FUTURISTIC TRENDS IN OPERATIONS MANAGEMENT

Abstract

IT advancements, globalisation of markets, decentralised operations, and environmental concerns have forced industry to reconsider efficiency and quality strategies and approaches, including operations management (OM). An Operating System combines resources to provide products or services. Operating systems are used by retailers, hospitals, transport and taxi services, tailors, motels, and dentists. To assure the expected output, an organisation compares feedback data with previously defined criteria to determine if corrective action is needed (control). Goods and services often coexist. Changing your car's oil is a service, but the oil is a good. Similar to home painting, paint is a good. Goods-services are continuous. It might be dominated by commodities or service. Companies sell product bundles because there are few pure items or services. These product bundles combine products and service manufacturing. This makes operations management intriguing and difficult. This problem requires rethinking education and training. In the early years, Japanese productivity and quality pushed enterprises in other nations to consider their own productivity and quality issues. OM developed from mass manufacturing to mass personalization. To compete in the global market, corporations have deployed new operational strategies, techniques, and technology.

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I. INTRODUCTION

The management of operations is responsible for the design, operation, and improvement of productive systems, often known as systems for getting work done. These are the systems that are typically referred to as "work-doing systems." The people who work in operations are the ones who are responsible for providing you with the food that you consume, the movies that you watch, the stores in which you buy things, and the books that you read. Operations managers are needed in a wide array of organizations, including financial institutions, healthcare facilities, private businesses, and even the public sector. They are accountable for the development of systems, the maintenance of quality control, the production of goods, and the provision of services. They work together with both customers and suppliers, in addition to global partners and cutting-edge technology. They come up with answers to problems, reengineer the processes that are already in place, establish new processes, and integrate the ones that are already in place.

Doing is an essential part of operations, which also comprise planning and controlling as two other essential components. It makes no difference to the success of a company whether the priority is a quick time to market, rapid customization, low prices, or low costs all around if the operations of the business are not carried out with the highest level of expertise. One meaning of operations is that of a transformative process, which is also a frequent description. Figure 1.1 provides a visual representation of the process by which inputs are converted into outputs. These inputs include of items like raw materials, machinery, human labour, managerial expertise, and financial resources (goods and services). During the process of transformation, requirements and feedback from customers are utilised to adjust factors, which may subsequently impact inputs. Inputs may also be affected directly by these factor modifications. This cycle will keep repeating itself until the change has been fully accomplished. One of the aims in the discipline of operations management is to ensure that the process of transformation is carried out properly and that the value of the output is greater than the entire value of the inputs. This is one of the ways in which the goal might be achieved. As a consequence of this, the primary purpose of operations is to generate value. The process of transformation may be conceptualised as a series of activities that are carried out at various points along a value chain that extends from the initial provider to the final consumer.

The process of input–transformation–output is one that is utilised by a variety of operating systems in their respective implementations. First, sheet steel is formed into a variety of shapes using moulds at an automobile plant. After that, the steel is painted and given a final touch. At long last, it is assembled with hundreds of other component parts to form a car that is fully functioning. In an aluminium plant, various grades of bauxite are mixed together, then the mixture is heated to the point of melting, and finally it is poured into ingots of diverse sizes. During their time spent in a hospital, patients get specialised care, food, medicine, laboratory tests, and surgical treatments, all of which contribute to their overall improvement in health. The fact that "operations" may be carried out in a variety of different ways shouldn't come as much of a surprise. The process of transformation can be physical, such as in the operations of manufacturing; locational, such as in the operations of transportation or warehouse; exchange-based, such as in the operations of retail;

physiological, such as in the operations of health care; psychological, such as in the operations of entertainment; or informational, such as in the operations of communication.

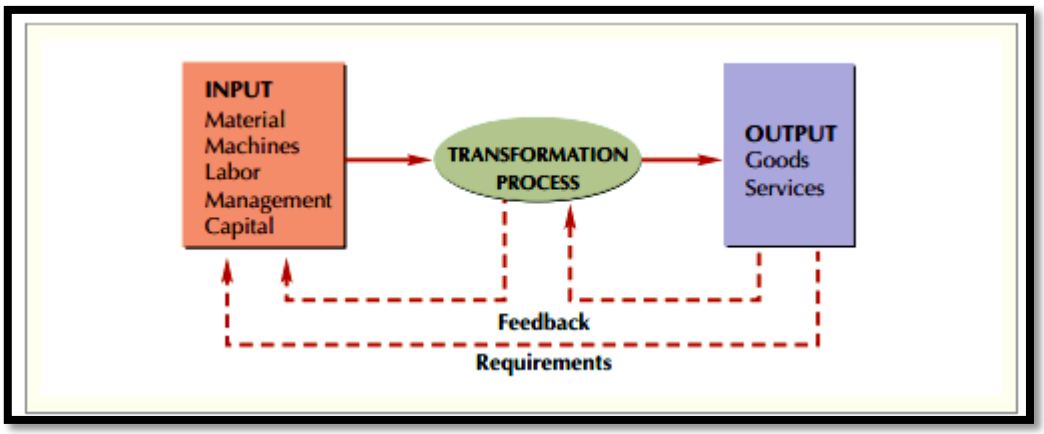

Figure 1.1: Operations as a Transformation Process

"THE HISTORICAL EVOLUTION OF OPERATIONS MANAGEMENT"

"Production methods have been around since the beginning of human history. Skills in operations management were required, for instance, in order to construct ancient structures like the pyramids and Roman aqueducts. The manufacturing of items for sale, at least in the contemporary sense, as well as the modern industrial system, may trace its origins back to the Industrial Revolution".

II. THE INDUSTRIAL REVOLUTION

The earliest stirrings of what would become known as the Industrial Revolution can be traced back to England in the 1770s. These stirrings proceeded across the rest of Europe and the United States in the 19th century. England was the birthplace of the Industrial Revolution. Prior to that period, the majority of products were made in artisan workshops by experienced craftsmen and the younger people who learned their trade from them. Under such a "system, it was common practice for a single person to be responsible for the entirety of the manufacture of a product, from the beginning to the conclusion, whether it was a horse-drawn cart or a piece of furniture". Examples of such products are a piece of furniture and a horse-drawn cart. The only tools that could be discovered were simple implements; the only advanced machinery that was available were inaccessible.

Then, in the 18th century, a succession of breakthroughs happened that permanently transformed the character of production by substituting the labour of humans for the power of machines. This occurred because machines were able to do tasks that previously required the labour of humans. It is possible that the steam engine was the most important of these inventions since it enabled businesses to run their machinery by providing a source of power that could be used to drive the machinery. Coal and iron ore were readily available in large quantities, which ensured a steady supply of the raw materials required for the manufacturing of machinery and the generation of energy. The old machines that were replaced with new ones were simple wooden contraptions; the new ones, on the other hand, were made of iron, thus they were far more sturdy and durable.

During the early stages of industrialization, goods were produced by a process that came to be known as craft production. Using this approach, staff who had received extensive training produced things using straightforward machinery that allowed for a high degree of adaptability in response to the requirements of the customer. The production of the handicraft was plagued by a number of issues. Because it required highly skilled craftsmen to produce each individual component of the product in a manner that was tailored to the customer's needs, the manufacturing process was both time-consuming and costly. In addition, when components failed, replacements needed to be carefully made, which was a process that in and of itself was both time-consuming and expensive. The absence of economies of scale, which would have provided a significant incentive for companies to expand their operations, was another shortcoming of the system. This meant that the costs of production did not decrease in proportion to the quantity of goods produced. This was only one of the several issues that existed with the system. Instead of this, a vast number of smaller businesses came into existence, each of which operated in accordance with its own set of requirements.

It was during this time period that a key event known as the establishment of standard measuring procedures took place. These methods contributed considerably to the quickening of the pace of the Industrial Revolution. As a consequence of this, there was a noticeably reduced demand for goods that were made specifically to the customer's specifications. Many people, especially those who lived in rural areas, were lured to the city in substantial numbers in order to find employment in the factories that were rapidly developing and popping up all over the place. This was especially true for people who lived in rural areas.

