The Challenges of Operations Management for Business Managers

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This paper examines the challenges of operations management for business owners and managers by exploring and presenting three major areas in which operations management becomes critical to organizational success and competitive advantage. The author defines operations management as both a study and a practice embracing the productive processes in organizations and providing opportunities for adding value to existing products and services. The rationale and importance of understanding operational processes and principles are presented and the author sees three major challenges existing in applying these processes, principles and practices of operations management (OM) to their businesses: technical challenge, service challenge, and applications challenge. The author presents operations management as a value and quality adding approach and philosophy to planning, organizing and controlling organizational resources or inputs for optimum results in terms of efficiency and customer expectations. Operations management is viewed as a systems-oriented and highly integrative study of methods, tools, processes, and techniques that coordinate “the vital three” (people, systems and processes) with “the central one” (physical and natural resources) in creating and adding value to meet organizational goals and customer requirements at an appropriate cost of acquisition, production, and distribution. Finally, the author makes several recommendations for improving and increasing the practice of OM in organizations.

Keywords: Applications Challenge, Benchmarking, Service Blueprints, Service Challenge, SERVQUAL Model, Six Sigma, Statistical Process Control (SPC), Technical Challenge, Theory of Constraint (TOC), Total Quality Management (TQM)

INTRODUCTION

A successful stream of business and customer value adding activities is only possible with effective and efficient operations management processes that uniquely identify, plan for, organize, monitor and control organizational resources, and competitive priorities and capabilities in accordance with market demand. Thus, as one of the key activities of business, operations must become more important to 21st century companies, especially new and growing

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businesses facing the additional constraints of the hypercompetitive and rapidly changing environment. Unfortunately, many new businesses and especially small businesses underestimate the value and importance of effective operations management in creating quality product and brand power, and furthermore, their owners, leaders, and managers often lack operations management knowledge and strategies to effectively and efficiently coordinate resources for competitive advantage and success. This should not be surprising because the field of operations management is not only a challenging one, but one requiring deep understanding of business processes and tools in order to successfully apply them to design, create and deliver value to customers and other stakeholders.

The 21st century business environment has presented a complex of factors and actors that affect business processes and value creation. Companies and their leaders and managers must become more conscious of the changing nature of the contexts in which business activities and processes are unfolding and must strategically plan for their operations in order to sustain value practices and weather the rapids of change. As the paradox of change sets in and increased scarcity of resources leads to efficiency constraints and the need for sustainable business practices across the globe and organizations, the field of operations management will become even more important to business owners and managers who must find, develop, and apply new methods and processes of creating value, or seek more lean methods and better quality inputs to ensure that outputs meet and exceed growing and changing consumer needs and wants. Furthermore, effectively managing what Burke (2005) refers to as planned and unplanned change requires sound operations management knowledge that will equip managers with the understanding and ability to select the most suitable tools and techniques to efficiently use organizational resources and balance the flow of inputs in the value creation process. Operations managers are really production leaders or value creators whose jobs are essential in ensuring that organizations deliver on quality promises to customers and other stakeholders. Implementing and successfully leading and managing change in organizations has become a priority (Kotter, 1996; Spector, 2010) and operations managers are key actors in this process.

OPERATIONS MANAGEMENT AS STUDY AND PRACTICE

Operations management more than any other branch of management study offers the greatest tools and opportunities for companies to understand and add value to their existing creative or productive processes, products and services. As a field of study, operations management has been defined by Krajewski, Ritzman and Malhotra (2013) as “the systematic design, direction, and control of processes that transform inputs into services and products for internal, as well as external customers” (p. 2). It is the effective and efficient management of operations or resources that perform all or part of one or more processes in value creation (Krajewski, Ritzman & Malhotra, 2013). Operations management essentially studies and makes visible the link between process and value. Heizer and Render (2011) define operations management as “the set of activities that creates value in the form of goods and services by transforming inputs into outputs” (p. 4). As such, operations management is important to each and every organization as activities that create goods and services take place in all organizations.

As business owners, managers, and practitioners, we must study, understand and appreciate operations management for several reasons: (1) operations management represents one of the three major functions of any organization (the other two being marketing, and finance and/or accounting) and it is strategically and integrally related and connected to all other functions in an organization; (2) operations management is that area which delves into the actual processes that create value or produce goods and services and we must know how our goods and services are produced in order to make quality changes and add value for increased customer choice and satisfaction; (3) the work, roles and functions of operations managers are important in our society where the production of good and services affects our well-being and safety and determines our standard of living and happiness to a certain
degree; and (4) operations represent a costly part of any organization because a large percentage of a firm’s revenue is spent on its operations management function (Heizer & Render, 2011).

