

Objectives of Operations Management and Automation

Dr. Kadambat Kumar

Professor,

Master in Business Administration (General Management), Presidency University, Bangalore, India,
email id: krishnakumark@presidencyuniversity.in

ABSTRACT:

Discipline of operation management, which focuses on the efficient planning, organizing, and regulating of organizational processes to accomplish successful production and delivery of products and services, is examined and proposed in this essay. Process design, capacity planning, quality management, supply chain management, and performance measurement are just a few of the important topics and methods covered. The importance of operation management in boosting operational effectiveness, customer happiness, and overall organizational success is examined in the research. This study seeks to shed light on the practical application and strategic significance of operation management in contemporary corporate operations.

KEYWORDS:

Design, Management, Operation Management, Planning, Quality Management, Supply Chain.

I. INTRODUCTION

When employed normally, automation seems to be the self-controlling functioning of equipment that decreases or eliminates the need for human communication or control. In other terms, it is the act or process of changing a machine or device's control to a more automated system, such as computer or electronic controls. Automation is becoming more significant in the international economy and in everyday life. It improves organizational operational efficiency. Engineers try to integrate automated devices with mathematical and organizational skills to construct complex systems for a rapidly expanding variety of uses and human activities[1]–[3].

Advantages of Automation

1. Human operators are being replaced in timeconsuming operations.
2. Replacing people in hazardous areas e.g., fire, space, volcanoes, nuclear facilities, under water, and so forth.
3. Doing duties that are beyond human capacities, such as managing excessively big weights, enormous items, excessively hot or cold substances, or the obligation to make things too quickly or too slow.
4. The economy is improving. Occasionally and in certain cases, automation indicates an improvement in the economics of companies, society, or the majority of humanity.

Disadvantages of Automation

Economic Growth

1. Occasionally and in some cases, automation means an improvement in the economics of businesses, society, or the majority of humanity. It is constrained by technological limitations. Technology is not capable of automating all required jobs.

2. It is difficult to anticipate the cost of automation. The cost of research and development for automating a process is difficult to anticipate in advance. Since this cost may have a significant influence on profitability, it is conceivable to complete automating a process only to realise that there is no economic benefit to doing so.
3. The initial investment is rather significant. The automation of a new product needed a significant initial investment in compared to the product's unit cost, even if the expense of automation is distributed over several product batches. The automation of a factory also needed a significant initial investment, however this cost is spread over the items to be manufactured.

Comparison between Services and Manufacturing

Operations management is critical to an organization's purpose and competitive objectives being met. It is concerned in the creation of value in goods. Goods may be both physical and intangible. Tangible products are referred to as goods or making, while intangible products include services. They are referred to collectively as products. Good operations management is essential for firms that sell things as well as those that provide services and contracts. The everyday operations of a company may determine its success or failure. Goods are physical commodities that are often manufactured in one area and acquired in another. They may be moved from one location to another and saved for later purchase by a customer. Services can include 'backoffice' support for an organization's internal customers, such as IT Notes support, training, and legal services. Services are provided via direct interaction between a consumer and service function agents.

Client interaction is an important aspect of services. A high level of client interaction is indicative of a strong service company. This is critical for both retaining existing consumers and gaining new ones. Although most service businesses do not have completed goods, they do have supportive inventory. Hospitals stock medications, surgical supplies, emergency supplies, and spare equipment; banks stock forms, chequebooks, and other materials. Services demand more care and planning than production. A manufacturing flaw may always be repaired before shipment. Yet, service happens in the presence of the service provider, making capacity and utilization difficult to control. Mercedes, for example, has announced the development of a system that would link the car's software to a customer help centre through the Internet. This system will be capable of detecting, diagnosing, and repairing the issue. Organizations are increasingly attempting to increase their market presence and gain a competitive advantage over competitors by combining products and services. This introduces a lot of permutations and combinations, drastically altering the operational environment[4], [5].

