

Building the boeing 787 case study

Business



The Boeing Company's Key Developments and Management Strategies The Boeing Company is headquartered in Chicago since 2001 and has four business segments: Commercial Airplanes, Missile Aircraft and Missile Systems, Space and Communication, and Phantom Works ("Boeing in Brief", 2012). For the present day, the company employs more than 170,000 people across the USA and in 70 other countries ("Boeing in Brief", 2012).

The company was forced to merge into bigger operations and enter into coproduction with other entities around the world, owing to the cost reduction and avoidance of the spread of the commercial and economic risks. Japan is the main country cooperater with the Boeing Company (Tung, 2001). Throughout its history, the company was challenged with the huge competition and some of the competitors latter became its alliances, such as McDonnell and Douglas, Rockwell International, and North American Aviation (Yenne, 2005). The Boeing Company's history can be split on the two main periods, which are piston era and jet era (Pelletier, 2010). During the war years, the Boeing Company focused on building military airplanes and was the first to introduce mail delivery by air (Pelletier, 2010). Following methods were used in the course of research: a) data collection, which helped to describe the major historical events, which shaped the company; b) analysis, which helped to explain negative and positive outcomes of the company's taken decisions; c) comparison, which helped to define the negative and positive sides of the results; d) evaluation, which helped to determine effective economic solutions to the existing problems.

Among the biggest technological and competition's challenges, which the Boeing Company faced, were its major losses in 1930s, 1990s and 2000s and

employees' strikes (Pelletier, 2010). In order to shorten production time and eliminate economical risks in building 787 the Boeing Company merged into outsourcing management (Norris & Wagner, 2009). However, after having been stood up by the foreign suppliers, the Boeing's employees had to fix received gaps in the constructional materials, which caused delivery delays and further losses (Norris & Wagner, 2009). Moreover, the company did not want to lay off the development and certification of the 787 program or any other aircraft productions that were currently implemented (Turim & Gates, 2009). Therefore, the following question should be answered on the grounds of chronological report: a) Do the financial benefits of outsourcing overweight the management risks that the company had already experienced? b) How can the company prevent and solve management problems? c) How should company respond to the criticisms of exporting American job overseas by outsourcing greater percentage of its work? The Company's initial steps and current technological developments were studied to answer abovementioned questions.

Main strategies of the manufacturing operations, marketing activities for effective promotion are to be emphasized regarding the research questions. From the First Single-Engine Airplane to the Greatest Numbers of Jets In 1916, a timber businessman William Edward Boeing together with a naval lieutenant Conrad G. Westervelt launched the Pacific Aero Company and built his first plane the B (Pelletier, 2010). In 1917, the company was renamed as the Boeing Airplane Company, and its starting capital was \$ 100,000. 998 of the 1000 shares belonged to Boeing (Pelletier, 2010).

Despite of the 28 hired people's efforts, B&W did not sale, which made Boeing use his personal fortune to pay the wages (Pelletier, 2010). But the European zone demand for the military, supporting equipment, the first Air Show of the Cs models, and contract with the Army to rebuild and modernize 354 British and Havilland DH-4S helped Boeing to avoid shutdown and sustained the company during early 1920s (Pelletier, 2010). Boeing was the first to get a contract with the US Postal Department to carry mail at a distance of 1, 918 miles, and this helped to create a new root between Chicago and San Francisco (Pelletier, 2010). Therefore, in 1928 was remarked by the creation of the Boeing Airplane & Transport Company, incorporating both the airplane manufacturing and commercial transport (Yenne, 2005). Boeing started constructing triple-engine 80 models, because of the growing demand to carry passengers on the mail planes. Front part of the fuselage was initially constructed from wood and could carry 450kg (Yenne, 2005).

The success of the Pratt & Whitney Wasps used in those 12 seated partly-metal, partly-wood biplane was a key point of the new group formation under the name of the United Aircraft and Transportation Corporation (UATC) in 1929 (Pelletier, 2010). Nevertheless of the biggest order in civil aviation at a total coast of \$ 4, 000, 000 to construct twin-engine monoplane for ten passengers, there came the first statistics of the airplane crushes (Pelletier, 2010). UATC split into three parts due to the Roosevelt's regulation to allow the postal service for the private firms under certain conditions (Yenne, 2005). Boeing was left with \$ 582, 000, from which the company had to pay salaries and other costs and make downsizing to 700 employees (Pelletier,

2010). Although Boeing had shortages and retired from the business, the company had built a total number of 1, 615 aircrafts, the number that was 300 more comparing to the previous year (Pelletier, 2010). Throughout the years of the World War II and Early Cold American War, the Boeing Company responded to the need for bombers and gained unique financial strength (Kinkerdall, 2007).

