UNIT-5

Procurement & Manufacturing Strategies

Learning Outcomes

By the end of this unit the learner will be able to:

- ✓ Differentiate between Purchasing and Procurement
- ✓ Explore the Importance, Aims and Organization of Procurement.
- ✓ Recognize the Selection of Suppliers and Suppliers' Performance.
- ✓ Identify effective manufacturing strategies.

Unit 5

Procurement & Manufacturing Strategies

Purchasing and Procurement

As we have previously discussed, the preparation of a supply chain begins with strategic objectives, moves down to systematize the movement of materials, ensures that resources are obtainable and constantly looks for areas for improvement. But we have still not discussed the method for initiating the movement of materials. This is faciliated by **Purchasing** or **Procurement**.

In a supply chain, every business purchases materials from suppliers, adds value and sells them to downstream consumers. As every business in turn buys and sells, the materials flow through the entire supply chain. The trigger that begins each move is a **Purchase**. This is primarily a message that a business sends to a seller, something along the lines of, "we have agreed on terms, so deliver the materials to us and we will pay you".

PURCHASING provides a system for initiating and regulating the flow of materials all over the supply chain.

Purchasing is the task that takes responsibility for acquiring all the materials requisite by an organisation. Many of the purchaser's transactions are not standard, but comprised of rental, contracting, leasing, gifts, exchange, borrowing and so on. This is the reason why some people to talk about the 'achievement of materials' or the more common term of **Procurement**. 'Procurement' and 'purchasing' are often referred to as the same thing. Usually, purchasing refers to the actual buying process, while procurement has a much wider meaning. It can consists of different kinds of acquisition (rental, purchasing, contracting and so on) as well as the related work of selecting suppliers, agreeing terms, negotiating, expediting, monitoring supplier performance, materials handling, transport, warehousing and receiving goods from suppliers.

PROCUREMENT takes care of all the materials required by a business. It consists of all the associated activities required to get the goods, services and any other materials from suppliers to the business.

Procurement does not generally involve the movement of materials, but it *arranges* the transfer. It communicates the message that materials are required and organises the change of possession and location. But it is another function, like transport, that really delivers them. So, procurement is mainly concerned with information processing; it gathers data from a range of sources, analyses it and conveys the information to the supply chain.

Importance of Procurement

It is easy to see why procurement is vital. If we take a wider view, procurement forms a necessary connection between businesses in the supply chain and provides a system for coordinating the movement of materials between suppliers and consumers. At each point in the supply chain,

procurement sends messages backwards to explain what customers desire in a product; it also passes messages forwards to declare what suppliers have accessible. Then it negotiates conditions for delivery.

If we take a more limited view, procurement is clearly an essential function within every organisation. We know that each organisation requires some supply of materials and procurement is responsible for organising this.

If procurement is carried out badly, materials do not arrive, or the wrong materials are delivered in the wrong quantities, at the wrong time, with poor quality, at too high price, with poor customer service and so on.

Aims of Procurement

The overall objective of procurement is to assure that a business has a consistent supply of materials. With this superseding aim, we can widen scope with the following list of more direct goals:

- organising a consistent and continuous flow of materials into a business;
- working directly with end-user departments, establishing relationships and understanding their requirements;
- finding good suppliers, working directly with them and developing beneficial relationships;
- buying the correct materials and ensuring that they have satisfactory quality, arrive at the time and place required and meet any other needs;
- negotiating the best prices and all other terms and conditions;
- keeping stock low, considering stock policies, investment, readily available materials and so on;
- moving materials rapidly through the supply chain or expediting deliveries when essential;
- Keeping abreast of conditions, including pending price increments, shortages, new products and so on.

Organisation of Procurement

The way that procurement is controlled always depends upon the kind and size of the business. In a small organisation, a single consumer might be accountable for all purchases, policy and supervision. A medium-sized organisation might have a department with buyers, storekeepers, expeditors and clerks. A big company might have hundreds of people co-ordinating large volumes of purchases.

Usually, procurement is arranged as a single division to gain the advantages of **centralised purchasing**.

These benefits include:

- Consolidation of all orders for the same and similar materials to acquire quantity discounts
- Co-ordinating related activities to decrease costs of transport, stockholding and administration
- Eliminating duplicated efforts and messy practices
- Having a single point of contact for vendors and giving them reliable information and service
- Developing focused skills and enhancing procurement operations
- Allowing other people to focus on their own work without having to think about purchasing
- Concentrating liability for procurement and making management organization easier

Choosing Suppliers

Qualified Suppliers

Arguably, the most significant element of procurement is finding and choosing the right supplier. There is no point in having an outstanding product if the supplier cannot be relied on to deliver it. Suppose you are working on a plan and need to purchase significant materials – maybe a prefabricated bridge for a building project. You will consider two factors. First, a product design that meets your needs and second, a seller who can promise to deliver the product as required. In other words, the seller must be capable of doing the work, delivering high quality service, working to a timetable, promising satisfactory costs and so on. An advertised time of four hours for a train journey may appear to be good service, but it has less value if the train operator cannot actually deliver this.

