by eliminating functions that do not supply specific advantages to satisfy customers' requirements.

Also, new ideas that arise from the creativity/innovation phase may add radical changes and therefore competitive advantages that will be regarded by the market. In addition, value analysis creates a new systematic mentality to be taken into account for the designs of new products or to systematically improve the existing ones. By eliminating cost functions, Jarvis (2002) pointed out that the only drawback to the value analysis process is that it requires thorough supervision, lesser number of staff but with higher intelligence than is required by ordinary traditional approach to achieving organizational objectives. Some components (vitamins and minerals) of Bournvita perform the same function. Customers' response to price-quality relationship is swift. Since Value Analysis is only practiced on a fairly satisfactory level and customers demand for reduced prices and improved quality products, there is still need for improvement in term of quality and price which will increase productivity, enhance sale revenue and goodwill, ensure satisfaction of customers, creditors and suppliers as well as employees (corporate efficiency) through the spiral effect on sales, return and profitability as well as dividends.

The staffs are not well informed of the practice of Value Analysis Concept which results in the current low level of practice of value analysis as well as the company's current low level performance (profitability) of Cadbury Plc. This result is adjudged less satisfactory if an improved practice of value analysis is capable of improving corporate efficiency as revealed by Courtney's (2002) study where one of the world's leading managing companies dramatically increased its efficiency and saves more than seven million dollars ($7m). This translates to mean that the company can still do better by jettisoning the outdated, less effective traditional approach, adopt the new mantra 'value analysis' and thereby overcome corporate inefficiency.

Questions

1. Study and analyze the case.
2. Write down the case facts.
3. What do you infer from the case?

Source: http://www.unilorin.edu.ng/publications/olaniyi/Publicatn%203.htm

10.7 Summary

- Value analysis is a technique with immense possibilities, and systematically employed, it can achieve great economies and increased efficiency.

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- Although good results have been obtained in several individual cases in some industries, only a large scale and systematic application of this technique in all industries, and in defence production, can result in substantial economies on a national scale.
- The value analysis technique supported cost reduction activities by relating the cost of components to their function contributions.
- Value analysis defines a "basic function" as anything that makes the product work or sell. A function that is defined as "basic" cannot change.
- In all problem solving techniques, we are trying to change a condition by means of a solution that is unique and relevant.
- When trying to describe problems that affect us, we become locked in to a course of action without realizing it, because of our own bias.
- A function should be identified as to what is to be accomplished by a solution and not how it is to be accomplished. How the function is identified determines the scope, or range of solutions that can be considered.
- From a product design point of view, products that are perceived to have high value first address the basic function's performance and stress the achievement of all of the performance attributes.
- The first step in the value analysis process is to define the problem and its scope. Once this is done, the functions of the product and its items are derived. These functions are classified into "basic" and "secondary" functions.
- FAST permits people with different technical backgrounds to effectively communicate and resolve issues that require multi-disciplined considerations.
- Value analysis can be applied universally, i.e., to everything materials, methods, processes, services, etc., where it is intended to bring about economics. One should naturally start with items where the maximum annual saving can be achieved.

10.8 Keywords

Value: The value of a product will be interpreted in different ways by different customers.

Value Analysis: Value analysis is a "basic function" as anything that makes the product work or sell.

FAST: Function Analysis System Technique is an evolution of the value analysis process.

Cost Reduction: Cost reduction is the process used by companies to reduce their costs and increase their profits.

Reliability: Reliability (systemic def.) is the ability of a person or system to perform and maintain its functions in routine circumstances, as well as hostile or unexpected circumstances.

Quality: Quality in business, engineering and manufacturing has a pragmatic interpretation as the non-inferiority or superiority of something.

Quality Function Deployment (QFD): It is a "method to transform user demands into design quality, to deploy the functions forming quality, and to deploy methods for achieving the design quality into subsystems and component parts, and ultimately to specific elements of the manufacturing process."

Estimated Costs: A cost estimate is the approximation of the cost of a program, project, or operation.

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10.9 Review Questions

1. What do you mean by the concept of value?
2. Explain value analysis process in detail.
3. Describe value improvement process.
4. Briefly explain the various applications of value analysis.
5. Describe value analysis method.
6. What is the main objective of value analysis?
7. What is Function Cost Matrix?
8. What do you understand by Function Analysis System Technique?
9. Illustrate Function Analysis System Technique (FAST) with a diagram.
10. How would you create a FAST model?
11. Briefly describe clustering functions.
12. Explain organization for value analysis.

Answers: Self Assessment

1.	Product	2.	Value
3.	Basic	4.	General Electric
5.	Verb, Noun	6.	Divergent
7.	Single	8.	Performance
9.	Components	10.	Percent
11.	FAST	12.	Innovative
13.	Universally	14.	Monopoly
15.	Staff		

10.10 Further Readings

Books

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Notes

Online links

http://www.npd-solutions.com/va.html

http://www.value-eng.org/pdf_docs/monographs/FAbasics.pdf

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http://www.wixsonvalueassoc.com/99paper.pdf

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Unit 11: Purchasing Research

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Objectives

After studying this unit, you will be able to:

- Discuss Purchasing Research
- Explain Price Forecasting
- Discuss Forward Buying
- Elaborate Make or Buy Decision

Introduction

Previous unit dealt with the concept of value analysis, its application and organization. It also discussed the functional analysis system technique. In this unit you will study about purchasing research and price forecasting. This unit will also discuss forward buying and make or buy decision.

11.1 Meaning of Purchasing Reserach

One of the important functions of purchasing is that of purchasing research. In many large and well managed organizations there is a group of people doing formal purchasing research. This is not only the study of substitute materials to get over a recent problem of procurement, but also a long range study of the requirements of the present as well as anticipated products.

Purchasing research, understandably, also has the task of studying the trends and future forecasts of the cost of various input materials; and also that of the general economic conditions, industrial conditions, and national and international developments of interest for the task. Purchasing research will have to interact with the R&D and engineering departments of the company on a continual basis.

The idea is that when the crunch comes in the future, the company should not crumble under the pressure. The other tasks of purchase research include: make or buy studies, studies of alternative

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vendors studies in developing the vendors (in terms of their technical financial capabilities and needs), co. In short, purchasing research includes short and long-range studies of the internal company requirements and the external supply market. This is an important aspect of purchasing, and all organizations that can afford it, should launch formal purchasing research programs

11.1.1 Price Forecasting

Cost aspects are useful when dealing with the supplier on a one-to-one basis. However, there are very many situations, particularly regarding raw materials, where the material is subject to a multitude of economic factors which influence the price of the material. It becomes necessary on the part of the purchasing executive to take cognizance of and understand the price movements.

Caution Price forecasting, based upon the time-series methods of computing trends and business cycles, or based upon the understanding of the influence of various economic/ business parameters should be of some interest to the purchasing executive who would like to keep the costs low.

The objective is to keep the costs of purchases reasonably low, and if the prices of the materials do "run away", then to ensure the availability of supply of the material for the current and near future requirements.

11.1.2 Techniques of Price Forecasting

An important part of anticipating both future price levels and the risk that anticipated prices will not be achieved is developing strategies for forecasting prices. In general, there are two basic approaches to forecasting prices: fundamental analysis and technical analysis. While they are often presented as substitutes or competitors in price forecasting, the two can be complimentary. Most market analysts pay attention to both fundamental and technical factors even though they may emphasize one over the other.

- ***Fundamental Analysis:*** Fundamental price analysis is based on the notion that the underlying supply/demand conditions in a given market ultimately determine price. Since the futures market is attempting to discover prices that will balance supply and demand in some future time period, there is uncertainty in initially establishing an equilibrium price. The market may be "shocked" by new information resulting in traders' changing their assessments of what the equilibrium price will be in the future. Fundamental analysis is attempts to both anticipate changes in supply/demand information, and to evaluate the direction and range of price movement resulting from new information.

  Fundamental analysis may be simple (intuitive), or complicated (using quantitative statistical or mathematical models). In both cases, analysts are attempting to assess price implications of economic variables including:

  - seasonal use patterns
  - seasonal supply patterns
  - prices of substitute goods
  - prices of compliment goods
  - market structure

  Intuitive analysis uses a basic understanding of economic principles to hypothesize about price changes. Quantitative analysis combines knowledge of economic theory with mathematics and statistics to establish explicit relationships between economic variables and price. Several indicators are used to understand a given market. For example, the following reports are used by analysts to understand the respective markets.

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- ***Technical Analysis:*** While fundamental price analysis often asks the question: "Where should the price be?" given economic conditions, technical analysis asks the question: "How will we get there?" As such, technical analysis often deals with the timing of pricing decisions within a given price range. While sophisticated mathematical models are often employed with technical analysis, the only data used is past price history, volume traded, and in futures markets the open interest (i.e., how many futures contracts are outstanding). As such, technical analysis is simply the analysis of price trends —by looking at past prices, volume, and open interest technical analysts attempt to identify buy and sell signals based on underlying market emotion. The idea is to reduce the opportunity cost of buying too early or selling too late.

There are literally an infinite number of ways to look at past prices, but some of the more common technical indicators include:

1. Bar Charts
2. Lines of support and resistance
3. Consolidation planes (also called price channels)
4. Key reversals
5. Price Gaps and
6. Moving Averages

Self Assessment

Fill in the blanks:

1. Purchasing research has to interact with the …….....…. and engineering departments of the company on a continual basis.
2. Purchasing research includes short and long-range studies of the internal …….....…. and the external supply market.
3. An important part of anticipating both future …….....…. and the risk that anticipated prices will not be achieved is developing strategies for forecasting prices.
4. Most market analysts pay attention to both fundamental and …….....…. factors even though they may emphasize one over the other.
5. …….....…. price analysis is based on the notion that the underlying supply/demand conditions in a given market ultimately determine price.
6. Quantitative analysis combines knowledge of economic theory with mathematics and statistics to establish explicit relationships between economic variables and …….....….

Caselet

What is Involved in Cost Forecasting and Cost Analysis?

In preparing a budget, a distance teaching institution needs to forecast two types of costs: fixed and variable. The main fixed costs are likely to be capital investment and the salaries of full-time staff. Capital investment is needed for buildings and production facilities, such as television studios and printing presses. Of course, it may be possible to contract production services and thus reduce fixed costs. Salary costs will be determined by the extent to which the institution hires its own content and learner support specialists and how much it depends on consultants and part-time help.

