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Boeing Co. Analysis

Introduction:

Boeing, one of the world's largest aerospace companies, has a storied history that spans over a century, marked by significant achievements, challenges, and transformations. Founded in 1916 by William Boeing as Pacific Aero Products Co., Boeing initially focused on producing seaplanes. The company's first major success came with the Model C, which the U.S. Navy used for training during World War I. This early military contract set the tone for Boeing's long-standing relationship with the U.S. government and military, a key aspect of its business model. The 1920s and 1930s saw Boeing diversify into a broader range of aircraft, including the innovative Boeing 247, which revolutionized air travel in the 1930s. During World War II, Boeing's production scaled dramatically, most notably with the B-17 and B-29 bombers, which played crucial roles in the war effort.

Post-World War II, Boeing shifted its focus to commercial aviation, leading to the development of the iconic 707 jetliner in the 1950s. This marked a pivotal moment in Boeing's history, as the 707 ushered in the jet age of commercial flight, significantly reducing travel time and changing global travel dynamics. The success of the 707 was followed by other legendary models like the 737, the world's best-selling jetliner, and the 747 "Jumbo Jet," which became symbols of Boeing's dominance in commercial aviation. However, Boeing's journey has not been without challenges. The 1970s and 1980s brought financial struggles due to the high costs of developing new aircraft and competition from Airbus, which emerged as a formidable rival. This competition intensified over the decades, influencing Boeing's strategic decisions, including

mergers and acquisitions, notably the merger with McDonnell Douglas in 1997. The 21st century saw Boeing facing new challenges, including the 2008 financial crisis, which impacted air travel demand, and the grounding of the 737 MAX in 2019 due to safety issues, leading to significant financial and reputational damage. Despite these setbacks, Boeing has remained a key player in aerospace, continuously innovating and adapting to the evolving landscape of aviation and aerospace technology. Boeing is headquartered in Arlington Virginia with facilities and employees all over the world. The company employs more than 14,000 people around the world.

In this paper, we will discuss the company's impact in the aviation, aerospace, and defense industries. We will also discuss Boeing's current state in the economy and how powerful they are in their industries. We will also look at Boeing's diverse portfolio of products and services examining its contributions to both the public sector, private sector and corporate sector. We will also look at its present economic impact and its future outlooks.

Mission Statement:

Boeing's Mission Statement is "to connect, protect, explore, and inspire the world through aerospace innovation." Their goal is to create meaningful aviation products that can be used by the government, the public, and corporations around the world. Boeing's goal is to be the world's premier aerospace and defense company. The company strives to create innovative products and services that meet the evolving needs of its customers. Boeing is dedicated to advanced technology, sustainability and efficiency in all of its industries aiming to connect, protect, and to explore the world and space. The company also strives to be a diverse company and to be considered not an American company, but a multinational company with a diverse employee base and clients.

Firm Structure and Products:

Boeing's last restructuring happened at the end of FY2016. Boeing decided to separate into four divisions. These divisions specialize in different types of products and services that are directed to different types of clients. The subdivisions are: Boeing Commercial Airplanes (BCA), Boeing Defense, Space & Security (BDS), Boeing Global Services, and Boeing Capital.

Boeing Commercial Airplanes(BCA) specializes in the design and manufacture of commercial aircrafts. BCA also provides product-related services such as maintenance and training to their international customers. BCA's division headquarters is located in Renton, Washington and has multiple facilities used to manufacture commercial plans around the world. Below is shown current products, total order amount and price under BCA.

Boeing Commercial Planes

Aircraft	Total order amount	Price (million)
737-700	7124	89.1
737 MAX	4821	99.7
747-8	155	121.6
767	1346	217.9

777	2100	410.2
777x	334	426
787	1490	239
Boeing business jets	Around 1300	71

Boeing Defense Space and Security(BDS) is the division responsible for all of Boeing's defense and space products and services. BDS is considered as a consolidated group in which oversees companies that Boeing has acquired and products that were made from Boeing. Some of these companies include; Boeing Military Airplane Company, Hughes Satellite Systems, and Boeing Helicopters. BDS's objective is to be the main provider of aviation products and services to the United States and their allies and also be a leader in Space exploration.

Boeing Defense, Space and Security has over 100 different types of products and services. They serve multiple companies and countries around the world who use Boeing as a main provider for certain products. BDS categorizes their products into 15 different categories. The categories and number of products in each category are listed below. Data on BDS is very limited as most of the clients are state governments who require privacy.

Boeing Defense, Space and Security

Category	Number of products in category
Bomber aircraft	20
Rotorcraft	12
Fighter and attack aircraft	19
Experimental aircraft	3
Tankers and transport aircraft	16
Trainer aircraft	6
Electronic warfare, surveillance and other military variants	12
Utility aircraft	2
Unmanned aerial vehicles	19

Missiles	14
Space launch and spacecraft	12
Spaceplanes	3
Satellites	9
Space probes	4

Boeing Global Services(BGS) is the division of Boeing specializing in aviation services. Boeing Global Service main objective is to provide aftermarket support to the customers of Boeing Commercial Airplanes, Boeing Defense Space and Security and other manufacturers. This would include maintenance, custom design and provide technological modifications and solutions in which the client desires. Unlike BDS and BCA, this division is a serviced based organization. Below is shown 5 main categories in which BGS is separated into. In these categories, there are multiple services that fit a common objective.