Operations management brings to business owners, leaders, and managers an understanding and knowledge of how people and resources are efficiently and effectively organized and controlled for productive enterprise. Operations management educates business owners and managers about the production function that creates the value that organizations offer and customers seek. Therefore, understanding operational processes and what operations management entails will help managers plan, organize, lead, and control resources more effectively and efficiently in achieving organizational goals. When business owners and managers possess operations management knowledge they will be able to devise better strategies in improving quality and increasing profitability for their shareholders as well as provide better services and products, and they are better able to organize employees and tasks with systematic order and prioritization.

In the area of decision making, operations management can contribute significantly to better managerial decision making at the corporate and functional levels of the organization. Heizer and Render (2011) have identified ten (10) critical decisions in which operations management assists managers and organizations (Table 1). These ten areas represent the operationalization of the management functions within their job scope, tasks, responsibilities and functions by operations managers. In fact, these ten decision areas address certain challenges or issues of operations that determine how well a company utilizes scarce resources to create value or quality products and services to meet customer needs, and how well they meet shareholder expectations in terms of revenue and profits. The ten decision areas engaging operations management help managers to answer critical questions on design of goods and services, quality management, process and capacity design, location strategy, layout strategy, human resources and job design, supply chain management, inventory and material requirement planning, intermediate and short-term scheduling, and maintenance (Heizer & Render, 2011).

[TABLE 1 HERE – see Appendix]

Ten critical decisions of operations management match uniquely to twenty (20) questions (see Table 1) that effective operations managers should ask and answer. Organizations in the 21st century must ask these questions if they are to efficiently manage their inputs and outputs while ensuring value, quality, and cost savings that create purchase point opportunities for customers and economies of scale for businesses.

Operations Managers as Generalists

As Table 1 demonstrates, operations managers must make decisions that are critical to several functional areas of business, not just operations, as they must take into consideration, the marketing, financing and other functions that are interrelated, interconnected and affected by their decisions and operational processes and policies. Thus, they must have basic or fundamental knowledge and understanding of the function and importance of finance, marketing, human resources, supply chain or distribution, and other activities within the organization in order to fully understand how important their job is and how they affect organizational value as value creators or value and quality managers. Operations managers must engage in interfunctional coordination by working with other managers and personnel from several different departments; essentially, all other departments in the organization in making the best production decisions possible to optimize the use of resources in the creation of maximum output or yield for systems and machines that create goods and services.

The “generalist” characteristic and body of knowledge is one of the chief factors contributing to the technical challenge in operations management because effective operations managers must possess a broader and general understanding of the organization and its various functional activities and processes atop of their existing specialized knowledge in operations management to make the best decisions possible when confronted with an operations issue or
challenge. This means having the luxury of recognizing the interconnections between operations management and other functional activities in order to best understand constraints, limitations, opportunities, and other factors that constitute advantages and disadvantages, as well as according to theory of constraint (TOC), bottlenecks and constraints in decision making in production systems. Operations managers must take a holistic approach to operations or production within their organizations, recognizing that what is done in the operations management department affects all other aspects of business. They must think as general organizational overseers who understand the links and connections that bind resources, people, systems, and processes into formulating a value chain or value web that creates organizational products and services to meet and exceed customer requirements.

Students with a fundamental and integrative understanding of management and business administration in terms of a collective body of knowledge combining theories and principles or practices from marketing, finance, accounting, leadership and organizational behavior, human resources, managerial economics, entrepreneurship, strategic management, macroeconomics and microeconomics, international business, project management, business statistics, business law and ethics, and the generally common business curriculum courses and subjects in colleges and schools will generally have a better capacity for appreciating and understanding the role, theories, and practices of operations management as a field of study. For example, in operations management, we must understand the differences between goods and services that affect their creation and distribution and this knowledge comes from marketing, while we also must be able to understand strategy and apply concepts and principles of strategy and the strategic process in capacity planning and process design. Similarly, we must understand job process and task and this knowledge emerges from human resources and organizational management or behavior. Thus, operations management is at best, an integrative management study focusing on using knowledge and understanding of organizational systems and processes, as well as functional activities and resources in the creation and application of tools and methods for achieving efficiency and quality in the conversion process that turns inputs into outputs or creates goods and services.