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Variable costs are those that depend on the number, size, and quality of courses and those that depend on the number of students in the course. The first group includes the salaries of part-time staff (which vary with the length and nature of the course) and transmission costs (which vary with the length of the course). The second includes payments to learner support staff (which vary with such factors as the number of tutorials and the amount of feedback on assignments) and the costs of distribution (such as warehousing and mailing costs).

Cost forecasts for the design and production of materials must be based on assumptions about the number of students to take the courses, the costs of materials and labor, and the number of courses to be produced. Clearly, institutions' budgets will vary considerably, depending on their investment in face-to-face sessions, the technologies they use, the number of students, and the quality of materials.

Source: http://www.ouhk.edu.hk/cridal/gdenet/Management/Benefits/forecasting.html

11.2 Forward Buying

Although quantities to be purchased are normally determined by inventory management and control, it is often advantageous to purchase quantities in excess of the normal operating requirements of the manufacturing plant. If operational considerations or supply conditions indicate the need for such an inventory reserve, these purchases are termed as forward buying.

In order to ensure near-future availability, the buyer may have to take recourse to 'Forward Buying' which means buying the quantities now, but for the requirements of a future period of time. However, when the material is bought for 'future' and not for 'current' requirements, it raises questions as to whether this amounts to: (i) hoarding. or (ii) speculative buying. How ethical is the price consideration then? In a scarcity economy such as ours, the question assumes much importance. If the intention of purchase is solely to assure supplies to production, and not making a speculative profit on the inventory of materials, then it is justifiable. It is the business of an industrial enterprise to produce goods, market them, and gain a profit on the output and not to make a profit on the raw material inputs. The enterprise has thus an economic function to carry out. But, in carrying out that function how much of self-interest should it serve? It is not easy to answer this question because there is a thin line between what is 'to hoard' and what is 'to ensure future supplies to production operations. The difficulty is compounded in a scarcity-prone economy. The best thing would, perhaps, be to stick to the type of inventory 'norms as suggested by the Tandon. Also, if there is monitoring by an external agency such as a bank (which supplies funds), it would standardize and regulate the ethicality problem. With economic liberalization and therefore, competition with the multinational corporations, prices and, therefore, costs have to be kept low. Hence, there is an increasing emphasis, even in Indian organizations, on lean production that is, with minimal possible inventories of materials. This business imperative should put a dam, on the speculative inventory, if any.

Self Assessment

Fill in the blanks:

7. In order to ensure near-future availability, the buyer may have to take recourse to ……
8. If there is monitoring by an external agency such as a bank (which supplies funds), it would standardize and regulate the …… problem.
9. There is an increasing emphasis, even in Indian organizations, on …… that is, with minimal possible inventories of materials.

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11.3 Make or Buy Decision

When a request for a given material is received from a user department, purchasing routinely checks to see if the item is being kept in inventory somewhere in the company. Assuming that it is not in stock, a decision must be made as to how to produce it. This selection process often begins with the fundamental choice of make or buy.

Notes Management must decide whether a component, service, or finished product should be produced in the firm's own facilities or bought from an outside source.

In making the make-or-buy decision, management should strive toward the primary objectives of obtaining a product of specified quality from a reliable source at the lowest possible total cost and achieving the best utilization of available resources. Even when a firm has the ability to make an item itself, a more prudent choice may be to buy from an outside source – for cost reasons, for example.

Make-or-buy decisions are particularly important in the development of new products, affecting the economic viability of the offering as well as the ability of the firm to supply its market. Buying from an outside source can also be a form of risk control when entering a new market.

Example: When the German baby formula company, Alete, decided to introduce a limited line of commercially prepared baby foods, management did not want to incur the high risk investment of building a new plant for this purpose until a steady level of demand was assured. The company formulated the new products, specified their ingredients, and then farmed out their production to a contract manufacturer. Once sales volume picked up sufficiently, management brought production in-house.

Another trigger for make-or-buy deliberations could be dissatisfaction with a current supplier's performance. Quality and/or delivery may have become erratic and unpredictable over time, or the price of a part may have been increased to the point where reconsideration is warranted. This can happen when a supplier gets careless or too comfortable and begin to consider the buyer's business captive because of sheer inertia. It is sound purchasing practice to prevent this attitude from developing by keeping suppliers honest and "hungry for the business" and by considering alternative courses of action periodically including making the product internally.

The issue of make or buy also presents itself when a firm's sales volume changes significantly. When decreased sales leave plant capacity underutilized, a concern for continued employment will tend to return parts previously bought from outsiders to a firm's production lines wherever possible. Conversely, if demand increases markedly, the firm must compensate for inadequate facilities by supplementing its own production with purchases from outside sources. This may only be a stopgap measure, however. If the sales increase is judged to be permanent, an expansion of the firm's own capacity may be in order.

A variety of factors and considerations affect the make-or-buy decision. A firm that makes a part preserves its independence and enhances its production skills. Buying the part results in source dependence without the benefit of capability development. Quality and scheduling control are also easier to exercise internally than externally. Large quantity needs to favor the make approach, while low volume demand suggests the buy approach.

On the other hand, higher fixed cost of building and maintaining company-owned capacity leads to a lack of flexibility. Buying an item from an outside source helps a company to avoid additional fixed cost and brings with it a higher degree of flexibility because reduced sales simply translate into fewer purchase orders placed with outside suppliers. A make decision

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usually means a single-source situation, with all the attendant risks in case of a breakdown or strike. This is why some firms have turned the make-or-buy decision into a make-and-buy decision, enjoying the best of two worlds by combining the advantages of both approaches. In any event, buying often involves several sources.

Did u know? Factors that are to be carefully analyzed in arriving at make or buy decision includes following:

- quality requirement
- quantity requirements
- cost aspects.

Other factors potentially influencing the make-or-buy choice include capability (know-how and equipment), available capacity, cost per unit, reliability of supply, need to maintain secrecy, continuity of employment and investment required. Depending on its magnitude and relative importance, any of these factors could support either outcome. And because these factors change over time, make-or-buy decisions should be reviewed periodically.

Task Make a presentation on make or buy decision.

Self Assessment

Fill in the blanks:

10. Make-or-buy decisions are particularly important in the development of new products, affecting the …… of the offering as well as the ability of the firm to supply its market.
11. A trigger for make-or-buy deliberations could be dissatisfaction with a current …… performance.
12. If demand …… markedly, the firm must compensate for inadequate facilities by supplementing its own production with purchases from outside sources.
13. If the sales increase is judged to be permanent, a/an …… of the firm's own capacity may be in order.
14. …… and scheduling control are easier to exercise internally than externally.
15. A make decision usually means a …… situation, with all the attendant risks in case of a breakdown or strike.

Case Study

Forward Buying for Profit Maximization

Forward buying is a term that refers to acquiring materials well in advance of the time when the material may actually be needed. This kind of purchase can be made for a number of reasons, such as pending price increase, a potential supply shortage or unusual manufacturing logistics. Many factors influence the extent to which forward buying can be practiced. The stability (perishability) of the purchased material is probably

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the most important factor. Where material stability is not a problem, further considerations need to be made: Will demand for the material change significantly in the near term? Are funds available to finance forward purchases? Are materials-handling equipment and warehousing facilities available if necessary? Having satisfied questions like these, a conscientious buyer can maximize corporate assets utilization through forward buying techniques. This case will focus on the use of forward buying in anticipation of a price increase.

Forward buying in this case is done to minimize the impact of a price increase, which is another way of effectively delaying the price increase for a period of time. To what extent (in terms of amount of material or forward period of time) should forward buying be done? It should be done to the extent that it maximizes asset utilization—the net savings accrued as a result of the forward purchase is maximized against having made no forward purchase at all. How does a purchasing agent determine how far ahead to buy? One would expect the net savings obtained to first increase with each increment purchased, due to low price advantages. Then, as additional increments are purchased, the savings should decline, due to cost disadvantages. To do the job well, the purchasing agent must be able to identify the purchase quantity that generates the maximum savings. In order to identify the maximum savings, an equation must be developed which describes the various cost factors and savings.

Question

Critically analyze the above case?

Source: http://connection.ebscohost.com/c/articles/4524039/forward-buying-profit-maximization

11.4 Summary

- Purchasing research is not only the study of substitute materials to get over a recent problem of procurement, but also a long range study of the requirements of the present as well as anticipated products.
- Cost aspects are useful when dealing with the supplier on a one-to-one basis.
- Price forecasting, based upon the time-series methods of computing trends and business cycles, or based upon the understanding of the influence of various economic/business parameters should be of some interest to the purchasing executive who would like to keep the costs low.
- There are two basic approaches to forecasting prices: fundamental analysis and technical analysis.
- Fundamental price analysis is based on the notion that the underlying supply/demand conditions in a given market ultimately determine price.
- Technical analysis often deals with the timing of pricing decisions within a given price range.
- Forward Buying' which means buying the quantities now, but for the requirements of a future period of time.
- With economic liberalization and therefore, competition with the multinational corporations, prices and, therefore, costs have to be kept low.
- Management must decide whether a component, service, or finished product should be produced in the firm's own facilities or bought from an outside source.

Notes

- Make-or-buy decisions are particularly important in the development of new products, affecting the economic viability of the offering as well as the ability of the firm to supply its market.

11.5 Keywords

***Forward Buying*:** The placement of an inventory purchase order earlier than required in order to take advantage of a special price offer, or similar.

***Fundamental Analysis*:** Fundamental analysis of a business involves analyzing its financial statements and health, its management and competitive advantages, and its competitors and markets.

***Hoarding*:** In economics, hoarding is the practice of buying up and holding resources so that they can be sold to customers for profit.

***Key Reversals*:** A chart formation that signals a reversal of the current trend. In an uptrend, the market must open above the previous day's close, make a new high for the trend and then close below the previous day's low.

***Make or Buy Decision*:** A business often confronts the question whether it should perform a given part of its production process internally — that is, with its own employees and materials — or contract with another firm to perform the work.

***Market Analysis*:** A market analysis studies the attractiveness and the dynamics of a special market within a special industry.

***Opportunity Cost*:** The difference in the performance of an actual investment and a desired investment adjusted for fixed costs and execution costs.

***Price Trends*:** The consistent movement of prices in a certain direction.

***Purchasing Executive*:** Purchase executive is the head of the purchase department.

***Quantitative Analysis*:** A research technique that deals with measurable items such as the value of assets and the cost of capital.

***Speculative Buying*:** When purchasing is done purely from the point of view of taking advantage of a speculated rise in price of the commodity it is called speculative buying.