Boeing Global Services

Categories	Specialized services	Summary
Aviation Business Solutions	<ol style="list-style-type: none">1. Aviation Operations Consulting2. IT and Cybersecurity Consulting3. maintenance and Engineering Consulting4. Military Aviation Consulting	Aviation Business solutions provides strategic consulting to various business providing way to improve cost management, reliability, and operational efficiency for businesses in industries that Boeing is a part of
Flight Operations	<ol style="list-style-type: none">1. Airspace Optimization2. Crew Management Solutions3. Data Solutions4. Developer Tools5. Flight Data Analytics6. Flight Efficiency and Sustainability7. flight Planning and	Flight operation is a department specializing in data driven solutions that helps all phases of the aviation operation.

	<p>Dispatch</p> <p>8. Navigation Solutions</p> <p>9. Network Operations Management</p>	
Maintenance and Engineering	<p>1. Technical Data Services</p> <p>2. Technical and Engineering Services</p> <p>3. Maintenance Optimization</p> <p>4. Modifications</p> <p>5. Transition Services</p>	<p>This department helps clients of Boeing with their maintenance and Engineering problems. This department also helps improve efficiency, performance and profitability.</p>
Parts and Distribution Services	<p>1.Parts, Kits, and Packages</p> <p>2. Managed Part and Repair Programs</p> <p>3.Repair Services</p> <p>4.Emergent Services (AOG)</p> <p>5.Shop Online</p> <p>6.Distribution Services</p>	<p>Boeing has the largest inventory of aviation products in the world which do include various parts.</p> <p>This department helps Boeing find ways to provide materials to their clients.</p>

Training Solutions	<ol style="list-style-type: none"> 1. Flight Training 2. Maintenance Training 3. Specialty Training and Services 4. Simulator Hardware and Data Packages 	<p>Boeing has multiple certified aviation professionals that are able to help train commercial/military pilots.</p> <p>This department also helps create simulation packages to help commercial pilots get certified.</p>

Boeing Capital is the division that helps its customers with their financial needs. Boeing recognizes that products and services under BCA, BDS and BGS are very expensive and will require a financial commitment. Boeing created this division in order to provide comprehensive financial support throughout their journey with Boeing. Boeing Capital comprises two segments: Aircraft Financial Services and Space & Defense Financial Services. Aircraft Financial Services provides financial solutions and leasing opportunities for commercial aircrafts and specializes in private airlines around the world. Space & Defense Financial Services provides leasing and lending services to mostly governmental clients and military organizations.

Revenue, Cost and Profit:

Boeing Revenue by Segment (All figures in millions of U.S. Dollar)

	DEC '22	DEC '21	DEC '20	DEC '19	DEC '18	DEC '17	DEC '16	DEC '15	DEC '14	DEC '13
	365 Days	365 Days	366 Days	365 Days	365 Days	365 Days	366 Days	365 Days	365 Days	365 Days
Total	66,83 9	62,63 3	58,22 3	77,19 4	101,2 02	92,73 2	94,86 5	96,84 9	91,28 7	86,68 8
Commercial Airplanes	25,86 7	19,49 3	16,16 2	32,25 5	60,71 5	56,72 9	65,06 9	66,04 8	59,99 0	52,98 1
Defense, Space & Security	23,16 2	26,54 0	26,25 7	26,22 7	23,19 5	21,05 7	-	-	-	-
Global Services	17,61 1	16,32 8	15,54 3	18,46 8	17,01 8	14,63 9	-	-	-	-
Boeing Capital	199	272	261	244	274	307	298	413	416	408
Historical Segments	-	-	-	-	-	-	29,49 8	30,38 8	30,88 1	33,29 9
Boeing Military Aircraft	-	-	-	-	-	-	12,51 5	13,48 2	13,51 1	15,93 6
Global Services & Support	-	-	-	-	-	-	9,937	9,155	9,367	8,749
Network & Space	-	-	-	-	-	-	7,046	7,751	8,003	8,512

Systems										
Other	-	-	-	-	-	-	-	-	-	102

Table above shows Boeing total Revenue by financial year and revenue by division. It should be noted that a restructuring happened in FY2017 where BDS and BGS were created. In FY 2022, 38.7% of revenue came from BCA, 34.7% of revenue came from BDS, 26.3% of revenue came from BGS and 2.98% came from Boeing Capital. This shows that Boeing's most popular products are its commercial airplanes. From 2013-2018, Boeing fulfilled multiple international orders from multiple airlines. Covid-19 did affect BCA negatively by decreasing its demand and production rate, but BCA is currently in talks with its clients and is receiving multiple contracts in order to get to its goal of sustaining 50 billion dollars in revenue yearly.

