Materials Management

Materials management is concerned with management functions supporting the complete cycle of material flow, from the purchase and internal control of production materials to planning and control of work in process, to warehousing, shipping and distribution of the finished product. An effective materials management process ensures that the right kinds of materials are at the right place whenever needed.

Objectives of Materials Management:

Materials management objectives are categorized into:

1. Primary Objectives:

"Making available (supply) of materials in specified quantity and quality at economic cost and maintaining the continuity of supply. Minimization of investments in materials and inventory costs, and assuring high inventory turnover."

2. Secondary Objectives:

Secondary objectives help to achieve the primary objectives.

The secondary objectives can be stated as:

1. Purchasing the items from a reliable source at economic price.

2. Reduction of costs by using various cost reduction techniques such as variety reduction, standardization and simplification, value analysis, inventory control, purchase research etc.

3. Co-ordination of the functions such as planning, scheduling, storage and maintenance of materials.

Scope of Materials Management:

Materials management encompasses all the aspects of the materials i.e. material costs, material supply and material utilization. Materials management is concerned with material planning and materials control activities. The details of planning and control activities are represented in table 1.3.

Table 1.3. Planning and Control Activities of Materials Management

• Planning	-	Right type, quantity of purchasing of materials.
• Sourcing	-	Selecting a right source of material supply and procurement from these sources.
• Controlling	-	Follow up and monitoring, inventory control.
• Storing	-	Receiving, inspection, storing and issue of materials.
• Handling	-	Flow or movement, packaging, transportation.
• Distribution	-	Distribution of finished goods, warehousing and shipping.

The importance of material management may be summarized as follows:

1. The material cost content of total cost is kept at a reasonable level. Scientific purchasing helps in acquiring materials at reasonable prices. Proper storing of materials also helps in reducing their wastages. These factors help in controlling cost content of products.

2. The cost of indirect materials is kept under check. Sometimes cost of indirect materials also increases total cost of production because there is no proper control over such materials.

3. The equipment is properly utilized because there are no break downs due to late supply of materials.

4. The loss of direct labour is avoided.

5. The wastages of materials at the stage of storage as well as their movement is kept under control.

6. The supply of materials is prompt and late delivery instances are only few.

7. The investments on materials are kept under control as under and over stocking is avoided.

8. Congestion in the stores and at different stages of manufacturing is avoided.

Functions of Material Management:

Material management covers all aspects of material costs, supply and utilization. The functional areas involved in material management usually include purchasing, production control, shipping, receiving and stores.

The following functions are assigned for material management:

1. Production and Material Control:

Production manager prepares schedules of production to be carried in future. The requirements of parts and materials are determined as per production schedules. Production schedules are prepared on the basis of orders received or anticipated demand for goods. It is ensured that every type or part of material is made available so that production is carried on smoothly.

2. Purchasing:

Purchasing department is authorized to make buying arrangements on the basis of requisitions issued by other departments. This department keeps contracts with suppliers and collects quotations etc. at regular intervals. The effort by this department is to purchase proper quality goods at reasonable prices.

Purchasing is a managerial activity that goes beyond the simple act of buying and includes the planning and policy activities covering a wide range of related and complementary activities.

3. Non-Production Stores:

Non-production materials like office supplies, perishable tools and maintenance, repair and operating supplies are maintained as per the needs of the business. These stores may not be required daily but their availability in stores is essential. The non-availability of such stores may lead to stoppage of work.

4. Transportation:

The transporting of materials from suppliers is an important function of materials management. The traffic department is responsible for arranging transportation service. The vehicles may be purchased for the business or these may be chartered from outside. It all depends upon the quantity and frequency of buying materials. The purpose is to arrange cheap and quick transport facilities for incoming materials.

5. Materials Handling:

It is concerned with the movement of materials within a manufacturing establishment and the cost of handling materials is kept under control. It is also seen that there are no wastages or losses of materials during their movement. Special equipment's may be acquired for material handling.

6. Receiving:

The receiving department is responsible for the unloading of materials, counting the units, determining their quality and sending them to stores etc. The purchasing department is also informed about the receipt of various materials.

Purchasing:

Purchasing plays a crucial role in the materials management because it is concerned from input stage up to the consumption in manufacturing. Purchasing functions as a monitor, clearing house and a pipeline to supply materials needed for production.