***Speculative Inventory*:** The term "speculative inventory" can mean different things, but in general, it refers to inventory that a business obtains and holds in anticipation of future demand, rather than to meet current demand.

Technical Analysis: Analysis of past price changes in the hope of forecasting future price changes.

11.6 Review Questions

1. Define purchasing research.
2. Why do you think is purchasing research important for companies?
3. Explain price forecasting.
4. Mention and discuss the different techniques of price forecasting.
5. Differentiate between fundamental analysis and technical analysis.
6. Explain the concept of forward buying.
7. Discuss make or buy decisions.

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8. What are the different reason for make or buy decisions?
9. What are the factors that are needed to be analyzed before arriving at a make or buy decision?
10. Write a short note on:
    (a) Price forecasting
    (b) Forward buying
    (c) Technical analysis.

Answers: Self Assessment

1.	R&D	2.	Company requirements
3.	Price levels	4.	Technical
5.	Fundamental	6.	Price
7.	Forward Buying	8.	Ethicality
9.	Lean production	10.	Economic viability
11.	Supplier's	12.	Increases
13.	Expansion	14.	Quality
15.	Single-source		

11.7 Further Readings

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http://www.enotes.com/make-buy-decisions-reference/make-buy-decisions

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Unit 12: Stores Management

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Objectives

After studying this unit, you will be able to:

- Explain the Concept of Stores Management
- Discuss the Purpose of Store Management
- Explain the Location and Layout of a Store
- Discuss the Cost Aspects and Productivity in Store Management
- Describe the New Developments in Storing

Introduction

In the previous unit, we dealt with the concept of purchase research and price forecasting. The unit also discussed about forward buying. This unit will help you to understand the concept of Stores management. The various section and sub section of this unit will also summarize the problems and developments in storing. As all the activities in any organization cannot be carried out at one point of time, storage is an inevitable process. It increases the value of the material by simply carrying it overtime; no transformation of any characteristics is desired. Thus a store in any company has a vital role to play. All other activities involving materials are in day-to-day touch with the stores. In a majority of manufacturing organizations material constitutes the major fraction of cost, i.e. 60 to 80% of total cost. The cost of capital blocked in inventories is substantial. If this part of working capital is not properly managed the subsequent losses may be enormous.

The success of the business, besides other factors, depends to a large extent on the efficient storage and material control. Material pilferage, deterioration and careless handling may lead to reduced profits. Stores management is concerned with carrying the right kind of materials in

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right quantity, neither in excess nor in short supply, providing it quickly as and when required, keeping it safe against any kind of deterioration, pilferage or theft, and to carry out the efficient performance of all these functions at lowest possible cost.

12.1 Purpose of Store Management

A significant role is played by stores in the operations of a company. Store department remains in direct touch with other departments of a company in its day-to-day activities.

Did u know? The key objective of the stores is to provide non-stop service to the manufacturing divisions.

Additionally, a store is time and again equated directly with money, as money is locked up on the stores. The objectives of the stores can be classified as follows:

- ***Receipt:*** Receiving and accounting of raw-materials, bought out parts, spares, tools, equipment and other items.
- ***Storage:*** Provision of right and adequate storage and preservations to ensure that the stocks do not suffer from damage, pilferage or deterioration.
- ***Retrieval:*** Facilitating easy location and retrieval of materials keeping optimum space utilization.
- ***Issue:*** Fulfilling the demand of consumer departments by proper issue of items on the receipt of authorized purchase requisitions.
- ***Records:*** To maintain proper records and update receipt and issue of materials.
- ***Housekeeping:*** Keeping the stores clean and in good order so that the handling, preservation, stocking, receipt and issue can be done satisfactorily.
- ***Control:*** Keeping a vigil on the discrepancies, abnormal consumptions, accumulation of stocks, etc., and enforcing control measures.
- ***Surplus Management:*** Minimization of scrap, surplus and obsolescence through proper inventory control, and effective disposal of surplus and obsolete items.
- ***Verification:*** Verifying the bin card balances with the physical quantities in the bins and initiating the purchasing cycle at appropriate time so as to avoid the out of stock situations.
- ***Coordination and cooperation:*** To coordinate and cooperate with the interfacing departments such as purchasing, manufacturing, production planning and control, inspection, etc.

In India, owing to stiff supply positions, 4 to 6 month's inventories are not uncommon and, in fact, for certain imported items, it could be as high as 24 months" stock. In this context, stores management assumes greater importance.

Caselet

Assistant Store Manager

Natalie has worked as a full time Assistant Store Manager for Aldi for the last 2 years. It's her responsibility to maintain stock availability, manage staff issues, ensure the store is clean and tidy and even deal with the occasional theft. Not to mention keeping the store 100% customer-focussed.

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A typical day starts at 7am where she'll see to the produce in the morning, manage the till operators and the 'biggie' of the day is making sure there's enough space for the Thursday or Sunday special offers. Then there's the close - cleaning the store, cashing up (when I'm in charge), banking and paperwork. "It's a busy old day but it's easy when your team is hard working, enthusiastic and cooperative. I love working with them but I love socialising with them even more. Last Christmas, the whole team went on a night out! It was a lot of fun."

When the manager is away Natalie runs the store. "The first time I realised I was in charge of a multi-million pound retail operation it was a huge thrill I can tell you."

"Some people think that if you work at Aldi the hours are ridiculous and you never get any time off. It's not true at all. I get 2 days off a week like most of the rest of the country. Our rotas are quite flexible so if there's anything I need specific time off for I can work my hours round it."

Source: http://www.careers.aldirecruitment.co.uk/accessible/case-studies/store-manager.asp

Self Assessment

Fill in the blanks:

1. A store is time and again equated directly with …….....…., as money is locked up on the stores.
2. Stores facilitates easy location and …….....…. of materials.
3. A store manager maintain proper …….....…. and update receipt and issue of materials.
4. One of the main objectives of store management is …….....…. management.
5. …….....…. of the bin card balances with the physical quantities in the bins is another important function of store management.

12.2 Store Location and Layout

The concept of store location and layout can be explained as follows:

12.2.1 Store Location

The location of stores is a strategic decision which if once taken cannot be easily undone. It would be extremely costly to change the storage location at a later stage. It should be carefully decided and planned so as to ensure maximum efficiency. The optimal location of stores minimizes the total transportation, handling and other costs related to stores operation and at the same time provide the needed protection for stores items. The models of facilities planning can be applied to determine the optimal storage location in large size organizations. Store location depends upon the nature and value of the items to be stored and the frequency with which the items are received and issued to the different departments.

Example: Other important factors governing the location are the number and location of end users, variety and volume of goods to be handled, location of the central receiving station and accessibility to rail or road links.

In general, stores are located close to the point of use. Raw-materials stores is usually located near the first operation (in case of line layout), in process stores near to subsequent operation, and finished goods stores near the shipping area. The tools and supplies stores are located

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centrally to the personnel and equipment served. In big plants it may not be possible to locate the stores which are convenient to all the departments and at the same time near to the receiving section. Usually a central store is located near the receiving section and the issues are decentralized by setting up sub stores conveniently located to serve user departments.

Task Visit a store nearby you and study the location and layout design and make a presentation on the same.

The location and building up of stores should be done with a futuristic outlook. The provision for the new departments and the increase in the volume to be stored should be kept.

12.2.2 Layout and Design of Stores

The efficient layout and design of stores is very important from the point of view of its functioning which is linked to the overall functioning of the plant.

Notes A good layout must bring the point of origin, store room and point of use in adjacent and proper reference of best material flow.

The planning and design of stores should be carried out with the following objectives in mind:

- To achieve maximum ease of operation with ready accessibility of major materials.
- To achieve minimum waste of space and flexibility of arrangement.
- Minimization of material handling requirements.
- Minimization of material deterioration and pilferage.

To assist the planning to meet the objectives, following information should be generated from the records:

(a) Classification of store items by size, number, weight, frequency of handling (FSN-Fast moving, Slow moving, Non-moving), handling arrangements, perishability.

(b) Space requirement to store the item.

(c) Units withdrawn at a time.

(d) Maximum number of units to be stored at one time.

(e) Storage facility best suiting the item.

(f) List of available storage space for different kinds of storage facilities.

(g) Size and shape of the space available for laying out the stores.

(h) Prepare a flow diagram of the flow of materials through the stores.

(i) REL Chart for the storage of different classes of materials can be prepared.

While planning the layout and design of the stores, following factors should be considered:

- The space for receipt and inspection should be provided adjacent to the main stores
- Use of third dimension must be made effectively.
- Different storage facilities should be situated in clearly defined lanes, so that items are quickly stored and located.

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- Main lanes or aisles should usually be 1.5 to 3 metres wide, depending upon the type of material and the amount of traffic involved.
- Clear markings should be made at storage space to facilitate location and identification.
- The fast moving items should be stored near the dispensing window; the slow moving should be away from the window.
- The layout should permit the use of modern material handling equipment.
- Stores layout should encourage the FIFO, i.e. the old stock should be used earlier and the storekeeper should not be compelled to keep the new stock above the old one.
- Due space should be left for expansion purposes in each portion.
- A pleasing and hygienic environment must be provided within the store room. This may be done by proper selection of the colour of walls, provisions of exhaust removal, provision of cleaning, etc.
- Adequate and clear lighting arrangements should be provided.
- Adequate safety provisions including fire-fighting equipment, alarms, accident control and prevention methods should be in-built in the store room design.
- Special facilities, such as cold room, heating equipment, air-conditioning etc., if required, should be carefully planned in advance.

Self Assessment

Fill in the blanks:

6. The location of stores is a …….....…….. decision which if once taken cannot be easily undone.
7. Store location depends upon the …….....…….. and …….....…….. of the items to be stored.
8. The location and building up of stores should be done with a …….....…….. outlook.
9. The planning and design of stores should be carried out to achieve minimum waste of space and …….....…….. of arrangement.

12.3 Cost Aspects and Productivity

It is mentioned incorrectly that each cubic metre of space should be employed by stocks for high efficiency. This type of stocking may considerably decrease the speed of movement of material frequently and create blockages apart from influencing the overall safety. Consequently, maneuvering needs for tackling equipments and for minimizing the time needed for receipt, stocking and issue, should be borne in mind at the planning stage in order to make sure real efficiency and effectiveness.

Costs involved in stores can be analysed under two heads, vis., fixed and variable. Fixed costs are to be incurred irrespective of the utilization of space of the stores. They include money spent on land and buildings, rent, interest, repairs, maintenance, insurance, etc.