Procurement begins by finding a **capable supplier**. This means a supplier who can absolutely deliver the materials required.

In general, organisations search for suppliers which:

- Are financially safe with good long-standing prospects;
- Have the aptitude and competence to supply the essential materials;
- Accurately deliver the requested materials;
- Send materials that are high in quality;
- Deliver reliably, on time and with minimal lead times;
- Quote satisfactory prices and financing arrangements;
- Are flexible to customers' demands and changes;
- Are knowledgeable and have expertise/experience with their products;
- Have earned an excellent reputation;
- Use expedient and simple procurement systems

- Have been used effectively in the past and can nurture long-term relationships

In diverse circumstances, a lot of other factors may be significant, like convenient location, skill to deal with variable demand and so on.

Most organisations maintain lists of officially-approved suppliers who have given good service in the past, or who are otherwise known to be trustworthy. If there is no satisfactory supplier on file, the organisation has to search for one. Suppliers for low-value items can sometimes be found in trade journals, catalogues or through business contacts. More costly items need a careful search and selection process, which can be very time-consuming.

A helpful approach for deciding on the best supplier for a product includes the following steps:

- Look for alternative suppliers;
- Build a list of qualified suppliers who can deliver the products;
- Compare organisations on this long list and eliminate those which are, for any reason, less desirable;
- Continue eliminating organisations until you have a shortlist (usually four or five) of the most promising suppliers;
- Prepare an enquiry or request a quotation and send it to each of the suppliers;
- Receive bids from the shortlist;
- Do a preliminary evaluation of the bids and eliminate those with major problems;
- Do a technical evaluation to see if the products meet all specifications;
- Do a commercial evaluation to compare all costs and other conditions;
- Arrange a pre-award meeting to discuss bids with the remaining suppliers;
- Discuss bid conditions, which are specific conditions that have to be agreed upon by both parties;
- Select the supplier which is most likely to win the order;
- Arrange a pre-commitment meeting to sort out any last minute details;
- Award orders to the preferred supplier.

This is clearly a time-consuming procedure, but keep in mind that a poor merchant can cause more problem than simply providing poor materials. Remember: this whole process is utilized for main purchases only. If you are simply looking to buy pencils or basic supplies, for example, the shop next door is possibly as good as any other supplier.

Normally, a business will not spend a lot of time looking at substitute suppliers if:

- It is purchasing low-value materials;
- There is just one supplier available;
- There is already a successful arrangement with a merchant;
- There is not sufficient time for extensive negotiations;

- The business has a strategy for selecting particular types of supplier.

Sometimes, specifically with government work, procurement has to be comprehensively fair and all prospective suppliers must be provided with the chance to give quotations. Rather than making a shortlist of capable suppliers, a business will broadly promote that it is seeking quotations for particular materials or work. The organisation evaluates all the bids submitted and selects the one that best fulfils the approved criteria. This is called **open tender**. A difference reduces the managerial effort by putting some qualifications on suppliers, maybe based on experience, financial status, or size. This gives a **limited tender**.

As you can see, we are discussing how consumers select suppliers – and we are supposing that suppliers are pleased to serve all the consumers they can attract. This is generally the case, but often suppliers have more authority and selectiveness when selecting their customers. This might occur when a supplier enjoys a monopoly, or near-monopoly, of some material or product. It may also occur when there is a short-term shortage of some product, such as oil, and suppliers select the customers they will sell to - maybe giving first choice to larger consumers, those who pay more or those who have long-standing agreements.

Number of Suppliers

We have already talked about the trend towards building partnerships and alliances. This unavoidably moves businesses towards single or limited suppliers, either for every material or for a range of diverse materials. Some organisations refer to this as **single sourcing,** which leaves them vulnerable to the performance of an individual business; all of which can lead to serious problems if anything goes wrong along the way. If the single seller of a vital part hits financial difficulties, an organisation though no fault of its own might have to halt production. To avoid this, some organizations employ a strategy of buying the same materials from more than one competing supplier. They may use rules of thumb such as 'never let a producer account for more than 20% of total revenue' or 'never let a consumer take more than 50% of total resources'. The selection must depend on individual circumstances, there are certainly benefits to both policies:

Benefits of single sourcing:

- A stronger connection between consumers and suppliers who may form valuable alliances or partnerships;
- Dedication of all parties to the accomplishment of the relationship;
- Economies of scale and cost discounts with large orders;
- Easier communication, decreased administration and simpler processes for standard orders;
- More consistency in materials and their supply;
- Easier to maintain requirements, terms, conditions, and so on.