In spite of the enormous changes that were going place in the world at the time, neither the theory nor the practise of management had advanced significantly since its early days. A management plan that was both more clever and more systematic was necessary to accomplish what needed to be done.

III. WHAT IS OPERATIONS MANAGEMENT?

Operations management is the process of managing the resources that are utilised in the production and delivery of goods and services. This activity is also known as resource management. This undertaking is under the jurisdiction of the organization's operations department, which is also the division of the business that is responsible for seeing to its completion. Because every organisation produces some kind of product or service, it is necessary for every organisation to have a function that is in charge of managing its day-to-day business. Having said that, not all businesses or other types of organisations will necessarily refer to this role by this particular title. (It is vitally important to keep in mind that we also use the words "the operation" and "operations" interchangeably with the more formal term "operations function.") Individuals who are given the responsibility of managing any or all of the resources that are part of the operations function are known as operations managers. This duty might encompass anything from a single resource to all of the available options. One such option is that the role of operations manager is referred to by a different name in some businesses. For instance, in a distribution company, they may be referred to as the "fleet manager," at a hospital, they might be called the "administrative manager," and in a grocery store, they would be referred to as the "store manager."

IV. OPERATIONS IN PRACTICE

To play with Lego is to engage in creative play. "We want any child playing with LEGO ® bricks to have a high quality play experience," said JrgenVigKnudstorp, CEO of the Lego group. "In addition, we also want to make a positive impact through the way that we operate from our focus on business ethics to reducing our impact on the environment," Knudstorp added. The toy business is widely recognised as one of the sectors that face the greatest levels of competition worldwide. It is hard to anticipate, it is always subject to the most recent ephemeral fads among youngsters, and it is always susceptible to the most recent technological breakthroughs. The Lego Group, which is privately held and controlled by a Danish family, has become one of the most respectable corporations in the world in recent years, according to the reputation institute. Additionally, the Lego Group is one of the most successful makers of play materials. Billund, which is located in Denmark, is home to the corporate headquarters of the Lego Group. It is a success that was built on an idea that is so easy to understand that most people overlook its complexity. A single Lego brick is nothing special, but when you combine even just one or two of them, suddenly you have access to a whole new world of building opportunities. Even if you simply add a few more bricks to your collection, the number of different things that you are able to build will significantly expand. For example, there are more than 915 million possible configurations that may be achieved simply stacking six traditional four-by-two bricks. When you take into account that the Lego collection has over 4,200 different components, 58 different colours, and a wide variety of decorations, the total number of viable options is far more. And it makes no difference how many bricks you put together, what colour they are, or whose set they came from; the individual sections will always be a perfect fit for each other, regardless of how many bricks you use. There is just one method to put together the core Lego parts, and it is always the same way. On the top, they have studs that are a little bit larger than average, and on the inside, they have tubes. When you push the bricks together, you produce something that's known as a "interference fit," which is simply a temporary connection that doesn't need any more fasteners to be installed. This concept, on the other hand, is dependent on the fact that the components are created to exceptionally high standards of precision and quality, which explains why the motto of the company is "only the best is good enough." In 1932, Danish carpenter Ole Kirk Kristiansen established the company that bears his name. At the time, he was searching for a way to produce more income, so he started selling wooden toys as a means toward that end.

These featured wooden toy bricks, which were the forerunners of the plastic bricks that have subsequently grown so popular that there are presently an estimated 86 pieces of Lego for every person living on the planet. Bricks and other Lego 'elements' are manufactured at sites owned by the Lego Group in Denmark, Hungary, the Czech Republic, and Mexico, respectively. Because of their proximity to the company's most valuable clients in Europe and the United States, these sites were chosen for the company's operations. Not only have these locations been expanded, but also whole new factories have been erected in Nyiregyhaza, Hungary, and Jiaxing, China, in order to fulfil the ever-increasing demand for the company's products. The products that are manufactured at these facilities are meant to be sold in marketplaces located all over the world. The objective, as stated by Bali padda, executive Vice President and Chief Operations Officer of the Lego group, is to "build a stable manufacturing base around the world," with the ultimate goal of ensuring that LEGO products are accessible to children and their parents whenever and wherever they desire them. It is the company's operational processes that are essential to the maintenance of its quality

reputation as well as its capacity to create millions of elements in a manner that is both profitable and kind to the environment. This is because of the company's capacity to create millions of elements in a manner that is profitable and kind to the environment.

The process starts at the primary warehouse, which is made up of silos and is used to store raw plastic granulates. The silos are used to keep the granulates. Sixty metric tonnes of plastic are worked with at the factory in Billund every single twenty-four hour period. At the production site, the silos are connected to the moulding equipment via a tangled web of tubes that form an intricate network. The moulding stage is of the highest relevance since every Lego piece must be produced to a rigorous degree of quality, with tolerances as tiny as 10 micrometres. This standard must be met throughout the whole manufacturing process. Before the plastic is injected into the mould through the principal channel, it is heated up at each machine and brought to the appropriate temperature. After that, this major channel will divide into several minor channels, and each of these secondary channels will be comparable to a single brick. After the moulds have been cooled with water, the bricks are taken from the moulds as soon as the plastic has hardened (this just takes a few seconds) and then placed in containers. The maximum number of bricks that may be produced with a single mould is 32. These moulds come at a considerable cost, and in order to make each component, you will need to purchase a new mould. In general, the price of a mould may range anywhere from 80,000 to more than 360,000 euros, while some can go considerably higher. When a sensor detects that a container's contents have reached their maximum capacity, an automated trolley is sent to relocate the container to a new location.

The robots move around the machinery and pick up empty boxes as well as those that are already full as they go. Because of this, the manufacturing process may carry on without interruption. Because to the presence of the automation, the process may be carried out with a significantly reduced workforce. The robotic cranes will stack the boxes until they are needed, and in the meanwhile, the boxes will be moved by robots to conveyors, which will move them into the storage area. After this phase, some of the components will be painted on an individual basis as they move on to the next stage, which is referred to as the "decoration" stage. The decorating step of the Lego manufacturing process is the most expensive part of the process. Other pieces are delivered straight to the packing section, which is where the Lego sets take on their final form. The components are loaded into a machine that, in addition to sorting and individually counting the components, also places them in the boxes that are appropriate for them during the packing stage of the process. The automatic movement system has a thorough grasp of how much a box ought to weigh at any stage in the packing process, and high-precision scales are used to maintain track of the container's weight as the process advances. This knowledge is available at any point in the packing process. Even if it's only a few micrograms, the system will sound an alarm if there is any fluctuation. The boxes are then hermetically sealed, automatically weighted to ensure that there are no missing components, inspected by a worker who has been trained to look for things like plastic bags sticking out of the box, packed by a robot six to a case, and then finally sent out for distribution. All of these steps take place at the conclusion of the process.

The quality assurance team performs routine checks and tests on the many different Lego components in order to make certain that the toys are long-lasting and free of any potential dangers. These tests include things like biting and impact testing, as well as drop, torque, tension, compression, and tension tests. Other types of tests include biting and impact

tests. Failure occurs in around 18 out of every million Lego components that are manufactured (which equates to 0.00002 percent), indicating that the rate of failure is relatively low. In addition, during the entire process, the organisation puts in a lot of effort to achieve high levels of environmental sustainability. Plastic recycling is given a high priority at the factory, which places a substantial focus on the practise. The entire mound of scrap is reduced to a powder and then included back into the production process. This includes any faulty parts that make it through the automated handling system as well as the plastic that fills the tubes that transport the hot plastic into the moulds. Also included in this category is the plastic that fills the tubes. When the manufacturing colour is changed, the same clear plastic that is broken up and provided to other firms that manufacture other plastic items is also used to clean the channels in moulding machines. This is done in a similar method to the previous example.