Variable costs vary with the volume of throughput. They consist of handling costs, damages, deterioration, obsolescence, etc. Apparently, when the throughput or the volume of goods handled is high, the total cost per tonne is low. This must be the aim of the stores manager in order to optimise the costs in stores.

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Self Assessment

Fill in the blanks:

10. Costs involved in stores can be analyzed under two heads namely …….....…….. and …….....……..

11. When the throughput or the …….....…….. of goods handled is high, the total cost per tonne is low.

12.4 Problems and Developments

It is an inauspicious fact that stores management has been considered as a clerical function. In the array of materials management, stores is deemed as the least glamorous and it never attracts talent.

Caution It is forgotten that the stores manager is probably the custodian of the single largest group of current assets and plays a pivotal role in ensuring smooth production, besides assisting purchase activities through timely support. This is the foremost difficulty and challenge that faces the stores manager today.

Many decisions in stores management, for instance selection of racks, bins, handling equipment, safety practices, codification, training personnel and accounting, call for considerable skill and ability to coordinate with other departments as well as with outside agencies. These aspects should be highlighted and appreciated so that the stores function is given due importance. Other regions in stores, such as records keeping, movement analysis to reduce obsolescence, surplus and damage are crucial to the profitable operation of the firm and the stores manager confront a challenge in these areas as well.

In many organizations, the scrap yard comes under the control of the stores manager. This is an entirely new responsibility calling for the ability to maximize returns on the disposal of scrap. The chief stores officer has under him separate officers for the functions of receipt, issue, kardex and sub-stores. Besides coming into contact with the production, purchase, maintenance, inspection and finance departments within his organization, he has to some into contact with outsiders like suppliers, transport carriers and bankers. In order to meet such challenges, the significance of the stores function must steadily gain thrust and qualified engineers must be posted as chief officers reporting to the materials manager.

Self Assessment

Fill in the blanks:

12. Records keeping is crucial to the …….....…… operation of the firm.

13. The chief stores officer has under him …….....…… officers for the functions of receipt, issue, kardex and sub-stores.

12.5 New Developments in Storing

A new development in storage practice in India will be discussed briefly in this section. This is known as dry storing. This is fairly new concept in sack/bulk stores and has resulted in an extremely versatile and economical method of dry storage. Available initially in four sizes, that is 250, 500, 750, and 1000 tons, the stores are suitable for storing any type of bagged material, as

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well as grain and all other types of foodstuffs and materials. Made from thick rotproof butyl rubber laminate and heavy duty steel mesh. They are entirely portable allowing their use to be either or temporary and permanent they can be moved from one site to another in a matter of hours. An exceptional advantage is simplicity of operation and no mechanical loading aids need to be used unless desired.

The stores are circular in shape, with an outer support wall made up to 7′–10′ high 5 gauge weldmesh. To the inside of this is secureda thick lining of butyl rubber laminate, which consists of 0.040" layer of black butyl rubber faced with a 0.010′ thick skin of white EPDM rubber bonded to it. This lining passes up and over the top of the side-wall, to which it is secured by a continuous clip/rim, and a 0.050" thick butyl rubber floor is bonded to the sidewalls.

The effect is that of a giant bin, its diameter according to the specific model varying between 38′0" and 68′0". The work/storage area inside the bin is not obstructed in any way, and in any way, and the roof/lid fitting over it, again made from thick butyl rubber laminate, is intended to be supported at the centre by the sacks actually being stored. At the sides, it is clipped to the rim of the sidewalls by clamps, which are tensioned by a simple strainer device and not only hold the lid firmly in place but also effectively seal the inside off from atmosphere.

Sacks can be loaded into the store by various methods. Thus, a stairway can be built up to the sidewall so that the sacks can be quickly passed into the store or a lorry can be backed up to the sidewall and sacks passed over from the vehicle tailboard. A third alternative is the use of a mechanical conveying system.

Example: For bulk materials the store can be loaded manually or mechanically. Once inside the store, sacks are loaded from the centre outwards, higher at the middle up to approximately 15′0" in the largest model and tapering towards the sides, the lid being conical in shape for this purpose.

Since the storage is equally airtight and waterproof bagged grain and other products can be safely stored for long periods.

Self Assessment

Fill in the blanks:

14. Dry Storing is a new development in .....…… practice in India.
15. The stores are suitable for storing any type of .....…… material, as well as grain and all other types of foodstuffs and materials.
16. The stores are .....…… in shape, with an outer support wall.

Case Study

Store Management at ABC

ABC company is a young growing organization with a turnover of over ₹ 200 crore. The company has a central store near the factory, 7 regional stores at important locations and 27 depots or storage points from where supply is made to the stockists who sell the company's products. Its current stock holding is: ABC company is a young growing organization with a turnover of over ₹ 200 crore. The company has a central warehouse near the factory, 7 regional warehouses at important locations and

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27 depots or storage points from where supply is made to the stockists who sell the company's products. Its current stock holding is:

18 days All India sales at Central store

37 days All India sales at 7 regional stores

50 days All India sales at its 27 depots

The company was making very good profit on its sales and the marketing manager who was in charge of the entire distribution system was least concerned about the huge inventory.

The top management was, however, not very happy with the situation and hired a professional materials manager to conduct a diagnostic study. The study revealed that out of the total stock held, a considerable volume, representing about 25 days annual sales was slow moving and 72 non-moving items valuing more than ₹ 4.1 crore had not moved for over two years. 354 items that were slow moving valued at ₹ 6.1 crore could last for about 5 years based on the present rate of consumption.

The area salesman attached to the depots indented for the new stocks and not the depot incharge.

Questions

The area salesman attached to the depots indented for the new stocks and not the depot incharge. As a professional materials manager, you are asked to:

1. Comment on the shortcomings of the present state of affairs.
2. Comment on the current system of controlling finished goods inventories.
3. Suggest area of improvement in the present system.

Source: *Narayan.P, Subramanian.Jaya(2008).* "Inventory Management: Principles and Practices". *Excel Books Pvt. Ltd.*

12.6 Summary

1. As all the activities in any organization cannot be carried out at one point of time, storage is an inevitable process.
2. The cost of capital blocked in inventories is substantial. If this part of working capital is not properly managed the subsequent losses may be enormous.
3. Stores management is concerned with carrying the right kind of materials in right quantity, neither in excess nor in short supply, providing it quickly as and when required, keeping it safe against any kind of deterioration, pilferage or theft, and to carry out the efficient performance of all these functions at lowest possible cost.
4. The key objective of the stores is to provide non-stop service to the manufacturing divisions.
5. Verifying the bin card balances with the physical quantities in the bins and initiating the purchasing cycle at appropriate time so as to avoid the out of stock situations.
6. The optimal location of stores minimizes the total transportation, handling and other costs related to stores operation and at the same time provide the needed protection for stores items.
7. The models of facilities planning can be applied to determine the optimal storage location in large size organizations.
8. Costs involved in stores can be analysed under two heads, vis., fixed and variable.

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9. Dry storing is fairly a new concept in sack/bulk stores and has resulted in an extremely versatile and economical method of dry storage.
10. An exceptional advantage of dry storing is simplicity of operation and no mechanical loading aids need to be used unless desired.

12.7 Keywords

Fixed Cost: A cost that does not change with an increase or decrease in the amount of goods or services produced.

Variable Cost: A corporate expense that varies with production output.

Stock: The goods or merchandise kept on the premises of a business or warehouse and available for sale or distribution.

Pilferage: Pilferage is the theft of part of the contents of a stock.

Deterioration: It is a symptom of reduced quality or strength.

Surplus Management: The technique of managing the funds of a company or financial institution with the aim of earning a return on the available assets and creating more assets than liabilities.

Location: An actual place or natural setting in which a film or broadcast is made, as distinct from a simulation in a studio.

Layout: The way in which the parts of something are arranged or laid out.

12.8 Review Questions

1. How does a store helps in increasing the value of the material?
2. What is the purpose of store management?
3. How does a store facilitate surplus management?
4. Briefly explain the verification function of stores.
5. How does change of the location of store affects it financially?
6. What objectives should be kept in mind while planning and design of stores should be carried out?
7. Explain briefly the costs involved in stores.
8. What are the problems associated with stores management?
9. What are the new developments in storing in India?
10. What is the role of chief stores officer in stores operations?

Answers: Self Assessment

1.	Money	2.	Retrieval
3.	Records	4.	Surplus
5.	Verification	6.	Strategic
7.	Nature, value	8.	Futuristic

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9. Flexibility
10. Fixed, variable
11. Volume
12. Profitable
13. Separate
14. Storage
15. Bagged
16. Circular

12.9 Further Readings

Books

Ramakrishnan. R V, Tony Arnold. J R (2007). "*Introduction to Materials Management*". Pearson

K. Shridhar Bhat, "*Production and Materials Management*". Himalaya Publishing House

Chary. S.N., "*Production and Operations Management*". Tata McGraw Hill

Gopalkrishanan. P, Sundaresan. M, "*Materials Management: An Integrated Approach*". PHI Learning Pvt. Ltd.

Online links

http://www.slideshare.net/thombremahesh/stores-management

http://www.slideshare.net/nfs7/store-management

http://www.managementstudyguide.com/store-design-and-layout.htm

http://retail.about.com/od/storedesign/ss/store_layouts_2.htm

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Unit 13: Evaluation of Materials Management

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13.2 Difficulties

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Objectives

After studying this unit, you will be able to:

- Discuss the Organization and Difficulties in Materials Management
- Explain Its Process and Criteria
- Discuss the Reporting and Purchasing

Introduction

Previous unit dealt with the concept of stores management, its purpose and location and layout. It also discussed the cost aspects, productivity, problems and new developments in the area of stores management. In this unit you will study about the organization and difficulties in the evaluation of material management's performance. This unit will also discuss the process and criteria along with the reporting and purchasing for the evaluation of material management's performance.

13.1 Organization

The evaluation of materials management can either be done by external agencies or internally. Within the organization itself, the top management, usually at the end of the financial year and periodically during the year, evaluates the performance on the basis of inventory holding and obsolete items. The user-departments evaluate the materials function in terms of the number and the duration of the stock-out. In a few Indian organizations, committees frequently review the performance of materials management against the objectives set for the department. It is known that suppliers who are evaluated by the materials management department, in turn, evaluate the materials manager with regard to quality consciousness, adherence to payment schedule and his importance as well as decision-making capabilities in the hierarchy. The other external agencies interested in the performance of a materials manager arc: banks with regard to the credit-worthiness, and professional associations and national association of materials management with respect to the ethical practices. Occasionally, external consultants evaluate the materials management systems to suggest improvements.