Benefits of multi-sourcing:

- Competition between suppliers decreases prices;
- There is less possibility of disrupted supply, as issues can be avoided by changing suppliers;
- Can deal and easier with changing demand;
- Involving more businesses can provide access to broader information and knowledge;
- More probable to benefit from innovation and development;
- Does not rely on trusting one single organisation.

Organizations utilize more sellers when they want to avoid potential problems. Another way of doing this is an approach called **forward buying**. In its simplest form, this occurs when a business orders more materials than it presently needs and keeps the surplus in stock.

Another form utilizes contracts to bring materials at particular points in the future. Both of these carry two benefits. Firstly, they assure supplies for some period in the future and reduce the effect of potential disruptions. Secondly, the cost of the materials is fixed, avoiding the possibility of future price increases or unavailable items. Of course, things can still go wrong. A company that signs a long-term contract can still go out of business, or a storage facility can burn down. Nevertheless, the chances of facing a crisis are much lower. It is perhaps safest for the business to hold spare stock itself, but this has higher costs. By contrast, agreeing a contract for upcoming deliveries gives lower costs, but does not eliminate so much risk.

Monitoring Supplier Performance

Most organisations monitor their suppliers to ensure that they continue providing satisfactory service. This is called **Supplier Rating** or **Vendor Rating**. This is usually done casually by way of a skewed review; sometimes there are multifaceted measures for each elelment of performance. Most organisations employ a negotiation process that gives a sensible view of performance, and requires a rational amount of effort. One general approach utilizes a checklist of significant factors and checks that the supplier meets a suitable standard in these. The checklist may ask whether the supplier is economically sound; whether its supplies on time; if material value is high enough; if there is practical support; whether the cost is competitive; is able to offer advice and support about related trends and so on.

If the supplier does not meet any of the required measures, the consumer has to demand improvements or look for new sources. The objective is not specifically to substitute particular suppliers on a regular, but to check performance, recognize areas that require improving and agree on the very best way of making these improvements. Only as a last option should a business start looking for new suppliers.

A more practical approach gives the seller a score for diverse aspects of performance. They may, for instance, give each supplier a score out of ten for on-time delivery, and if a supplier's score drifts down below eight, the consumer can consider ways of improving performance. Although this method sounds simple, it can present substantial difficulties. How, for instance, can you recognize the most significant factors of supplier performance, the comparative value of each, the actual performance and the lowest acceptable performance?

Each of these is likely to come from a blend of agreement and discussion, rather than from more accurate measurement. The result is a skewed view that might be useful, but contains little objective and concrete measurement.

Procurement Cycle

Steps in the Cycle

After selecting the supplier, the business has to follow a series of processes for arranging purchases. Suppose that you want to purchase something costly, like a new computer. You possibly approach this in a number of stages; listing the features you want, searching for systems that may provide these, searching suppliers, developing a list of options, comparing these and selecting the best option. Your objective is to find the blend of products and suppliers that best caters your needs. The procurement function in a business does exactly the same, following a particular process for every purchase. This process is diverse in each organisation and varies with the kind of items being bought. You would not anticipate an organisation such as the US army, which purchases millions of items a day, to work in the same way as the directors of Real Madrid football club when they look for a new striker. And the US army would not approach its decision to purchase pencils in the same way as its decision to purchase helicopters.

Despite these inherent differences in detail, we can nonetheless propose a common approach to procurement. This involves a chain of common steps, which begin with the user searching for required materials and ends when the supplies are delivered.

A distinctive **Procurement Cycle** has the following steps (with key documents in bold) -

1. A user department:

- Establishes the need for acquired materials;
- Examines materials accessible and prepares **specifications;**
- Checks departmental financial plans and gets clearance to procure;
- Prepares and transmits a **purchase request** to procurement department.

2. The procurement department:

- Obtains, verifies and authorises the purchase request;
- Inspects the material requested, looking at existing stocks, substitute products, production options and so on. After negotiations with the user department, procurement makes a shortlist of possible suppliers from standard suppliers, lists of favoured suppliers or those known to cater to requirements;
- Sends a request for quotations to this shortlisted suppliers.

3. Then, every supplier:

- Examines the requests for quotations;
- Checks the customer's position, status, credit and so on;
- Considers how it could best cater the order;
- Sends a quotation back to the business, giving details of prices, products and conditions.