The case of LEGO highlights how important the operations function is for any organisation, but it is especially important for businesses whose reputations are tied to the creation of safe, high-quality, environmentally friendly, and profitable products or services. It takes great care to ensure that its processes are carried out to exacting quality standards, and it has made significant investments in process technology that lessens the negative impact that its operations have on the environment as well as the price of its products. As a result of these investments, the company is able to ensure that its processes are carried out to exacting quality standards. The global presence of the corporation may be attributed, in part, to both of these characteristics. Obviously, the type of company that the operations function is a part of will play a large part in deciding the particular activities that are necessary for the production of products and services. This is due to the fact that the operations function is a component of the business.

Why is operations management important in all types of organization?

Even if we have never seen an operations function in action before, it is not difficult to conceptualise what it includes and how it performs in various sorts of organisations. This is the case even though we have never experienced an operations function in action. For instance, the overwhelming majority of individuals have seen photographs depicting the process of assembling an automobile. But what about a company that specialises in marketing and communications? We have a broad understanding of the work that these agencies do (they are the ones who create the advertisements that we see in publications and on television), but what exactly is the function of their operations? You may locate the solution by looking for it in the word "make." Because any business that produces something also has to use resources, it is essential for that business to have an operations activity. The manufacturing plant for automobiles and the advertising agency do have one significant thing in common, and that is the fact that the primary goal of both is to generate a profit from the development and distribution of the goods or services that they offer. This is true for both the manufacturing plant for automobiles and the advertising agency. However, there are further organisations that do not operate for the purpose of making a profit, but still utilise their resources in order to create and provide services. The provision of some form of service to society rather than the pursuit of financial gain is the mission of the organisations being discussed here. When we take a look at the following examples of what operations management does in five different companies, we are able to see that there are some elements that are shared throughout all of these companies.

1. **Automobile assembly plant:** Operations management makes use of various machinery to assemble products in a way that is both efficient and satisfies the demands of the market at the moment.
2. **General practitioner (physician):** Operations management makes use of information to accurately identify illnesses in order to address both real and perceived patient concerns.
3. **Management consultant:** Operations management makes effective use of people to provide services that satisfy both the demands of existing customers and those that may arise in the future.
4. **Charitable organisation providing disaster assistance:** Operation management makes use of our resources as well as those of our partners to swiftly offer the goods and services that alleviate community suffering.

To begin, take into consideration the remark made by the automobile manufacturing factory that is "easy to picture." The following statement provides a succinct summary of what is involved in operations management: "Operations management makes use of machines to manufacture goods in a manner that is both efficient and satisfies the requirements of current consumers." Comparable remarks were made by the other groups, but with some phrasing that was a little bit different from what was used here.

Operations management utilised not only machines but also "knowledge, people, our and our partners' resources," as well as "our staffs' experience and knowledge" in order to "assemble" (or produce, change, sell, move, cure, shape, etc.) products (or services or ideas) that satisfy (or match or exceed or delight) customer (or client or citizens' or society) demands (or needs or concerns or even dreams). This was accomplished in order to "satisfy" (or match or exceed or delight) The manner in which we are able to conceptualise the activities that take place within the operations of any kind of organization—whether it be a small or large one, a service or manufacturing one, a public or private one, or one that is for profit or not for profit—shares a central idea and an overarching goal with the other types of organisations. This is correct regardless of the word that is chosen to describe it. What operations management accomplishes may be summed up in the term "resources to appropriately generate outputs that fulfil specified market demands" (see Fig. 1.2). Nevertheless, despite the fact that the essential nature and goal of operations management are the same in any sort of organisation, there are certain particular considerations that need to be

taken into mind. This is especially true for organisations that are more concentrated, as well as those whose primary goal is to maximise anything other than profit.

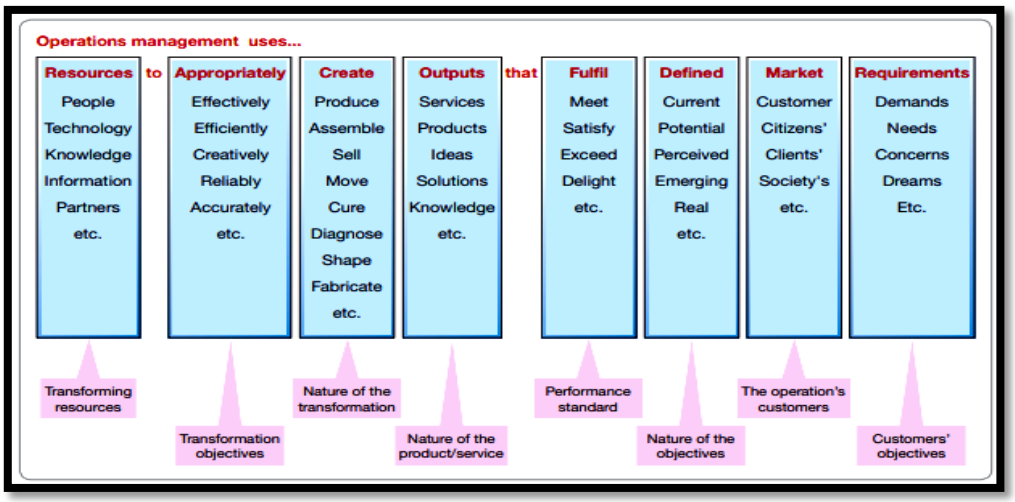

Figure 1.2: Operations Management uses Resources to Appropriately Create Outputs That Fulfill Defined Market Requirements.

Operations management in the smaller organization

In businesses of every size, from sole proprietorships to global conglomerates, effective management of the operations is an absolute need. Every company, regardless of how large or little it is, is required to have the ability to manufacture and distribute its products and services in a manner that is both efficient and effective. Despite this, day-to-day operations management in a small or medium-sized organisation comes with its own own set of obstacles that must be overcome. People who work for smaller businesses frequently have to wear multiple hats because those businesses lack the resources that are available to larger corporations, which allow those corporations to assign specific staff members to do specialised activities. This forces people who work for smaller businesses to multitask. It's possible that the company may be able to respond more quickly to new opportunities or obstacles as they come up if it has an organisational structure like this, which is more lax. But since the responsibilities of different persons frequently overlap, the decision-making process is frequently complicated. It is likely that small firms have the same difficulties as large organisations in terms of operations management; however, these difficulties may be more difficult to differentiate from the organization's wider collection of other issues. However, even the smallest of firms have the potential to reap great rewards; an excellent illustration of this is provided by the concise case study on Torchbox.

V. OPERATIONS IN PRACTICE

Torchbox is a web design company that has won several awards.

The act of browsing websites, whether as part of your education, your career, or your leisure time, is something that all of us do – unquestionably on a daily basis, and frequently multiple times on a daily basis. This is true regardless of whether you do it for educational purposes, for your career, or for your leisure time. Even though we might not give it much

thought, this is something that each and every one of us does. Because of this, it is very important. It is necessary for an organisation to have a web presence in order for them to be able to sell their products and services, connect with their customers, and promote their cause. This is something that must be done by all organisations. It shouldn't come as much of a surprise that a whole industry has developed around the process of constructing websites in such a manner that they have the effect that is sought from them. In point of fact, web development has been one of the sectors that has had the fastest rate of worldwide expansion when assessed over a longer period of time. This is because of the way the internet works. However, the level of competition in this industry is rather high. There is no guarantee that a web design company will be profitable, and some of them won't even survive the first few years of business.

To be successful, web designers need to have a strong grasp of technology, a knack for design, an awareness of standard business practises, and the ability to conduct their work in a professional manner. A prosperous company like torchbox, which specialises in web design and development and has its headquarters in Oxfordshire, is a good example of a company that has been able to achieve its goals. The year 2000 marked the beginning of operations for this business, which today consists of a team of thirty individuals. "high-quality, cost-effective, and ethical solutions for clients who originate mostly, but not totally, from the charity, non-governmental organisation, and public sectors" is the company's stated objective. Tom Dyson, who was not only one of the co-founders of the firm but also served as its technical director, has been the one in charge of deciding the course that the most significant technological improvements should follow for the organisation.