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Self Assessment

Fill in the blanks:

1. The evaluation of …….....… can either be done by external agencies or internally.
2. The user-departments evaluate the materials function in terms of the number and the duration of the …….....…
3. External consultants evaluate the materials management systems to suggest …….....…

13.2 Difficulties

Before proceeding to discuss the process of evaluation, it is desirable to understand the background in which the materials manager operates. While all the managerial functions like production, marketing, etc., as well as a large number of other professions in the world are evaluated on the basis of their achievements, materials management is one of the few professions which is judged by failures or stock-outs. It should also be emphasized that the integrated concept of materials management is hardly a decade old and hence there could be misjudgments on the part of the materials manager. In a controlled economy like India's, it is increasingly difficult to procure materials as per well-known principles. The lead time is invariably high because of administrative controls and procedures. What is worse in some firms, the materials manager is held responsible for the total inventory, including raw material, work-in-progress, finished goods and obsolete items, even though he can control only the raw materials. In view of all this, goals are difficult to set, hard to achieve and hence impractical to measure, as the ideal conditions do not exist in practice. The concept of MBO or management by objectives can also be used for goal setting and evaluation purposes.

Caselet

Materials Management

When manufacturing was in its infancy, companies found it difficult to keep a steady supply of the materials needed to keep the machines roaring and the products rolling off the assembly line. Some companies chose to order an abundance of stock which cost them more in warehouse space and sometimes left them holding a large quantity of unused inventory or they tried to predict accurately when they needed to re-order based on current production levels. While both methods sometimes paid off, neither took into consideration the variability of supply and demand. These situations were known as "Push" systems and were common up until World War II.

The opposite of "Push" systems are "Pull" systems. In a "Pull" system, reorders are based on need not on anticipation. For example, if a grocer has twelve cartons of orange juice for sale on the shelf and all but three of them are sold, he knows to go back into the warehouse and bring out another 9 cartons. He doesn't try to determine how long those cartons will last nor does he put out 30 cartons just in case. In manufacturing, "Pull" systems allow companies to save money on excess inventory and so they were popular, but they weren't full-proof. Delays in communication and slow lead-times sometimes prevented them from getting their supplies before they ran out.

During World War II, the concept of the reorder-point was developed. Researchers recognized the need for a materials management strategy that took into consideration the

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variability of supply and demand (as the "Pull" system does) but which allows for orders to be placed in plenty of time for the goods to arrive before the stock is depleted. The Reorder-Point takes into consideration lead-times for the creation of those materials so that companies don't wait until the last minute to reorder. Instead, when their stock reaches a certain level (determine through complex mathematical computations), they place an order.

As "Pull" systems were being refined by researchers, an additional advancement in materials management was devised. This advancement was called Period Batch Control, and it allowed businesses to set a fixed lead-time for their productions. Companies were able to do this by scheduling the creation of the different components that went into the finished product. For example, one week the supplies would arrive and two weeks later the components would be completed and would be moving on to be turned into sub-assembly parts.

Batch Control started off primitively, but in the 1970's the automotive industry saw incredible success by computerizing the scheduling necessary for developing these fixed lead-times. Today, batch control is central to Materials Requirements Planning (MRP) which uses software to determine these lead-times so that "Pull" systems can be more effectively accommodated.

Obviously, materials management has had a long history that began with an inefficient method of guessing how much stock would be needed. Today's improved, technology-based approach literally allows companies to tell vendors the moment they hit the reorder point and thanks to improved batch control strategies those reorder points are more accurate than ever as well. This combination of technology and proven effective materials management strategies have been an important asset to businesses since their development.

Efficient materials management not only keeps the business running smoothly but also helps companies maintain improved relationships with the members of their supply chains, cut down on their costs, and satisfy the demands of their customers. All of which have become increasingly important because of the competitive market most organizations are faced with today. These benefits are not optional; they have become mandatory for companies that have been successful in their fields.

Source: http://www.epiqtech.com/inventory_Materials-Management.htm

Self Assessment

Fill in the blanks:

4. In a controlled economy like ….....……., it is increasingly difficult to procure materials as per well-known principles.
5. The ….....…….. is invariably high because of administrative controls and procedures.
6. The concept of ….....…….. is used for goal setting and evaluation purposes.

13.3 Process and Criteria

The process of evaluation can be visualized on various measures, either on temporal comparison basis, i.e., performance over financial or calendar years—or between similar companies—interfirm comparisons—over the same year. The criteria of evaluation, obviously, depend on the corporate objectives, company culture, functions of materials management, evaluation process of other departments, etc., and hence could vary, and do vary, from company to company. The

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process in all the cases is to formulate norms for each of the characteristics and compare the actual performances with the norms. It should be emphasized, in this context, that it will not be possible to act norms for subjective characteristics.

Did u know? The subjective characteristics are source development, training and manpower development as well as morale in materials department, exception reporting, good buyer-seller relations, satisfaction to the user, materials managers' knowledge of processes and products, attitude to modern techniques of materials management and development of manuals and procedures. The objective criteria include the frequency and intensity of stock outs, ratios involving inventory.

Example: Sales to inventory and value of obsolete items, consumption to inventory carrying cost, transport cost, costs of acquisition, use of codification and value analysis, variety reduction and standardization.

Self Assessment

Fill in the blanks:

7. The …….....….. of evaluation, obviously, depend on the corporate objectives, company culture, functions of materials management, evaluation process of other departments, etc.
8. The process in all the cases is to formulate norms for each of the characteristics and compare the …….....….. with the norms.

13.4 Reporting and Evaluating

The evaluation of the materials function is usually done by the top management on the basis of periodic reports emanating from the materials wing. Mere facts reflect what has happened, whereas the reports would give the summary of the working of the purchasing function.

Caution The report should be written in a simple language, clearly and briefly.

Reporting is a communication which helps in setting things right and goes a long way in efficient functioning of the department. Besides establishing an effective communication, reporting is the means for collection and dissemination of data. This process is a two-way traffic, weekly reports containing the value of purchases, stock status, stock-outs, etc., usually meant for the middle-level executives, are common in many organizations. Monthly and annual summaries of the report with special emphasis on long-term aspects, such as effects of cost reduction achieved, source development, vendor rating, value analysis, are found to be useful documents for the management.

In order to take suitable remedial corrective measures and to improve materials activities in the organization, the reports should be submitted at the appropriate time - viz. monthly reports in the first week of the following month and an annual report in the first month of the following year. Wherever necessary, diagrams, charts, graph, tables and comparative statements with adequate explanatory notes should be made in the reports. The frequency and content of the reports depend upon the level to which it is intended. Quarterly and annual reports with specific recommendations on future are intended for top management, while the monthly reports with

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detailed information may be sent to all in the purchase and user departments. The reports should be accurate, up-to-date, brief, clear and to the point. The report should serve the materials policy in an organization, namely, continuity of supply of uniform quality of input, with the lowest cost of ultimate product.

For this purpose, the reports should be presented suds that they are easily read and understood.

Notes The report must include enough supporting diagrams, data and charts to explain the variations from the budgeted figures.

The reports should cater to the management's needs, an analysis of the business conditions, environment price movement, material requirements, estimates of cash requirements, changes in lead-time, comparison of actual performance with budget, etc. Obviously, the reports should be more frequent, containing detailed and quantitative data to the operating levels, whereas the results should be summarized with suitable recommendations for the policy-making level. The important aspects in reporting are: (a) clarity. (b) brevity, and (c) periodicity (related to frequency.)

Task Choose a company and formulate the materials management evaluation criteria for it.

The evaluation of materials management can either be done by external agency or internally. The process of evaluation can be visualized on various measures either on temporal comparison basis i.e. performance over financial or calendar years - or between similar companies inter-firm comparisons-over the same year. The criteria of evaluation depends on corporate objective, company culture, functions of materials management, evaluation process of other departments etc. and hence could vary, and do vary, from company to company. An illustrative list of criteria in the form of ratios given below can be used to evaluate the performance of different functions of Materials Management.

Material Cost Indexes

1. $$\text{Material Cost Index} = \frac{\text{Material cost for a product}}{\text{Production cost of the product}}$$

2. $$\text{Material Cost/Sales Index} = \frac{\text{Material cost for each product}}{\text{Sales Value}}$$

3. $$\text{Indigenous Content Index} = \frac{\text{Cost of 1 indigenous material}}{\text{Total material cost}}$$

4. $$\text{Material Variances Index} = \frac{\text{Value of material actually used}}{\text{Value of standard material quantity}}$$

Vendor Rating Indexes

1. $$\text{Vendor Rating Index (Quality)} = \frac{\text{No. of lots rejected}}{\text{No. of lots received}}$$

2. $$\text{Vendor Rating Index (Delivery)} = \frac{\text{Delivery on Schedule}}{\text{Total No. of deliveries}}$$

Notes

3. Vendor Rating Index (Price) = $\frac{\text{Lowest price bids}}{\text{Total No. of deliveries}}$

4. Vendor Rating Index = VRI (Quality) × A + VRI (Delivery) × B + VRI (Price) × C, Where A, B and C are the weights given to the three vendor rating indexes by the materials manager.

Material Planning and Forecasting Indexes

1. Forecast Accuracy Index = $\frac{\text{Forecast price of material}}{\text{Actual price of material}}$

2. Planning Efficiency Index = $\frac{\text{Number of rush orders placed}}{\text{Total No. of orders}}$

Efficiency Indexes

1. Order Cost Index = $\frac{\text{Total purchase of dept. cost}}{\text{Total No. of order placed}}$

2. Purchase Efficiency = $\frac{\text{Total purchase value}}{\text{Total expenses of purchasing department}}$

3. Sales/Purchase Index = $\frac{\text{Total Sales}}{\text{Total purchases}}$

Inventory and Stores

1. Out of Stock Index = $\frac{\text{No. of times out of stock}}{\text{No. of times requisitioned}}$

2. Work-in-progress Index = $\frac{\text{Average work-in-progress}}{\text{Total production value annually}}$

Store Indexes

1. Handling Cost Index = $\frac{\text{Total handling cost}}{\text{Total value of material received \& issued}}$

2. Scrap Disposed Index = $\frac{\text{Value of scrap disposed}}{\text{Total value of Scrap}}$

3. Material Utilization Index = $\frac{\text{Value of Scrap sold}}{\text{Value at which bought}}$

Self Assessment

Fill in the blanks:

9. The evaluation of the materials function is usually done by the …….....……. on the basis of periodic reports emanating from the materials wing.