4. Then, procurement:

- Examines the quotations and carries out commercial evaluations;
- Discusses the technical aspects with the user department;
- Checks the budget details and clearance to purchase;
- Chooses the best supplier, based on the supplied details;
- Discusses, consults and confirms the terms and conditions with the seller;
- Issues a purchase order for the materials (with terms and conditions attached).

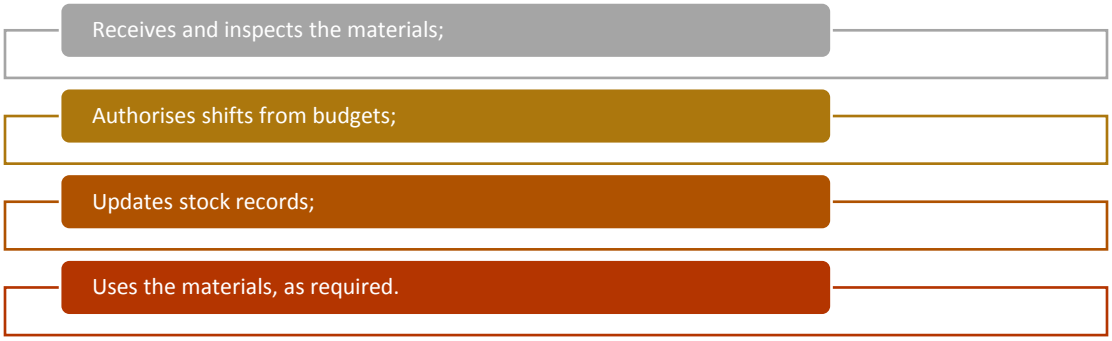
5. The selected supplier:

- Receives, acknowledges and processes the buying order;
- Organises all operations required to provide the materials;
- Ships materials jointly with shipping advice;
- Sends an invoice.

6. The procurement department :

- Acknowledges the receipt of materials;
- Carries out necessary follow-ups and requests information where required;
- Receives, examines and accepts the materials;
- Informs the user department of materials received.

7. The user department:



8. The Procurement:

Arranges for the payment of the supplier's invoice.

The first three steps are more concerned with the supplier and materials, and then comes the critical point with the topic of a purchase order in step 4. At this stage, the organisation has decided it is willing to buy particular materials from a supplier, and the purchase order triggers the supply process (along with essential production planning, transport arrangements, finance and so on). The purchase order is one element of a legal agreement between the supplier and its customer. The remaining steps focus on the details of delivery.

This process seems complicated and consists of a lot of steps and documents. If you are buying something costly, the effort is definitely worthwhile. You might in fact follow a much more complex procedure to set product specifications, choose the supplier and discuss terms. But if you are making smaller purchases, if there are existing relationships with suppliers or there is just one competent supplier available, it is generally not worth going through this lengthy and expensive procedure.

Some of the issues with paper-based procurement are:

- It takes too much time to go through the entire procedure;
- Relies upon heavy paperwork, which is passed between various locations;
- Labour required to complete, examine, process, store and generally deal with all the papers;
- Has other people administer, manage and organize the managerial procedures;
- Inevitable errors may arise because of too many documents and people involved;
- Not able to interact with linked systems like stock control.

A pivotal step in the evolution of procurement came with electronic buying. Electronic Data Interchange (EDI) has been utilized since the 1980s and permits automated procurement. A business links its information system to a vendor's and when it is time to place an order, the system automatically conveys a message. This works well for small, normal and repeat orders and most businesses quickly adopted the method. There are some variations on automatic procurement, all of which are categorised under the broad heading of **e-procurement**.

E-Procurement

Most organisations are currently utilizing some type of e-procurement. Surveys suggest that more than 60% of UK companies were using e-procurement by 2002 and 80% of European managers are already using the system or intend to implement it in the near future.

Some of the benefits this system offers include:

- Allows immediate access to vendors anywhere in the world;
- Creates a transparent market where goods and buying terms are readily accessible;
- The automation of procurement with benchmark procedures;
- Greatly reduces the time required for transactions;
- Reduces costs, usually by 12–15%;
- Allows some procurement activities to be passed vendors or third parties;
- Integrates flawlessly with suppliers' information systems.

There are essentially two kinds of e-procurement which are explained as B2B (where one company buys materials from another company) and B2C (when an end customer buys from a business). Most of the people are more familiar with B2C transactions.

Between 1999 and 2002, the number of Internet shoppers in the UK increased from 2 million to 6 million. Nonetheless, many of these websites hit monetary troubles with the bursting of the 'dot-com bubble' and there have been plenty of extensively publicised bankruptcies.

