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Chapter 1 : Operations Management: Definition, Principles, Activities, Trends

Time adjustments just right. In most industries, capacity is typically added in chunks, known as step increases, because adding a single unit of capacity is impractical. If demand exceeds a company's current capacity, then the company must increase capacity by either acquiring more equipment or hiring additional workers.

The ICU seems to be constantly full, and trauma patients in the emergency department sometimes wait up to 24 hours before receiving a bed. Additionally, the cardiac surgeons were forced to cancel several elective coronary-artery bypass graft cases because there was not a bed available for postoperative recovery. Introduction Increasing demand for critical care has made capacity limitations commonplace in the ICU [1]. These limitations occur when there are no available ICU beds for patients with critical illness, leading to delays in ICU admission that have important clinical and economic consequences. Admission delays can result in the boarding of critically ill patients in the emergency department or in other hospital units, which is associated with increased morbidity and mortality [2 , 3]. Admission delays can also result in decreased revenue for hospitals, as they may force hospitals to cancel elective surgeries or transfers from outside hospitals. These problems have forced the critical care community to develop innovative ways to address capacity constraints and improve throughput. Yet these problems are not unique to the ICU, or even unique to healthcare in general. Limited capacity and the resulting problems of waiting times and throughput losses exist in many processes, ranging from financial services to automotive production. The academic field of operations management is specifically designed to address these issues. The purpose of the present review is to provide a brief overview of operations management and to present a set of case studies from work environments other than hospitals, thereby exposing readers to operations management and its potential application to critical care. What is operations management? Working with capacity limitations Many operations - in particular, service processes such as restaurants and airlines - have high fixed costs. These fixed costs typically reflect the cost of maintaining a certain capacity availability, where capacity is defined as the maximum number of customers that can be served per unit of time. Examples of fixed costs include the wages required to pay labor or the cost of machinery for production. Yet while costs in services tend to be fixed, revenue increases proportionally to the number of customers served per unit time - also referred to as throughput. This scenario creates an economic incentive to operate the process at a high level of utilization, where utilization is defined as the ratio of the number of customers served the throughput to the maximum number of customers that we could serve the capacity. Consider the following simplified example. The operation thus breaks even at 50 customers served per day. In other words, increasing the number of customers served from 60 to 70 a The marginal additional cost of service is zero while the marginal revenue is high. Maximizing utilization becomes a key priority. And high utilization, in and by itself, is not a problem. To see this, assume in an example process that customers arrive exactly once every 5 minutes 12 customers arrive per hour. Further, assume that it takes us exactly 4 minutes to serve each customer thus, we could serve up to 15 customers per hour. This strategy, however, would ignore an important reality of service delivery - variability. Customers are not widgets in an assembly line. The amount of service time depends on the particular needs of the customer at hand. Furthermore, the arrival times of individual customers may not be known in advance. These sources of uncertainty create a stochastic effect on our process. Just as before, 12 customers arrive per hour. This time, however, the arrival times are random. Similarly, we again take 4 minutes, on average, to serve a customer. Yet some customers get served quickly while others take longer. Indeed, some customers for example, the fifth and sixth customers spend much more time waiting than they spend in service. We also observe that the number of customers in the process at any one time goes as high as four three waiting, one being served. Contrast this with the previous deterministic scenario, where each customer is served immediately upon arrival.

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Chapter 2 : Capacity Planning - Operations Management

Capacity management is the management of the limits of an organization's resources, such as its labor force, manufacturing and office space, technology and equipment, raw materials, and inventory.

Capacity Planning Written by Andrew Goldman for Gaebler Ventures The capacity of your company to meet expected demand should be measured in both the short-term and the long-term. Properly managed capacity can have great benefits for the small business. Capacity planning is the analysis of what you are capable of producing versus what your expected demand will be. In order to increase capacity, you may have to purchase new equipment or change facilities. This can be a lengthy process. As a result, capacity planning needs to be analyzed in the long-term. In addition, on a monthly basis a production report is generated, demonstrating expected future demand and the production necessary to meet that demand. The capacity of the business needs to be checked versus the production plan in order to ensure an achievable plan. If there is not enough capacity, you may have to run an extra shift, use overtime or subcontract work. In the short-term when the Master Production Schedule is generated, capacity planning needs to be used to balance the workload. Are the machines running full-capacity on Monday but less than half-capacity on Friday? In the short-term you want to manage capacity to balance the workload, ensuring an even flow of work. Capacity should be first be analyzed during business planning sessions. The company should have a good sense of their current capacity and at what percentage they are operating. You should measure your capacity versus actual demand, not versus actual production. During these business planning sessions, the long-term should be analyzed and discussions regarding the purchase of equipment or facilities should be discussed. These are obviously major decisions with huge capital expenditures. As a result you will want to analyze your options fully with financial data. In the medium-term, capacity should be analyzed during monthly meetings. If capacity is consistently less than what is demanded, it may be necessary to take short-term measures. When making the decision to increase capacity in the medium-term financial data and comparisons need to be completed. The decision to hire more people, subcontract or use overtime are all costly and need to be analyzed appropriately. In the short-term, capacity should be analyzed on a weekly basis when the production schedule is being released. You want to have a balanced workload if possible. You should fully understand where your bottlenecked machines are and manage the throughput as close to the bottleneck as possible. The decision to increase capacity is not easy and can be extremely costly. This is a false way of thinking. You should be operating to meet your demand, not to keep the machines running. This line of thinking will lead to excess materials and increased costs. He has extensive experience working with small businesses on a consulting basis.

