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Production and Operations Management Sample Material

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1. PRODUCTION AND OPERATIONS MANAGEMENT (POM)

Operations are that part of a business organization that is responsible for producing goods and/or services. Goods are physical items that include raw materials, parts, subassemblies such as motherboards that go into computers, and final products such as cell phones and automobiles. Services are activities that provide some combination of time, location, form, or psychological value.

The ideal situation for a business organization is to achieve an economic match of supply and demand. Having excess supply or excess capacity is wasteful and costly; having too little means lost opportunity and possible customer dissatisfaction. The key functions on the supply side are operations and supply chains, and sales and marketing on the demand side.

1.1. What is Operation Management

Operation Management is a part of management sciences. Operation Management is concerned with the production of quality goods and services and ensures that the business operations are performed smoothly, efficiently, effectively. It is a field of management that deals with effective planning, scheduling, use and control of a manufacturing or service organisation. Operations management is the business function that plans organises, co-ordinates, and controls, the resource needed to produce a company's goods and services. Operations Management is the process whereby resources, flowing within a defined system, are combined and transformed by a controlled manner to add value in accordance with policies communicated by management.

Operations management is the management of that part of an organization that is responsible for producing goods and/or services. There are examples of these goods and services all around you. Every book you read, every video you watch, every e-mail you send, every telephone conversation you have, and every medical treatment you receive involves the operations function of one or more organizations. So does everything you wear, eat, travel in, sit on, and access the internet with.

Operation is concerned with the transformation of inputs into the required output or services. Management is the continuous process, which combines and transforms various resources used in the operations system of the organization into value added services. Operation Management is the set of interrelated management activities, which are involved in manufacturing of certain products or services.

Operations management is an area of management concerned with designing and controlling the process of production and redesigning business operations in the production of goods or services. It involves the responsibility of ensuring that business operations are efficient in terms of using as few resources as needed and effective in terms of meeting customer requirements. It is concerned with managing an entire production system which is the process that converts inputs (in the forms of raw materials, labor, and energy) into outputs (in the form of goods and/or services), as an asset or delivers a product or services.[2] Operations produce products, manage quality and creates service. Operation management covers sectors like banking systems, hospitals, companies, working with suppliers, customers, and using technology. Operations are one of the major functions in an organization along with supply chains, marketing, finance and human resources. The operations

function requires management of both the strategic and day-to-day production of goods and services.

The Association of Operation Management defines operation management as 'the field of study that focuses on the effective planning ,scheduling, use and control of manufacturing or service organisations through the study of concepts from design engineering, industrial engineering, MIS, quality management, production management, industrial management and other functions as they affect the organisation'.

To create goods and services, all organizations perform three functions. These functions are the necessary ingredients not only for production but also for an organization's survival. They are:

- ✓ Marketing, which generates the demand, or at least takes the order for a product or service (nothing happens until there is a sale).
- ✓ Production/operations, which create, produce, and deliver the product.
- ✓ Finance/accounting, which tracks how well the organization is doing, pays the bills, and collects the money.

So the role of operations is to design, plan, direct, and improve all the activities that transform resources into goods or services. And while the operations function is distinct from the other internal functions of an organization, it interfaces with them. It must also interface with key external players: suppliers, customers, and the environment. Suppliers are those who provide the materials necessary to create the product or service. Customer are those targeted to purchase the product or service. The environment includes such external factors as government taxation policies and legal requirements.

Operation management is the business function that manages that part of a business that transforms raw materials and human inputs in to goods and services of higher value. Operation management is a business activity that deals with the production of goods and services. The term operation includes management of materials, machines, and inventory control and storage functions. Operations management includes a set of activities performed to manage the available resources in an efficient manner in order to convert inputs in to desired outputs.

The value addition to an input can be done in the following ways. They are

- ✓ Alteration - It refers to the transformation of the state of input. This transformation can be a physical change in the input to produce goods.
- ✓ Transportation - It refers to physical movement of goods from one location to another.
- ✓ Storage - It refers to preserving goods in a protected environment.
- ✓ Inspection - It refers to the verification of and confirmation towards the requirements of an entity.

Important Terms

All the above activities in one way or another are making a product more useful. The operations managers have the prime responsibility for processing inputs into outputs. They must bring together the materials, capacity and knowledge available for the purpose achieving its production

objectives. The definition of the operations Management contains the concepts such as Resources, Systems, transformation and Value addition Activities etc.

- ✓ Resources - Resources are in the forms of the human, material and capital inputs. Human resources are the key resources of an organisation. By using the intellectual capabilities of people, managers can multiply the value of their employees. Material resources are the physical inputs, which are needed for production.
- ✓ Systems - Systems are the arrangement of components designed to achieve objectives. The business systems are subsystem of large social systems. Business system contains subsystem such as personnel, engineering, finance and operations. The ability of any system to achieve its objective depends on its design and control mechanism. System design is a predetermined arrangement of components. It establishes the relationships between inputs, transformation activities and outputs in order to achieve the system objectives. System control consists of all actions necessary to ensure that activities conform to pre-conceived plans.
- ✓ Productivity - The objective of combining resources is to transform the inputs into goods and services having a higher value than the original inputs. The effectiveness of the production factors in the transformation process is known as productivity. The productivity refers to the ratio between values of output per work hour to the cost of inputs.
- ✓ Operations system - It converts inputs in order to provide outputs, which are required by a customer. It converts physical resources into outputs, the function of which is to satisfy customer wants.