One difficulty, of course, is that people do not essentially like e-procurement. If you want to purchase a book, you can visit a variety of websites, fill in the forms and get the book delivered within a day. But if you go to your nearby bookshop, you may use less advanced and convenient technology, but you get to pick up the book right away and with no delivery charge. B2C can run also into difficulties as people in general like going to look at things they are thinking of purchasing before they purchase them.

Types of Purchase

Different Approaches for Different Products

When we explained a formal process for procurement, we said that it can be extremely complex and time consuming. It would be costly and needlessly complicated to make use of this process for each

purchase; nobody wants to waste six months buying a pack of envelopes. On the other hand, main purchases require much more consideration and examination.

This is why organisations change the specifics of their procurement dealings, in order to match material types and supply methods with their needs and prorities. Typically speaking, the higher the cost of materials and the more complex the requirements, the more time and effort the procurement process demands.

Organisations often follow rough rules for the effort they are willing to put into procurement. Maybe using ad hoc actions for low-value routine supplies, an easy, automatic method for purchases up to £20,000, a more precise process for purchases up to £150,000 and unique, comprehensive analysis for bigger purchases.

Once such rules are defined, a management control system can check purchases and ensure that they are completed in the best way. It can review how purchases have been made, if the result is acceptable, if the effort is practical in relation to the costs/value and if the process can be enhanced for the future. One significant point here is the difference between schedule, repeat orders and new ones. If a seller has given good service over an extensive time period, a business may remove itself almost entirely from the procurement cycle and put negligible effort into administering potential orders. Ordering turns out to be routine and the organisation successfully sends a message to say, 'send another order like the last one'. With non-routine buying, an organisation has to be more cautious and put more effort into the choice of supplier and the conditions of purchase.

If an order is repeated often enough, a business might consider the 'make-or-buy' decision. In other words, it has to choose those materials that it can manufacture for itself and those that are best supplied by external suppliers. In its simplest form, the business asks whether it can get materials more inexpensively from a supplier than it can make them in-house. Well-organized strategies and economies of scale often mean that particular suppliers can carry materials at lower prices than other businesses can make them. There are, however, a lot of other factors to consider. Making parts internally can be more reliable, give greater control over supply, allow the company to modify products, have shorter lead times, use spare resources, protect designs, keep value-adding operations, boost the size of the business and so on. On the other hand, buying them from sellers can mean the advantages of specialisation, access to better expertise, economies of scale, decreased stock levels, augmentation of some risk, greater flexibility and so on.

The Department of Trade and Industry suggests that the three major criteria for these decisions are:

- Financial Factors – related to costs;
- Operational Factors – related to responsiveness, reliability and flexibility;
- Strategic Factors – related to the lasting consequences of the decision for the business

In practice, the apparent benefits of outsourcing are rising and more organisations are happy to focus on their core functions and use external suppliers for materials.

Terms and Conditions

Though we have talked in broader terms about 'placing an order', there are numerous types of orders. Organisations usually talk about 'placing an order' for supplies, but then about 'signing a contract' for services and 'leasing' for equipment. To a great extent, these are diverse ways of saying the same things, but there might be legitimate differences.

We have already described some specific types of orders, with the following being most general:

- Purchase orders are utilized as the standard manner for procurement that we described above.
- It is fundamentally a letter from one business to another, communicating information of the materials required and the conditions of buying. This is generally a reaction to a quotation from a capable supplier, giving details of the materials it can provide and its conditions of trade.
- Blanket orders offer a simple system for inexpensive standard items, such as stationery. A business can put a single order for all the goods that it will require over a given time period, such as a year. Then, the seller delivers batches of products when requested during the year.
- E-Procurement uses EDI or the Internet to simplify purchases, replacing paper-based procedures with electronic ones. This provides a fast and efficient method for repeat, or straightforward, orders.
- Contracts give detailed descriptions of am agreement between a business and a supplier. They explain precisely the responsibilities, work and services for each, alongside all applicable terms and conditions. A lot of organisations make use of contracts, regardless of purchase orders for comprehensive services, so they sign a contract for a supply of electricity, for example. In a similar way, businesses can sign a contract for a particular piece of work, like a construction business building a road or housing block.
- Sub-contracts: when a seller signs a contract with the business, it might not do all the work itself, but instead assign some work to a sub-contractor. Then, there are two contracts – the contract between the business and the supplier, and the subcontract between the supplier and sub-contractor. For larger projects, there can be many more layers of sub-contracting.
- Leases and rental agreements are again there to communicate the terms and conditions of getting materials. They are usually used for buildings or equipment that is returned to the owner after a period of utilization by the consumer. You can rent or lease a car, for instance, and when the deal comes to an end, you return it to the owner.