THE CHALLENGES OF OPERATIONS MANAGEMENT

Operations management is challenging as a branch of study because it employs highly technical and highly specialized language and approaches. In addition, another challenge emerges in the context of business activities and business environment, especially as both context and environment change to alter the effectiveness of operations techniques and processes for managers and businesses. Moreover, the levels of technical and problem solving or conceptual skills required in understanding and applying the tools and techniques of operations management create the most significant challenge for business owners and managers. Business managers and owners must be able to delve into the deeper sides or aspects of processes that create value by understanding activity flow and interrelationships between productive inputs or variables (the factors of production) and how external and internal environmental factors affect how effectively and efficiently these can be combined to produce goods and create services. Most importantly, the concept of value should be understood in terms of the link between value and processes. Operations managers should understand that it is processes that create value and therefore, strive to manage these processes in relation to the value they envision for the organization and their customers. Operations managers must meet the technical challenge presented by operations management in terms of the required body of knowledge and understanding they need to possess to carry out their job responsibilities and tasks effectively and efficiently. They must also be able to meet the service challenge of operations management by understanding that the design and creation of services differ from the design of physical products or goods. Finally, operations managers must meet the applications challenge of operations
management by being able to effectively apply its proposed tools, techniques, methods, theories, principles, and processes in solving production problems, adding value, and maximize output for the organization in efficient ways.

The Technical Challenge of Operations Management

The first challenge of operations management for business owners and managers is to fully understand what operations management is all about and its role and function in creating and adding value to business processes and practices for customer satisfaction and business performance. This stems from the highly technical characteristic of this field of management study in terms of the variety of tools, techniques, and their abstract nature and complex interrelationships and connections, as operations management is at best an integrative field of management study which leans more toward the quantitative side of management theory and focusing more predominantly on efficiency practices. It is more than any other field of management study, a highly technical and increasingly quantitatively-oriented subject matter, especially as it becomes more advanced with the application of project management, time, motion, capacity planning and forecasting theories and models, lean systems theory, decision making analysis models, and scheduling techniques that are often rigged with mathematical formulas and techniques, and most recently in its practice, computer applications software systems that require high technical and quantitative skills. For the student of operations management, these can be overwhelming enough, especially for those with mathematics or numbers phobia. Thus, it becomes increasingly unpleasant to think about for business owners and managers who lack formal education and understanding of these techniques, processes, and tools that could potentially add value to their business or change their business models significantly to create more revenue streams, competitive advantage and opportunities. Even the average MBA graduate lacks sufficient knowledge in operations management, especially if he or she never completed more than a course or concentration in the field. Thus, it should be rather daunting for managers in training without such luxury of a college course or education in operations management to be presented with a diversity of operations processes, techniques, and methods engaging complex and highly quantitative ideas and formulas. Corporate trainers in the field of operations management must therefore break down materials to simple practical principles and ideas that can be immediately and easily applied to practice to facilitate usefulness and understanding to practicing managers and business owners.

Operations managers must be especially literate and technically competent by possessing a significant level of knowledge and understanding of operations management. This means understanding its major philosophies, principles, theories, and practices as well as the variety of tools, techniques, and methods used in operations management. This includes understanding value and quality management theories and methods or techniques in a manner sufficient enough to apply them and getting positive results for the organization in terms of added value and quality, understanding the techniques and processes involved in forecasting, scheduling, capacity and resource planning, supply chain management, facility layout and design, as well as other relevant operational processes and activities as deemed essential in the effective and efficient management of organizational resources. Operations managers must speak the language of operations most fluently while being able to also speak the language of other functional areas fluently enough to understand what other managers do, as this affects the decisions and policies they make and engage in the production and creation of goods and services. They must understand the importance of finance and marketing in affecting operational processes and how their operations decisions in turn affect these functional areas or activities that organizations use to create a value stream of customer-desired characteristics and features in what the organization does or will do. This essentially means possessing more than surface level knowledge of the field of operations management and related fields; it means being able to
understand the interdisciplinary nature of operations management as study and practice devoted to maximizing value creation for competitive advantage and success.