II. DISCUSSION

The term productivity refers to the number of facilities or inputs needed to create output. It is primarily concerned with the efficiency with which a certain output of products and services is produced, as well as the value generated by the production process. At the corporate level, productivity makes it possible to produce superior quality and highvalue goods and services at the lowest possible cost. If a product could be manufactured at the lowest feasible cost while maintaining great quality, and then sold competitively with in marketplace at a reasonable price, its productivity would be deemed extremely high. This simple equation expresses productivity:

$$\text{Productivity} = \text{Output} / \text{Input}$$

But, the idea of productivity has expanded through time to encompass more than just an efficiency ratio. Its scope has evolved beyond cost and quality considerations to include social problems such as creation of jobs and security, poverty reduction, quality of life enhancement, resource conservation, and environmental preservation. The function of Green Productivity GP is particularly important. Green Productivity is a new socioeconomic development paradigm aiming at achieving economic and efficiency growth while safeguarding the environment. There are several definitions of productivity. There are multifactor productivity measures which relate a measure of output to a bundle of inputs in addition to single factor productivity measures. Another contrast, which is especially important at the

industry or business level, is between productivity metrics that connect some measure of gross output to one or more inputs and those that employ a value-added notion to capture output measurements.

Productivity is also utilised on a national scale. Productivity is often expressed as the rupee worth of production per unit of labour. This metric is determined by the quality of a country's goods and services, as well as the efficiency in which they are produced. Productivity statistics for national productivity, sectoral productivity, and industry performance are accessible from a variety of sources. Productivity is more essential than money in enhancing a nation's quality of living since productivity dictates production while money just assesses the worth of output. Yet, from the perspective of the operations manager, the measurements that are relevant here are labor productivity, multiple factor productivity, and total factor productivity. Productivity is tied to the organization's competitive strategy. Corporate strategy and goals have a significant role in setting the many operational factors at the corporate level. There are several more elements, and the list may fluctuate from one company to the next as well as throughout time periods within an organization. Competitive tactics have the most influence on these characteristics [6]–[8].

A strategy hierarchy is formed by corporate and competing strategies. Corporate strategies are concerned with the sort of business that the company is in, its overall competitive position, and how the firm's resources must be allocated. Business strategies are mostly competitive in nature. The goals of these strategies are to determine how to compete effectively in certain markets and how business units might get a competitive edge. Sun Tzu, a Chinese strategist and commander, said in *Art of War* the more chances I grasp, the more possibilities proliferate before me. This phenomena is crucial to strategy. Companies compete well by taking advantage of chances. The strategic choice that the company must make at the business unit level is how will it put its goods in the marketplace. What will serve as the foundation for it to obtain a competitive advantage.

Companies get a competitive edge by offering what their consumers want or need better or more effectively than rivals and in ways that competitors find difficult to mimic. Each organization's strategy is unique, reflecting the specific conditions it encounters. When it comes to establishing competitive tactics, there are two schools of thinking. On the one hand, strategic theorists such as Michael Porter support the notion of Generic Strategies. On the other hand, Prahalad and Hamel support the Resource based Approach. Nonetheless, we will place a larger emphasis on Generic Strategies since they are industry oriented and more closely represent the OM Strategy objectives. To succeed in this, firms have devised a variety of offensive and defensive strategies to maintain their industry position and deal with competition pressures.

Resource Utilization

Another significant goal is to effectively employ resources to satisfy customer desires, i.e., customer service must be supplied with the attainment of successful operations via efficient resource usage. Inefficient resource utilisation or poor customer service results in an operating system's commercial failure. Operations management is primarily concerned with resource utilisation, that is, getting the most out of resources while reducing their loss, underutilization, or waste. The degree of resource use may be described in terms of the fraction of available time utilised or occupied, space usage, levels of activity, and so on. Each metric represents the amount to which such resources' potential or capability is exploited. This is known as the resource usage goal. Operations management is also about offering acceptable customer service and maximising resource use. An improvement in one will often result in a deterioration in the other. While both cannot always be maximised, a sufficient performance on both must be obtained. All operations management tasks must be undertaken with these two goals in mind, and many challenges will be encountered by operations managers as a result of this conflict. As a result, operations managers must seek to strike a compromise between these fundamental goals.