Chapter 3 : Capacity planning - Wikipedia

Capacity: The capacity can be calculated for every station in a business process. It is always m / processing time with m being the number of resources (e.g. workers) being devoted to the station. It is always m / processing time with m being the number of resources (e.g. workers) being devoted to the station.

History[edit] The history of production and operation systems began around B. The next major historical application of operation systems occurred in B. It was during this time that the Egyptians started using planning , organization , and control in large projects such as the construction of the pyramids. In large cities, on the other hand, inasmuch as many people have demands to make upon each branch of industry, one trade alone, and very often even less than a whole trade, is enough to support a man: It follows, therefore, as a matter of course, that he who devotes himself to a very highly specialized line of work is bound to do it in the best possible manner. This hierarchical organization in which people were divided into classes based on social position and wealth became known as the feudal system. Although a large part of labor was employed in agriculture, artisans contributed to economic output and formed guilds. The guild system, operating mainly between and , consisted of two types: Although guilds were regulated as to the quality of work performed, the resulting system was rather rigid, shoemakers , for example, were prohibited from tanning hides. They provided service to the nobility for cooking, cleaning and entertainment. Court jesters were service providers. The medieval army could also be considered a service since they defended the nobility. The industrial revolution was facilitated by two elements: Division of labor has always been a feature from the beginning of civilization , the extent to which the division is carried out varied considerably depending on period and location. Compared to the Middle Ages, the Renaissance and the Age of Discovery were characterized by a greater specialization in labor, one of the characteristics of growing European cities and trade. It was in the late eighteenth century that Eli Whitney popularized the concept of interchangeability of parts when he manufactured 10, muskets. Up to this point in the history of manufacturing, each product e. Interchangeability of parts allowed the mass production of parts independent of the final products in which they would be used. In , Frederick Winslow Taylor introduced the stopwatch method for accurately measuring the time to perform each single task of a complicated job. He developed the scientific study of productivity and identifying how to coordinate different tasks to eliminate wasting of time and increase the quality of work. The next generation of scientific study occurred with the development of work sampling and predetermined motion time systems PMTS. Work sampling is used to measure the random variable associated with the time of each task. PMTS allows the use of standard predetermined tables of the smallest body movements e. PMTS has gained substantial importance due to the fact that it can predict work measurements without observing the actual work. The Gilbreths took advantage of taking motion pictures at known time intervals while operators were performing the given task. At the turn of the twentieth century, the services industries were already developed, but largely fragmented. In the U. Services were largely local in nature except for railroads and telegraph and owned by entrepreneurs and families. Ransom Olds was the first to manufacture cars using the assembly line system, but Henry Ford developed the first auto assembly system where a car chassis was moved through the assembly line by a conveyor belt while workers added components to it until the car was completed. During World War II, the growth of computing power led to further development of efficient manufacturing methods and the use of advanced mathematical and statistical tools. This was supported by the development of academic programs in industrial and systems engineering disciplines, as well as fields of operations research and management science as multi-disciplinary fields of problem solving. While systems engineering concentrated on the broad characteristics of the relationships between inputs and outputs of generic systems, operations researchers concentrated on solving specific and focused problems. The synergy of operations research and systems engineering allowed for the realization of solving large scale and complex problems in the modern era. Recently, the development of faster and smaller computers, intelligent systems , and the World Wide Web has opened new opportunities for operations, manufacturing, production, and service systems. The textile industry is the prototypical example of the English industrial revolution. Industrial