**Operations Management and the Service Challenge**

Manufacturers produce tangible products while service products are often intangible (Heizer & Render, 2011). Services can be defined as “economic activities that typically produce an intangible product [such as education, entertainment, lodging, government, financial, and health services]” (Heizer & Render, 2011, p. 10). The challenge here is that operations managers are engaged in the creation of a product which they cannot touch or see, but which must be experienced, and as such, is difficult to measure in any objective form and is highly characterized by variations. The Service Challenge is one of the most difficult for business owners and managers when it comes to applying the theories, processes, techniques and tools of operations management in creating value because these tools and techniques were originally the domain of a large manufacturing economy that prevailed until the early 1990s in highly developed countries. Now that over 75% of GDP stems from the creation of services in the United States, for example, these techniques must now be applied broadly in services businesses and industries in streamlining the processes that create service value and quality for customers.

There are some fundamental differences between goods and services that operations managers should be conscious of as they manage the processes that create services. Services are usually intangible as opposed to physical products which are tangible. This means that it becomes increasingly difficult to gauge the processes that create services because of difficulty in measurements and uniqueness of service providers. According to Heizer and Render (2011) services are often produced and consumed simultaneously thereby constituting no need for storage or inventory. A challenge of service is that we have not developed ways or methods to really inventory services on any recognizable or significant levels. Therefore, we have to constantly repeat and recreate services upon their simultaneous demise. Compared to tangible products, services are often unique (Heizer & Render, 2011). This means that the combination of resources in terms of mix or amounts can vary significantly when it comes to services provision or creation. Unlike physical products, services require higher levels of customer contact and customer interaction, and hence, they are very difficult to standardize, automate, and make because customers are unique and this affects their different levels of demand for services. Furthermore, services have what Heizer and Render (2011) describe as “inconsistent product definition” (p. 10). For example, while product definition may be rigorous, inconsistency sets in because of the characteristics, uniqueness, and influence of the service provider or customer.

We are living in an economy where the knowledge worker is emerging as the dominant creator of value, and services are often predominantly knowledge-based because they require and depend on the technical and conceptual, as well as interpersonal skills of the service provider. Finally, Heizer and Render (2011) describe services as being frequently dispersed because they must be brought into contact with consumers in various places. There are several characteristics of services that create a challenge for operations managers: perishability, variability, intangibility, and subjectivity.

Many of the functional activities in organizations are in fact services. For example, accounting, human resources and training, logistics, and marketing are services. These services serve as value enhancing productive or creative activities that create enhanced products by adding value and increasing quality. The service sector is still growing and it is most probable that operational practices must center even more on creating effective service processes in the near future. The service sector represents that segment of economies that include trade, education, lodging, financial, medical, legal, and other professional occupations and services constitute the largest economic sector in postindustrial societies (Heizer & Render, 2011; Krajewski, Ritzman & Malhotra,
Most organizations today are engaged in the creation of services and operations managers must develop effective methods and approaches in making services more efficient and satisfying to their customers. This means having knowledge and keen sight to recognize service improvement opportunities and creating service blueprints or flowcharts of service process that show which steps have high customer contact (Krajewski, Ritzman & Malhotra, 2013). Moreover, operations managers must understand the requirements for service facilities and the number of lines and arrangement of the facilities (service system) as they affect service provision.

The Practical Applications Challenge

Despite any understanding of operations management theories, principles, processes, ideas and techniques, the real world is far more complex than we can imagine and the variables of change have become more uncontrollable as unplanned change creates a paradox (Burke, 2005) for organizational leaders and managers who seek to balance strategy and process. Therefore, the context in which application of operations management processes and techniques take place can create as much a challenge as these processes and techniques, and furthermore, the nature and types of business activities and outputs will also create limitations and challenges in applying what has been established throughout literature and practice as sound operations management principles for increasing quality and performance or adding value to business.

Whether it is Six Sigma, Theory of Constraint (TOC), Total Quality Management (TQM), Lean Six Sigma, Statistical Process Analysis, or any other methods or techniques to managing value and quality through forecasting, scheduling, enterprise resources planning (ERP), materials requirement planning, process strategy, supply chain management, operations managers must be able to fully appreciate and understand these before they can apply them to create the value and quality they seek or desire for their organizations and customers. Operations management is an applied field of study and operations managers must apply its knowledge and principles as practices that set the pace for organizational value creation and quality improvement processes. From statistical processes, tools, and techniques to philosophies and guidelines underlying various methods such as TQM, Six Sigma, JIT, and the like, operations managers must endeavor to understand these for the opportunities they can create in terms of building and sustaining competitive advantage.

