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Operation Management Decisions for Boeing 787 Dreamliner

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Abstract

Operation management decision includes making decisions for effective operation in an organization. Therefore, operation management comprises of adding value to products for customer satisfaction. Boeing company has been involved in several operation management decisions, however, they have been faced with production challenges especially in the supply chain. The purpose of this paper is to discuss and analyze the ten-operation management decision while considering the Boeing 787 Dreamliner. The faults in the 787 Dreamliner were caused by several factors in the company operation management decisions leading to loss of billions of dollars. Although Boeing Company is a known organization worldwide, the operation problems resulted in significant impacts on its reputation.

Operation Management Decisions for Boeing 787 Dreamliner

Every organization works towards enhancing its customers' satisfaction to increase its financial revenues through high sales. For that reason, to do this operation management decisions plays a critical role in helping companies develop the highest level of efficiency as managers will be able to balance the costs with revenues to attain the maximum net operating profit. On the other hand, Boeing is a multinational organization that has concentrated on developing and designing airplanes, operates globally and has several branches across the world providing several products to its customers. Although its headquarters is based in Chicago, Illinois in the United States of America, Boeing was established ¹ in 1916 by William E. Boeing as Pacific Aero Products and later changed to Boeing Airplane Company. Unfortunately, due to the dynamic nature of the company, it has faced several challenges in its operations.

Boeing has designed, developed and sold several airplanes; however, the Boeing 787 Dreamliner was supposed to be the groundbreaking and innovative product to be developed in the aviation sector because it was the most progressive commercial airplane ever as well as effective to operate. Furthermore, Boeing 787 Dreamliner was the fastest-selling plane with orders around nine hundred before the beginning of its first flight selling at nearly 150 billion dollars. Nevertheless, Boeing Company faced several problems during the process of development including delays and substantial cost variations. For that reason, this paper will focus on ten operation management decisions while considering the operational issues faced during the development of the Boeing 787 Dreamliner.

Background Information on Operational Failures

Before any project is initiated managers and operational staff are required to consider all the aspects required, project on the cost and completion time for the project. Therefore, like other projects the Boeing 787 Dreamliner plane was started as 7E7 before renamed in 2005. After careful research and design, the 787 Dreamliner was viewed as one of the visionary airplanes in the company. In 2007, the first Dreamliner was shown in a rolled-out ceremony at Boeing Everett assembly factory, then the ultimate assembly was performed at Everett factory in Washington as well as Boeing South Carolina workshop in North Charleston. While the plane was prearranged to start service in 2008, it accomplished its testing in 2011.

Moreover, despite the delivery of the Boeing 787 Dreamliner had a delay of forty months, it was delivered in September 2011 at Nippon Airways. Nevertheless, during the development of the Dreamliner, there were also problems associated with cost, because the final development cost was projected to be around forty billion dollars but was greater than twice the previous projection. Therefore, if the managers knew operation management, then they would have provided several strategic problems such as recognizing the size of developing procedures as well as project management tools and executing the structure of information technology. Although it was intended to bring down the use of fuel by 20 percent, it was more fuel-efficient than 767. This is because, the Dreamliner was differentiated from other planes through the electrical flight system, noise decreasing chevrons, a four-panel windshield and a smoother nose contour. As more operational problems continue to emerge in the development of the 787 Dreamliner brought by delays caused by scarcity on supply, the Airbus A380 was competing with 787 Dreamliner and affecting their market substantially.

Literature Review

Research conducted by Batuwangala et al. (2019), argues that some faults discovered from the Boeing 787 Dreamliner were based on human errors. Also, the same source added that the development of Boeing 737 Max had high redundancy needed for airplane standards. For example, the plane had a cockpit that has three flight computers which help the pilot with the flight procedure. Similarly, it also has digital gadgets that function in parallel, two of the devices are main gadgets, at the same time one of the devices is the backup gadget. Furthermore, Campbell (2019), states that the whole scheme was provided with self-regulating sensors that were intended to enhance the capacity of the pilot to approve the readings from the backup device as well as distinguishing the two interpretations. However, the pilot realized that the left sensors were not functioning hence leading to turning on the right gadgets. Since data was sent with right sensors it indicated that they were working, nevertheless, after some time the pilot concluded that all the sensors system were working well and was only a human error in the decision.

Campbell (2019), also states that human error can emerge during the production phase in different ways. For example, the Boeing 787 Dreamliner was faced with significant human fatal errors during taking off. The plane had formally completed the takeoff phase at 1500 feet, which led to the co-pilot to set the structure to attain the ideal climb. However, the contrary happened and the plane started to nose dive rather than climbing resulting in the officers responding to the situation. The officer involved managed to resolve the situation by pressing the controls and utilizing the accelerator to stabilize the 787 Dreamliner, nevertheless, the plane nose-dived again after several seconds. Furthermore, the quick guide book did not have the solution for the condition, hence leading to the conclusion that the errors occurred during the production phase.