Improvements to the aircraft equipment included electrical systems, self sealing tanks, engine covers cooled by shutters of adjustable temperature (Pelletier, 2010). The production range was broadened with the manufacturing of the turbine models helicopters and diversified with experimental boats Aqua-Jet and Little Squirt in the early 1960s (Pelletier, 2010). The growth of the 700 family - the tailless, supersonic aircrafts, which were capable of flying at high subsonic speeds, came between 1970 and 1990 (Yenne, 2005). Meanwhile, the company introduced different shuttle designs implemented in the 90-meter-long craft fanjets and rocket engines, which composed boosters (Pelletier, 2010). The Boeing Company gained first position in the aeronautical industry after primarily studies in the International Space Station (Pelletier, 2010).

Therefore, the total turnover reached 75% (Yenne, 2005). The company became the Boeing Commercial Airplane Group in 1996 with the number of employees of 87, 000 people (Pelletier, 2010). Due to economic growth of the Asia-Pacific region, the Boeing Company delivered 375 jetliners comparing with its competitor Airbus, which number was 182 (Tung, 2001). Therefore, the Boeing Company invented the concept of the Sonic Cruiser, code-named " Glacier", which could fly with the 98% of the speed of sound
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to shorten travel times (Turner, 2011). From “ Glacier” to 7E7 and than 787 Program In 1991, United Airlines challenged the Boeing Company to come up with a transpacific aircraft with 600 or 700 seats (Norris & Wagner, 2009). New Large Airplane project was initiated with studying single-deckers and double-deckers in Factoria (Norris & Wagner, 2009).

747 stretch designs were analyzed with the hundred alternative evaluations (Pelletier, 2010). Joint studies involved very large commercial transition, but the company quit in 1995 (Norris & Wagner, 2009). During that year, the Boeing Company tried to combine 777 technology and 747 baselines into the project (Norris , 2009). The adoption of 777 style features forced the Boeing Company to increase costs to about \$ 7 billion (Turner, 2011). Lower-power engines were required as composite materials. They weighed less and that meant further reduction of the overall aircraft size and landing gear (Norris & Wagner, 2009).

Moreover, fuel consumption per passenger was 15-20% less than in conventional aircrafts of the same size (Pelletier, 2010). In 1996, Boeing was completing certification of the 737 family and planning to increase its production rates by twenty four airplanes in two years time (Norris & Wagner, 2009). But in 1997 company’s manufacturing melt down forced it to write the biggest charge in its history of \$ 2, 6 billion and downsize up to twelve employees by the end of the next year (Turner, 2011). However, the Boeing’s engineer Stuart Buchan encouraged internal systems’ suppliers to come with their own budget and twelve engineers of the Japanese Mitsubishi were included into the team (Norris & Wagner, 2009). A significant company’s change during that period of 1997 came with the merges of four <https://assignbuster.com/building-the-boeing-787-case-study/>

the most important aerospace companies to the Boeing Company, namely McDonnell, Douglas, North American Aviation, and Rockwell International (Yenne, 2005).

In February 2000, the Boeing Company was hit by strike, because negotiations with the Society of Professional Engineering Employees in Aerospace broke down (Norris & Wagner, 2009). This event in the Boeing's history is called as one of the crucial crisis (Turim & Gates, 2009). Therefore, company started the ninety-day study after the 787 program's presentation, which described structural organization on the theoretical benefits of composite wings (Yenne, 2005). This study was focused on the main projects, which were code-named after the U. S.

national parks: a) Project Yellowstone, which described the possibilities of the 85% speed of flight close to the speed of sound; b) High-speed design Glacier and c) Blended-wing body design inherited with the McDonnell merger - Project Redwood (Norris & Wagner, 2009). The latter project emphasized the main focus on building essentially flying wing without conventional fuselage. It was shut down because of the lack of financing (Yenne, 2005). The \$ 4 billion plan for the project " Glacier" included the design and construction of a larger wing with 7% more area and 8% bigger span (Norris & Wagner, 2009). " Glacier" project was filled for application on January 2001 and accompanied sketch of the aircraft's description contained detailed information of the type of wings and level of the cruise speeds (Norris & Wagner, 2009). The project became known as the " Sonic Cruiser" (Yenne, 2005).