VITAL THEORIES AND PRINCIPLES FOR PRACTICING OM MANAGERS

There are several vital theories and principles that business owners and managers must consider in their overall philosophy and general approach to operations management. These vital theories and principles will serve to guide their underlying processes and decisions in creating and enhancing quality and value for customer satisfaction and organizational success. They represent embodiment of ideas and practices that pervade operations management literature and the most commonly engaged practices and principles governing value and quality improvement processes in today’s organizations. Among these theories and principles, total quality management (TQM) has been the most enduring and longstanding in organizational value practice. The PDCA or Deming Cycle represents a simple process designed to check and control quality. Benchmarking is another process of quality improvement that originated in manufacturing and which is now applied to services as well. Benchmarking is generally treated as part of TQM and focuses on adopting or adapting best practices. The SERVQUAL model has become especially important with the development of a dominant service sector in modern economies, especially in developed nations where the majority of productive resources and opportunities are dedicated to and center on services and their creation. Six Sigma principles represent a growing body of knowledge and principles designed to reduce defects and variability in products and services in order to improve quality. Additionally, there are several simple process analysis tools that business owners and their operations managers can use to evaluate the processes that create goods.
and services in order to ensure that there is quality and that value is being added.

**Total Quality Management (TQM)**

Total Quality Management (TQM) has long been advocated as the most organizationally-salient philosophy process to quality improvement that engages systems, people, and processes in effectively and efficiently using resources to create value and improve quality. TQM is a philosophy that emphasizes three principles for achieving high levels of performance and quality: (1) customer satisfaction, (2) employee involvement, and (3) continuous improvement in performance (Krajewski, Ritzman & Malhotra, 2013). Organizations employing TQM must also focus on service and product design, process design, application of problem solving tools, and using good purchasing strategies and benchmarking processes. Both internal and external customers must be satisfied by having their expectations met by organizations. This means focusing on conformance to specifications, value, supporting customers and creating good psychological impressions by offering quality products and service. For TQM to work effectively in improving quality and performance, all employees must become involved and operations managers must do an excellent job of serving internal customers if they expect to satisfy external customers (Krajewski, Ritzman & Malhotra, 2013). Operations managers must empower their employees to serve customers and make vital decisions that lead to quality improvement and added value in the creation and provisions of goods and services. They should effectively engage teams, especially problem solving teams or quality circles, as well as special-purpose teams and self-managed teams to deal with different operational issues and challenges. In terms of continuous improvement in applying TQM, an important tool is the PDCA or Deming Cycle. PDCA stands for Plan, Do, Check, and Act. This means that operations managers must plan processes, implement and monitor these processes or activities, analyze data collected regarding these process or activities, and act in accordance with what these results dictate.

**Benchmarking**

Benchmarking can best be described as a TQM philosophy or process that selects a demonstrated standard of performance that represents the very best performance for a process or activity (Heizer & Render, 2011). It is a systematic procedure that measures a firm’s processes, services, and products against those of industry leaders in an attempt to adopt or adapt those that are deemed best practices (Krajewski, Ritzman & Malhotra, 2013). In benchmark, operations managers are required to know the competition; both market leaders and market followers (market driving and market driven value providers) and must then develop a target they want to reach and a standard or benchmark against which to compare their company’s performance. There are five (5) major steps recommended by Heizer and Render (2011) in developing a benchmark: (1) determine what to benchmark, (2) form a benchmark team, (3) identify benchmarking partners, (4) collect and analyze benchmarking information, and (5) take actions necessary to match or exceed the benchmark. On the other hand, Krajewski, Ritzman and Malhotra (2013) recommend four (4) steps in the benchmarking process: (1) planning by identifying processes, services, or products to be benchmarked, (2) analyzing the gaps between the firm’s current performance and that of the benchmark firm; (3) integrating goals and seeking support from managers who will provide resources, and (4) taking action by developing cross-functional teams that will work on the benchmark.

**SERVQUAL Model**

Service quality matters - especially in today's economy where majority of productive resources and activities are geared toward the creation of services. In fact, we are living in an information-based and service-led economy that demands high quality services and superior customer value. Operations managers engaged in the creation and provision of services must be knowledgeable about the services they engage people, systems, and processes to create. Furthermore, they should understand that certain characteristics or elements must be emphasized and integrated into services
and service experience to create maximum customer satisfaction and drive customer loyalty. According to Joos (2013), Tangibles, Reliability, Responsiveness, Assurance, and Empathy are the elements that must be managed if you want to provide excellent service quality. The SERVQUAL Model was developed by Zeithaml, Parasuraman, and Berry to represent the five most important dimensions of service quality from decades of research on the factors that constitute maximum customer satisfaction in services provision and consumption experiences. Zeithaml, Parasuraman, and Berry (1990) narrow down the elements of service quality to the following five dimensions that customers use when evaluating service quality: (1) Tangibles: the appearance of physical facilities, equipment, personnel, and communication materials; (2) Reliability: the ability to perform the promised service dependably and accurately; (3) Responsiveness: the willingness to help customers and provide prompt service; (4) Assurance: knowledge and courtesy of employees and their ability to convey trust and confidence; and (5) Empathy: the caring, individualized attention that the firm provides for its customers. In managing service quality, operations managers must remember to focus obsessively on customer satisfaction.