The cockpit is among the critical part that requires special considerations. Research conducted by Myers (2016), posits that several human factors need to be taken into considerations during the flights. Big companies such as Boeing have not taken into deliberation human factors, which might lead to tragedies because minor involvement from the pilot might lead to devastation (Tangel et al., 2019). The aviation industry requires extreme discipline to reduce the level of risk, for instance, according to Kelly & Efthymiou (2019), communication plays a vital role in ensuring an understanding is achieved between officers hence reducing the chances of accidents happening. The plane cockpit requires special consideration during the design phase because it performs a critical role as it is also referred to as the controller where the pilot and the co-pilot manage the craft.

According to Castillo & Couture (2016), plane cockpit is responsible for two main functions, the first one is to make all the control devices available to them and the second role is to offer the pilot the best angle. Similarly, all the data is conveyed to the pilot and co-pilot with the aid of panels in the cockpit to guarantee the airplane can fly effectively. The section also requires special consideration with as minimum human errors as possible because it is where the security systems are placed hence, offering the data concerning the plane safety.

Boeing company has realized that most accidents that have happened in their planes are attributed to human errors. This has resulted in the development of measures that will help reduce the fatalities in their products. According to Nowakowski & Kułakowski (2019), Boeing has developed new training models to be utilized by pilots to reduce human errors. Furthermore, discipline is taken as a major aspect for all officers because it will help in decreasing the level of errors, which are brought by negligence. Also, the aim of the plane to be managed by both the pilot and the co-pilot is to ensure they decrease the likelihood of human faults from happening

because two individuals can help each other in certifying that the flight has minimal errors. Tangel et al. (2019), argues that discipline is important for all pilots because slight indiscipline during the process might result in accidents hence the death of individuals.

According to O'Donnellan (2016), Boeing has suffered from project failure due to ineffective operation management decisions. Operational decisions are critical to the success and efficiency of the production system, therefore, due to challenges and delays in production decision-making, Boeing has suffered from many problems beginning from the technology used. Boeing 787 Dreamliner issues began when they chose to use complex resources in the development of the product in contrast to the usual metal utilized for the past years. The project continued to be intricate as the company was in a crucial decision-making problem concerning the sharing of technology with suppliers that led to issues in the supply chain process. Similarly, O'Donnellan (2016), adds that a challenge in the supply chain process had a significant effect on Boeing Company as they had to undergo financial challenges due to increased budget in the production process as well as delays of more than three months.

Vascik (2017), argues that aircraft manufacturers are faced with substantial challenges associated with increased demand for planes and delays in the production process. Therefore, considering that the production process does not culminate at the development phase, because of other problems that arise past the phase. For instance, the Boeing 787 Dreamliner faced two diverse involved failures because of the lithium-ion battery. This resulted in the company losing billions of dollars in developing the Dreamliner which was projected to be around five billion dollars. Furthermore, due to the intricacy of the system, Boeing company was needed to outsource most of the design and development of the majority of the materials used to make the

Boeing 787 Dreamliner. Although outsourcing was intended to reduce the expenses sustained during the production, designing and development was performed in-house by Boeing officials.

Another research done by Campbell (2019), emphasize that the materials used in the development of airplane have been evolving since the development of the first plane by the Wright brothers. More sophisticated materials are developed that can overcome thrilling strength and thermal resistance challenges. Although Boeing management officials were already given experts advice from the Flight Proficiencies, they did not follow the advice on changing the materials utilized in making Boeing 787 Dreamliner. The flight professionals had advised Boeing management to utilize traditional materials used in development thus included metals. Nevertheless, they ignored the advice to reduce expenses by changing the production scheme. This failed due to the absence of simplicity and process. O'Donnellan (2016), supports that process is vital in project management as it provides engineers with steps required to perform the project as well as simplifying the process involved by providing procedures.

Operation Management Decision

Before materials are changed into finished goods services processes must be involved. Operation management comprises the management of processes during the transformations of materials into goods and services (Viveros Gunckel et al., 2016). During this process, management will be required to make decisions every time and then facilitate the day-to-day activities. The main purpose of operation management is to maximize effectiveness while producing goods and services that efficiently satisfy consumers' wants. Therefore, Boeing company was required to decide to ensure the quality of the Boeing 787 Dreamliner is not affected and thus operation management decision played a critical part in ensuring the production phase of the plane is safe and efficient.

Operation Management decision for Boeing 787 Dreamliner

Ten operation management decisions are followed to ensure efficient development of the product that quality is not interfered with. The first management decision is the design of goods and services which requires the operation management to focus on maintaining consistency in cost, resources and quality in all business sections (Viveros Gunckel et al., 2016). Boeing 787 Dreamliner focused on market research and trends when developing its product. Also, the 787 Dreamliner comprised of not only outsourcing of a certain recognized technology but also its primary technological innovations that were not used in any airplane before. With proper goods and service management, the relationship with suppliers will be enhanced and performance monitoring will be easy. This will in turn allow the operation management to have a close association with quality and manufacturing team. In this case, Boeing Company did not prepare well for the purchase decisions during the scarcity.