He continues by saying that "being a relatively small firm comes with a number of advantages." There are a variety of positive aspects that come along with running a somewhat unassuming business. We are able to retain a high degree of adaptability and flexibility, which is necessary in our business because it is always evolving. On the other hand, we have the resources and the experience necessary to provide a service that is not just novel but also properly carried out. No senior manager in our organisation can afford to have a skill set that is veryspecialised because of the size of the business. We are all equally responsible for the development and success of the business as a whole, despite the fact that everyone of us in this room is liable for a different set of responsibilities that are specific to them. In addition, we have the capacity to be detailed and laser-focused with regard to the nature of the work that we wish to do. Our basic principles are very crucial to us. We make it a goal to work with customers that share our passion to the preservation of the natural environment and to the implementation of responsible, ethical business practises; we consider the work that we do as well as the work that our customers do to be significant. If you operate a business that involves the sale of firearms, you can be confident that we will not be interested in collaborating with you under any circumstances.

Nevertheless, the basic operational effectiveness of torchbox's firm is equally as crucial to its success as it is to the company's performance overall. According to OllyWillans, who was not only a co-founder of the company but also serves as its creative Director, "We know how to make sure that our projects operate not just on schedule but also to budget." He continues by saying, "But we also like to think that we provide an enjoyable and stimulating experience both for our customers' development teams as well as for our staff."

Our customers expect things to be delivered on time and within their allotted budgets, and they want accessibility, usability, performance, and security to be included in their web designs. We spend a significant amount of importance on ensuring that the quality of both our goods and our services is consistently of the highest possible degree. Even while we operate in an industry that is known for its high levels of creativity and is largely dependent on fast developing technology, this does not mean that we are unable to be efficient in our job. Everything we do is backed up by a dependable, feature-driven software development process that takes use of the kanban method of project management. Because of this, we are better equipped to handle the duties that we have for our clients. Automobile manufacturers such as Toyota were the first to apply the "kanban" approach, which is now used by the web development teams working on the Torchbox platform. "Using excellent operations management principles helps us to continually deliver value to our clients," says Tom Dyson. [Further citation is required] According to the company's statement, "We like to think that our measured and regulated approach to handling and regulating work helps guarantee that every hour we work offers an hour's worth of value for both our clients and ourselves."

VI. FUTURISTIC TRENDS IN OPERATIONS MANAGEMENT

From the division of labour to scientific management and mass production, operations have always strived to respond to the needs of business by improvising and experimenting with numerous different trends. This has been the case from the advent of scientific management to mass manufacturing. The following is a discussion on how operations are strategized in today's world and the future trends that will effect production and the management of operations.

1. **Computer aided design and manufacturing:** It indicates that all of the planning and manufacture of the product would be done with the assistance of making the production and operation significantly more efficient. Product life cycles have gotten shorter in recent years as a direct result of the rapid development of new technologies. As a result, practically all existing products are upgraded or replaced within a shorter period of time.

2. **Supply chain management:** As a consequence of shorter product life cycles, more demanding consumers, and rapid change in technology, materials, and processes, supply chain partners are obliged to be more in tune with the demands of end users.

3. **Employee involvement:** In response, operation managers are increasingly delegating decision-making authority to individual employees. Firms have a tendency to focus more

on the empowerment of employees, regarding employees as resources that contribute a competitive edge to the organisation. This shift in focus has coincided with the growth of HRM.

4. **Green manufacturing:** Green production has been seen as a result trend in operation management concerning ecological sustainability.

5. **Lean operation- just in time:** Just in time production is the current trend in production and operation management. In just in time production, products and services are only created once an order has been placed, and the end result is a significant reduction in the cost of maintaining an inventory of those things.

VII. PRODUCTION OF GOODS VERSUS PROVIDING SERVICES

Although commodities and services commonly go hand in hand, there are some very fundamental differences between the two. These differences include variables that affect the management of the products side of the business in contrast to the administration of the service component of the firm. Additionally, there are a great deal of similarities to be found between the two. When anything is produced, the ultimate product is a tangible object that can be seen or handled, such as a vehicle, glasses, a golf ball, or a refrigerator. This might also be the case with other things. To put it another way, anything that can be perceived by the senses. There is a possibility that it takes place at a factory; nonetheless, it might take place anywhere. Farming and the management of restaurants are two examples of non-manufacturing activities that might be considered producers of goods. On the other hand, the rendering of a service nearly often necessitates the execution of some kind of action. A checkup at the doctor's office, upkeep on a lawn, repairs on a television or vehicle, and showings of movies in a theatre are all instances of services. The vast majority of jobs in the service sector may be categorized as falling into one of these four buckets:

- Services rendered by trained and experienced professionals (e.g. financial, health care, legal).
- Service providers of a generic kind (e.g. utilities, Internet, communications).
- Shops that offer a variety of services, including alterations, the maintenance and repair of autos, the washing of vehicles, and the maintenance and repair of home equipment.
- Personal care (e.g. beauty salon, spa, barbershop).
- Management and Leadership (e.g. Medicare, mail, social services, police, fire).
- Explicit directions (e.g. schools, universities).
- services related to catering (e.g. catering).
- Retailing and wholesaling, as well as providing services to institutions (such as payroll, accounting, maintenance, information technology, human resources, and cleaning services).
- The logistics of transport and distribution ("e.g. truck, railroad, boat, air").
- "Residential services (e.g. lawn care, painting, general repair, remodeling, interior design)".
- Transportation by carriage and transportation (e.g. mass transit, taxi, airlines, ambulance).
- "Tourism and the hotel and restaurant business (e.g. travel bureaus, hotels, resorts").

- Miscellaneous services (e.g. copy service, temporary help).
- In terms of the activities they do, manufacturing and service are frequently quite different from one another; nevertheless, in terms of the methods by which they achieve their objectives, they are rather analogous.

Take into consideration the following points of comparison:

1. **Degree of customer contact:** Although certain services, such as those that provide Internet access, utility services, and mail service, do not entail a significant amount of consumer contact, many other services do. When there is a high degree of contact between the server and the client, the interaction between the two creates a moment of truth that will be assessed by the customer each and every time the service is performed"
   .
2. **Labor content of jobs:** Services often have a higher degree of labor content than manufacturing jobs do, although automated services are an exception.

3. **Uniformity of inputs:** In many cases, businesses that provide a service are susceptible to a greater degree of input fluctuation. Every single client, patient, consumer, and repair work, among other things, provides a somewhat one-of-a-kind circumstance that demands careful consideration and adaptability. On the other hand, manufacturing processes often have a stronger capacity to manage the unpredictability of the inputs they use, which ultimately results in more standardised work needs.

4. **Measurement of productivity:** It's possible that measuring "productivity in the service sector is more difficult than it would be in other" sorts of professions because of the high degree of variation in the business's inputs. Therefore, one physician may have a higher number of scenarios that are thought to be ordinary, whereas another physician may have circumstances that are seen as being more difficult. If a comprehensive study is not conducted, it may appear as though the physician who treats difficult patients has a considerably lower rate of productivity than the physician who treats patients whose cases are more typical of what the physician sees in their practice.

5. **Quality assurance:** Quality assurance is usually more challenging for services due to the higher variation in input, and because delivery and consumption occur at the same time. Unlike manufacturing, which typically occurs away from the customer and allows mistakes that are identified to be corrected, services have less opportunity to avoid exposing the customer to mistakes.

6. **Inventory:** Since manufacturing activities often entail less utilisation of inventory than service operations, the costs of maintaining inventory on hand are typically lower for service operations than they are for manufacturing operations. On the other hand, in contrast to produced items, services can't be kept in a warehouse. Instead, "on demand" delivery of them is what's required.

7. **Wages:** Manufacturing jobs are often well paid, and have less wage variation than service jobs, which can range from highly paid professional services to minimum-wage workers".