Dr. Walters defines scientific purchasing as:

"Procurement by purchase of the proper materials, machinery and equipment and supplies of stores used in manufacturing of the product, adopted to marketing in the proper quantity and quality at the proper time and at the lowest price consistent with quality desired."

Purchasing Cycle:

The purchase procedure followed varies from company to company and also from one industry to other. The purchasing cycle is represented as shown in fig (1.11).

The basic elements in purchasing are:

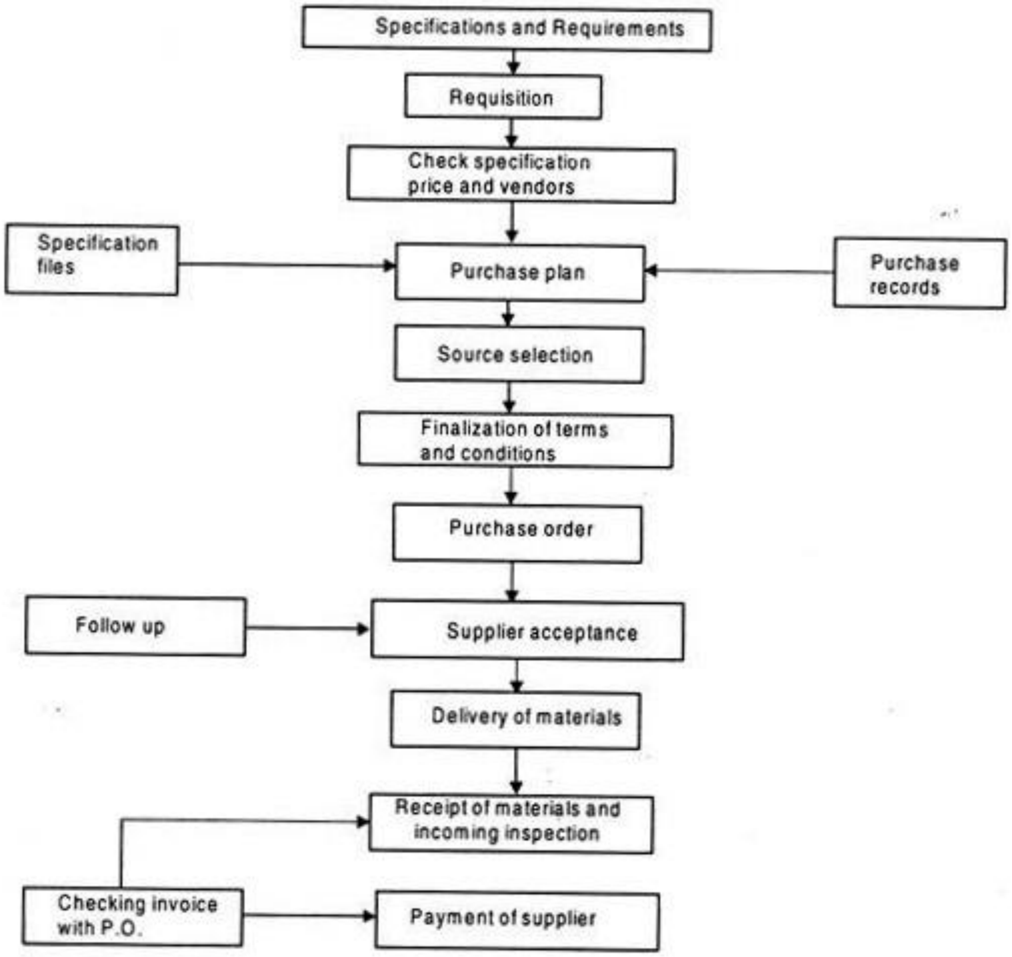


Fig. 1.11. Purchasing Cycle

1. The origin of demand for materials and components based upon the requisitions made to purchase department by user departments with all the details like descriptions, quantity and quality specifications.

2. Specifications are checked and verified and purchase plan is made for items demanded

3. Selection of source of supply.

4. Preparation of purchase order by supplier (order acceptance) and acceptance of terms and conditions.

5. Follow up to ensure prompt delivery of right quality and quantity of materials.

6. Incoming inspection of materials (both to check quality and quantity) to ensure correct material as per specification.

7. Checking supply invoice against purchase order and goods received and payments are made.

What is the function of purchasing management in a manufacturing firm?

At first glance, it may seem to be to find and purchase a quantity of material for the best price. But price is not the only concern. Low-priced material may not be a bargain if it is of unacceptable quality or if delivery is not reliable.