Revolution and Productivity improving technologies historical Before the First industrial revolution work was mainly done through two systems: In the domestic system merchants took materials to homes where artisans performed the necessary work, craft guilds on the other hand were associations of artisans which passed work from one shop to another, for example: The beginning of the industrial revolution is usually associated with 18th century English textile industry , with the invention of flying shuttle by John Kay in , the spinning jenny by James Hargreaves in , the water frame by Richard Arkwright in and the steam engine by James Watt in In at the Crystal Palace Exhibition the term American system of manufacturing was used to describe the new approach that was evolving in the United States of America which was based on two central features: The model T car was introduced in , however it was not until Ford implemented the assembly line concept, that his vision of making a popular car affordable by every middle-class American citizen would be realized. The first factory in which Henry Ford used the concept of the assembly line was Highland Park , he characterized the system as follows: That is the real principle of our production, and conveyors are only one of many means to an end" [9] This became one the central ideas that led to mass production , one of the main elements of the Second Industrial Revolution , along with emergence of the electrical industry and petroleum industry. The post-industrial economy was noted in by Daniel Bell. Since all sectors are highly interconnected, this did not reflect less importance for manufacturing, agriculture, and mining but just a shift in the type of economic activity. Operations management[edit] Although productivity benefited considerably from technological inventions and division of labor, the problem of systematic measurement of performances and the calculation of these by the use of formulas remained somewhat unexplored until Frederick Taylor, whose early work focused on developing what he called a "differential piece-rate system" [11] and a series of experiments, measurements and formulas dealing with cutting metals [12] and manual labor. One of the problems Taylor believed could be solved with this system, was the problem of soldiering: In Taylor published his "The Principles of Scientific Management", [14] in which he characterized scientific management also known as Taylorism as: The development of a true science ; The scientific selection of the worker ; The scientific education and development of the worker; Intimate friendly cooperation between the management and the workers. Taylor is also credited for developing stopwatch time study, this combined with Frank and Lillian Gilbreth motion study gave way to time and motion study which is centered on the concepts of standard method and standard time. Frank Gilbreth is also responsible for introducing the flow process chart in Also in Hugo Diemer published the first industrial engineering book: Factory Organization and Administration. In Ford Whitman Harris published his "How many parts to make at once" in which he presented the idea of the economic order quantity model. He described the problem as follows: Experience has shown one manager a way to determine the economical size of lots" [16] This paper inspired a large body of mathematical literature focusing on the problem of production planning and inventory control. In Walter Shewhart introduced the control chart through a technical memorandum while working at Bell Labs , central to his method was the distinction between common cause and special cause of variation. In the s methods-time measurement MTM was developed by H. MTM was the first of a series of predetermined motion time systems , predetermined in the sense that estimates of time are not determined in loco but are derived from an industry standard. This was explained by its originators in a book they published in called "Method-Time Measurement". Harris to the more elaborate techniques of the calculus of variations developed by Euler in or the multipliers employed by Lagrange in , and computers were slowly being developed, first as analog computers by Sir William Thomson and James Thomson moving to the eletromechanical computers of Konrad Zuse and During World War II however, the development of mathematical optimization went through a major boost with the development of the Colossus computer , the first electronic digital computer that was all programmable, and the possibility to computationally solve large linear programming problems, first by Kantorovich [20] in working for the Soviet government and latter on in with the simplex method of Dantzig. These methods are known today as belonging to the field of operations research. From this point on a curious development took place: Toyota evolved a unique manufacturing system centered on two complementary notions: SPC and worker responsibility over quality Easy able -to-see quality: Plossl and Oliver W. One of the key insights of this management system was the distinction between dependent demand and independent demand. Independent

demand is demand which originates outside of the production system, therefore not directly controllable, and dependent demand is demand for components of final products, therefore subject to being directly controllable by management through the bill of materials , via product design. Orlicky wrote "Materials Requirement Planning" in , [26] the first hard cover book on the subject. Enterprise resource planning ERP is the modern software architecture, which addresses, besides production operations, distribution , accounting , human resources and procurement. Dramatic changes were occurring in the service industries, as well. While modeled after manufacturing in the production of the food in the back-room, the service in the front-room was defined and oriented to the customer. This was based on the innovative idea of flying all packages into the single airport in Memphis Tenn by midnight each day, resorting the packages for delivery to destinations and then flying them back out the next morning for delivery to numerous locations. This concept of a fast package delivery system created a whole new industry, and eventually allowed fast delivery of online orders by Amazon and other retailers. This was accomplished by adhering to their system of delivering the goods and the service to the customers at the lowest possible cost. The operations system included careful selection of merchandise, low cost sourcing, ownership of transportation, cross-docking, efficient location of stores and friendly home-town service to the customer. There standards apply to both manufacturing and service organizations. There has been some controversy regarding the proper procedures to follow and the amount of paperwork involved, but much of that has improved in current ISO revisions. With the coming of the Internet, in Amazon devised a service system of on-line retailing and distribution. With this innovative system customers were able to search for products they might like to buy, enter the order for the product, pay online, and track delivery of the product to their location, all in two days. This required not only very large computer operations, but dispersed warehouses, and an efficient transportation system. Service to customers including a high merchandise assortment, return services of purchases, and fast delivery is at the forefront of this business. Recent trends in the field revolve around concepts such as: Business Process Re-engineering launched by Michael Hammer in [32]: BPR seeks to help companies radically restructure their organizations by focusing on the ground-up design of their business processes. Lean systems is a systemic method for the elimination of waste " Muda " within a manufacturing or service process. Lean also takes into account waste created through overburden " Muri " and waste created through unevenness in work loads " Mura ". The term lean manufacturing was coined in the book The Machine that Changed the World. Six Sigma an approach to quality developed at Motorola between Six Sigma refers to control limits placed at six 6 standard deviations from the mean of a normal distribution , this became very famous after Jack Welch of General Electric launched a company-wide initiative in to adopt this set of methods to all manufacturing, service and administrative processes. Production systems[edit] In a job shop machines are grouped by technological similarities regarding transformation processes, therefore a single shop can work very different products in this picture four colors. Also notice that in this drawing each shop contains a single machine. Usually in the back there is a similar system for managing the set of tools required for different machining operations. A production system comprises both the technological elements machines and tools and organizational behavior division of labor and information flow. A first possible distinction in production systems technological classification is between continuous process production and discrete part production manufacturing. Another possible classification [36] is one based on Lead Time manufacturing lead time vs delivery lead time: According to this classification different kinds of systems will have different customer order decoupling points CODP , meaning that work in progress WIP cycle stock levels are practically nonexistent regarding operations located after the CODP except for WIP due to queues. See Order fulfillment The concept of production systems can be expanded to the service sector world keeping in mind that services have some fundamental differences in respect to material goods: Services can be classified according to a service process matrix:

