University of Navarra

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The Functions and Costs of Inventory

Introduction and Definitions

Inventory can be defined as the stock of any item that an organization owns with the purpose of selling, either in its current form or after going through a transformation process. Note that resources like labor, equipment, etc. are not included in the definition of inventory.

Inventory is money tied up that provides no return until it ceases to be inventory and becomes sold product. Inventory usually takes a big share of the current assets of a firm and it is therefore very important to manage it effectively. It is probably the business community's most necessary evil, providing an essential ingredient in the production process, allowing the inputs to smoothly flow into outputs, thus creating value.

Companies traditionally keep too much inventory. Some managers tend to think of inventory as gaseous material. This is because when left unattended it tends to grow to occupy all the available room. Many people in a firm feel comfortable with a high level of inventory. For example, the sales manager needs to have it in the finished products warehouse to be able to satisfy customer needs without delay. Also, a purchasing manager can feel satisfied about having plenty of stock and being able to negotiate with the suppliers on larger quantities, without being worried about a shortage of an article. Similarly, production managers can schedule machines to work more efficiently if they are not concerned with meeting urgent orders.

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This tendency can cause financial headaches to the firm, since inventory is expensive to keep, not only because of the low return investment it represents but also because of the obsolescence of the stocked products, the lack of flexibility they generate and so on, as will be discussed later in this note.

Some Classifications

Inventory can be classified into three groups, depending on its state within the production process:

1) **Raw materials and parts** (RM) include the inventory of articles purchased by the firm from exterior suppliers. The "raw materials" notation is generally used for articles that will undergo some transformation, while "parts" is used for articles that will be used in assembly operations.

2) Materials in the interim stage of the production process are called **Work in process** (WIP) inventory. These materials have already undergone some transformation or partial assembly but (except as spare parts) will not be sold in their present state.

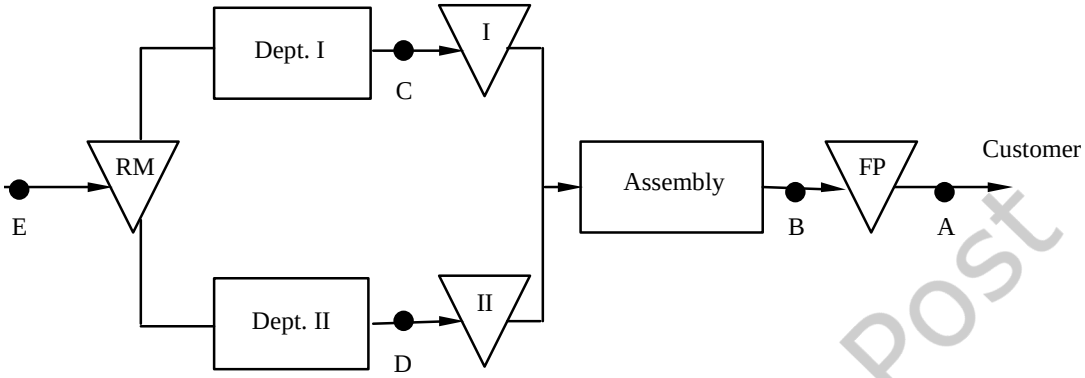
3) **Finished products** (FP) include all the materials that are in their final form, ready to be delivered to the customers.

In a very rough way, firms can be classified from an inventory management point of view into two categories: those that make decisions on the purchasing and manufacturing of articles in order to keep a determined level of stock to satisfy future needs (**manufacture to stock**) and those that manufacture articles to fulfill a specific customer order (**manufacture to order**).

The demand (usage) of an article can be independent of any production decision[1] (**independent demand**) or can depend on other decisions taken inside the factory (**dependent demand**). For example, in the process represented in Figure 1, flow in (A) is decided by the customer, external to the company, but decisions on the number of units to assemble, (flow in B), the number of components I and II to manufacture (flows C and D) and the amount of raw material to purchase (flow in E) are obviously not independent. The demand experienced by the RM manager depends on the decisions taken by managers in departments I and II, and the demand for these will depend on the decision taken by the assembly manager. The only department facing an independent demand is the last one, while the others are dependent on somebody else's decisions.

[1] This independence is limited to production decisions, because you certainly expect to modify demand behavior with appropriate marketing decisions.

Figure 1



Therefore, the managers in departments I and II, as well as the manager in the purchasing department need not forecast their demands, but just compute them from the decisions taken by the departments downstream and from the available inventories.

Methods for managing inventories will be different if faced with independent or dependent demand. In the present note, we will only cover the case of independent demand, while the presentation of the techniques for dependent demand (Materials Requirement Planning, MRP) will be tackled in another note.

Inventory Measurements

Keeping a record of the inventory positions can be a very difficult task depending on the accuracy of the required measurements. There are three important dimensions to take into account: the different products, the different phases in the production process, and the different physical locations where inventories are kept. Figure 2 might illustrate this point:

Figure 2