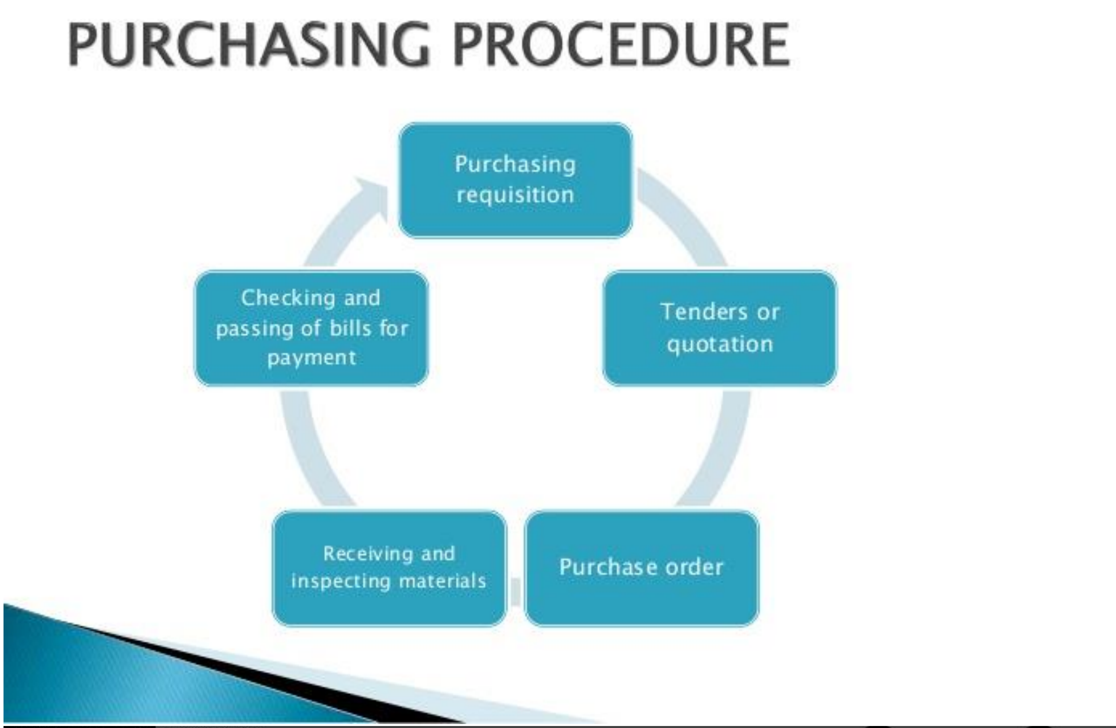
Clearly, the purchasing function involves more than obtaining the best price. It also involves buying the best value, which means buying:

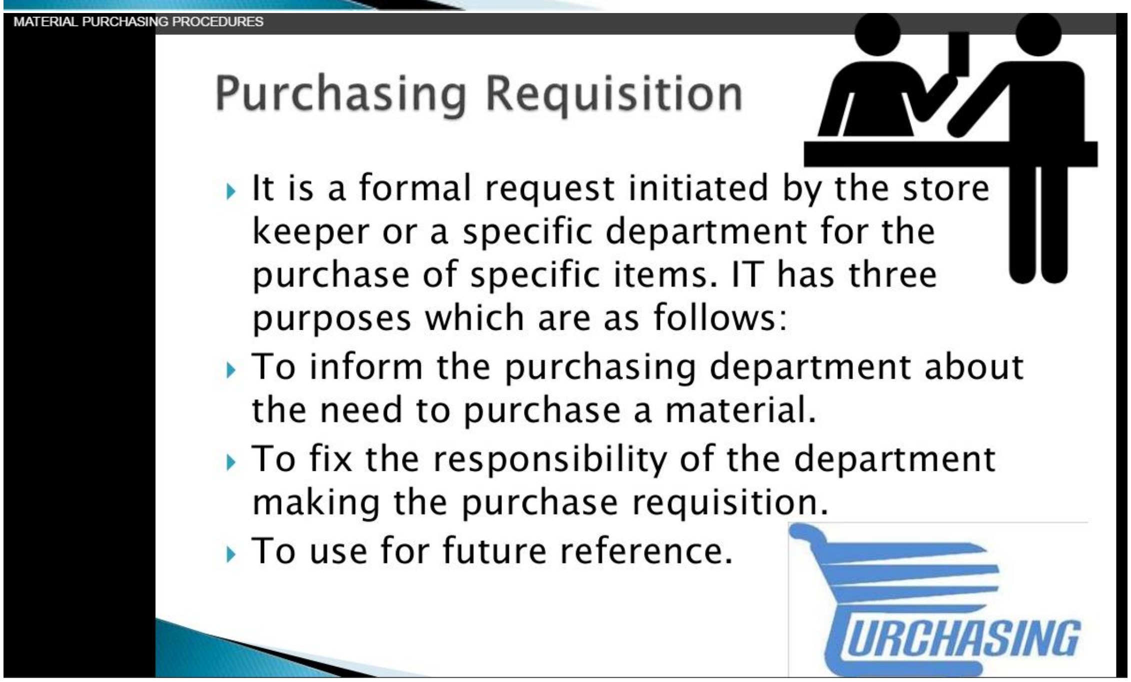
- *The right quantity and quality -* Right quality implies that quality should be available, measurable and understandable as far as practicable. In order to determine the quality of a product sampling schemes will be useful. The right quality is determined by the cost of materials and the technical characteristics as suited to the specific requirements. The quality particulars are normally obtained from the indents. Since the objective of purchasing is to ensure continuity of supply to the user departments, the time at which the material is provided to the user department assumes great importance.

