Manufacturing systems, strategies and technologies: implications for the design of management accounting systems

Learning objectives

After studying this chapter, you should be able to:

- describe the different manufacturing systems and production management strategies;
- outline the main features of the new manufacturing technologies;
- discuss the factors influencing the choice of a particular production management strategy;
- explain the implications of the different manufacturing systems and production management strategies for the design of a system for recording product costs for inventory valuations;
- explain the implications of the alternative production management strategies and advanced manufacturing technologies for deriving product costs for decision-making;
- list the criticisms of conventional management accounting information for operational control and performance measurement in a just-in-time and advanced manufacturing environment;
- discuss the proposed modifications for overcoming the criticisms relating to operational control and performance measurement in a just-in-time and advanced manufacturing environment.

In this chapter we shall consider the different ways in which the manufacturing process can be organized (i.e. the manufacturing systems) and the alternative production management strategies that may be applied to manage the production process. In addition, the advanced manufacturing technologies (AMTs) now being used by many companies are described. Figure 21.1 illustrates the relationship between manufacturing systems, AMTs and production management strategies. You can see that a range of alternative AMTs can be used for each type of production system, and also different production management strategies exist to manage the alternative production systems. The management accounting system should support the manufacturing goals of an organization. It is therefore important that management accountants understand the manufacturing systems, production management strategies and AMTs used in their organizations. In this chapter we shall focus on manufacturing systems and strategies and consider their implications for the design of management accounting systems.

Various organizations of the manufacturing process are possible. Three different approaches for organizing the manufacturing process are described in the literature. They are jobbing shop production, batch production and flow production.
Jobbing shop production
The main characteristic of jobbing shop production is that products are specially made to meet the requirements of individual customers. Each order tends to be unique, and there are few, if any, common components. It is therefore most unlikely that the manufacturer will maintain stocks of components or finished products. The only items held in stock are raw materials and work in progress. To produce the many different products, a jobbing firm requires highly flexible production equipment capable of performing many different tasks, and also a highly skilled work force.

A typical layout for a jobbing shop is illustrated in Figure 21.2(a). This layout is called a functional (or process) layout. With a functional layout, all similar machines are grouped together and adapted to the special requirements of different orders. The manufacturing system is organized into separate specialist departments such as marking out, turning, milling/drilling, heat treatment, assembly and inspection.

Batch production
The main characteristics of batch production are medium-volume production runs of a medium range of standardized products, although a number of variations on a standard theme may be offered. Production takes the form of small batches or lots by a series of operations, each operation normally being carried out on the whole batch before any subsequent operation is started.

The production system must be reasonably flexible to accommodate varying customer requirements and fluctuations in demand. Batch production is often carried out using functional layouts (Figure 21.2a), but with a greater number of more specialized machines. With a functional layout batches move by different and complex routes through various specialized departments travelling over much of the factory floor before they are completed. Quality control in the batch situation will depend to a large extent on the size of the batch. If the batch size is relatively large, it is probable that some form of batch sampling will take place, and the batch will be accepted or rejected on the basis of the sample.

Flow production
Flow production is a transformation process in which successive units of output undergo the same sequence of operations, with more specialized, dedicated equipment, usually involving a production line of some sort. This is generally viewed as mass production. The major characteristics of mass production are large-volume