Chapter 4 : Capacity Planning - Meaning, Classification and its Goals

Operations Management. Capacity Planning. Written by Andrew Goldman for Gaebler Ventures. The capacity of your company to meet expected demand should be measured in both the short-term and the long-term.

Strategies[edit] The broad classes of capacity planning are lead strategy, lag strategy, match strategy, and adjustment strategy. Lead strategy is adding capacity in anticipation of an increase in demand. It is also a strategy aimed at reducing stockout costs. A large capacity does not necessarily imply high inventory levels, but it can imply higher cycle stock costs. Excess capacity can also be rented to other companies. Advantage of lead strategy: First, it ensures that the organization has adequate capacity to meet all demand, even during periods of high growth. This is especially important when the availability of a product or service is crucial, as in the case of emergency care or hot new product. For many new products, being late to market can mean the difference between success and failure. Another advantage of a lead capacity strategy is that it can be used to preempt competitors who might be planning to expand their own capacity. Being the first in an area to open a large grocery or home improvement store gives a retailer a define edge. Finally many businesses find that overbuilding in anticipation of increased usage is cheaper and less disruptive than constantly making small increases in capacity. Of course, a lead capacity strategy can be very risky, particularly if demand is unpredictable or technology is evolving rapidly. Lag strategy refers to adding capacity only after the organization is running at full capacity or beyond due to increase in demand North Carolina State University, This is a more conservative strategy and opposite of a lead capacity strategy. It decreases the risk of waste, but it may result in the loss of possible customers either by stockout or low service levels. Three clear advantages of this strategy are a reduced risk of overbuilding, greater productivity due to higher utilization levels, and the ability to put off large investments as long as possible. Organization that follow this strategy often provide mature, cost-sensitive products or services. Match strategy is adding capacity in small amounts in response to changing demand in the market. This is a more moderate strategy. Capacity[edit] In the context of systems engineering , capacity planning [4] is used during system design and system performance monitoring. It extends over time horizon long enough to obtain resources. Capacity decisions affect the production lead time, customer responsiveness, operating cost and company ability to compete. Inadequate capacity planning can lead to the loss of the customer and business. The question of when capacity should be increased and by how much are the critical decisions. Failure to make these decisions correctly can be especially damaging to the overall performance when time delays are present in the system. In this example 4. By repeating this process for all the parts that run through a given machine, it is possible to determine the total capacity required to run production. Capacity available[edit] When considering new work for a piece of equipment or machinery, knowing how much capacity is available to run the work will eventually become part of the overall process. Typically, an annual forecast is used to determine how many hours per year are required. To calculate the total capacity available, the volume is adjusted according to the period being considered. The available capacity is difference between the required capacity and planned operating capacity.

Chapter 5 : Working with capacity limitations: operations management in critical care

Capacity planning is the study of allocating resources to satisfy changing demand. Every business, small and large, in every industry, has a capacity that limits how much it can produce.

Capacity Planning Capacity Planning The production system design planning considers input requirements, conversion process and output. After considering the forecast and long-term planning organization should undertake capacity planning. Capacity is defined as the ability to achieve, store or produce. For an organization, capacity would be the ability of a given system to produce output within the specific time period. In operations, management capacity is referred as an amount of the input resources available to produce relative output over period of time. In general, terms capacity is referred as maximum production capacity, which can be attained within a normal working schedule. Capacity planning is essential to be determining optimum utilization of resource and plays an important role decision-making process, for example, extension of existing operations, modification to product lines, starting new products, etc. Strategic Capacity Planning A technique used to identify and measure overall capacity of production is referred to as strategic capacity planning. Strategic capacity planning is utilized for capital intensive resource like plant, machinery, labor, etc. Strategic capacity planning is essential as it helps the organization in meeting the future requirements of the organization. Planning ensures that operating cost are maintained at a minimum possible level without affecting the quality. It ensures the organization remain competitive and can achieve the long-term growth plan. Capacity Planning Classification Capacity planning based on the timeline is classified into three main categories long range, medium range and short range. Long range capacity of an organization is dependent on various other capacities like design capacity, production capacity, sustainable capacity and effective capacity. Design capacity is the maximum output possible as indicated by equipment manufacturer under ideal working condition. Production capacity is the maximum output possible from equipment under normal working condition or day. Sustainable capacity is the maximum production level achievable in realistic work condition and considering normal machine breakdown, maintenance, etc. Effective capacity is the optimum production level under pre-defined job and work-schedules, normal machine breakdown, maintenance, etc. The strategic capacity planning undertaken by organization for 2 to 3 years of a time frame is referred to as medium term capacity planning. The strategic planning undertaken by organization for a daily weekly or quarterly time frame is referred to as short term capacity planning. Goal of Capacity Planning The ultimate goal of capacity planning is to meet the current and future level of the requirement at a minimal wastage. The three types of capacity planning based on goal are lead capacity planning, lag strategy planning and match strategy planning. For example, there could be a scenario where demand is more than production capacity; in this situation, a company needs to fulfill its requirement by buying from outside. If demand is equal to production capacity; company is in a position to use its production capacity to the fullest. If the demand is less than the production capacity, company can choose to reduce the production or share it output with other manufacturers.