  The right quantity is the most important parameter in buying. Concepts, such as, economic order quantity, economic purchase quantity, fixed period and fixed quantity systems, will serve as broad guidelines. But the buyer has to use his knowledge, experience and common sense to determine the quantity after considering factors such as price structure, discounts, availability of the item, favorable reciprocal relations, and make or buy consideration.

- *At the best price-* It is the primary concern of any manufacturing organization to get an item at the right price. But right price need not be the lowest price. It is very difficult to determine the right price; general guidance can be had from the cost structure of the product. The 'tender system' of buying is normally used in public sector organizations but the objective should be to identify the lowest 'responsible' bidder and not the lowest bidder. The technique of 'learning curve' also helps the purchase agent to determine the price of items with high labor content. The price can be kept low by proper planning and not by rush buying. Price negotiation also helps to determine the right prices.
- *From suppliers who are reliable and provide good service* - The source from which the material is procured should be dependable and capable of supplying items of uniform quality. The buyer has to decide which item should be directly obtained from the manufacturer. Source selection, source development and vendor rating play an important role in buyer-seller relationships. In emergencies, open market purchases and bazaar purchases are restored to.

Purchasing Procedure





Tenders or Quotations

- After receiving purchasing requisition, the purchasing department has to find the best source to purchase the material from.
- Selection of a particular supplier is made after inviting quotations or tenders from possible sources of supply.
- Invitations for tender in a prescribed form are sent to prospective suppliers.

Purchase order

- The purchase order is a contractual agreement with the supplier for the supply of materials.
- It is prepared in five copies.

Receiving and inspecting materials

- The receiving department should perform the function of unloading and receiving of materials dispatched by the suppliers.

- It has to verify the quantity and condition of materials.

Checking and Passing of Bill for Payment

- When the invoices are received from the supplier, they are sent for verification.
- After the verification, the store department requests the accounting department to make the payment to the supplier.
- Payment will be made according to the terms specified in the contract.

PRICING PRINCIPLES

It hardly needs to be emphasized that in today's world of crippling competition buying goods at right (cheapest possible) price is vital. In fact survival of organizations literally depends on it. Right price does not mean a loss for the seller. Price must be fair to both - supplier as well as the buyer. Hence determining the right price is an important and a complicated process. Complicated because of multiple dynamic variables involved in it. Some of the important variables are:

- Conditions of competitions
- Variable margin pricing
- Differences between the product.
- Various costs.

Conditions of Competition: The market competition is broadly classified as: Pure, Oligopoly, Imperfect and Monopoly.

The pure or perfect competition is said to exist when roughly following conditions prevail in the market:

1. Number of sellers is very large.
2. Number of buyers is very large
3. Both producers and consumers have complete knowledge of product.
4. There is no product differentiation
5. Entry into and exit from the industry is free for firms.

Under such conditions of pure competition only the market forces of demand and supply and not the individual actions of buyer or sellers, determine prices.