8. **Ability to patent:** Patenting a product design is typically far simpler than patenting a service design, and certain services simply cannot be protected at all, which makes it much simpler for rivals to replicate them. There are also a great deal of parallels to be found in the management of the "production of goods and the management of services".

Table 1.1: Typical differences between production of goods and provision of services

Characteristic	Goods	Services
Output	Tangible	Intangible
Customer contact	Low	High
Labor content	Low	High
Uniformity of input	High	Low
Measurement of productivity	Easy	Difficult
Opportunity to correct problems before delivery	High	Low
Inventory	Much	Little
Wages	Narrow range	Wide range
Patentable	Usually	Not usually

When there are important service considerations, these are highlighted in separate sections. Here are some of the primary factors for both:

- Forecasting and capacity planning to match supply and demand.
- Process management.
- Managing variations.
- Monitoring and controlling costs and productivity.
- Supply chain management.
- Location planning, inventory management, quality control, and scheduling.

Note that many service activities are essential in goods-producing companies. These include training, human resource management, customer service, equipment repair, procurement, and administrative services.

Table 1.1 provides an overview of the differences between production of goods and service operations. Remember, though, that most systems involve a blend of goods and services.

VIII. WHY LEARN ABOUT OPERATIONS MANAGEMENT?

The skill set you get from studying the topic will serve you well in both your personal life and your professional life, regardless of whether or not you decide to make operations management your major while you are in school. The acquisition of knowledge in operations management is advantageous to your professional life in a variety of ways, regardless of

whether or not you want to work in the operations industry in the future. This is true even if you do not want to work in the operations business in the future. This is as a result of the reality that every aspect of an organisation has the potential to either impact operations or be influenced by them. The sales and operations divisions of a firm are, respectively, what are known as the line functions of the organisation. The additional functions, such as accounting, finance, marketing, information technology, and so on, provide support for the two line functions. These functions include accounting and finance, among others. Jobs in financial services (such as stock market analysts, brokers, investment bankers, and loan officers), marketing services (such as market analysts, marketing researchers, advertising managers, and product managers), accounting services (such as corporate accountants, public accountants, and budget analysts), and information services are a few examples of service jobs that are closely related to operations. Other examples include jobs in marketing services (such as market analysts, marketing researchers, and product managers), and accounting services (such as corporate accountants, public accountants, and budget analysts) (e.g., corporate intelligence, library services, management information systems design services).

Employers frequently express their dissatisfaction with the fact that recent college graduates enter the workforce with a high level of specialisation, despite the fact that they would prefer that these individuals have a more comprehensive understanding of how businesses and other organisations operate. This is because employers would prefer that these individuals have a broader understanding of how businesses and other organisations function. One of the reasons why corporations recruited you is because you have some of the breadth that companies desire in new employees, and this book is one of the reasons why. In addition to the aspects that are connected to a person's occupation, there is a third aspect that is not as readily apparent: After gaining knowledge "about operations and supply chains, you will have a significantly heightened awareness of the world in which you live, the global interdependence of organizations and governments, some of the factors that contribute to the success or failure of businesses, and the significance of working together with other people".

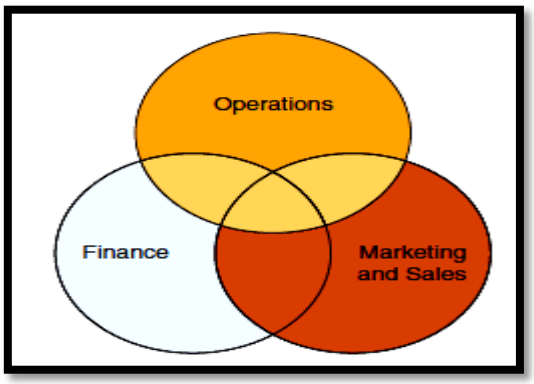

Figure 1.3: The Three Major Functions of Business Organizations Overlap

In order for members of an organisation to work together effectively, they not only need to have a good understanding of the role that they play in the organisation, but also of the functions that are performed by the other members of the organisation. In actual operations, there is a substantial degree of interaction and cooperation across the many different functional areas. All of the people concerned will need to communicate with one another in order to share information and come to a conclusion together. For instance, despite

the fact that the three fundamental functions in business organisations carry out separate activities, many of the decisions made by these functions have an influence on other portions of the firm. This is because of the interconnected nature of the business organisation. As a direct result of this, these functions have a significant amount of dialogue with one another, as can be seen by the overlapping circles in Figure 1. 3 Collaboration between the experts in charge of financial management and operations management occurs when these professionals share information and their respective areas of expertise in activities such as the following:

1. Budgeting. In order to successfully prepare for future monetary requirements, it is essential to create and adhere to regular budgets. It is often essential to make changes to budgets, and performance must constantly be evaluated in respect to a budget. Both of these things are required to be done.

2. An analysis of the possible effects that the suggested investments may have on one's finances. In order to conduct an accurate analysis of the numerous opportunities for financial investments in plant and equipment, it is important to have feedback not only from those who are in charge of operations but also from those who are in charge of money.

3. The allocation of available monetary resources When there is a shortage of cash, it can be helpful or even essential to pay attention to the necessary funding of operations, as well as the amount of money and the timing of the funding. Issues that arise with one's flow of cash may frequently be prevented with enough planning.

The basic purposes of marketing are to generate revenue and/or increase visibility for the goods or services offered by a firm. In addition, it is the responsibility of marketing to ascertain the needs and requirements of clients, as well as to communicate this information to the individuals in charge of operations (in the "short term) and design (in the long term) (long term). That is to say, the department of operations needs information about demand over the short to intermediate term so that it can plan accordingly (for example, purchase materials or schedule work)" whereas the department of design needs information that relates to improving already existing products and services as well as designing new ones. In order to efficiently create new products, make improvements to existing designs, and produce new items, the three departments of marketing, design, and manufacturing need to work closely together. Marketing research has the potential to provide incredibly helpful information on the marketing methods utilised by competitors. In addition, marketing may supply information about client preferences to design, which will enable design to decide the sorts of products and features that are necessary. This is possible since marketing gathers information directly from customers. Operations are able to offer information on capacity and evaluate the feasability of designs to be manufactured.

In addition, the operations department will be informed in advance if any new skills or pieces of equipment are going to be necessary for the delivery of new products or services. People who work in the financial industry should take part in these exchanges so that they may provide information on the types of funds that might be accessible in the short term and find out what types of finances would be necessary for the creation of new products or services (intermediate to long term). Manufacturing or service lead time is one of the most important pieces of information that marketing needs from operations in order to provide

consumers with accurate estimations regarding the amount of time it will take to fulfil their orders. Marketing needs a number of pieces of information from operations in order to provide consumers with accurate estimations regarding the amount of time it will take to fulfil their orders.

For this reason, the departments of marketing, operations, and finance need to work together on the design of products and processes, forecasting, and the setting of schedules that are realistic, as well as decisions regarding quality and quantity. Additionally, they need to keep each other informed on the strengths and weaknesses of the other two departments. People working in every department of a company need to have an understanding of the significance of effectively managing and coordinating operational decisions that have an effect on the "supply chain and the process of balancing supply and demand" as well as the ripple effect those decisions have on other parts of the organisation. This is because operational decisions can have an effect on the supply chain and the process of determining the optimal balance between supply and demand.

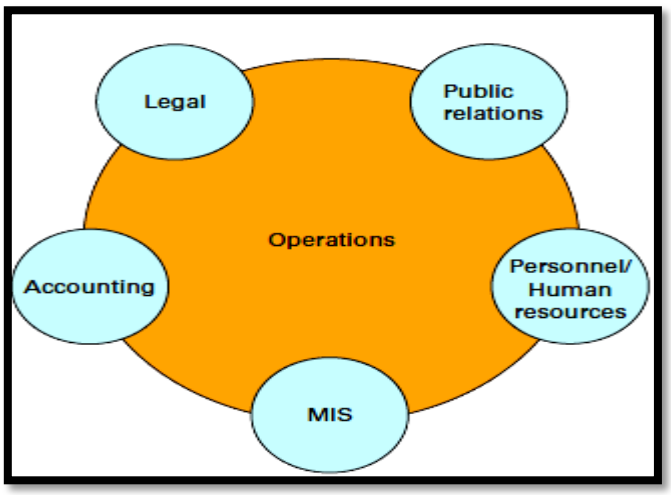

Figure 1.4: APIs for a Variety of Supporting Functions are provided by Operations.