10. …….....……. is a communication which helps in setting things right and goes a long way in efficient functioning of the department.

11. In order to take suitable remedial …….....……. and to improve materials activities in the organization, the reports should be submitted at the appropriate time.

12. The …….....……. and content of the reports depend upon the level to which it is intended.

Notes

Case Study

Indiana Steels

M/s Indiana Steels and Strips is a multi-location steel conglomerate with an annual turnover exceeding ₹ 10,000 crore. Their equipments are state-of-the-art highly sophisticated and computerised machinery and there are into production of various sizes and grades of high carbon and medium carbon steels in coil as well as bar forms.

M/s Indiana Steels has three steel plants – one built with German collaboration, one with British collaboration and the third with Russian collaboration. Each of these plants has the installed capacity to produce almost 1 million tones per annum. All the three plants were commissioned within a span of 5 years.

At the time of installation of the plants, while buying the mother equipments, spares that were recommended by the OEMs were also purchased. It was told to M/s Indiana Steels that these spares are insurance in nature and would cover the requirement of the next 3 to 5 years. M/s Indiana Steels did not question the logic and they did not also have the necessary expertise to do the same. Hence spares amounting to 5-10% of the equipment cost were purchased in each of the steel plants.

Ten years passed by. Purchases acquired the necessary importance in the company and its contribution to profits was recognised. It was decided to represent the function at the Board level and a Director Purchases was appointed. His brief was to optimise procurement and contribute to making Indiana Steels a world class company.

After settling down, Director, Purchases began a probe. Amongst his findings, the following were significant:

- Spares account for 42% of the total inventory
- Emergency purchases accounted for 10% of the total purchases and half of it were spares
- Capital and Insurance spares accounted for 9% of the total inventory. Most of them were purchased at the time of purchase of the mother equipment. No drawings or specifications were available for those spares
- Spares could not be interchanged amongst plants because no two spares matched even within the same group of items.
- Many of the spares were imported and had a procurement lead time of 9 to 12 months
- Many of the spares were proprietary in nature
- The Maintenance Department was responsible for indenting of spares and they would even suggest to whom the enquiries are to be sent. The Materials Management Department never questioned anything – neither the quantities nor the list of suppliers. After all, the loss of even one day's production meant crores of rupees lost!

Director, Purchase immediately realised that spares is one area he must attack immediately to get results.

Question

Give your suggestions to Director, Purchase for him to implement.

Source: Narayan.P, Subramanian.Jaya (2008). *"Inventory Management: Principles and Practices". Excel* Books Pvt. Ltd.

Notes

13.5 Summary

- The evaluation of materials management can either be done by external agencies or internally.
- The user-departments evaluate the materials function in terms of the number and the duration of the stock-out.
- While all the managerial functions like production, marketing, etc., as well as a large number of other professions in the world are evaluated on the basis of their achievements, materials management is one of the few professions which is judged by failures or stock-outs.
- The concept of MBO or management by objectives can be used for goal setting and evaluation purposes.
- The criteria of evaluation depend on the corporate objectives, company culture, functions of materials management, evaluation process of other departments, etc., and hence could vary, and do vary, from company to company.
- The evaluation of the materials function is usually done by the top management on the basis of periodic reports emanating from the materials wing.
- Reporting is a two-way traffic, weekly reports containing the value of purchases, stock status, stock-outs, etc., usually meant for the middle-level executives, are common in many organizations.
- The frequency and content of the reports depend upon the level to which it is intended. Quarterly and annual reports with specific recommendations on future are intended for top management, while the monthly reports with detailed information may be sent to all in the purchase and user departments.
- The important aspects in reporting are: (a) clarity. (b) brevity, and (c) periodicity (related to frequency.)

13.6 Keywords

Annual Reports: The yearly financial statement issued by a mutual fund to its shareholders. It reports on the funds assets, liabilities, and year-end earnings, as well as certain historical information.

Brevity: The attribute of being brief or fleeting.

Budget: An estimate of income and expenditure for a set period of time.

Credit-worthiness: Trustworthiness with money as based on a person's credit history; a general qualification for borrowing.

Evaluation: Evaluation is systematic determination of merit, worth, and significance of something or someone using criteria against a set of standards.

Management by Objectives: The employee and supervisor set objectives for the employee for the coming year; the employee is evaluated on how well she/he has achieved the agreed upon objectives.

Materials Management: The planning and control of the activities related to the materials flow from the suppliers up to the end of the conversion/production process.

Periodic Reports: Providing information to managers using a prespecified format designed to provide information on a regularly scheduled basis.

Notes

Stock-out: When at a given moment in a given inventory there is not the quantity of a part or a product that is demanded. A stock-out occurs in a distribution center when there are orders that can not be filled within their due date.

13.7 Review Questions

1. What do you mean by the evaluation of materials management?
2. Explain the organization of materials management.
3. What are the various problems faced in the evaluation of materials management?
4. Explain the procedure followed in the evaluation of materials management.
5. What are the criteria considered in the evaluation of materials management?
6. Explain reporting.
7. Discuss the concept of purchasing and the various terms related to it.
8. Explain material cost index and vendor rating index.
9. Make a flowchart for the evaluation of materials management.
10. Define:
    (a) Reporting
    (b) Purchasing
    (c) Store index

Answers: Self Assessment

1.	Materials management	2.	Stock-out
3.	Improvements	4.	India's
5.	Lead time	6.	Management by objectives
7.	Criteria	8.	Actual performances
9.	Top management	10.	Reporting
11.	Corrective measures	12.	Frequency

13.8 Further Readings

Books

Ramakrishnan. R V, Tony Arnold. J R (2007). "*Introduction to Materials Management*". Pearson

K. Shridhar Bhat, "*Production and Materials Management*". Himalaya Publishing House

Chary. S.N., "*Production and Operations Management*". Tata McGraw Hill

Gopalkrishanan. P, Sundaresan. M, "*Materials Management: An Integrated Approach*". PHI Learning Pvt. Ltd.

Notes

Online links

http://www.newagepublishers.com/samplechapter/001386.pdf

http://www.productivity.in/knowledgebase/Material%20Management/Evaluating%20materials%20managment%20performance.pdf

http://lean.mit.edu/downloads/cat_view/75-theses/327-2004-theses

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Unit 14: Computers in Materials Management

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Objectives

After studying this unit, you will be able to:

- Explain the Role of Computers in Materials Management
- Discuss Electronic Computers
- Explain the Integrated Computer System for Materials Management
- Discuss the Material Planning

Introduction

In the previous unit, we dealt with the evaluation of materials management. The unit also discussed about the process and criteria of evaluation of materials management. This unit will help you to understand the usage of computers in material management. The various section and sub section of this unit will also summarize the integrated computer system for materials management and material planning. The application of computers to materials management and physical distribution problems led to a tremendous increase in the number and sophistication of tools available to the manager. Computers enabled managers to manipulate large databases and perform complex calculations in short periods of time.

The application of computers to distribution problems made many traditional management approaches obsolete. Material planning is a scientific way of determining the requirements starting with raw materials, consumables, spare parts and all other materials that are required to meet the given production plan for a certain period. Material planning is derived from the

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overall organizational planning and hence it is always a sub-plan of the broad organizational plan. The main function of materials planning is forecasting and initiating for procurement of materials.

14.1 Role of Computers in Materials Management

Materials management is an important and specialized function existing in all industries and utilities. Although the store management and purchasing functions have coexisted for a long time, the need to integrate and streamline these functions, as well as planning them on a scientific management basis is considered increasingly important and urgent. Computers can be used to look after their resources optimally and aggressively. Future trends will see the emphasis on shift from the mainframe computer to the microcomputer, from traditional inventory monitoring to materials and capacity planning based on decision support systems, and from centralized processing to distributed processing at the microcomputer level.

For Materials Management computers software is tailor-made as per the requirements of a particular manufacturing organization. Usually materials management information system comes under Transaction Processing system (TPS) e.g. Tally is a Transaction process system for financial accounting. Besides for decisions connected to materials management managers also use Decision Support System (DSS) along with TPS. Obviously all information systems (under management information system) require computers to process.

MRP 1

Chronologically Materials Requirements Planning (MRP1) came in the late 1960s, initially with fixed period lead-times ("bucketed" systems). This was the scheduling engine required for Period Batch Control, which utilized the Bill of Material within it and the scheduling rules (periods) to produce a schedule for the preceding stages, using the example above, five weeks in advance. At this time computers began to be used commercially to generate the schedule for the preceding stages, five weeks in advance. Later variable lead-times ("bucket-less" systems) and safety stocks were accommodated.

Caselet

Indiana Electronics

M/s Indiana Electronics is a small firm located at Bhiwadi near Gurgaon. Its major product line is the electronic system for automobiles and M/s Maruti Udyog Ltd. Gurgaon is its major customer.

With competition getting tougher for M/s Maruti Udyog Ltd., they are forced to contain the prices of all their raw materials. So, M/s Indiana Electronics too cannot escape and have to give a cost reduction consistently to M/s Maruti Udyog Ltd.

The top management of M/s Indiana Electronics decided that the firm is ideally suited to implement MRP in its planning and controls. Several organisational changes were brought about. A Materials Management Department was created to include Purchasing, Production control, Traffic, Inventory Management and Warehousing operations. The implementation and effective operation of an MRP system came within its purview.

Another change brought about was the Buyer-Planner concept, i.e. an MM executive would be responsible for both buying and planning functions. The number of materials handled

Contd...

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by each executive had been reduced but the scope of work of each executive had become large and more integrated. For a given group of materials, a single executive would prepare the production schedule and work directly with suppliers to make it function properly.

All the systems in M/s Indiana Electronics are computerised. Whenever a new executive is hired, he or she is required to develop and manage the plan for one or two items, Manually. The idea is to teach the newcomer how the system works.

Source: Narayan.P, Subramanian.Jaya (2008). "*Inventory Management: Principles and Practices*". *Excel* Books Pvt. Ltd.

MRP 2

This was followed in the 1970's by Manufacturing Resources Planning (MRP2) ("Manufacturing Resource Planning: MRP 2 Unlocking America's Productivity Potential": Oliver Wight) which combined MRP 1 and capacity planning together with a control system. Whilst widely implemented, the faulty implementation of MRP systems became a scandal with little regard for data accuracy, ownership, and accompanying (new) management processes.