Objectives of operations management

Objectives of operations management can be categorised into

- ✓ Customer service - The first objective is the customer service for the satisfaction of customer wants. Customer service is therefore a key objective of operations management. The Operations Management must provide something to a specification which can satisfy the customer in terms cost and timing. Thus, primary objective can be satisfied by providing the 'right thing at the right price at the right time'
- ✓ Resource utilization - Customer service must be provided with the achievement of effective operations through efficient use of resources. Inefficient use of resources or inadequate customer service leads to commercial failure of an operating system. Operations management is concerned essentially with the utilization of resources, i.e., obtaining maximum effect from resources or minimizing their loss, under-utilization or waste. the extent of the utilization of the resources' potential might be expressed in terms of the proportion of available time used or occupied, space utilization, levels of activity, etc. each measure indicates the extent to which the potential or capacity of such resources is utilized. This is referred as the objective of resource utilization.

The Transformation Model

A transformation process is any activity or group of activities that takes one or more inputs, transforms and adds value to them, and provides outputs for customer or clients. Where the inputs are raw materials, it is relatively easy to identify the transformation involved, as when milk is transformed into cheese and butter. Where the inputs are information or people, the nature of the transformation may be less obvious. For example, a hospital transforms ill patients (the input) into healthy patients (the output).

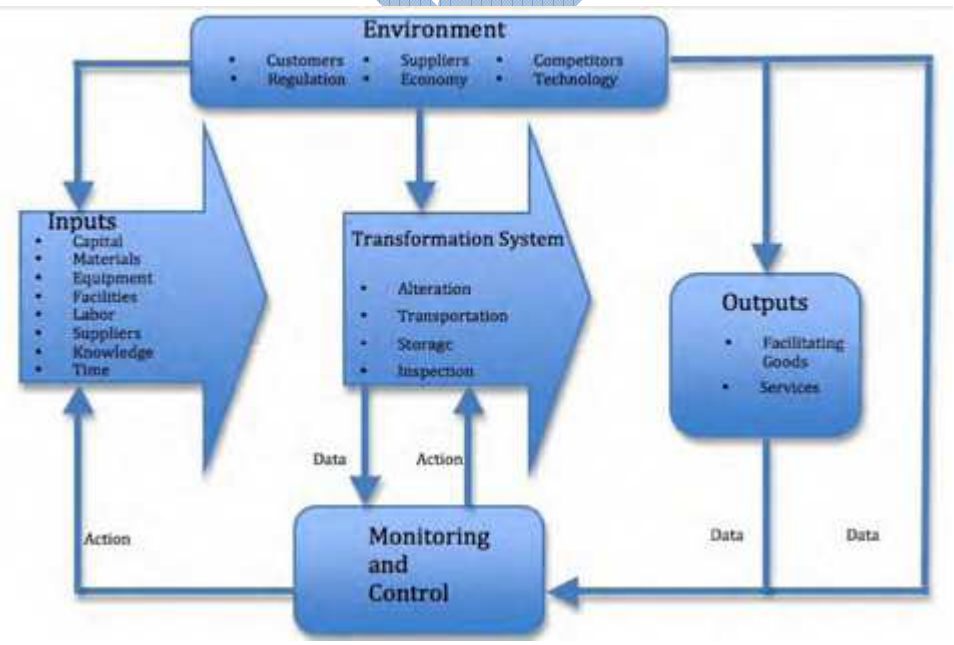
Transformation processes include:

- ✓ changes in the physical characteristics of materials or customers
- ✓ changes in the location of materials, information or customers
- ✓ changes in the ownership of materials or information
- ✓ storage or accommodation of materials, information or customers
- ✓ changes in the purpose or form of information
- ✓ changes in the physiological or psychological state of customers.

One useful way of categorising different types of transformation is into:

- ✓ manufacture – the physical creation of products (for example cars)
- ✓ transport – the movement of materials or customer (for example a taxi service)
- ✓ supply – change in ownership of goods (for example in retailing)
- ✓ service – the treatment of customer or the storage of materials (for example hospital wards, warehouses).

Operations management transforms inputs (labor, capital, equipment, land, buildings, materials and information) into outputs (goods and services) that provide added value to customers. Below figure summarizes the transformation process. The arrow labeled "Transformation System" is the critical element in the model that will determine how well the organization produces goods and services that meet customer needs. It does not matter whether the organization is a for-profit company, a non-profit organization (religious organizations, hospitals, etc.), or a government agency; all organizations must strive to maximize the quality of their transformation processes to meet customer needs.