The interactions that take place between the Operations department and the other functional departments of the organisation are depicted in figure 1.4 of the same document. Legal, management information systems (MIS), accounting, personnel and human resources, and public relations are some of the functional domains that are included here.

The legal department has to be consulted with issues relating to liability and the environment, as well as contracts with workers, customers, and suppliers and transporters.

Data on the costs of labour, materials, and administrative charges are provided to management through accounting. Accounting can also provide management with information on topics like scrap, downtime, and inventory levels.

"Management information systems, sometimes abbreviated as MIS and entrusted with the job of giving management with the information it needed to manage effectively, are burdened with the obligation of fulfilling this responsibility". Developing systems that are able to gather relevant information and providing reports are the primary means by which this

goal might be achieved. An additional key role of management information systems (MIS) is the administration of "the control and decision-making tools that are used in operations management".

The department of people or human resources is responsible for a variety of tasks, including the recruitment and training of staff, labour relations, contract negotiations, pay and salary administration, helping with manpower predictions, and ensuring that employees are safe and healthy. Among these responsibilities is the administration of pay and salaries.

The responsibility of cultivating and upholding a positive image of the organisation in the eyes of the general public lies with the department of public relations within the organisation. Keeping up excellent interactions with the general population can bring about a wide range of beneficial outcomes. One of the clearest illustrations of this may be seen in the market. Other possible benefits include the public's awareness of the organisation as a good place to work (which increases the supply of labour), increased odds of approval of zoning change petitions, community acceptance of development plans, and the instillation of a positive attitude among employees.

IX. THE SCOPE OF OPERATIONS MANAGEMENT

The scope of operations management's responsibility extends all the way across the rest of the business. People who work in operations management are involved in the design of products and services, the selection of processes, the "selection and management of technology, the design of work systems, the planning of locations and facilities, and the improvement of the quality of the organization's goods and services". Additionally, these individuals are responsible for the planning of locations and facilities.

The operations function is comprised of a wide variety of interconnected tasks, some of which are as follows: "forecasting, capacity planning, scheduling, managing inventory, ensuring quality, motivating personnel, and choosing where facilities should be located. Choosing where facilities should be located".

Consider the operational system of an airline corporation as an illustration of how the operational system of a service organisation performs as an example.

The system consists of the aeroplanes, the airport facilities, and the maintenance facilities, all of which are sometimes located in different parts of a wide territory at the same time. Listed below are some of the activities that are available:

A number of elements, such as the weather, the circumstances of the landing, the demand for seats on flights, and the growth of airline travel, are taken into account throughout the forecasting process.

It is essential for the airline to engage in capacity planning in order to maintain a consistent flow of cash and earn a profit that is satisfactory. (A loss in revenue is likely to result from having the improper "number of planes at the wrong places, having too few planes, having too many planes, or even having the appropriate number of planes at the wrong locations".)

Choosing which cities to provide service for, where to site maintenance facilities, and where to establish large and small hubs are all factors that go into the managers' judgments on the location of facilities.

The facilities as well as the layout are very crucial in order to achieve efficient usage of the personnel and the equipment.

The scheduling of aeroplanes for flights as well as for normal maintenance, the scheduling of pilots and flight attendants, as well as the scheduling of ground employees, counter staff, and luggage handlers.

Managing inventory of things like food and drink, first-aid supplies, in-flight periodicals, pillows and blankets, and life vests, among other things.

"When engaging with customers at ticket counters, check-in, telephone and electronic reservations, and curb service, where the focus is on efficiency and kindness, providing quality assurance is vital. Required in flying and maintenance operations, where the priority is always on putting the passengers and crew members' well-being first".

Providing inspiration and instruction to workers across all aspects of business operations

X. MANAGING THE SUPPLY CHAIN TO ACHIEVE SCHEDULE, COST, AND QUALITY GOALS

Imagine for a moment that you are at a factory that manufactures bicycles. It's probable that this is simply an assembly process, in which components like frames, tyres, wheels, gears, and other items are obtained from multiple suppliers, and then the bicycles themselves are put together once all the pieces have been acquired. Additionally, the firm could carry out part of the fabrication work on its own, including the creation of gears and chains, as well as the forming of frames. In addition, the factory could primarily buy"raw materials and just a few other components and materials, such as paint, nuts and bolts, and tyres, in addition to buying other things. In either case, the primary responsibilities of management include the scheduling of production, choosing which components to make and which components to buy, ordering parts and materials, choosing the style of bicycle to produce and how many, purchasing new equipment to replace old or worn-out equipment, maintaining equipment, motivating workers, and ensuring that quality standards are met".

The notion that a factory that makes bicycles and one that makes aeroplanes are two quite different sorts of enterprises shouldn't come as much of a surprise to anyone. The first one is focused mostly on the service industry, whilst the second one is involved in the manufacturing sector. Despite this, there is a great deal of overlap between the two processes that are being described. In either scenario, it is required to carefully plan out operations, provide incentives for workers, purchase and manage supplies, choose and maintain equipment, adhere to quality standards, and, most importantly, satisfy customers. In addition, the accomplishment of the goals set for the company in each of these areas requires planning not just for the immediate future but also for the far future. One of the most important jobs of an operations manager is to come up with decisions that will determine the overall course of the system. There are certain decisions that may be made that will have an impact on the

system's design, while others can be made that will have an impact on the way the system operates.

System design include making decisions concerning system capacity, the geographical location of facilities, the layout of departments and placement of equipment inside physical structures, product and service planning, as well as the acquisition of various pieces of apparatus, among other things. Commitments made for the foreseeable future are necessary for carrying out these choices the vast majority of the time, although this is not always the case. In addition, the majority of the time they require the selection of appropriate tactic. The administration of the system's people, as well as the planning and control of its inventory, the scheduling of its activities, the management of its projects, and the quality assurance of its output, are all necessary for the system to work well. The vast majority of the time, these judgments concern matters of strategy and operation. The process of delivering feedback on these decisions requires the utilisation of measurement and control. In many instances, the degree to which an operations manager is involved in making decisions regarding day-to-day operations is far higher than the degree to which they are involved in making decisions regarding the design of the system. However, the operations manager has a significant interest in the process of system design because the system design, in essence, decides the values of many of the parameters that govern the functioning of the system. This means that the operations manager has a significant interest in the system design process. For instance, decisions made all during the design process have an immediate and direct influence on a variety of aspects, including costs, the amount of available space, the overall capacity, and the overall quality. Even if the operations manager is not directly responsible for making any design decisions, he or she may nonetheless provide the individuals who are directly responsible for making design decisions with a broad variety of information that will have an influence on the decisions that they make.

The "operations" function also integrates aspects of a wide variety of other domains or gets assistance from other areas. This area include not only purchasing and industrial engineering but also distribution and maintenance duties as well.

"Purchasing: has responsibility for procurement of materials, supplies, and equipment. Close contact with operations is necessary to ensure correct quantities and timing of purchases. The purchasing department is often called on to evaluate vendors for quality, reliability, service, price, and ability to adjust to changing demand. Purchasing is also involved in receiving and inspecting the purchased goods".

"Industrial engineering: is often concerned with scheduling, performance standards, work methods, quality control, and material handling".

"Distribution: involves the shipping of goods to warehouses, retail outlets, or final customers".

Maintenance: is accountable for the removal of toxic waste, parking, and maybe even security, as well as the general maintenance "and repair of equipment, buildings, and grounds, as well as heating and air conditioning." The operations manager is the most significant person in the organisation since he or she is ultimately responsible for the

production of goods or the delivery of services. This makes the operations manager the most important person in the organisation.