1. The Monopoly has following characteristics:
2. Number of buyers is large
3. There is only one seller
4. Product is perfectly differentiated
5. Buyers may not have full knowledge of product
6. Entry for other firms into industry is difficult if not outright impossible.

The price under monopoly does not depend upon the market forces (Demand and Supply), rather they are determined by the seller who is free to maximize his profit by regulating output and forcing a supply demand relationship that is most favourable to the seller.

The competitive area between the extremes of pure competition and monopoly is called imperfect competition. These are of two types: Imperfect competition and Oligopoly.

1. Imperfect competition has following characteristics:
2. The number of sellers high but not as high as in perfect competition.
3. Number of buyers is high.
4. There are many products which are similar but slightly differentiated (mostly in buyer's mind).
5. Buyers knowledge of the products is not very high although he thinks otherwise.
6. The prices differ according to perception but market forces can not be ignored altogether.

Sellers spend considerable money alongwith major promotional efforts to persuade buyers that their products are different. This is an important category as a large number of products are sold under this category.

Oligopoly is characterized by following characteristics:

1. Number of buyers is high
2. Number of sellers limited (2-6, when only 2 it is called duopoly)
3. Products are homogeneous.
4. Consumers may or may not possess good knowledge of product.
5. Entry into industry is difficult. Exit from industry is free but may not be easy.
6. Oligopolists at times may conspire and act together as monopolists

Oligopolist industries frequently hold firmly to their prices for long periods and appear non competetive. This however, is deceptive because they shift competition to areas other than price, such as service or quality or help seller with other schemes.

From this discussion it would be obvious that prices can be negotiated very little with firms in the market of perfect competition or monopoly. They can be negotiated a great deal with firms operating in the market of imperfect competition.

Variable-Margin Pricing:

Most industrial firms sell a line of products rather than just a single product. Very few firms attempt to earn the same profit margin on each product in the line. Such a variable-margin pricing policy permits maximum competition on individual products. The profit from maximum-profit products is used to offset the losses or the lower profit margins of the inefficiently products.

It is important for a buyer to understand this theory because it is useful to obtain right price while buying 'low-margin' products. The supplier may try to seek average margin or even maximum margin for low margin products. Thus while dealing with multiproduct firms, a buyer must know which items are low-margin and which are high-margin. This can be learnt by noting the differences in volumes, manufacturing skills and costs of various producers.

Unfortunately most buyers concentrate only on the product they are buying and have no information about other products of the seller to utilize this concept. Buyers are rewarded by directing their efforts towards the development of savings produced by recurring long-term cost reductions, rather than focusing on savings from short-term cost reductions.

Differences between products: We have already introduced the concept of differentiated and undifferentiated products. Differentiated products could further be intrinsically different or may be different because of psycho-emotional conditioning. (Some buyers are prepared to pay premium prices for a product even though it may be similar to other much cheaper products in the market.) And in such cases the advertising is directed towards ultimate consumer as they are more susceptible to advertising.

For both differentiated and undifferentiated products, producers compete on quality and service as well as price.

Six categories of cost: Price = cost + profit.. However a better understanding of cost is required to take advantage of this relationship. The cots are Variable, fixed, semiveriable, total, direct and indirect costs. They have a different implication for the ultimate price.
Variable Cost: Cost that vary directly and proportionally with the production quantity of a particular product. e.g. raw material and packing material. Thus variable costs represent money seller can keep if they do not accept the contract and money they must pay if they do perform it.
Fixed Cost: Fixed costs do not vary with volume. It is the cost they pay simply into the business. e.g. building and machinery cost, advertising and R&D cost. They are not dependent on volume of production.
Semivariable cost: These are costs which fall between the aforesaid two costs and depend partially on the production volume. Costs such as maintenance, utilities and postage fall under it. However a closer analysis may help to identify the fixed and variable cost inbuilt in it.
Total cost: The sum of the variable, fixed and semiveriable costs is called total costs. As the volume of production increases, total cost increases, however cost of each unit decreases. This is because fixed cost are spread over a large number of units.
Direct and Indirect Costs: Since it is not possible to divide costs as fixed, variable or semi-variable, accountant often divide them as direct or indirect. Direct costs are traceable to or caused by a specific project or production operation. Labour and material are two direct costs. This should however be not confused with variable cost. Direct cost relates to traceability while variable cost relates to the behaviour of cost as volume fluctuates. Indirect cost or overheads are associated with two or more operating activities. Once again these should not be confused with fixed cost. Because indirect cost could be fixed or variable.