The 3M Company is a good example of the strategic importance of transforming inputs into outputs that provide competitive advantage in the marketplace. 3M manufactures a top-quality

adhesive tape called "Magic Tape". Magic Tape is used for everyday taping applications, but it offers attractive features that most other tapes do not, including smooth removal from the tape roll, an adhesive that is sticky enough to hold items in place (but not too sticky that it cannot be removed and readjusted if necessary!), and a non-reflective surface. For several decades, 3M has enjoyed a substantial profit margin on its Magic Tape product because 3M engineers make the manufacturing equipment and design the manufacturing processes that produce Magic Tape. In other words, 3M enjoys a commanding competitive advantage by controlling the transformation processes that turn raw material inputs into the high value-added Magic Tape product. Controlling the transformation process makes it extremely difficult for competitors to produce tape of the same quality as Magic Tape, allowing 3M to reap significant profits from this superior product.

An opposite example of the strategic implications of the input/output transformation process is 3M's decision in the 1980s to stop manufacturing VHS tape for video players and recorders. In the VHS tape market 3M had no proprietary manufacturing advantage, as there were many Asian competitors that could produce high-quality VHS tape at lower cost. Since 3M had no proprietary control over the transformation process for VHS tape that would allow the company to protect its profit margins for this product, it dropped VHS tape from its offerings. The two 3M examples of Magic Tape and VHS tape show how important the transformation process and operations management can be to providing and protecting an organization's competitive advantage.

A service example of the strategic importance of the transformation process is ING Bank, a banking company that conducts all banking transactions through the Internet, phone, and mail. ING maintains no traditional bank facilities, except for the buildings that house the employees that execute remote transactions with ING's customers. This strategy results in tremendous cost savings and competitive advantage to ING by not having to spend capital resources on land and buildings that traditional banks must spend. Consequently, ING can offer its customer higher interest rates on savings accounts and lower interest rates on loans.

1.2. Operation Management Evolution

The traditional view of manufacturing management began in eighteenth century when Adam smith recognised the economic benefits of specialization of labour. He recommended breaking of jobs down into subtasks and recognises workers to specialized tasks in which they would become highly skilled and efficient. In the early twentieth century, F.W. Taylor implemented Smith's theories and developed scientific management. From then till 1930, many techniques were developed prevailing the traditional view. Production Management became the acceptable term from 1930s to 1950s. As F.W. Taylor's works become more widely known, managers developed techniques that focused on economic efficiency in manufacturing. Workers were studied in great detail to eliminate wasteful efforts and achieve greater efficiency. At the same time, psychologists, socialists and other social scientists began to study people and human behaviour in the working environment. In addition, economists, mathematicians, and computer socialists contributed newer approaches. With the 1970s emerged other two distinct changes. The most obvious of these, reflected in the new name Operations Management was a shift in the service and manufacturing sectors of the economy. As service sector became more prominent, the change from 'production' to 'operations' emphasized the broadening of field to service organizations. The second, more suitable change was the beginning of an emphasis on synthesis, rather than just analysis, in management practices.

A brief account of development of operations and production management is as

Year	Contribution	Contributors
1776	Specialization of labour in manufacturing	Adam Smith
1799	Interchangeable parts, cost accounting	Eli Whitney & others
1832	Division of labour by skill; assignment of jobs by Skill; basics of time study	Charles Babbage
1900	Scientific management time study and work study Developed; dividing planning and doing of work	Frederick W.Taylor
1900	Motion of study of jobs	Frank B. Gilbreth
1901	Scheduling techniques for employees, machines Jobs in manufacturing	Henry L. Gantt
1915	Economic lot sizes for inventory control	F.W. Harris
1927	Human relations; the Hawthorne studies	Elton Mayo
1931	Statistical inference applied to product quality: quality control charts	W.A. Shewart
1935	Statistical Sampling applied to quality control: inspection sampling plans	H.F. Dodge & H.G. Roming
1940	Operations research applications in world war II	P.M. Blacker & others
1946	Digital Computer	John Mauchlly and J.P. Eckert
1950	Mathematical programming, on-linear and stochastic processes	A. Charnes, W.W. Cooper& others
1960	Organisational behaviour: continued study of people at work	L. Cummings, L. Porter
1970	Integrating operations into overall strategy and policy Computer applications to manufacturing, scheduling, and control, Material Requirement Planning (MRP	W. SkinnerJ.Orlicky & G. Wright
1980	Quality and productivity applications from Japan: robotics, CAD-CAM	W.E. Deming & J. Juran

In the last century, operations management has experienced more changes than any other functional area of business and is the most important factor in competitiveness. This is a chronology of major themes that have changed the scope and direction of operations management:

The evolution of operation management (OM) in terms of changes in approaches for manufacturing and operations, can be summarized as

Focus on efficiency

OM has it's roots in the Industrial Revolution that occurred during the late 18th and early 19th centuries in England. Until that time, goods had been produced without the aid of mechanical equipment. During the Industrial revolution many inventions came into being that allowed goods to be manufactured with greater ease and speed; it lead to the development of modern factories. As international Trade grew the emphasis on operations efficiency and cost reduction increased. Many companies moved their factories to low-wage countries. Technology was viewed primarily as a method of reducing costs and distracted from the importance of improving quality.

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