The kinds of responsibilities that fall under the purview of operations managers are extremely diverse from one business to the next. This is primarily attributable to the fact that each business deals with a different range of products or services, which in turn results in a vastly different set of tasks that need to be supervised. It should come as no surprise that the management skills required to run a banking operation are much different from those needed to run a firm that manufactures steel. On the other hand, both occupations are primarily managerial in nature, which is a big resemblance between the two positions. This is one of the main similarities between the two roles. It doesn't matter what sort of goods or services are being manufactured; the job of an operations manager is fundamentally the same in any industry. To a large extent, contributions to the economy are made by both the service industry and the manufacturing industry. More than seventy percent of employment in the United States are currently held by people working in the service industry, and the importance of this sector is growing not just in the United States but also in other countries. Furthermore, the number of people employed in the supply of services is expanding, whilst the number of people employed in the production of commodities is not growing at the same rate. There are two primary explanations for the decline in the number of people finding work in the manufacturing sector: "As the operations department in manufacturing organisations finds more productive ways of generating things, the corporations are able to sustain or even increase their output while employing fewer people". This is because the operations unit is discovering more productive ways of creating things. This is due to the fact that the operations function is constantly searching for more efficient methods of creating items. In addition, a percentage of the work that is done in the manufacturing industry has been subcontracted out to other firms that are more productive. The vast majority of these businesses are situated in other countries and are able to produce things at lower prices. Outsourcing and productivity will each be the subject of an analysis that is more in-depth not just in this chapter but also in following ones.

This book covers a wide range of topics, many of which contain concepts that may be implemented in either the industrial or service sectors of the economy. As a result, it is essential to have an understanding of these concepts, regardless of whether the provision of services or the production of goods is now your primary emphasis. This is the case even if a concept is being illustrated by using an example from manufacturing rather than an illustration of a concept using an example from the service industry.

Why Manufacturing Matters?

The importance of the service industry to the economy of the United States is only expected to continue to rise. Since quite some time ago, the percentage of workers employed in manufacturing has been steadily going down, while the percentage of people employed in the service sector has been steadily going up. It would be rather reckless, on the other hand, to presume that the supply of services is of greater relevance to the economy than manufacturing. What leads you to believe that is the case?

Not only is the number of employments in manufacturing as a whole on the decline, but also the proportion of positions that are held in the manufacturing industry is decreasing. The decrease can largely be attributed to two factors: advances in productivity, which means

that fewer workers are required to maintain manufacturing production; and outsourcing, particularly to nations that have significantly lower wages, which is an appealing alternative for businesses that are looking to preserve their competitiveness and improve their bottom lines.

On the other hand, when companies choose to move some or all of their manufacturing to countries where the cost of labour is lower, this results in a loss of jobs in the service sector as well. It's possible that this will happen in some circumstances. Some are left in the town, namely in the form of retail outlets that are frequented by manufacturing workers. These people are the ones that are left behind. That figure incorporates the contributions made by factory workers who perform various services ("e.g., workers who do machine repairs, maintenance, material handling, packaging, and so on"). It is anticipated that there will be a loss of four jobs in the service sector for every one job in the manufacturing sector that is removed.

As a result of the general decline in the number of jobs available in the manufacturing sector, individuals who have been laid off from their previous manufacturing positions are finding it more difficult to secure new employment in the industry. They opt to either join the ranks of the unemployed or seek employment in the service industry, both of which pay, on average, a lower wage than the manufacturing industry did. Not only is employment sent to a different nation, but also intellectual knowledge is transferred there. This practise is known as outsourcing. When viewed from this angle, a nation's perspective is presented. In addition to this, as more time passes, the indigenous base of industrial experience and know-how becomes increasingly depleted.

In addition to this, this has substantial implications for the way taxes are administered. The cost of unemployment benefits is high, and the deterioration of tax bases at the federal, state, and municipal levels leads to a reduction in the amount of income received through individual and corporate taxation. Consequently, the amount of money available to pay for unemployment benefits decreases.

To summarise, the industrial sector is an important engine for the advancement of innovation. According to the article titled "Go Glocal" written by RanaForoohar and published in Time on August 20, 2012, page 30, it is responsible for 70 percent of the research and development carried out by the private sector as well as 90 percent of the patents that are awarded in the United States. Knowledge work that has a high value-added component and prepares the ground for future innovation is a sizeable amount of the total effort that goes into getting a product ready for mass production. And new job prospects are opened up as a result of innovation. Intel has invested tens of billions of dollars in its factories in Oregon, Arizona, and New Mexico so that they are able to produce the most advanced semiconductors, as stated in the article "Why Manufacturing Matters for America," which was published as a Special to CNN on September 21, 2012 by Willy Shih and Gary Pisano. "Why Manufacturing Matters for America" was published as part of CNN's coverage of the State of Manufacturing in the United States.

XI. THE NEED TO MANAGE THE SUPPLY CHAIN

The management of supply chains is garnering an increasing amount of attention as the amount of pressure placed on commercial organisations to improve the management of their supply networks continues to climb. When it comes to controlling their supply chains, the vast majority of businesses in the past didn't put in a lot of work. They would rather concentrate their efforts on their own activities and those of the nearby merchants with whom they did business. In addition, the functions of planning, marketing, production, and inventory management in companies that are participants in supply chains have typically been carried out independently of one another.

As a direct result of this, supply chains came across a number of problems that seemed to be beyond the control of the various companies that were engaged. The problems included major shifts in inventory levels, stockouts of some goods, late deliveries, and problems with the quality of the product. As a consequence of these challenges as well as others, it has become clearly clear that efficient management of supply chains is critical to the success of enterprises. Listed below are some of the additional issues that have been raised:

1. **The need to improve operations:** Efforts on cost and time reduction, and productivity and quality improvement, have expanded in recent years to include the supply chain. Opportunity now lies largely with procurement, distribution, and logistics—the supply chain.

2. **Increasing levels of outsourcing:** Organizations are increasing their levels of outsourcing. One option is to generate or give away items or services yourself, but another is to buy them instead. As a result of the increasing demand for outsourcing services, businesses are devoting a greater part of their total income to the management of their supply chains ("wrapping, packaging, moving, loading and unloading, and sorting)". It is likely that a significant amount of time and money was wasted on these activities as well as on other activities that are linked to them in some way. "Issues with imported products, including tainted food products, toothpaste, and pet foods, as well as unsafe tyres and toys, have led to questions of liability and the necessity for businesses to take responsibility for monitoring the safety of outsourced goods". Other examples of problematic imported products include unsafe tyres and toys. A lack of regulation for the safety of imported items, such as tyres and toys, is another problem associated with imported goods.

3. **Increasing transportation costs:** Transportation costs are increasing, and they need to be more carefully managed".

4. **Competitive pressures:** The demands of competition have resulted in an increase in the quantity of new items, a reduction in the length of time needed for product creation, and an increase in the desire for customisation. Additionally, product life cycles are typically rather brief in many industries, most notably the consumer electronics sector. In addition to this, efforts are being made to cut down on lead times and the implementation of quick-response tactics.

5. **Increasing globalization:** The physical length of supply networks has increased as a direct result of growing globalisation. The management of a supply chain is made more difficult by the presence of global supply chains. When you have clients and/or suppliers

located in different parts of the world, you should plan for lengthier lead times and more potential for delivery disruptions. In many cases, linguistic and cultural barriers, as well as disparities in currency and monetary changes, play a role in the situation. Additionally, in certain instances, increased border security has caused a delay in the supply of products.

6. **Increasing importance of e-business:** The increasing importance of e-business has added new dimensions to business buying and selling and has presented new challenges.

7. **The complexity of supply chains:** Supply chains are complex; they are dynamic, and they have many inherent uncertainties that can adversely affect them, such as inaccurate forecasts, late deliveries, substandard quality, equipment breakdowns, and canceled or changed orders.