Chapter 6 : ITIL Capacity Management: Best Practices & Processes - BMC Software

Potential Capacity - It is for the long term and indicates the available capacity at hand which can be utilised to influence the planning of senior management Immediate Capacity - It is the maximum available capacity which can be utilised in the short term (on a day-to-day basis).

Discover how to reduce TCO and improve business and operational efficiency. Automated Workload Balancing Automatically and continuously balance workloads across hosts and clusters based on business and operational intent. Optimize workload balancing for cost savings, performance, software license management or densification. Continuously verify workload performance against defined intent, applying predictive analytics to project future requirements, and balance workloads automatically or schedule balancing in a convenient maintenance window. Continuous and Automated workload placement throughout the VM lifecycle Integrate vRealize Operations and vRealize Automation for initial placement and on-going placement to meet utilization and business intent. Automated Host Based Placement, Driven by Business Intent Create placement zones across hosts regardless of cluster boundaries to optimize placement and balancing of workloads based on software license enforcement, tiers and other tags. Analyze and predict future demand or contention and proactively move workloads to avoid the issues. Efficient Capacity Management and Planning Reduce cost and risk with real-time, predictive capacity analytics correlated with cost analytics, delivering optimal densification and proactive planning and procurement. Reclaim and Right-size Reclaim overprovisioned capacity, right-size virtual machines and increase densification while honoring business and operational intent. Real-time predictive capacity analytics provide proactive alerting based on capacity usage and demand. They also deliver actionable recommendations that include reclamation, as well as compute and storage procurement options. Correlate Business and Operational Insights Combine capacity analytics with costing information to easily understand and track how operational efficiency and capacity management drive cost efficiency. Understand total cost of ownership and fine-grained savings opportunities to manage private cloud costs. Capacity Planning Use flexible capacity modeling to develop resourcing strategies and what-if scenarios across multiple clouds. Intelligent Remediation Predict, prevent and troubleshoot faster with actionable insights correlating metrics and logs. Streamline and centralize IT operations with native SDDC integrations, federated views and a highly scalable and extensible platform. Unified Operations Get a unified IT operations view into applications and infrastructure health. Visualize key performance indicators and get actionable out-of-the-box, persona-based dashboards and workflows to troubleshoot quickly. Enable proactive remediation of performance problems through predictive analytics and smart alerts. Gain insight into application-to-infrastructure dependencies to simplify change impact analysis and troubleshooting. Customize dashboards, reports and views to create unique workflows across infrastructure, operations and applications teams. Integration of vRealize Operations and vRealize Log Insight brings structured data such as metrics and key performance indicators and unstructured data such as log files together for faster root-cause analysis. Leverage native vSAN management for vSAN-specific monitoring and troubleshooting, as well as capacity management, including capacity and time remaining, deduplication and compression savings and reclamation opportunities. Take advantage of centralized management of multi-site and stretched vSAN clusters with advanced troubleshooting, proactive alerting and visibility from virtual machines to disk. Launch in context to vRealize Operations for full stack troubleshooting and capacity management. Integration with Wavefront by VMware Out-of-the-box integration with Wavefront by VMware empowers infrastructure and application operations teams to triage and resolve issues faster as well as collaborate to ensure application performance. This capability enables IT to gain control and provide app monitoring capabilities for the next gen apps such as Cassandra, Kafka and PCF as well as traditional apps such as Exchange, Active Directory and Weblogic. Open and Extensible Platform Manage large, complex, heterogeneous and hybrid environments with an open and extensible architecture with scalability and resilience. Get federated views across multiple data centers. Deploy domain-specific Management Packs from VMware and third-party hardware and application vendors.

Chapter 7 : Capacity Analysis in Operations Management - an Example

This is a sample of our (approximately) 11 page long Operations Management - Capacity Planning And Control notes, which we sell as part of the Operations Management Notes collection, a 1st package written at University Of Exeter in that contains (approximately) pages of notes across 11 different documents.