**Six Sigma**

Six Sigma can be described as a “comprehensive and flexible system for achieving, sustaining, and maximizing business success by minimizing defects and variability in processes” (Krajewski, Ritzman & Malhotra, 2013, p. 164). Popularized by Motorola Corporation, Honeywell, and General Electric (GE), Six Sigma is a process, product, or service with an extremely high capability [99.999% accuracy] (Heizer & Render, 2011), and is usually defined as in “defects per million” or “dpm” terms. Under a TQM process, Six Sigma can be defined as a program designed to reduce defects and variability in products and services in an effort to lower production or operations costs, save time, and improve customer satisfaction. Heizer and Render (2011) view Six Sigma as a comprehensive system because it is a strategy, a discipline, and a set of tools that operations managers can use to attain and sustain business success. Six Sigma is a strategy because it focuses on total customer satisfaction; a discipline because it follows the formal Six Sigma Improvement Model or DMAIC process; and a set of tools used to control quality processes. DMAIC stands for Define, Measure, Improve, Analyze, and Control, and represents the five-step process improvement model applied in Six Sigma. The Six Sigma DMAIC model involves the following steps: (1) Defining the characteristics of the process’s output that are critical to customer satisfaction, (2) Measuring by quantifying the process the work does that affects quality gaps, (3) Analyzing the data on measures to perform process analysis, (4) Improving by modifying or redesigning existing methods to meet new performance objectives, and (5) Controlling by monitoring the process to ensure that high levels of performance are maintained (Krajewski, Ritzman & Malhotra, 2013).

**Simple Process Analysis Tools**

There are several simple process analysis tools that operations managers and business owners can use to evaluate and monitor processes used to create value or goods and services. Operations managers must learn how to effectively apply tools such as Pareto charts, scatter diagrams, and cause-and-effect diagrams and statistical process control (SPC) tools in determining where improvements to their value creating processes are needed to improve quality and performance. These tools can help operations managers determine process capability or the ability of a process to meet the design specifications for outputs or products and services (Krajewski, Ritzman & Malhotra, 2013). Statistical process control (SPC) is simply the application of statistical techniques to determine whether a process is delivering what customers want, and which primarily uses tools called control charts “to detect defective services or products or to indicate that the process has changed and that services or products will deviate from their design specifications, unless something is done to correct the situation” (Krajewski, Ritzman & Malhotra, 2013, p. 166). As such, SPC can detect process changes such as: (1) a decrease in the average number of complaints per day from customers in a service business, (2) a sudden increase in the proportion of defective tires, (3) an
increase in the time to process a deposit at the local bank, (4) a decline in the number of broken bottles at a bottler, and (5) an increase in the number of claimants receiving refunds from a medical clinic. Sampling techniques are especially important in SPC, and a control chart which is used to determine whether variations in a process are abnormal (Heizer & Render, 2011) by designating an upper control limit (UCL) and a lower control limit (LCL) for that process or activity within a process.

Pareto charts, scatter diagrams, cause-and-effect diagrams, flowcharts, and histograms are examples of tools that are used in TQM in organizations or in continuous improvement and quality processes. The Pareto Chart is a method of organizing errors, problems, or defects to help focus problem solving, and is based on the work of economist Vilfredo Pareto. According to the Pareto Principle as popularized by J.M. Juran, 80% of a company’s problems result from 20% of the causes. The Scatter Diagram is used to ascertain the relationship between two variables such as the relationship between waiting time and service satisfaction and is depicted through data points that are plotted on two axes (x and y). The Cause-and-Effect Diagram is known as the fish-bone diagram or the Ishikawa diagram for its founder’s sake. It is used to identify quality issues and inspection points in a process. A flowchart is a tool that graphically presents a process or system using annotated boxes and interconnected lines in describing the process or system. Finally, histograms are used to show the range of values of a measured process or phenomenon and the frequency associated with it (Krajewski, Ritzman, & Malhotra, 2013). These are some of the simple and effective tools that operations managers can use in continuous and quality improvement processes.