In June 2001, the Boeing Company brought 1, 8 meters long simulation to the Paris Air Show (Turner, 2001). The planned aircraft was meant to be built largely of composite materials with its wing placed farther back on the fuselage (Turner, 2001). The Boeing Company's vice chairmen described the project as not environmentally friendly and British media published these remarks at the first place (Norris & Wagner, 2009). Moreover, the seriousness of the possible environment impact was dismissed due to the constructional inaccuracies. However, Japan Aircraft Industries rejected an offer from Airbus and joined the Boeing Company on a deal of the centered composite technology approach (Norris & Wagner, 2009).

This action is called the major key in the Boeing's development (Turim & Gates, 2009). The future of commercial aviation radically changed on September 11, 2001. In December 2002, after major delays in production and its reduction to 50%, the Boeing Commercial Airlines' then president and CEO Alan Mulally announced that company stopped building Sonic Cruiser (Turner, 2011). Tough business environment dedicated the rules, and Boeing stated that it losses comprised \$ 10 billion and 20% drop of revenue (Norris & Wagner, 2009). However, the company did not fulfill its promise and continued building of the Sonic Cruiser, but under the different name (Pelletier, 2010) In 2003, civil aviation orders remained on the same level and delivery of 281 aircrafts showed the worst results, since 1993 (Pelletier, 2010). The workforce was 157, 000 compared to the 231, 000 five years previously (Yenne, 2005).

However, as the 2003 began Boeing changed the Super Efficient designation of 7E7, two initial versions of which were focused on the finalist's heritage of <https://assignbuster.com/building-the-boeing-787-case-study/>

the Sonic Cruiser (Norris & Wagner, 2009). 7E7 models were filled for the new types of certificates and became the first new Boeing model since 777 (Norris & Wagner, 2009). Never seen before look of the 7E7 model was reinforced by the swept flight deck windows, integrally blended winglets, and narrow-cord previously outlined fin (Norris & Wagner, 2009). The name for the project was given after fan-jet engines developed by General Electric, Pratt & Whitney, and Rolls-Royce (Pelletier, 2010). On December 2003, the board gave “ go-ahead” for the plane (Yenne, 2005).

And after the first order, 50 planes came in April 2004 from All Nippon Airways (ANA), the plane received the name: the 787 Dreamliner (Pelletier, 2010). The design for the 787 turned to be highly complex due to the widespread use of the composite materials (50% of the total weight) and 3D digital model accessibility by the sub-contractors involved in the program (Pelletier, 2010). On April 2005, the Boeing Company announced that it has 237 options and firm orders (Yenne, 2005). The same time the Boeing Company won orders from Air Canada and Air India (Turim & Gates, 2009). Only vertical fin was manufactured by the Puget Sound near Tacoma, while pre-installing of all wiring and deducting were required from the Boeing’s partners (Turim & Gates, 2009).

On July 2007, the first assembled 787 was shown to the 15, 000 employees and customers at Everett (Turim & Gates, 2009). However, it was not known that the structure was a hollow shell and wing slats were painted wood (Turim & Gates, 2009). In 2008, the Boeing’s employees went on strike, because of the encountered errors in the aircraft sections delivered by the different suppliers (Pelletier, 2010). No-strike agreement was negotiated <https://assignbuster.com/building-the-boeing-787-case-study/>

between the Boeing Company and the Mechanics Union, ensuring that a second 787 final-assembly line will go to Everett instead of Charleston (Gates, 2009). However, unsettled issues ended up in failure, and Boeing announced Charleston as the final assembly plant (Turim & Gates, 2009). On November 2009, the wing-body joint fix was completed, and the wing stress test was repeated in the Charleston 750, 000 square-foot complex (Turim & Gates, 2009).

The airplane was given the green light to fly (Turim & Gates, 2009). Total of six planes were included into the flight-test program to obtain certificate (“Building the Dream: Boeing 787”). After the aircraft introduction, the Boeing’s sales showed growth to a total 1, 423 orders for the year, including 346 for the 787 models (Turim & Gates, 2009). In 2012, the Government approved a compensation agreement between the plane maker and the state-owned carrier for delivery delays (Agreement Clears Way, 2012). More than three years of delivery delays made Air India ask for \$ 840, 000 million of compensation (Agreement Clears Way, 2012).