Pricing is a very complex issue. It is not in an organisation's long-standing interest to force suppliers to offer unrealistically low prices as they will eventually go out of business and not be there when they are required. However, supermarkets in parts of the European Union have bowed to customer pressure to decrease food prices.

While this benefits their consumers – and most probably the wider population – it means paying less to farmers who cultivate the crops. If farmers go out of business, there is a huge impact on rural

communities and the countryside, more dependence on imported food, a consequence on the balance of trade and so on.

In general, there are four means of setting a price for materials:

- **Price Lists –** where sellers quote fixed prices. Book publishers, for instance, quote a selling price that they expect retailers to utilize. They can offer discounts for large or unique purchases, but one business basically fixes the price.
- **Special Quotation –** where suppliers quote prices to every customer, mainly for nonstandard materials. Customers submit a quotation request and the supplier returns a price and the conditions that it is willing to offer.
- **Negotiation –** when there is some flexibility in both price and conditions. A seller might give a quote, but is ready to discuss potential perks and advantage for bulk or repeat orders. Similarly, consumers can negotiate if they want special conditions, like fast delivery.
- **Commodity Pricing –** for commodities like oil, coffee, gold and wheat, market forces determine the going rate that is followed by all suppliers. You can see examples of lots of these figures in financial futures markets.

A number of standard conditions are utilized and for historic reasons they are phrased in terms of shipping:

- **Ex-Works:** The customer accepts materials 'at the factory gate' and takes over all liability for transport, documents, customs authorization, insurance, risk and so on. This kind of contract is best when the seller has little experience of shifting materials through the related area, or the buyer has a lot of experience. If neither has the essential experience, they can sub-contract the movement to third party specialists.
- **Free Alongside (FAS):**Here the supplier moves materials to a specified 'port' and delivers them 'alongside a ship'. The customer takes over the loading onto the vessel and all onward movement.
- **Free on Board (FOB):**This is a variation of FAS, where the seller also takes care of the loading onto the vessel, after which the consumer is accountable for onward transport. This may seem like a small adjustment to FAS, but loading may involve heavy lifts, danger of damage or use of heavy machinery.
- **Delivered Ex- Ship:**Where the goods are obtainable on the ship (or quayside) but the consumer has to organize for customs authorization, duty and so on.
- **Cost and Freight (C&F):**Here, the merchant arranges transportation to an agreed point, but the consumer accepts any danger and arranges insurance for the voyage.
- **Cost, Indemnity, and Freight (CIF):**Where the seller delivers to an agreed point and also arranges insurance for the journey.

- **Delivered:**Where the seller is accountable for all aspects of the transport up to delivery to the consumer.

Manufacturing

A considerable number of firms in the supply chain are engaged in manufacturing products. Whereas, just about all businesses are involved in procurement and market distribution operations, manufacturers add value by converting raw materials into commercial or industrial products. They make value by producing and marketing product/service packages, either to end consumers or middle members of the supply chain.

Manufacturing Perspectives

The range of products a business makes derives from its technical ability and marketing strategy. Firms' ideal manufacturing competencies are based upon market opportunity and readiness to take ground-breaking risk. While the products made are clearly diverse, the genuine differentiator between firms is measured in competencies realted to knowledge, technology, procedure and strategy. Once established, a manufacturing business' image and focus are constantly customized in the eyes of supply chain partners as it conducts trade, researches and develops new products and performs agreed-to value-added services.

A firm's manufacturing capability is based on:

- **Brand Power;**
- **Volume;**
- **Variety;**
- **Constraints;**
- **Lead- Time Requirements**

Brand Power

A lot of manufacturers use a great deal of marketing capital to create brand awareness and approval among potential buyers. As a result, they are usually identified by their product brands. The evaluation of a customer's buying preference based on a manufacturer's status, product quality and supply chain abilities is known as brand power.

As a common rule, the stronger a firm's product brand image is among buyers, the more leverage the manufacturing organization will have in determining supply chain structure and strategy. For example, John Deere & Co. dominates how farm machinery, as well as lawn and garden products, are sold, distributed and maintained.

It is normal practice for a business to subcontract some or even all manufacturing and logistics operations necessary to market a particular product. The nature of the production process, costs and

next target in the supply chain go a long way to establish the appeal of outsourcing. Logistical needs in terms of inbound materials and finished product allocation are determined by the geographical relationship between places of manufacturing and those of traders and customers.

Volume

Manufacturing processes are categorized in terms of the association of cost per unit to volume of output. The conventional standpoint is to treat volume in terms of the well-established standard of **Economy of Scale.** The scale principle describes a connection, wherein the standard cost of producing manufactured goods declines as its manufacturing size increases. That is, product quantity must be increased as long as per-unit boosts in volume *decrease* the average cost per-unit manufactured. Economy of scale arises from efficiencies generated by specialization of procedure, labour force, fixed asset consumption, procurement economies and minimal need for procedure changeover.