SUSTAINABILITY AND OPERATIONS MANAGEMENT CHALLENGES

In today’s rapidly changing business environment where we are becoming more cognizant of resources constraints and where a new environmentalism is emerging in terms of value creation and quality, it pays to develop sustainable business practices that not only create competitive advantage, but ensure the survival of the organization amidst change and uncertainty. This is part of what operations managers do by anticipating changes in customer demand, the market and economic, political, legal, and social environments and modifying or shaping operations practices and processes to adopt these changes or adapt to these changes. Part of the sustainability responsibility of operations managers in the 21st century and coming era is to use the appropriate combination of resources that will maximize value creation and minimize wastes while providing customers with high quality products and services. Operations managers will also need to be increasingly accountable for the decisions they make that affect outcomes for internal and external customers, as well as toward the organization and its shareholders because their decisions certainly affect safety and the bottom line of a company.

An increasing challenge for sustainable practices in operations management today is in the area of social responsibility and ethics. As Heizer and Render (2011) note, “Operations managers’ roles of buying from suppliers, transforming resources into finished goods, and delivering to customers places them at critical junctures where they must frequently make ethical decisions” (p. 12). This means that operations managers must make ethical decisions in the resources acquisition and conversion processes that create products and services that affect customer well-being and health. We often see many organizations that engage in highly unethical practices such as dumping harmful chemicals in the environment that contribute to pollution, overstating the quality of their products, using harmful chemicals in the creation of goods, and engaging in activities that negatively affect service reliability, assurance, and responsiveness; critical dimensions of service quality identified by Zeithaml, Parasuraman, and Berry. Some of the ethical challenges facing operations managers include the following (a) efficiently developing and producing safe, quality products and services, (b) maintaining a sustainable environment, (c) providing a safe work environment, and (d) honoring customer and stakeholder commitments (Krajewski, Ritzman &
Sustainable practices by operations managers must be geared toward total customer satisfaction, efficiency, quality improvement and organizational success.

**FUTURE OPERATIONS MANAGEMENT CHALLENGES FOR MANAGERS**

Our future is rapidly emerging as one that will potentially be chaotic and where increased scarcity and competition for resources will mean employing leaner methods and systems in creating value or outputs. The field of operations management will have to change to embrace newer and emerging technology and ideas as the factors and actors in the business environment change. More importantly, the threats faced by organizations and society will become more pronounced where competition over scarce resources and resulting political, legal, and physical struggles create tension in environments that slow down and in some cases, bring production of goods and creation of services to a halt for some companies. This will mean increased potential for shortages and added pressure on operations managers and their companies to meet overarching demands from customers and other stakeholders. In the face of a bleak future where pandemics and epidemics prevail, or where the potential for such looms greater, operations managers will be functioning under more strict regulations and monitoring by government and other watchdog bodies to ensure that they are not adding to the social costs involved in resources use and business operations across a more well-defined spectrum. This means more streamlined processes for organizations as they seek to meet more stringent requirements where decreased resources create strategic wars among firms in and across various industries.

Future operations managers will need to be more environmentally conscious and must be able to engage global trends analysis in order to be better able to spot opportunities and threats to value and quality creating processes; they must possess insight and ability to isolate the vital few factors that are truly the requirement for accomplishing their tasks while creating competitive advantage in an increasingly chaotic and turbulent business and marketing environment. Additionally, operations managers will need to recognize where partnerships and alliances for resources and project management can lead to strengthening productive and strategic positions in the industries in which they operate. This means establishing effective and stronger supply chains for resources and product distribution to ensure that the organization can sustain its business practices even given dramatic changes in the market, industry, and global business environments. Furthermore, operations managers will find themselves becoming far more involved in strategic decision making as companies struggle to stay afloat amidst chaos and uncertainty. As wars, alliances, and technological improvements alter the differential advantages of trading nations and multinational corporations, companies will need to change their operations to weather these changes (Cateora, 1983). This will require operations managers to emerge as more effective planners and they will need to exercise greater wisdom in the control and monitoring of resources and productive processes to ensure that they are really engaging “on point” processes in the creation of value that will change overtime.