ITIL capacity management is responsible for ensuring that adequate capacity is available at all times to meet the agreed needs of the business in a cost-effective manner. Capacity management also serves as a focal point for any capacity issues in IT Service Management. Capacity management supports the service desk and incident and problem management in the resolution of incidents and problems related to capacity. Successful capacity management requires a thorough understanding of how business demand influences demand for services, and how service demand influences demand on components. This is reflected by the three subprocesses of capacity management: It is required that capacity management develop a capacity plan, which addresses both current capacity and performance issues, as well as future requirements. The capacity plan should be used throughout IT Service Management for planning and budgeting purposes. Capacity management is responsible for defining the metrics to be captured during service operation to measure performance and use of capacity. This includes monitoring tools, which can provide input to the event management process. Other activities of capacity management include sizing working with developers to understand capacity requirements of new services and modeling building statistical representations of systems. One way for an organization to accomplish this is to learn and own the definition. Capacity management introduces new ideas and terms that should be discussed before they are implemented, including component, capacity plan, capacity report, capacity management information system, and performance. A component is the underlying structure behind a service. For example, it is the database behind the application or the server underneath the website. It is a component that must be purchased, built, maintained, and monitored. Improving performance often involves a replacement, upgrade, or load balancing of the individual component. The capacity plan contains different scenarios for predicted business demand and offers costed options for delivering the service-level targets as specified. This plan allows service designers to make the best choices about how to provide quality service at an affordable price point. The capacity report is a document that provides other IT management with data regarding service and resource usage and performance. This is used to help other managers make service-level decisions or decisions regarding individual components. The capacity management information system CMIS is the virtual repository used to store capacity data. Dashboards are one way to store and report on capacity data. Performance is how quickly a system responds to requests. For example, how quickly an application processes data and returns a new screen is one indicator of its performance. The purpose of capacity management The purpose of capacity management is to determine how much capacity should be provided based on the information from demand management regarding what should be provided. In particular, capacity management is concerned with speed and efficiency. If IT capacity forecasts are accurate and the amount of IT capacity in place meets business needs, the capacity management process is a success. Capacity management activities This process involves constant measurement, modeling, management, and reporting. More specifically, these activities include: For example, implementation might follow these broad steps: Gather the data Work with business to determine the service-level need. Determine what this means relative to service availability and service capacity. Identify the individual components necessary. Work with demand management resources to predict demand based on user roles. Work with the financial management team to determine the costs. You will also have designed a service at this point. Build the service The next step is to build the service. Capacity management should continue to monitor the business needs and any new data to ensure that the service being built will have the necessary capacity for quality performance. Financial management will be involved at this stage to facilitate purchasing of components and other resources. This is when service operation takes over. Capacity management then supports service operation to deliver services that meet targets. Monitoring and managing services and their individual components are most easily done via monitoring dashboards that provide data on multiple components in one

location. Gathering the data manually from each service or component adds to the total time it takes to produce service-capacity reports. Capacity management processes This process is built on several sub-processes, including business capacity management, service capacity management, component capacity management, and capacity management reporting. These processes share common activities, such as modeling, workload management, analysis, and optimization. It is involved in service strategy and service design, reviewing the data to ensure that there will be not be any changes in demand before the IT service is implemented. This sub-process works with demand management to ensure that the service is meeting business needs. Other sub-processes make sure that the service meets service-level targets; this sub-process ensures that the service-level targets meet the business needs. A thorough understanding of the business and the service-level agreements is necessary to effectively perform the activities in this sub-process. Service capacity management is the sub-process that focuses on the operation of the service. Unlike component capacity management, this process focuses solely on the service itself. It ensures that the end-to-end service provided meets agreed-upon service-level targets. For example, this process would monitor, control, and predict a ticketing system to ensure it was up and running efficiently. Component capacity management focuses on the technology that provides the performance and capacity to the IT service. Components are things like hard disks, phones, and databases. This sub-process requires knowledge of how each component individually contributes to service performance. It manages, controls, and predicts performance usage and capacity of individual components rather than the service as a whole as seen in service capacity management. The goal of this sub-process is to reduce the total amount of service downtime by monitoring current performance and predicting future performance. Component capacities are designed around service capacities and not the other way around. Capacity management reporting is the final sub-process. It gathers and then provides other stages with the data related to service capacity, service usage, and service performance. The output of this sub-process is the service capacity report. Capacity management and other ITIL processes Capacity management must interface with other processes within ITIL, including demand management, availability management, service-level management, and financial management. When the business has a service need, it comes from demand management. Service-level management helps with this. Once the service is deployed, service capacity management and component capacity management come in to keep everything at peak performance. Availability management works hand-in-hand with capacity management to keep services running and prevent downtime. Financial management comes into play when individual components must be estimated, purchased, maintained, and replaced. Not working closely with financial management can result in either untimely drops in uptime or organizational budget losses. Takeaways ITIL capacity management is an important one. With it, your organization can save costs by having the data necessary to make decisions regarding service performance. Rather than being based on gut decisions and guesses, you can use gathered component data to make business cases that win over financial management. Other barriers, such as performance bottlenecks and early indicators of performance issues, are identified before they become problems. This maintains uptime and increases customer and end-user satisfaction.