However MRP is still the dominant technique used by most computer "ERP" software commercially available today. Whilst the concept of MRP 2 is sound, the advent of "Just in Time" (JIT) and its control system "Kanban" created an attractive and significantly simpler mechanism. This for a while in the early 1980's seemed to provide an alternative to the concept of MRP, to an extent where the leading gurus of the time predicted the demise of MRP, in favor of the more pragmatic approach. Even "I" and "T" and "V" type product production require a forward view to provide a planning ability. This led the computer software suppliers to attempt to integrate the two approaches with so called "Electronic Kanbans" (a replenishment signaling mechanism sent electronically). Although rarely needed for internal company signaling, this mechanism has found later usage in the intercompany replenishment signaling involved with "agile" communications.

14.1.1 Advantages of Computer in Materials Management

Following are the various advantages of using computers in materials management:

1. ***Visual Control Systems:*** In visual control systems, the control of stock is now becoming genuinely achievable through "eyeball control", rather than sophisticated computer systems and heavy reliance on Perpetual Inventory checking.

2. ***Bar coding/RFID:*** Stock recording and stock movement recording has been greatly simplified and improved by the automation of the data entry by bar coding. If used as a common identifier between sales outlet and first tier manufacturer this becomes a significant element of "Agile" manufacturing. Radio Frequency Identification (RFID) has now made an entrance into this arena.

   Did u know? RFID is capable of identifying an item at radio frequency distances, as opposed to bar code scanning. However this may be distracting us from the simplification of stock control which can be achieved by visible control systems, and Kanban replenishment systems.

3. ***Electronic Data Interchange:*** The use of computers to communicate demands between organizations has grown significantly from the introduction of faxes which were used to send schedules then Kanbans to the use of electronic buying via the internet and electronic

Notes

payment settlement towards e-commerce. It is now common to communicate the output of a delinquent MRP system to a supplier, with much greater speed via electronic means!

4. ***Back-flushing:*** The computer technique of deducting components parts from stock based on the arrival of a subassembly at some key measurement ("deduct") point has been developed in response to the need to automate the stock issuing process in conjunction with the introduction of JIT techniques. This has also been used as a basis for paying suppliers. By doing this, a situation has been created where the Bill of Material accuracy for these inexpensive parts must be totally accurate. Often these parts' usage is probabilistic anyway rather than deterministic (with shims for example), with average usage entered into the Bills of Material making the usage approximate.

5. ***Enterprise Resources Planning (ERP) Systems:*** These systems grew out of MRP and/or Inventory Management and/or Accounting systems in the early 1990's depending on the pedigree of the software supplier into a "total" business control system integrating the functions and data from various areas.

Example: A goods receipt would automatically update outstanding purchase orders, reduce requirements generated by MRP, update the stock balance, create a creditor in the purchase ledger and eventually update the general ledger with the new asset.

14.1.2 Disadvantages of Computer in Materials Management

Following are the various disadvantages of using computers in materials management:

- The inherent weakness of computers is that it is notoriously difficult to change computer programs quickly and reliably in the event of requirements, suppliers, or system changes and the lack of visibility of the process. This led to the expansion of parameters held within the computer system that could be changed to reflect the changed situation. This has now led to a process of "configuration" where the software can be "configured" to reflect different circumstances. Presently and unfortunately the process of reconfiguring can often be difficult.
- Another trap that the software suppliers have fallen into in the race to provide increased functionality is to add complexity to the configuration process. This has resulted in many horror stories of incorrect configuration, and a demand for highly skilled "configurers" which for a time outstripped supply.
- These factors combined to constrain sales of the software, and have led to the sale of preconfigured or cut down versions of complex software. Unfortunately this misses the point which is that the manufacturing plant was simply trying to plan materials and capacity simply.

Self Assessment

Fill in the blanks:

1. ……..... management is a specialized function existing in all industries and utilities.
2. Computers began to be used ……..... to generate the schedule for the preceding stages.
3. ……..... is the dominant technique used by most computer softwares such as "ERP".

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4. The inherent weakness of computers is that it is notoriously difficult to change computer ……..... quickly and reliably.

5. Another trap that the software suppliers have fallen into is to add ……..... to the configuration process.

14.2 Electronic Computer

Data have to be stored in terms of the suppliers, products, price and locations. As the volume grows, manual handling will become tedious and time consuming. It has been found from experience that one to two per cent of the total, turnover is spent on processing data in all areas of management, in large companies. Since, there are a large number of computer installations, computer time can be purchased from them instead of each organization possessing computer. The computer can be used to hold a supplier file, an arc file and a stock ledger. Based on regular updating on the stock and control limits, the computer can initiate follow-up action during the periodic review. Computers can be programmed to trigger purchase orders and also to initiate follow-up action on outstanding orders. The computer can be programmed to analyze the conjuration data and price data to forecast future behaviour.

The greatest improvement derived from an integrated computer information system is the replacement of paper work by organic data. Clerical processes, including tedious and erroneous computations are absorbed by computerized system to make more time available for decision making, planning and control. A memory system replaced perpetual inventory system and bin cards. Inventory is more scientifically planned to enable lower stock levels, to be maintained with the risk of stock-outs: up-to-date balances are produced more rapidly. Late deliveries and stock-outs are reduced, resulting in better planning of cash outflows.

The computer also provides output, including inventory state reports, stock records, usage analysis, movement analysis, obsolete item control, waste or loss indicators, recomputation of economic order quantity, preparation of purchase requisitions, purchase orders, call requirements, purchase price changes, redundant inventories, etc. For this purpose a proper feasibility study is needed, even before acquiring a computer system. The expectations as represented by computer salesmen must be thoroughly investigated and a proper cost benefit analysis must be carried out. Over-expectation is the biggest pitfall in electronic data processing, as the computer has been pictured as the panacea for all managerial and operational ills.

Self Assessment

Fill in the blanks:

6. ……..... have to be stored in terms of the suppliers, products, price and locations.

7. The computer can be used to hold a supplier file, an arc file and a ……. ledger.

8. Computers can be programmed to trigger ……..... orders and also to initiate follow-up action on outstanding orders.

9. The greatest improvement derived from an integrated computer information system is the replacement of paper work by ……..... data.

10. A memory system replaced perpetual ……..... system and bin cards.

14.3 Integrated Computer System for Materials Management

The present use of computers in materials management is only to make computations easier and faster. The integrated computer system should be utilized for the sake of an integrated information

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system which would result in the smooth operation of the materials functions. The main objective of such an integrated system should be accuracy in reporting demand and inventory. The integrated system also ensures a fast reaction to environmental changes—changes in either supply or price of materials or changes in customer taste and measurement of functions such as inventory, purchasing and vendors. The normal flow of information regarding materials in an organization is depicted below with detailed explanation of list of activities.

A computer can easily maintain this information flow with basic data, coming from production planning, design and maintenance departments and environmental information coming from purchase and sales departments. It can give back the formation of inventory records to the production planning department, can send purchase requisitions to the purchase department, remind purchase department for follow-up and place direct purchase orders for standard repetitive items. It can update the past record file with revised consumption figures for items, and can check the actual consumption against the bill of materials and debit material cost incurred to user departments. On the basis of record and basic data, the computer can formulate inventory levels.

The distinct advantages of an integrated computer system are: that it involves the line personnel and provides timely and quick information on the materials position. It is also used for operational convenience and not for mere calculations. Studies conducted in India and abroad indicate that computers have been fruitfully used in organizations where the primary objective of the computer system is operations management. The use of computers for only computations is probably the reason why businessmen are not sure of their worth.

Integrated Management Information Systems using computers are applicable in the following areas. The list is only illustrative and not exhaustive:

1. Long-term production schedule.
2. Short-term production schedule.
3. Materials manual.
4. Requirement of non-stock items from user departments.
5. Information regarding lead time, supply position (shortages), price trends, anticipated price changes, etc.
6. Production schedule handed over to production department.
7. Materials requisition from the production to stores.
8. Materials supplied from stores to production.
9. To and fro information between stores and inspection.
10. Information regarding receipts from the stores.
11. Date regarding issues from stores.
12. Due dates of supply from purchase department.
13. Information to purchase department for follow up of supplies.
14. Purchase requisition to purchase department.
15. Purchase order.
16. Materials from suppliers to stores.
17. Previous year's consumption data.

Notes

Computers are now the principal tool for processing the information that materials managers use for sound decision making, and computer-aided materials manage-menu is crucial to organizational effectiveness. Computer-Aided Materials Management (CAMM) is an advanced manufacturing technique that is used to manage the flow of raw materials and component parts into the conversion process, to develop master production schedules for manufacturing, and to control inventory.' The difference between traditional materials management and the new computer-aided techniques is the difference between the so-called push and pull approaches to materials management.

CAMM also helps an organization pursue a low-cost or differentiation strategy. The ability to control the now of materials in the production process allows an organization to avoid the costs of carrying excess inventory and to be flexible enough to adjust to product or demand changes quickly and easily.

Just-in-Time Inventory Systems

Another advanced manufacturing technique for managing the flow of inputs into the organization is the just-in-time inventory system. Developed from the Japanese kanban system, a just-in-time inventory system requires inputs and components needed for production to be delivered to the conversion process just as they are needed, neither Caller nor later, so that input inventories can be kept to a minimum,". Components are kept in bins and as they are used up, the empty bins are sent back to the supplier with a request on the bin's card (Kanban) for more components. Computer-aided materials management is necessary for a JIT system to work effectively because CAMM provides computerized linkages with manufacturing technology combines the variety advantages of small-batch production with the low-cost advantages of continuous process production.

In sum, computer-integrated manufacturing, just-in-time inventory systems, computer-aided materials management, and computer-aided design give organizations the flexibility to make a variety of products, as well as different models of the same product, rapidly and cost-effectively. They break down the traditional barriers separating the input, conversion, and output stages of production; as a result, input, conversion, and output activities merge into one another. These four innovations in materials technology decrease the need for costly inventory buffers to protect conversion processes from disruptions in the environment In addition, they increase product reliability because they increase automation and technical complexity.

Self Assessment

Fill in the blanks:

11. The integrated computer system should be utilized for the sake of an integrated …… system.
12. The integrated system also ensures a fast reaction to …… changes.
13. On the basis of record and basic data, the computer can …… inventory levels.
14. The difference between traditional materials management and the new computer-aided techniques is the difference between the so-called …… and …… approaches to materials management.

14.4 Materials Planning

Materials Planning can be used to assess the firm requirements for different planning horizons. As the planning horizon exceeds one year, the forecast becomes less reliable. Normally, planning

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is done on a quarterly basis. This is because the materials planner, at the beginning of every quarter, will find that some materials are in short supply and some in excess, owing to errors in forecasting. Thus operating on a quarterly basis help to rectify these errors. At the same time, since quarterly periods are sufficiently long enough in most cases, realistic ordering can be done through suppliers.