**CONCLUSION AND RECOMMENDATIONS**

Operations management is systematic, deliberate, focused, and provides a variety of tools and techniques backed by sound managerial practices and principles of effectiveness and efficiency that can significantly affect organizational activities, performance, competitive advantage, success and survival. It is therefore vital for managers to gain some appreciable understanding of operations management and apply those ideas that represent value added opportunities for their organizations in an effort to create recognized brands through quality and augmented products and services. Operations management is the effective and efficient synchronization of systems and system variables into a cohesive flow of input activities and processes that create value for organizations and customers. In such a way, operations management or OM can be viewed as a systems-oriented systematic and rational approach to value creation or production. Operations managers must
think of the entire organization as a value-creating organism whose interrelated activities and processes determine organizational core competence, distinct competence, and ultimately, its level of competitive advantage based on how efficiently and effectively it combines land, labor, capital and entrepreneurship or the factors of production to create value in the form of quality products and services for customers.

Operations managers can be regarded as “systems managers” because they coordinate “the vital three” (people, systems, and processes) around the “central one” (physical and natural resources) in creating and adding value to meet organizational goals and customer requirements at an appropriate cost of acquisition, production, and distribution. As such, they manage the processes that create value from the planning stages of production and acquisition of resources to the final output and its distribution through well-established supply chains to final users, end users, or customers. In order to be successful at their jobs, operations managers must understand the discipline (study) and practice of operations management and apply its principles, tools, methods and techniques in improving quality and sustaining those practices that deliver beyond competitors’ capability and customers’ expectations. In this capacity, operations management is a superior value adder compared to the other functional activities of marketing, finance, accounting, etc. In fact, operations underlie all the activities of a firm so much that we can speak of finance, accounting, and marketing operations.

In order to meet the challenges of operations management and create new opportunities for their organizations, operations managers and business owners or managers must stay abreast of new and emerging developments in the field of operations management. They must engage practice at various levels and constantly think about new opportunities and processes that can add value and quality to existing organizational products and services. This will require having deep knowledge of changes both within the field and practice of operations management and the internal and external environments of organizations. Operations managers can obtain this knowledge by pursuing formal education and training through college and university degree and certificate programs in the field, attending workshops and seminars in operations management, and by engaging in informal learning opportunities such as watching online videos and tutorials on various operations management topics, conducting Internet searches on topics in operations management, and even reading an operations management textbook. Bridging the gap between theory and application will be a strategically significant factor in the role that operations management plays in organizational success and performance.

REFERENCES


**AUTHOR’S BIOGRAPHY**

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## APPENDIX

**Table 1**: Ten Decision Areas and Issues of Operations Management

<table>
<thead>
<tr>
<th>Ten Decision Areas</th>
<th>Issues</th>
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</thead>
<tbody>
<tr>
<td>1. Design of goods and services</td>
<td>What good or service should we offer?</td>
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<tr>
<td></td>
<td>How should we design these products?</td>
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<tr>
<td>2. Managing quality</td>
<td>How do we define the quality?</td>
</tr>
<tr>
<td></td>
<td>Who is responsible for quality?</td>
</tr>
<tr>
<td>3. Process and capacity design</td>
<td>What process and what capacity will these products require?</td>
</tr>
<tr>
<td></td>
<td>What equipment and technology is necessary for these processes?</td>
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<tr>
<td>4. Location strategy</td>
<td>Where should we put the facility?</td>
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<td></td>
<td>On what criteria should we base the location decision?</td>
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<td>5. Layout strategy</td>
<td>How should we arrange the facility?</td>
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<td></td>
<td>How large must the facility be to meet our plan?</td>
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<td>6. Human resources and job design</td>
<td>How do we provide a reasonable work environment?</td>
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<tr>
<td></td>
<td>How much can we expect our employees to produce?</td>
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<td>7. Supply chain management</td>
<td>Should we make or buy this component?</td>
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<tr>
<td></td>
<td>Who should be our suppliers and how can we integrate them into our strategy?</td>
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<tr>
<td>8. Inventory, material requirements planning, and JIT (just-in-time)</td>
<td>How much inventory of each item should we have?</td>
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<td></td>
<td>When do we reorder?</td>
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<td>9. Intermediate and short-term scheduling</td>
<td>Are we better off keeping people on the payroll during slowdown?</td>
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<tr>
<td></td>
<td>Which job do we perform next?</td>
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<tr>
<td>10. Maintenance</td>
<td>How do we build reliability into our processes?</td>
</tr>
<tr>
<td></td>
<td>Who is responsible for maintenance?</td>
</tr>
</tbody>
</table>

Source: Adopted from Heizer and Render (2011, p. 7).