Factor Productivity

Labour productivity is a single factor productivity metric it relates an output measure to a single input measure. The amount of output generated by one unit of production input in a unit of time is referred to as labour productivity. Economic productivity is calculated by dividing output value by time/physical input units. If the manufacturing process only employs one element for example, labour, this approach calculates the productivity of that factor, in this instance, labour productivity.

III. DISCUSSION

Scope of Operation Management

Operations Management is concerned with the conversion of inputs into outputs via the use of physical resources in order to offer the required utilities to the customer while also satisfying the other organisational goals of effectiveness, efficiency, and adaptability. It separates itself from other departments like as people, marketing, finance, and so on by focusing on conversion through utilising physical resources. The actions described under Production / Operations Management functions are as follows:

1. Facility location.
2. Plant design and material handling.
3. Product Development.
4. Process Development.
5. Production Management and Control.
6. Quality Assurance.
7. Materials Administration.



Figure 2: Represent the Scope of production and operations management [Adoc.Pub].

Productions management vs operations management

Production management and operations management are distinguished by two factors. Initially, the phrase production management refers to a system that produces actual things (Figure. 2). When multiple inputs are turned into intangible services, operations management is more often applied. From this vantage point, operations management includes service organizations such as banks, airlines, utilities, pollution control agencies, super markets, educational institutions, libraries, consulting companies, and police departments, in addition to manufacturing corporations. The second difference concerns the subject's progression. Nowadays, the phrase operations management is utilised. In terms of historical progression, production management comes before operations management[6]–[8].

Characteristic of Modern Operations Function

Today's production management has specific qualities that make it seem completely different from what it was in the past. Today's manufacturing system is distinguished by at minimum four characteristics.

Manufacturing as Competitive Advantage

Production was formerly thought to be much like any other activity in the organisation. When demand was strong and production capacity was limited, the issue was to gather all inputs and utilise them to manufacture things that would be purchased by the market. But, the situation now is much different. Factories have surplus capacity, competition is increasing, and businesses are looking for ways to obtain a competitive edge in order to survive and prosper. Curiously, the production system provides a wealth of opportunities for enterprises to obtain a competitive advantage, which they seek to capitalise on. Total Quality Management TQM, TimeBased Competition, Business Process Reengineering BPRE, Just in Time JIT, Focused Industrial park, Flexible Manufacturing Systems FMS, Computer Integrated Manufacturing CIM, and The Virtual Corporation are just a few of the strategies used by businesses to gain a competitive advantage.

Services Orientation

The service industry is becoming more important these days. As a result, the production system must be organized with the service component's unique requirements in mind. The whole manufacturing process must be designed to accommodate i the intangible and perishable character of the services, ii frequent engagement with clients or consumers, iii modest levels of production to serve local markets, and iv the necessity to locate facilities to serve local markets. Instead of engineers and technologists, there is a greater presence of experts on the manufacturing line.

Disappearance of Smokestacks

Labor laws, the environmental movement, and the gradual growth of knowledgebased organisations have all resulted in a comprehensive overhaul of the industrial sector. Today's factories are beautifully planned and constructed, as well as environmentally sustainable in fact, most are houses away from homes. Going to the workplace on a daily basis is no longer an agonising experience; it is more akin to taking a vacation to a gorgeous location. A visit to ABB, L&T, or Smith Kline and Falk should persuade the reader of the wealth generation system's metamorphosis.

Small has Become Beautiful

Intermediate technology based on smaller working units, community ownership, and regional workplaces that use local labour and resources. Little was wonderful to him. Businessmen all throughout the globe rejected Schumacher's ideology. Industrialists were drawn to large organizations and mass production systems by economies of scale[9], [10].

Recent Trends in Production/Operations Management

Firms engaged in manufacturing. Some current patterns include:

- 1. Global Market Place:** The globalization of business has driven many manufacturing enterprises to establish operations in a variety of nations where they have a competitive edge. As a consequence, the degree of competitiveness among manufacturing enterprises throughout the globe has skyrocketed.
- 2. Production/Operations Strategy:** Increasingly and more businesses recognise the relevance of production/operations strategy for overall company performance and the need to link it to their entire business plan.
- 3. Total Quality Management (TQM):** Several businesses use the TQM technique to achieve customer satisfaction via a neverending effort to improve the quality of products and services.