Caution Effective inventory control production plans should be converted into materials plans. This enables the management to clearly define the quantity and time schedule of the requirement.

In integrated materials management, production and materials planning get a pride of place. Inventories consume a larger part of working capital. For best possible utilization of available capital resources materials' planning is resorted to. It enables the management to anticipate the further materials needs, necessary capital requirement for meeting out such needs and external and uncontrollable difficulties which may come in the way of fulfilling the future materials demands. Such anticipation helps in managing the materials in a manner in which it enables the organization to accomplish the given objectives. In fact, materials planning provide a mechanism for inventory control.

14.4.1 Need for Materials Planning

Planning is the essence of any project. Nothing efficient can be visualized without sensible and effective planning. Planning motivates people and serves as an effective control devices. Materials planning cannot be an exception. Production Department asks for raw materials, components, spares, consumables and other accessories to manufacture a product to be marketed. Materials planning is done in order to keep the production department active and alive. Materials planning help in effectively moving the whole organization in the right direction.

Materials planning is done at all stages and at all levels of the management. The top management is usually engaged in planning for non-programmed decisions Such as import policy, foreign exchange availability, credit squeeze and other monetary and fiscal policies. The middle-order management engages itself in planning for programmed decisions which are usually of routine nature such as hypothecating inventory for working capital, delivery schedules, quantity requirements, etc.

Materials planning is however based on certain feedback information and reviews. Sales forecasting, production programming and materials planning are interconnected. In fact sales forecasting and production programming are two major functions which normally precede the materials planning. There should be proper feedback information and periodic review in order to have better materials planning.

"Materials planning," say P. Gopalakrishnan and M. Sundaresam, "is the scientific way of determining the requirement of raw materials, components, spares and other items that go into meeting production needs within the economic investment policies". As the definition goes materials planning is a function and is a system which evolves methodology to plan the requirements of materials in a scientific manner. But it cannot function in itself. Neither can it be treated in isolation. It is positively related with production which follows market conditions and sales forecasts. Further it cannot ignore the economy and the investment policy of the organization.

14.4.2 Techniques of Materials Planning

The under mentioned two techniques are usually used for materials planning:

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1. Bill of Materials Technique,
2. Past Consumption Analysis Technique.

Bill of Materials Technique

A bill of materials indicates the name, part number, and usage of each component and the sub-assembly in which it is to be used. Each product has a bill of materials since each of the products has its own requirements dependent on its design and according to the engineering design and the components consisting of standard parts needed for a particular product to be manufactured.

Example: If a chair is to be prepared it can be split into (i) legs, (ii) arms, (iii) seat, and (iv) back rest. Each of the parts of the chair will have separate specifications and naturally each may have its own manufacturing design.

According to the specifications and design the bill of materials will be drawn on such composite information for the product—the chair in this case. In a bill of materials for a product, the components required are listed with their complete specifications so that the materials required may be procured according to the specifications.

When any of the units of the organization receives a work order or a production programme is finalized, the concerned foreman prepares the list of all the materials required for the execution of the order or manufacturing of the product as per production programme. The list of materials so prepared is known as a bill of materials which includes all the details as regards quality, quantity, code number, drawing number and other necessary specifications, etc.

Task Search over the internet and make a format for bills of material.

Once the production programme is finalized each product is exploded into its basic requirements with the help of its bill of materials. The number required per item is multiplied by the number to be produced in order to arrive at the total requirement. The total requirements are further adjusted for various losses. Rejections should also be provided for. Every care should be taken to visualize all types of contingencies and adequate provisions should be made for them. Provisions for buffer stock and lead-time consumption should also be made. Taking all these provisions into consideration the bill of materials should be drawn for each component and then through multiplication process total requirement should be obtained.

The bill of materials-known as BOM is the simplest technique of materials planning. BOM with required lead time and necessary contingency provision which eventually turns into indents for procurement also acts as a guide to delivery and inventory requirements. A BOM, therefore, helps in keeping watch over the delivery of matching equipments, spare parts, and components and also over material directly going into production. It enables the evaluation of the progress of the project undertaken and ensures the flow of needed materials.

Notes A bill of material is helpful in avoiding the locking of funds unnecessarily by proper scheduling the orders, delivery and arrival of materials, such as avoidance of capital blockade, saves the diverting of the working capital and reduces the inventory carrying cost to a larger extent.

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Explosion of bill of Materials

Explosion of bill of material refers to splitting of the requirements for the product to be manufactured into its basic components; then by multiplication process we get the total requirements. This is very effectively done with the help "of demand forecast". As we have seen earlier the very basis for material planning is the forecast of demand for the end-products for the calculation of requirements for various materials department. An explosion chart is a series of materials grouped together by combining the requirements for different components. It shows the total requirement for particular end-product or a group of end-products.

Past Consumption Analysis Technique: This technique is used for items that are consumed on a continuous basis and for which no bill of materials is possible. In it, past consumption data is analysed and future projection is made based on past and future production.

Self Assessment

Fill in the blanks:

15. Inventories consume a larger part of …… capital.
16. Sales …… and production …… are two major functions which normally precede the materials planning.

Case Study

Integrated Information System

M/s Jyoti Textiles, with four spinning mills, eighteen cloth cutting centres, sixteen processing departments and more than 200 machine centres has installed an information system.

The operations are characterised by a nationwide distribution network. The finished goods moves through 38 branch offices and 312 authorised distributors all of whom maintain some inventory. Authorised distributors generate 37% of the orders but account for only 24% of the sales. Most of the business is done through the branch offices.

The product line is large; products are classified into 175 family groups, representing 12,000 finished goods. Approximately 1,500 new items enter the product line annually, and a similar number are discontinued.

The 12,000 finished goods require 25,000 component parts of which 6,600 are carried in inventory and 18,400 are made to order. The newly implemented information system already has paid off substantially and refinements continue to increase benefits. In the preceding year, M/s Jyoti Textiles achieved a 60% customer service level (i.e. 60% of the orders were delivered according to original customer request, with no delays or adjustment of dates). Clerical expenses were 36% of the sales.

Questions

The company felt this was not good enough and wanted to improve the customer service. The company therefore is thinking of a highly integrated system.

1. Keeping in mind the objectives, do you think the company should go in for a highly integrated system? Support your answer with reasons.
2. Discuss the relevant inventory management strategies for the company.

Source: Narayan.P, Subramanian.Jaya(2008). "*Inventory Management: Principles and Practices*".Excel Books Pvt. Ltd.

Notes

14.5 Summary

- Materials management is an important and specialized function existing in all industries and utilities.
- For Materials Management computers software is tailor-made as per the requirements of a particular manufacturing organization.
- Stock recording and stock movement recording has been greatly simplified and improved by the automation of the data entry by bar coding.
- The inherent weakness of computers is that it is notoriously difficult to change computer programs quickly and reliably in the event of requirements, suppliers, or system changes and the lack of visibility of the process.
- It has been found from experience that one to two per cent of the total, turnover is spent on processing data in all areas of management, in large companies.
- Based on regular updating on the stock and control limits, the computer can initiate follow-up action during the periodic review. Computers can be programmed to trigger purchase orders and also to initiate follow-up action on outstanding orders.
- The greatest improvement derived from an integrated computer information system is the replacement of paper work by organic data.
- Clerical processes, including tedious and erroneous computations are absorbed by computerized system to make more time available for decision making, planning and control.
- The integrated system also ensures a fast reaction to environmental changes—changes in either supply or price of materials or changes in customer taste and measurement of functions such as inventory, purchasing and vendors.
- A computer can easily maintain this information flow with basic data, coming from production planning, design and maintenance departments and environmental information coming from purchase and sales departments.
- Developed from the Japanese kanban system, a just-in-time inventory system requires inputs and components needed for production to be delivered to the conversion process just as they are needed, neither Caller nor later, so that input inventories can be kept to a minimum,".
- Materials planning does help in effectively moving the whole organization in the right direction.

14.6 Keywords

Back-flushing: It refers to the process of determining the number of parts that must be subtracted from inventory records.

Bill of Materials: A bill of materials indicates the name, part number, and usage of each component and the sub-assembly in which it is to be used.

Electronic Data Interchange (EDI): Electronic data interchange is a method for transferring data between different computer systems or computer networks.

Electronic Data Processing: It refers to the use of automated methods to process commercial data.

Enterprise Resources Planning (ERP): Enterprise resource planning systems integrate internal and external management of information across an entire organization.

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Integrated System: Integration system is the bringing together of the component subsystems into one system and ensuring that the subsystems function together as a system.

Just-in-Time (JIT): Just in time is a production strategy that strives to improve a business return on investment by reducing in-process inventory and associated carrying costs.

Materials Planning: The materials management function is that attempts to coordinate materials supply with materials demand.

14.7 Review Questions

1. Discuss the role of computers in material management.
2. What are the benefits of using computers in management of materials?
3. Discuss the inherent weaknesses of the computers in context of materials management.
4. What is the significance of electronic computers in materials management?
5. What is the biggest pitfall in electronic data processing?
6. What is the meaning of MRP?
7. Briefly describe MRP2.
8. What is the main objective of integrated system in materials management?
9. Write a short note on Computer-Aided Materials Management (CAMM).
10. What is just in time inventory system?

Answers: Self Assessment

1.	Materials	2.	Commercially
3.	MRP	4.	Programs
5.	Complexity	6.	Data
7.	Stock	8.	Purchase
9.	Organic	10.	Inventory
11.	Information	12.	Environmental
13.	Formulate	14.	Push, pull
15.	Working	16.	Forecasting, programming

14.8 Further Readings

Books

Ramakrishnan. R V, Tony Arnold. J R (2007). "*Introduction to Materials Management*". Pearson

K. Shridhar Bhat, "*Production and Materials Management*". Himalaya Publishing House

Chary. S.N., "*Production and Operations Management*". Tata McGraw Hill

Gopalkrishanan. P, Sundaresan. M, "*Materials Management: An Integrated Approach*". PHI Learning Pvt. Ltd.

Notes

Online links

http://www.materialsmanagement.info/material-planning.htm

http://www.ose.com.tw/electronics-manufacturing/logistics-solutions/materials-management

http://www.materialsmanagement.info/defscope/integrated-materials-management.htm

http://www.adi.pt/docs/innoregio_MRP-en.pdf