Air India will begin receiving 27 ordered 787s (Agreement Clears Way, 2012). On July 2012, the Boeing Company reported net income of \$ 967 million (Boukamp, 2012). Revenue jumped to 21% and reached \$ 20 billion comparing with the \$ 16, 54 billion a year ago (Boukamp, 2012). All those incomes are the results of the effective implementation of the marketing activities and management concepts. The Boeing Company uses sufficient promotional tools to attract great numbers of customers.

Air Shows and Boeing Integration Centers as the Best Promotion Steps 15, 000 of aerospace enthusiasts are engaged in a production launch and millions - in a public air shows, promoted by the Boeing Company (Calder, 2012). The Company elaborates immersive simulations for pilot training and 3D complexes as a part of advanced manufacturing to develop the pre-air show environments (Calder, 2012). Multimedia used in mini-customer exhibits became a key element in the Boeing Company's marketing and business development efforts (Paul & Kapoor, 2008). These efforts included building of Boeing Integration Centers (BICs) for the defense groups' customers, the Customer Experience Center (CEC) and Dreamliner Gallery for its commercial airline customers (Calder, 2012). When military orders reached 97% of the company's production, it integrated system-to-system approach of battle planning exhibits to demonstrate the network of enabled operations through the created space (Calder, 2012).

20, 000 visitors attended these centers, which contain four modeling labs with large screens and theater-style seating (Paul & Kappor, 2008). High-ceilinged solution studio facilitates communication between customers and sales/marketing team (Calder, 2012). Aircraft's simulated models with the flat screens behind them are reinforced by the maps, which display all of the customer's daily flight in action (Calder, 2012). Design marketing campaigns, corporate identity programs, and promotional materials are developed by the Airline Marketing Service Group and Commercial Airplanes (Gunter, 2005). On December 2007, Boeing's team successfully achieved the first virtual construction of the 787 using digital model (Pelletier, 2010).

This virtual assembly permitted engineers to distinguish 5000 odd-elements from the different sub-contractors, which corrected when the real aircraft will be built (Pelletier, 2010). Boeing magazine “ Frontier” provides the latest information of the Boeing company projects, as well as historical outlines of its business (Pelletier, 2010). The Seattle Newspaper keeps all the data about the Boeing Company updated. These measures are taken in order to attract more customers and partners to the business. However, the Boeing Company’s total concentration on the promotional and management steps have brought negative results on its reputation and financing (Norris & Wagner, 2009). The Boeing Company’s Manufacturing Operations Principal activities are carried out by business groups - Commercial Airplanes and Integrated Defense Systems (Yenne, 2005).

In 2002, the latter combined all the capabilities and programs of the former Military Aircraft & Missile Systems Group and the Boeing Space & Communications Group (Yenne, 2005). Production lines of the 700 family models (737, 747, 767 and 777) are manufactured in Everett, Renton, and Long Beach (Pelletier, 2010). Part of the Boeing Company, known as Boeing Aerospace Support, performs the actions, which are bound to reduce life-cycle costs and increase the effectiveness of the aircraft, namely: aircraft maintenance, modification and repair, training for aircrews, and maintenance staff (Evans, 2008). “ AS People System” is highly structured process, which ensures that employees, who comprise supporting teams, understand priorities and expectations, and have training, knowledge, and tools to perform their job (Evans, 2008). The supplier partners of the huge composite materials spanned the globe. The Boeing Company assigned to 3

Japanese firms, which are Mitsubishi Heavy Industries, Kawasaki Heavy Industries, and Fuji Heavy, 35% of the design and manufacturing for the latest project 787 Dreamliner (Carbaugh, 2011).

Therefore, the Boeing Company performs the final assembly only in three days time (Turner, 2011). Japanese companies in return to the contract with the Boeing company secure a virtual monopoly in jetliners sale to Japan (Carbaugh, 2011). Companies, which provide Boeing's work outsourcing, are responsible for the following manufacturing of the aircraft sections. See table below: Table 1. Countries, from which Boeing outsources its work (Carbaugh, 2011).