Chapter 8 : CAPACITY PLANNING - Operations Management: An Integrated Approach, 5th Edition [Book]

Capacity is the maximum level of goods and services output that a given system can produce over a set period of time. Capacity management is the management of the limits of an organization's.

This means that the formatting here may have errors. This text version has had its formatting removed so pay attention to its contents alone rather than its presentation. The version you download will have its original formatting intact and so will be much prettier to look at. This usually means deciding how the operation should react to fluctuations in demand. Aggregate demand and capacity o The important characteristic of planning and control is that it is concerned with setting capacity levels over the medium and short term in aggregated terms. Costs will be affected by balance between capacity and demand. Capacity levels in excess of demand could mean underutilisation of capacity and therefore high unit cost,Revenues will also be affected by the balance between capacity and demand but in the opposite way. Capacity levels equal or higher than demand at any point in time will ensure that all demand is satisfied and no revenue lost. Working capital will be affected if an operation decides to build up finished goods inventory prior to demand. This might allow demand to be satisfied but the organisations will have to fund the inventory until it can be sold. Quality of goods or services might be affected by a capacity plan which involved large fluctuations in capacity levels by hiring temporary staff for example. The new staff and the disruption to the routine working of the operation could increase the probability of errors being made. Speed of response to customer demand could be enhanced, either by the build-up of inventories or by the deliberate provision or surplus capacity to avoid queuing. Dependability of supply will also be affected by how close demand levels are to capacity. The closer demand gets to the operations capacity ceiling the less able it is to cope with any unexpected disruptions and the less dependable its deliveries of goods and services could be. Flexibility especially volume flexibility will be enhanced by surplus capacity. If demand and capacity are in balance the operation will not be able to respond to any unexpected increases in demand. Typically operations managers are faced with a forecast of demand which is unlikely to be either certain or constant. They will also have some idea of their ability to meet this demand. In order to attempt to meet demand they must often decide output in advance based on a forecast which might change before the demand occurs or worse prove not to reflect actual demand at all. Decisions to operate extra hours and recruit extra staff are usually based on forecast levels of demand, which could in practice be different from actual demand leading to unnecessary costs or unsatisfactory customer service. Seasonality of demand o Capacity planning and control is concerned largely with coping with seasonal demand fluctuations. Related Operations Management Samples:

Chapter 9 : Operations management - Wikipedia

In operations, management capacity is referred as an amount of the input resources available to produce relative output over period of time. In general, terms capacity is referred as maximum production capacity, which can be attained within a normal working schedule.

Definition, Principles, Activities, Trends Since all companies have operations, i. Especially as mastering these basics can directly support your business goals. We will also give you an outlook on some of the recent trends that have an impact on this discipline. Operations management involves planning, organizing, and supervising processes, and make necessary improvements for higher profitability. Historical background Operations management was previously called production management, clearly showing its origins in manufacturing. Historically, it all began with the division of production, starting as early as the times of ancient craftsmen, but spreading more widely only by adding the concept of interchangeability of parts in the eighteenth century, ultimately sparking the industrial revolution. As the economies in the developed world were gradually shifting to be service-based, all the corporate functions, including product management, started to integrate them. The service side also began its approach by applying product management principles to the planning and organizing of processes, to the point where it made more sense to call it operations management. Multidisciplinary nature Operations management is now a multidisciplinary functional area in a company, along with finance and marketing. It makes sure the materials and labor, or any other input, is used in the most effective and efficient way possible within an organization â€" thus maximizing the output. Operations management requires being familiar with a wide range of disciplines. It incorporates general management, factory- and equipment maintenance management by tradition. The operations manager has to know about the common strategic policies, basic material planning, manufacturing and production systems, and their analysis. Production and cost control principles are also of importance. Interested in a deep dive into operations maangement? Read the following slides. Required skills The skills required to perform such work are as diverse as the function itself. The most important skills are: Organizing processes in an organization requires a set of skills from planning and prioritizing through execution to monitoring. These abilities together help the manager achieve productivity and efficiency. The capability to understand processes in your area often includes a broad understanding of other functions, too. An attention to detail is often helpful to go deeper in the analysis. Once processes are analyzed and understood, they can be optimized for maximum efficiency. Quick decision-making is a real advantage here, as well as a clear focus problem-solving. Flaws in the interactions with employees or member of senior management can seriously harm productivity, so an operation manager has to have people skills to properly navigate the fine lines with their colleagues. Furthermore, clear communication of the tasks and goals serves as great motivation and to give a purpose for everyone. When they do, creativity helps find new ways to improve corporate performance. Operations managers have to be familiar with the most common technologies used in their industries, and have an even deeper understanding of the specific operation technology at their organizations. Below you will find two major approaches that are important to understand the driving forces behind the decisions about planning, designing and organizing processes. They are both embracing the idea of focusing on the delivery: The ten principles of OM by Randall Schaeffer Randall Schaeffer is an experienced manufacturing and operations management professional, an industrial philosopher, and regular speaker at conferences organized by APICS , the leading US association of supply chain and operations management. He presented his list of 10 principles of operations management at an APICS conference in , saying the violation of these principles had caused the struggle US manufacturing companies were experiencing. Operations management should focus on the problem, instead of the techniques, because no tool in itself would present a universal solution. Processes in manufacturing are interconnected. All elements have to be predictable and consistent, in order to achieve a similar outcome in profits. The Pareto rule is also applicable to operations: Managers are expected to set the rules and the metrics, and define responsibilities of their subordinates, as well as regularly check if the goals are met. Only this way would the workers put in the necessary efforts. Variance of processes has to be