Economy of Scale is extremely important in manufacturing conditions involving high fixed-cost machines to transform raw materials into completed products.

In volume-sensitive industries, elevated capital outlay coupled with the high price of changeover tends to breed long production runs. In terms of logistics, two considerations associated to volume affect and influence supply chain design.

Firstly, Supply Chain Operations must record the number of times a particular product is manufactured during a particular planning period. Such **Manufacturing Frequency** has a direct impact on both inbound and outbound logistical needs. Secondly, the amount or lot size usually produced during a particular manufacturing run determines the product level that must be handled and warehoused in a supply chain structure.

Variety

In comparison to manufacturing situations subjugated by scale, other production technologies allow for flexibility. These manufacturing procedures are characterized by comparatively frequent product runs and high repetition of small lot sizes. As opposed to economy of scale, industrialized processes that favour variety, quickly switch production from one product to another an retain key competences are referred to as having **Economy of Scope.**

Variety refers to the **range** of product variations that can be produced in a given manufacturing procedure. Such differences might result from the nature of how products are routed through a modern plant and/or the use of general as opposed to specialized equipment. The attainment of economy of scope is also openly related to the speed and cost of changeovers from one product to another.

Constraints

All manufacturing procedures involve a balance between economy of scale and economy of scope. Volume and variety call for corresponding logistical support requirements. Constraints interrelate with volume and diversity to make manufacturing plans.

The three main constraints that govern manufacturing operations are:

- **Capacity;**
- **Equipment;**
- **Setup/Changeover**

Capacity is the measure of quantity in which a particular product can be produced per unit of time. Of particular importance is a firm's **demonstrated** ability of quality production. While a factory, process or mechanism might have a **rated** capability, the related measure is a firm's *verified* ability to attain and sustain a particular level of quality output in an expected time period. A measure of production capability is the swiftness to which a particular procedure reaches confirmed capacity, given an unanticipated change in requirements.

Equipment constraints are linked with flexibility, regarding the utilization and sequencing of particular machines to carry out key manufacturing tasks. Clearly the product range a factory can make is constrained by the range of obtainable equipment and the necessary sequence of work. However, some manufacturing requirements are more simply accommodated across a machines' family and by using changeable work sequences than others. In lots of situations, a particular machine or task tends to limit or act as a bottleneck to the overall manufacturing procedure.

The structure for emphasizing managerial notice is captured in the **Theory of Constraint** method.

Setup changeover constraints are directly connected to the prior discussion regarding variety. Substantial progress has been made in manufacturing administration to speed up both procedure changeover time and the time needed to reach confirmed capacity.

Lead Time

Manufacturing **Lead Time** is a gauge of the elapsed time between release of a production order to the shop floor and the achievement of all work needed to attain ready-to-ship product status. Any given manufacturing procedure uses both functioning and inter-operational time.

Operational Time is a blend of setup, changeover and running or genuine production time. In any manufacturing situation, the greater the amount of total lead-time accounted for by real production, the more efficient the conversion process. Efficient functioning time must be traded off against the issues discussed earlier about volume and diversity.

Manufacturing processes also encounter unforeseen losses of time. Production efficiency is negatively affected during periods when a procedure, line or mechanism is idle because of queuing, breakdown,

waiting or issues with logistical support. All forms of unanticipated delay represent severe bottleneck issues.

Logistical operations dedicated to supporting production can bolster and improve operating efficiency in a number of ways. The potential benefits of brand power are largely based on a firm's track record in the timely order-to-delivery performance for its consumers.

Lot-size efficiencies related to production frequency and recurrence are reliant on dependable logistical support. The choice to manufacture larger lot sizes creates the specific requirement for enhanced logistical support.

Manufacturing Strategy

The unique nature of every manufacturing procedure and the market served both limit the available range of different strategies. Strategic scope in manufacturing is constrained by both promotion and technological forces.

For example, a producer following a method dominated by economy of scale might wish to develop process flexibility. However, significant investment will normally be necessary to boost frequency and recurrence.

With time, the varying nature of the market and obtainable technology serve to change a firm's ongoing strategic position.

Matching Manufacturing Strategy to Market Requirements

Mass marketing requires limited product/service differentiation. In contrast, a one-on-one production strategy builds on exceptional or tailored product/service offerings for every consumer. The strategic marketing attitude of a firm in terms of flexibility and dexterity to satisfy particular consumer requirements is directly connected to manufacturing capability. To a large degree, a firm's manufacturing ability drives the possible range of its efficient marketing strategy. For a manufacturing business to efficiently compete, it must be able to incorporate manufacturing ability into a significant marketing value proposition.