Therefore, abovementioned table shows that only 20% of the work is being done by the Boeing Company (Pelletier, 2010). But it is quite true to state that the company runs into additional responsibility for the suppliers' actions and possible delays. Chronological comparison helped to determine that the risks the company undertakes are far greater than the benefits of outsourcing (Norris & Wagner, 2009). Comparison between Boeing's Benefits and Risks of Outsourcing The Boeing's work outsourcing has brought the following initial benefits to the company: a) cost savings, because foreign suppliers decrease the time required to build the Boeing's jets by more than 50%. The company was never under obligation to repay its vendors - whether the outcome of the program (Turner, 2011); b) implementation of wide initiatives, since the Boeing company has military production activities and other 700 family lines (Norris & Wagner, 2009); c) better access to the new methodology and technology, because the company is fully focused on the marketing operations and uses high-quality multimedia assets to

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promote its products and services (Calder, 2012). However, the company faced the following risks due to its commitment to outsourcing management:

a) loss of control, which caused the company to schedule unnecessary negotiations about the place of the following assembly implementation (Fetters-Walp, 2010); b) difficulty in bringing business together, since three thousand employees faced the challenges of fixing inaccuracies, which were failed to be done by the foreign suppliers (Turim & Gates, 2009); c) additional liability was endangered owing to the suppliers' delivery delays when 47 customers worldwide have ordered 683 airplanes at the cost of \$ 110, 000 billion (Bair, 2007).

Negative outcomes caused the employee's strikes during the most critical crisis after September the 11th and at the most important period in 2008 just before long-expected certification of the 787 line (Turim & Gates, 2009).

Moreover, the company's liability for Air India for more than three years of delivery imposed compensation approval by the Government (Agreement Clears Way, 2012). Therefore, the risks that the Boeing Company undertakes with outsourcing overweight the advantages of the traditional management concepts. Measures to Prevent and Solve the Boeing Company's

Management and Financial Problems The Boeing Company developed the traditional supply chain, where more than two parties are linked by the flow of manufactured products (Carbaugh, 2011). Due to outsourcing the U. S.

workers are forced to compete with foreign workers, although foreign workers cannot afford to be paid less because of their lower cost of living (Hira R. & Hira A., 2008). Outsourcing was the main cause for the Boeing Company's highest charge in the history of \$ 2, 6 billion after the twelve

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thousand of the skilled employees were downsized (Norris & Wagner, 2009). Due to this traditional prospective the company encountered particular problem areas emphasized by the management indicators and which should be mitigated in the following order.

See the Table 2 below. Table 2. Problems, which occur in the Boeing's and suppliers' chain reactions and measures to prevent them (Carbaugh, 2011). Abovementioned measures can improve the Boeing Company's financial and economic conditions, because they are sufficiently integrated and reproduce manufacturing circle inside their operations particularities. To address outsourcing criticism, the Boeing Company can impose contract termination on the supplier's service quality failure; increase the incentives for greater service quality; increase the share for financial risks (Hira R. & Hira A., 2008). Moreover, improving of the productivity should be a part of cost reduction program and the contract should include conditional sections for the better measuring results (Hira R. & Hira A., 2008). Fundamental Points in the Boeing Company's Development For over the century of its existence, the Boeing Company has grown into a major airline corporation, which provides aircrafts' manufacturing and commercial transportation.

It was the first company to gain the priority of delivering mail by air, as well as the leader of the military jets' production. Moreover, it gained the first position owing to the primary studies in the Aerospace Industry.

Technologies development and market demand challenged the company to use multimedia tools in the simulated training labs and galleries, which perspective was to reinforce the effectiveness of the public air shows. The

Boeing Company launched the 787 project under the code name “ Glacier” in order to meet demand of the Asia-Pacific’s region growth. To overrun Airbus in their long-lasting competition the Boeing Company went into outsourcing management. This action was taken due to the merges of the most important aerospace companies into the Boeing Corporation.

The 787 program was designated to provide the possibility for the aircraft to fly as far as 8, 500 miles without refueling. These conditions were possible if the aircraft’s weight could be reduced on 20% by equipment of the composite materials. Integration of 747, 737 and 777 sketch designs in the 787’s construction required funds increasing on 7%. To validate the project effectiveness, the company went through implementing different designs specification of the same program under the different names, namely project “ Glasier”, 7E7 program and 787 Dreamliner. In the course of 787 Dreamliner creation, the Boeing Company faced critical crisis of employees’ strikes and budget melt downs.

Moreover, outsourcing management caused financial and economic hazards for the company, such as delivery delays to the potential customers due to the manufacturing inaccuracies, which had to be fixed in the shortest periods. In order to address its outsourcing problems the company should make amendments into the manufacturing process. Additional financial responsibility should be imposed on the vendors in order to eliminate the effects of the financial and economic risks.