Regulation by competition: Suppose five suppliers submit their quotation giving details of their costs such as cost of material, labour, overhead, profit etc. Despite the prevailing controlling factors, companies will submit different prices because the cost of production and profit are only two of the factors a seller considers in determining price.

Regulated, Catalogue and Market prices:
Prices set by Law or Regulation: No supplier can change these prices.
Catalogue prices: The price updation is important in this respect. The buyer should request a recent sales summary indicating that significant quantities are sold to a significant number of customers at the indicated price before accepting a catalogue.
Market price: A market price is generally for an item or a service that is generic in nature and is associated with perfect competition.

Historical Prices: Price analysis also requires comparison of a proposed price with historical quotes. It is essential to determine that the base price was fair and reasonable. Several issues must be considered:

- How have conditions changed.
- Were there one time engineering setup or tooling charges.
- What should be the effect of inflation or deflation on the price.
- Will the new procurement create a situation in which the supplier should enjoy the benefit of learning.

Independent Cost Estimate: If price analysis technique does not work, a buyer may use an independent cost estimate as the basis for comparison. This estimate should be fair and reasonable.

ALL IN COST: The professional buyer recognizes that price is only a component of All-in-cost. All-in-cost refers to the total acquisition and usage cost and includes price, transportation, storage and administration as well as costs resulting from defective material.

Documenting a price analysis: The price analysis report includes:
- Information that was considered.
- Weight given to each piece of information and why.
- Logic supporting the determination that a price is reasonable or unreasonable.
- Soundness of that logic.

DISCOUNTS: These are important part of pricing and include trade discounts, quantity discount, seasonal discount and cash discount.

Trade Discount: Reduction from the list price allowed to various classes of buyers and distributors to compensate for performing certain marketing functions for the original sellers.
Quantity Discount: These price reductions are given to a buyer for purchasing increasingly larger quantities of materials and are offered under one of purchasing arrangement:
For purchasing material worth a specified amount of any number of different items at one time.
For purchasing material worth a specified amount of any number of item over an agreed-upon time.
Seasonal discount: It is based on the nature of certain products and is offered during off-season.
Cash discount: This is the discount offered for prompt payment of bills.

Legal implication of pricing are important to consider. Legislation, court orders etc.

SOURCES OF SUPPLY

- To produce the best product you need ideas, designs, specifications and good suppliers!
- Your products are only as strong as your weakest supplier.

A good supplier: An invaluable resource - One ‘outsider’ who is vital for your firm’s success is the supplier. He not only supplies you the goods of right quality, right quantity, on right time and at right price, but he assists you with product development, value analysis etc.
Selection and Management of the right supplier: Buyers must take six important supplier-oriented actions:
1. Develop and maintain a viable supplier base.
2. Address the appropriate strategic and tactical issue.
3. Ensure the suppliers are carefully evaluated.
4. Decide whether to use competitive bidding or negotiation as the basis of source selection.
5. Select the appropriate source.
6. Manage the selected supplier.

Supplier base development: Sources of supplier information include:

Supplier Purchasing Information File: Purchase department must maintain supplier information files on past, present, potential and future suppliers. The list includes name, address, phone numbers, FAX/Email number, a list of material available, delivery history, quality history and general information such as, management, plant and machinery, quality approach etc.

Supplier catalogs: A common and popular base and most firms maintain catalog libraries. It is useful for estimating prices also, thus facilitating planning and budgeting. Some large companies like L&T even appoint a full time Librarian to keep catalogs indexed and updated.

Trade Registers and Directories: Not very popular in India so far, these nevertheless are important base in developed countries and provide information such as addresses, number of branches, affiliations of all leading manufacturers and financial standings.

Trade journals: Useful in India and developed countries. Most journals contain such advertisements.

The yellow pages: Rapidly gaining popularity in India and even smaller cities like Siliguri are in the process of developing their local yellow pages. Since they do not provide much information but are well-indexed hence they are a good starting point.

Filing of mailing pieces: Many mail advertisements are worth saving. They should be numbered, dated and indexed for methodical filing. Some organization like Ranbaxy ask prospective suppliers to fill a form giving basic information about themselves and their product.

Sales Personnel: Popular in India, as salesman are usually well informed about the capabilities and features of their product, but are also familiar with similar and competitive products as well. Salesman can also suggest new applications of their products, Since they provide useful information, salesman should be treated with courtesy and given ample time to make their presentation.