8. **The need to manage inventories:** Because of the significant impact that inventories have on the success or failure of a supply chain, it is essential for all links in the chain to work together to manage their inventory levels. The timely flow of work can be significantly disrupted by shortages, which can have far-reaching implications, while surplus inventories can add unneeded expenditures to the overall total. It is not unheard of to find surplus stocks in some portions of a supply chain while there are inventory shortages in other parts of the same supply chain.

XII. ELEMENTS OF SUPPLY CHAIN MANAGEMENT

Managing the supply chain involves a number of vital tasks, one of which is the coordination of operations all along the supply chain. A crucial component of this method entails translating the demand expressed by end users into activities that may be carried out at each stage of the supply chain.

Table 1.1 provides an explanation of the fundamental aspects that must be effectively managed in order to have efficient supply chain operations. Customers are the initial component, and they are the fundamental force that is moving the business forward. In most cases, the responsibility of determining what it is that clients want, as well as anticipating the amounts and timing of client demand, falls squarely on the shoulders of the marketing department. When developing a new product or service, it is important to take into account the requirements and capabilities of the target audience.

Processing is something that takes place at each and every stage of the supply chain; in fact, it is at the heart of every enterprise. The majority of the processing is carried out by the organisation that is accountable for manufacturing the item or delivering the service for the final client (the organisation that assembles the computer, services the car, etc.). In this regard, scheduling is an essential component, and it is important to note that this concept is applicable to both the inside and outside aspects of a supply chain.

Inventory plays a significant role in the majority of supply chain networks. Attaining a balance is the fundamental aim; failing to reach this balance leads in delays and schedule disruptions, while achieving too much balance results in unnecessary expenditures and limited flexibility. If this balance is not achieved, the effects are delays and schedule

disruptions. The department known as "Purchasing" is the one in charge of liaising between a company and its many sources of supply. The procurement of the goods and/or services that will be used in the production of products or in the provision of services for the organization's end customers falls under the purview of this particular department. The department of Purchasing is accountable for the selection of suppliers, the negotiation of contracts, the formation of partnerships, and serving as a bridge between the various internal departments and the vendors themselves. The supply side of a value chain might be comprised of a single provider or several suppliers. Each of these providers is regarded to be a link in the network, and as such, they each have the capacity to impact the effectiveness — or the lack of effectiveness — of the supply chain. In addition, it is of the utmost importance that the planning and execution of the suppliers' supply chains be effectively coordinated with each and every participant in the demand component of such supply chains.

Location is something that may be considered a factor in a variety of contexts and methods. It's possible that the location of the processing facilities as well as the locations of the suppliers will be crucial in some circumstances. It's likely that being close to the market, being close to the sources of supply, or being close to both will be quite important. In the majority of instances, the location has an influence on both the amount of time it takes to deliver the package as well as the cost. In order to effectively manage supply chains, managers are required to make two distinct types of decisions: "strategic and operational. The strategic judgments include both the decisions on the design and the decisions on the policies. The operational choices entail managing the flow of material and product combined with other components of the supply chain in accordance with the decisions that have been made about the strategic aspects of the supply chain".

Table 1.2: Elements of supply chain management

Element	Typical Issues	Chapter(s)
Customers	Determining what products and/or services customers want	3, 4
Forecasting	Predicting the quantity and timing of customer demand	3
Design	Incorporating customers, wants, manufacturability, and time to market	4
Capacity planning	Matching supply and demand	5, 11
Processing	Controlling quality, scheduling work	10, 16
Inventory	Meeting demand requirements while managing the costs of holding inventory	12, 13, 14
Purchasing	Evaluating potential suppliers, supporting the needs of operations on purchased goods and services	15
Suppliers	Monitoring supplier quality, on-time delivery, and flexibility; maintaining supplier relations	15
Location	Determining the location of facilities	8
Logistics	Deciding how to best move information and materials	15

The fundamental decision-making areas that arise in supply chain management include the locations of manufacturing and distribution facilities, as well as the management of inventories. The choice concerning location applies to the selection of sites as prospective locations for both the production facilities and the distribution facilities. The costs associated with production and transportation, in addition to the lead times required for delivery, are of utmost importance. The preferences of customers, such as when they want something and how much of it is necessary, are taken into consideration when making decisions regarding production and distribution. Outsourcing is one choice that can be taken into consideration. The total cost of shipping and the length of time it takes for products to be delivered have a

significant influence on distribution choices. This is due to the fact that transportation costs usually form a large portion of overall prices. In addition, the decisions that may be made regarding production and inventory are inextricably tied to the many possibilities for transportation. The use of air transport results in higher costs as compared to the alternatives of shipping via sea, rail, or road; nevertheless, consumers' orders are fulfilled significantly faster when air transport is used. Concerns about capacity and quality must also be taken into account whenever decisions pertaining to distribution are being made. When it comes to operations, the decisions that need to be made centre on scheduling, the maintenance of equipment, and serving the requirements of consumers. It is also very important to maintain quality control over the work while also ensuring that it is distributed fairly. When making decisions on inventory, it is necessary to first determine how much stock is required, then coordinate decisions regarding manufacturing and stocking at various points along the supply chain. The management of logistics has a significant impact on the choices that are made about inventory. Enterprise Resource Planning, more commonly referred to as ERP, is a technology that is gaining in popularity as it helps to facilitate the sharing of information in real time between businesses and the primary supply chain partners that those businesses collaborate with.

The operations department of a commercial organisation is responsible for both the manufacturing of tangible goods and the delivery of services to customers. It is necessary for the running of each and every firm. A supply chain is a sequential system of suppliers and consumers that begins with primary sources of inputs and ends with the system's ultimate customers. A supply chain begins with primary sources of inputs and ends with the system's final customers. The most fundamental input sources are at the beginning of supply chains, and at the other end are the system's ultimate end users. Because a business's operations and supply chains are interwoven, it follows that neither one could exist without the other, nor could a firm run without both of them.

Both the planning of systems and the formulation of operational policies are elements that fall under the purview of operations management. The design of products and services, capacity planning, process selection, site selection, work management, inventory and supply management, production planning, quality assurance, scheduling, and project management are all examples of areas in which these considerations might apply. The development of operations management over the course of history is a fascinating source of background knowledge on the current growth of this important part of business, which can be found in a number of different contexts.

XIII. CONCLUSION

This study presents a notion of a new OM function that takes into consideration the significant change in the environment of the organisation. The market eventually became worldwide, which required businesses to choose global operations based on foreign operations, joint ventures, and outsourcing, supported by strategic alliances based on core competences. These options were available to businesses as a result of globalisation. In addition, the market demanded that both people and technology be leveraged. Companies were required to compete based on all of the many competitive performance criteria, such as price, quality, flexibility, reliability, and responsiveness. As a result, businesses devised new methods and strategies for their operations, such as BPR, lean, AM, and SCM. Since the

advent of electronic commerce (e-commerce) and numerous trade agreements, such as the North American Free Trade Agreement, the European Commission, and the Association of South East Asian Nations, businesses have been left with no choice but to be adaptable and responsive to the constantly shifting requirements of the market. Subsequently, supply chain management (SCM) gained popularity among businesses that take an integrated business process view into account. This perspective is crucial for the physically distributed company environment together with enterprise resource planning (ERP). Now, businesses are concentrating their efforts on establishing a supply chain that is based on RFID technology in order to give entire corporate visibility and to service worldwide consumers more effectively.
The curriculum for OM should be developed to promote skills in building a network of enterprises based on dynamic markets, developing strategic alliances based on core competencies, leveraging the role of information technology and systems, and recognising the fact that both the market and the operations have become global. This should all be done in light of the fact that the market and the operations have become global. As a result, it is imperative that curricula in schools and programmes of industrial training be established to convey the following:

- Global viewpoints
- Global market and operations
- An appreciation of global multiculture and language
- The significance of servitization
- The role of ethics in business
- The implications of technology in business
- Sustainable operations and business development
- The importance of logistics and its infrastructure
- Balanced growth of manufacturing across the globe

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