4. **Flexibility:** The capacity to swiftly adjust to changes in demand volume, product mix, product design, or delivery schedules has become a significant competitive strategy and a competitive advantage for enterprises. This is referred to as agile manufacturing.
5. **Time Reduction:** Reducing production cycle time and speed to market for a new product provides a business with a competitive advantage over rival enterprises. When two firms can provide the same product at the same price and quality, faster delivery short lead times gives one company a competitive advantage over the other.
6. **Technology:** Technological advancements have resulted in a plethora of new products, methods, materials, and components. Automation, computerization, and information and communication technology have transformed how businesses work. If sophisticated technology is skillfully incorporated into the current system, technological improvements in goods and processes may have a significant influence on competitiveness and quality.
7. **Employee Involvement:** A recent tendency has been to delegate responsibility for decision making and issue solving to lower levels of the organisation. Employee participation and empowerment are terms used to describe this. Quality circles and the utilisation of work teams or kaizen teams are two examples of worker participation.
8. **Re-engineering:** This entails severe measures or breakthrough innovations to boost a company's performance. It entails a clean slate approach or starting from scratch when restructuring business processes.

IV. CONCLUSION

Operation management is essential to an organization's effective operation and success. The essential ideas, methods, and strategic significance of operation management have been analysed and proposed in this work. In order to create effective and efficient production processes, process design is a crucial part of operation management. This involves identifying and optimising workflows and activities. Organisations may simplify operations, reduce waste, and boost productivity by examining and improving procedures. Today's production managers are increasingly concerned with pollution management and waste disposal, which are critical concerns in environmental and social responsibility. There is a growing focus on reduction.

REFERENCES

- [1] T. Niknam, H. Z. Meymand, and H. D. Mojarrad, An efficient algorithm for multiobjective optimal operation management of distribution network considering fuel cell power plants, *Energy*, 2011, doi: 10.1016/j.energy.2010.10.062.
- [2] T. Niknam and H. ZeinoddiniMeymand, Impact of fuel cell power plants on multiobjective optimal operation management of distribution network, *Fuel Cells*, 2012, doi: 10.1002/fuce.201100167.
- [3] T. Niknam, H. Z. Meymand, H. D. Mojarrad, and J. Aghaei, Multiobjective daily operation management of distribution network considering fuel cell power plants, *IET Renew. Power Gener.*, 2011, doi: 10.1049/ietrpg.2010.0190.
- [4] A. ShabanpourHaghighi and A. R. Seifi, Multiobjective operation management of a multicarrier energy system, *Energy*, 2015, doi: 10.1016/j.energy.2015.05.063.
- [5] T. Niknam, H. Z. Meymand, and H. D. Mojarrad, A practical multiobjective PSO algorithm for optimal operation management of distribution network with regard to fuel cell power plants, *Renew. Energy*, 2011, doi: 10.1016/j.renene.2010.11.027.
- [6] Z. Xu, C. Yu, L. Liao, P. Yang, and Z. Yang, Optimizing reservoir operations for tradeoffs between economic objectives and legacy phosphorus management, *Resour. Conserv. Recycl.*, 2021, doi: 10.1016/j.resconrec.2021.105413.

- [7] W. J. Hopp, W. S. Lovejoy, and K. Ulrich, Editorial objectives Design and operations management, *Management Science*. 2002.
- [8] A. Fathy and A. Y. Abdelaziz, Single and multiobjective operation management of microgrid using krill herd optimization and ant lion optimizer algorithms, *Int. J. Energy Environ. Eng.*, 2018, doi: 10.1007/s4009501802668.
- [9] A. F. Buckhorst and R. H. Schmitt, Multistaged, multiobjective optimization for operation management in lineless mobile assembly systems LMAS, 2020. doi: 10.1016/j.procir.2020.04.046.
- [10] A. A. Moghaddam, A. Seifi, T. Niknam, and M. R. Alizadeh Pahlavani, Multiobjective operation management of a renewable MG microgrid with backup microturbine/fuel cell/battery hybrid power source, *Energy*, 2011, doi: 10.1016/j.energy.2011.09.017.