Trade Exhibits: Regional and National Trade shows are an excellent source of information. It helps in expanding knowledge of new products, new potential suppliers and new ideas.

Company Personnel: Personnel from other departments who have good contacts, are members of associations, societies etc. often provide valuable information. So do the scientific, technical and research personnel.

Other purchasing and supply management departments:

Supplier development: A partnership or even a voluntary collaboration with supplier has following advantages:

1. A new supplier means a new, expensive and time consuming process.
2. Communication problems are common when dealing with a new supplier.
3. Adaptations forced by changing technology and conditions are better weathered by ongoing relationships.
4. A continuing partnership is the best antidote for quality and delivery problems.
5. Open relationships can help to cushion bad times.
6. Opportunistic buyers are more subject to shocks resulting from capacity r supply problems.
7. Opportunistic buyers do not get benefit of knowledge, research findings of suppliers.
8. A supplier willingly invests in research, innovation and value analysis in long term relationships, thus reducing your costs.

9. In competitive bidding suppliers are given designed and specifications thus they do not use initiative.
10. A partner supplier gets the opportunity to bring down his costs.

But it has its disadvantages also:
Partnering is a way to reduce purchase staff.
It can lead to complacency.
It can weaken leverage.
Purchasing and audit control can be lost.
Success can lead to excess.
Every supplier will want to be your partner including dishonest and incompetent ones.

Strategic and Tactical issues:

Early Supplier Involvement (ESI): A supplier is involved in early stage can help in material specification, tolerance, standardization, order size, process changes in suppliers manufacturing, packaging , inventory, transportation etc.

One supplier vs. many supplier: Single source is better when
- Better pricing results from much higher volume.
- Quality considerations dictates
- The buyer obtains more clout with the supplier.
- Lower costs are incurred to source process, expedite and inspect.
- The JIT reduces other costs also.
- Lower freight costs possible.

Multiple sourcing is appropriate:
- To protect the buyers during time of shortages, strikes, lock-outs etc.
- To maintain competition and provide backup source
- To meet customer volume requirements.
- When technological future is uncertain.

Green and social purchasing: Increasingly people are buying from sources which are environment-friendly or socially correct.

Evaluating a potential supplier:

Proposal analysis: Firms should be asked to indicate how they intend to comply with the quality requirements. He should assess the proposal to detect areas of misinterpretation or overemphasis.
- Technological and quality competition
- Price competition
- Service competition

Capability Survey: Once proposals have been chosen, the capability survey should be conducted by finding the answers to following questions:
What is firm's basic policy and philosophy with respect to product quality?
What is the general attitude of operators and supervisors towards quality?
What ideas and techniques they have to to ensure quality?
What is their engineering/production experience?
Do they have techniques, process and machines to ensure quality?
How well is their quality control Dept. equipped - manpower, equipment, techniques, ideas and knowledge. Does the top management support quality control Dept.
Past major customers.
General reputation
Letters of references.
ISO-9000 or ISO-14000 certification
Good manufacturing practices (GMP)

Financial conditions: A financially unsound supplier can not maintain, quality, delivery, rush orders etc. Such firms are managerially and technically weak, have no R&D facility and face labour unrest.
JIT capabilities
Service capabilities:

Competitive bidding Vs. Negotiation:

Competitive bidding is dictated by five criteria's:
The order value is large enough for both seller and buyer.
Specification of item and service are explicitly clear.
There are many sellers in the market.
The sellers in the market must be technically qualified and willing to supply.
Enough time to use this method for pricing.

Competitive bidding should not be used:

When it is impossible to estimate cost.
When price is a secondary consideration
When a purchaser anticipates a need to change specification.
When special tooling or setup costs are major factors.

International sourcing: Six common reasons for purchasing goods and services internationally are:

1. Quality: By far the most profound reason to seek international supplier.
2. Timeliness: Once initial difficulties of the new business relationship have been overcome, many international sources have proved to be remarkably dependable.
3. Cost: Total cost often is much cheaper when goods are sourced internationally.
4. Broadening the supplier base.
5. Countertrade.

6. Unique product and process technologies:

Problems associated with international procurement:

1. Culture and communication.
2. Payment terms and conditions.
3. Long Lead times
4. Additional inventories
5. Social and labour issues
6. Higher cost of doing business.