Another operation management decision to be made by Boeing company was quality management. Quality is essential in the flight industry because a slight ignorance of quality might result in fatal accidents. Thus, Boeing Company was required to be vibrant on customers' needs and then attain their expectations. Market research is significant in obtaining customers' requirements as well as quality assurance. During the development of Boeing 787 Dreamliner, the operation management was aware of the quality interference because flight experts had informed them earlier regarding the concern. Also, the faults of project and outsourcing were presented by the flight professionals but they ignored which led to increased losses and delays to sustain the problem as well as keep the process of development in-house.

Process and capacity design management is also a vital aspect of operation management decision because it concentrates on the design techniques which sustains all productions

objectives comprising of technology and resources. The process and capacity design would allow the organization to develop a clear guideline that will assist in the determination of the procedures necessary in keeping the process operating effectively. In this case, Boeing company did not design the development of the materials clearly because they had delays due to problems in deciding whether to share the technology design with the suppliers or not. Similarly, more challenges were available when the Boeing 787 Dreamliner suppliers delayed in delivering the products, considering that suppliers were accountable for the design and fabrication of the parts assigned. Hence, Boeing had to intervene and help suppliers financially to cater for the delays which resulted in increased financial losses.

The fourth operation management decision concerns the location of operation. For every business to prosper, they must focus on selecting a location that will not interfere with the material suppliers as well as marketing. Thus, Boeing had to select a strategic location that will be efficient for both the supply chain as well as easier for supplies to be provided. Furthermore, the location should be efficient for the movement of products to the consumers and the function of marketing and public relations. Unfortunately, Boeing saw the efficiency of allowing suppliers to provide their supply when already designed and will be assembled by Boeing engineers in-house. This was intended to reduce the cost incurred, however, due to inefficiencies in communication between suppliers and the company, more cost was incurred.

The fifth operation management decision concerns the layout design and strategy. This involved decision concerning the way supplies will arrive at the station as well as the way the process is conducted. Boeing has utilized a creative and innovative work environment, and thus it was developed being the best fuel-effective planes in the globe. Moreover, Boeing 787 was the first airplane to be developed utilizing composite materials as the major material and in the

building of the airframe. According to Campbell (2019), the plane was designed to utilize twenty percent less fuel as compared to 767 planes. Also, other distinctive features include the noise decreasing chevrons placed in the engine nacelles, electrical flight system and a smoother nose contour.

Boeing failed in human resources and job design because of the continuous challenges they faced in the production process. According to Paul (2018), Boeing was faced with the problem of fastening suppliers who were not proficient and thus resulting in complications in the existing condition. Also, the deprived work morals with the suppliers led to them lacking documentation procedures as recommended by the aviation authorities. To maintain the operation and managing human resources Boeing should have executed an incessant enhancement program with frequent reviews to offer unceasing training for employees and suppliers' satisfaction to attain success. Consequently, the supply chain is another operation management decision that requires special consideration. The supply chain can make a company fail in delivering the expected products within the provided timeframe (Khan, 2018). Therefore, with the increase in problems concerning the communication between Boeing officials and suppliers, first-level suppliers had a challenge in their attitude as they were from other countries such as Japan and Spain which led to failing in obtaining major requirements.

Inventory management is essential for the company in understanding the market. While many planes and markets are aware of metal usage, Boeing introduced an innovative use of carbon fiber technology in the making of Boeing 787. Since the carbon fiber demonstrated to be heavier, it would lead to the plane not being fuel effectual. Slayton & Spinardi (2016), argue that the center wing box was easy and would lead to challenges brought by increased pressure when the plane is flying. Another important operation management is scheduling as it requires

managers to check the relation between employees and production. For that reason, to make sure that the project is achieved according to the plan, then the Boeing 787 Dreamliner would follow the exact schedule developed at the beginning. However, more delays were accompanied including the seven times delays which influenced schedules and resulted in delays for three years. Final is the maintenance aspect which comprises of maintaining machines, processes and people. Also, while the 787 Dreamliner was using a Lithium-ion battery it faced significant challenges such as generating more heat that yielded to overrun and delays. The company needed to perform maintenance and change such defects to avoid the faults from happening again.

In summation, operation management plays a critical role in managing and controlling the operations process of the company. In this case inputs are needed to develop useful products needed by the consumers. After reviewing the Boeing 787 Dreamliner and analyzing it with the ten-operation management decision, it is clear that the development of the airplane was accompanied by many challenges, with the first flight being delayed by twenty-six months, and at the same time delivery was delayed by forty months. Also, substantial cost overruns were experienced as well as around seven percent of the orders being counseled before the first delivery. While most of the problems in Boeing 787 Dreamliner development were associated with the supply chain, Boeing Company could have addressed the issues by developing new strategies for obtaining potential suppliers. This would help in eradicating weak connections in the supply chain that led to late supplies as well as those supplies that were not up to the required standards. Also, Boeing company could have developed a system that will track suppliers in real-time to decrease the amount of time wasted in requesting suppliers.

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