encouraged, because if managed well, they can be sources of creativity. Unless the causes are attacked, the same problems will appear again. The passion of employees can be a major driver of company growth, and it can be instilled by the managers if not coming naturally. What is considered success will change over time, but always consider the interest of the customer. In order to keep them, all the other principles have to be revised occasionally. There will always be new theories and solutions, so you should not stick to one or the other, but embrace the change, and manage for stability in the long term. The 16 principles of operations management by Dr. Team up with customers. Know what they buy and use, and organize product families accordingly. Aim for non-stop improvement to always deliver the best quality, aim for a quicker response to customer demand, and always offer maximum flexibility. Thus, it gives more value, in a more flexible way. Involve frontline employees in strategic discussions to make sure they understand the purpose of their work and have their say in what to change. Know their customers, their best practices, and their competitive edges. Set priorities in organizing resources in a way the operations are close to the customer rate of use or demand. Offer cross-training options, job rotation , and improvements in work safety and health. Also offer more rewards and recognitions. Always think of improvement of current assets first, instead of a new purchase. Keep the equipment as simple and flexible as possible, at a reasonable cost. Improve the equipment and keep frontline workers accountable. Shorten product path to customer by making processes and delivery faster. Be prepared to support different processes and get all information and tools ready for on-demand production. Improve the workflow and cut the waste by producing on demand. Use only the best materials, processes, and partners. Focus on controlling the root causes that really affect cost and performance. Promote corporate achievements, let the market know about your improvements in competence or productivity. All activities involve considering assets, costs, and human resources, and are preceded by a thorough analysis of processes. Design Before planning processes or designing products, operations management should be busy analyzing the market to test the demands. If it delivers promising results, e. In most cases, planning involves designing a new product, from the initial concept to the actual launch , with several testing phases involved. During planning, you will have to consider both technical and business requirements. Sometimes the processes need to be updated: If your product is a service, process design aims for a variety of requirements and customer contact levels. Plans should always support the business objectives: Therefore, it is important to set proper measures in the planning phase, to know if the actual performance meets them, or there is need for adjustments. Capacity is one of these measures, as is product quality, or delivery times. The initial figures are usually estimates based on the market analysis conducted beforehand. One thing operation managers should be good at is critical path analysis. Learn more about that in the following video. This is a solid starting base for maximizing the efficiency of your operations. Still, you will need constant and competent management to correct the accidental mistakes in planning, to adjust production to changing costs or regulations, and keep them efficient on many levels. The operations manager selects and schedules the processes for an optimal result and does the same with materials for an ideal quality and capacity. Organizing the maintenance of the equipment is also part of the quality management activities. Furthermore, the inventory and the whole supply chain has to be managed in order to produce more efficiently. As in all management functions, the management of human resources is an essential activity. In operations management, the planning of actual employment levels can have a great impact on whether an organization can operate effectively. Improve There is always room to improve when it comes to the processes used, the quality and capacity achieved, or as far as the level of inventory and human resources are concerned. But remember, changes made according to these plans are only as good as the improvement they bring in business terms. A better way to forecast demand gets you closer to an improvement of processes, as savings on costs and delivery times occur. The quality of a product will be higher if you have Total Quality Control established and assess the operational risks correctly. Inventory control accounts for a better use of supplies. With Just-In-Time manufacturing, the capacity issues can be solved. Collaboration is a common go-to strategy that you can use to improve the effectiveness of your human resources. As a general advice, you can always consider adding some technology in the mix. The best way to do that is to develop a technology plan: Some of the trends that have a significant impact on the discipline today are: With Business Process Reengineering , you can foster innovation and improve any

selected measures dramatically. If you want to do it well, focus on how you can add more value to the customer. Lean and agile manufacturing Established by the Toyota Corporation, the term lean manufacturing has become a mainstream trend in the industry, and it is used interchangeable with Just-In-Time production. The concept behind is a constant improvement of processes in order to reduce waste and inventory, and maximize the output of high-quality, low-cost products and services. The reason it came to life was the growing complexity of processes, and it is characterized by product development done in small increments and super-fast decision-making. These together ensure the necessary flexibility and interactivity, proven remedies for unpredictable changes in market demand.