Strategic Alternatives

The most common manufacturing strategies are **Make–to-Plan (MTP), Make-to–Order (MTO)** and **Assemble–to-Order (ATO).** MTP is also referred to as **Make–to–Stock (MTS).**

As a common rule, MTP strategies are a trait of industries exploiting economy of scale that arises from long production runs. Important finished goods inventory is normally manufactured in expectation of future consumer requirements. The logistical necessities to support MTP are warehousing facilities to accumulate finished products and to assist product variety for particular customers. When flexible

manufacturing is launched to speed up change over, the inventory lots formed are normally smaller in size. However, warehouses are still necessary for short-term storage and to enable product variety.

In comparison, MTO manufacturing strategies focus on manufacturing to customer requirements.

While MTO might not be as simple as the conventional apprach, precise quantities and configurations are manufactured in comparatively small quantities. Logistical ability might be required for provisional storage and to attain outbound transportation consolidation, but most products produced in MTO surroundings are shipped straight to customers.

Total Cost of Manufacturing

The marketing and industrialized strategies of a business determine logistical service requirements. For instance, MTO manufacturing strategies usually require less finished goods inventory than MTP and ATO strategies. However, MTO strategies naturally require dynamic inventory support and might result in high-cost market allocation. In light of such cost trade-offs, the design of a logistics support system should be based on the **Total Cost of Manufacturing (TCM).**

Logistical Interfaces

The well-organized and successful coordination of a manufacturing policy with the procurement of components and materials ultimately relies on logistics. Resource inputs should be procured and made accessible when required for manufacturing operations. Whether the manufacturing scheme is MTO, ATO, or MTP, logistics links the seller base with manufacturing processes.

The better the prospect is for attaining lowest cost of possession and eventually, the lower the total cost of manufacturing. Such operations appear when there is high-level supplier combination in both operations and in design. Just-in-Time, Materials Requirements Planning, and Design for Logistics represent three approaches to achieving effective coordination.

Just-in-Time (JIT) techniques have generated a lot of interest and discussion over recent years, in each functional area linked to Supply Chain Management. Sometimes, this is termed as Just-in-Time production; it's also often called Just-in-Time purchasing and normally referred to as Just-in-Time delivery. The objective of JIT is to time-phase activities so that materials and components bought arrive at the manufacturing or congregation point just at the time they are needed for the transformation procedure.

Requirements can be fulfilled by focusing on the completed product being made. Once the production agenda is established, just-in-time entrance of components and materials can be designed to correspond with those needs, resulting in decreased handling and lower inventories. The implications of JIT are numerous. Of course, it is essential to deal with sellers who have high and reliable levels of quality, as their components will go straight into the finished product. Comprehenisvely steady logistical performance is essential and abolishes, or at least decreases, the necessity for safety stocks of materials.

JIT typically requires more regular deliveries of lesser quantities of purchased inputs, which might necessitate alteration of inbound transportation.

Originally, JIT was implemented to manufacturing procedures characterized as MTP, since the efficient functioning of the system is reliant upon a finalized production timetable.

Some organizations, noting the advantages of JIT systems and recognizing the benefits of supplier amalgamation, have gone so far as to carry their suppliers' personnel into their own manufacturing plants. The seller personnel are allowed to use the customer's purchase orders, have complete access to construction schedules and have liability for scheduling influx of materials.

Requirements Planning

In multifaceted manufacturing organizations, a procedure, which is called **Materials Requirements Planning (MRP),** is regularly used to help bridge the gap between purchaserand seller. MRP systems offer benefits similar to those of JIT; to reduce inventory, preserve high consumption of manufacturing capacity and organize delivery with procurement and associated activities. Execution of MRP systems needs a high level of technical sophistication. Software applications, like superior planning and scheduling systems, have been developed to deal with complex essential information, such as lead-times, quantities on-hand and on-order and mechanism capacities for thousands of materials across multiple manufacturing locations.

Design for Logistics

The way on which logistics overlap with procurement and manufacturing, as well as with engineering and advertising, can be really enhanced by incorporating a method known as **Design for Logistics** into the early stages of product development. Remember that the aims of JIT and MRP are to reduce inventories and handling, with materials and machinery being prepared for assembly or alteration as and when they are required.

Further Reading:

- ✓ ***Caroline Booth, (2010), Strategic Procurement: Organising Suppliers and Supply Chains for competitive advantage***
- ✓ ***Jeffrey P. Wincel, (2004), Lean Supply Chain Management: A Handbook for Strategic Procurement***
- ✓ ***Robert W. Turner, (2011), Supply Management and Procurement: From the Basics to Best-in-class***