Boeing Co. Income Statement(All figures in millions of U.S. Dollar)

		31 DE C'2 1	31 DE C'2 0	31 DE C'1 9	31 DE C'1 8	31 DE C'1 7	31 DE C'1 6	31 DE C'1 5	31 DE C'1 4	
Total revenues	<u>66,608</u>	<u>86</u>	<u>58</u>	<u>59</u>	<u>127</u>	<u>05</u>	<u>96</u>	<u>14</u>	<u>62</u>	<u>86,623</u>
Sales of products	<u>55,893</u>	<u>86</u>	<u>42</u>	<u>94</u>	<u>29</u>	<u>40</u>	<u>98</u>	<u>55</u>	<u>88</u>	<u>76,792</u>
Sales of services	<u>10,715</u>	<u>00</u>	<u>16</u>	<u>65</u>	<u>98</u>	<u>65</u>	<u>98</u>	<u>59</u>	<u>74</u>	<u>9,831</u>
Total costs and expenses	<u>-63,106</u>	<u>-59,</u>	<u>-63,</u>	<u>-72,</u>	<u>-81,</u>	<u>-76,</u>	<u>-79,</u>	<u>-82,</u>	<u>-76,</u>	<u>-73,268</u>

		<u>269</u>	<u>843</u>	<u>093</u>	<u>490</u>	<u>612</u>	<u>026</u>	<u>088</u>	<u>752</u>	
Boeing Capital interest expense	<u>-28</u>	<u>-32</u>	<u>-43</u>	<u>-62</u>	<u>-69</u>	<u>-70</u>	<u>-59</u>	<u>-64</u>	<u>-69</u>	<u>-75</u>
Cost of products	<u>-53,969</u>	<u>49</u> <u>954</u>	<u>-54</u> <u>568</u>	<u>-62</u> <u>877</u>	<u>-72</u> <u>922</u>	<u>-68</u> <u>879</u>	<u>-71</u> <u>013</u>	<u>-73</u> <u>446</u>	<u>-68</u> <u>551</u>	<u>-65,640</u>
Cost of services	<u>-9,109</u>	<u>-9,2</u> <u>83</u>	<u>-9,2</u> <u>32</u>	<u>-9,1</u> <u>54</u>	<u>-8,4</u> <u>99</u>	<u>-7,6</u> <u>63</u>	<u>-7,9</u> <u>54</u>	<u>-8,5</u> <u>78</u>	<u>-8,1</u> <u>32</u>	<u>-7,553</u>
Gross profit	<u>3,502</u>	<u>3,01</u> <u>7</u>	<u>-5,6</u> <u>85</u>	<u>4,46</u> <u>6</u>	<u>19,6</u> <u>37</u>	<u>17,3</u> <u>93</u>	<u>14,4</u> <u>70</u>	<u>14,0</u> <u>26</u>	<u>14,0</u> <u>10</u>	<u>13,355</u>

Shown above is the summarized income statement of Being Co. calculated in each financial year. From this income statement, we can observe that Boeing revenue steadily increases every year. In FY2022, the company generated revenue of US\$66,608 million where in 2021 it was US\$62,286 million. This is an annual growth rate of 6.49%. We can also observe that from FY2018 to FY2020, revenue dipped almost 42.5% due to how Fortunately, Boeing was able to pivot to other services during that period and today Boeing is receiving a multitude of orders from their diverse set of clients. This enhanced financial performance has elevated confidence in this company's investors which is helping Boeing to pursue its expansion plans.

This table also shows total cost and expenses. The table also separates it from the cost of products and services. According to Boeing, cost of service and products comes from its production rates, meaning they spent this money on supplies and labor. Currently the most volatile cost is its interest expense caused by the backlog.

Although Boeing's revenue increased in FY2022 over that in the last fiscal, its profitability unfortunately declined. Declined profitability is due to a number of reasons which will be discussed later. The declining profitability diminishes the company's capacity in order to

provide higher returns to its shareholders. The company reported a gross profit of US\$3,502 while its revenue was US\$66,608 million. This makes the profit margin of FY 2022 about 5.26%. Before covid, in FY20218, the profit margin was 19.418%. According to Boeing's business reports, this was caused by the lack of efficiency in cost management and the increase of supplies caused by the pandemic.

Subcontractors and Suppliers:

Boeing receives its material for its products from various subcontractors and suppliers. These companies manufacture raw material, components, sub-assemblies, and commodities Boeing uses in their products and services. The company relies heavily on their suppliers and/or subcontractors for their products/services in order to meet their own commitments to their customers. For example, Dynamatic Technologies is Boeing's supplier for their BDS department. This company is Boeing sole provider for Power and Mission Cabinets used in Boeing's P 8 Poseidon Maritime reconnaissance aircraft. If companies like dynamatic technologies experience delivery delays or other problems, then it also affects Boeing's manufacturing schedule which might affect their bottom line. This is one of the reasons why Boeing profit margin is less than 10% because it costs Boeing money every day it delays their manufacturing process. At its current production rates, Boeing has a seven-year backlog with its current production rate as countries such as the United States, United Arab Emirates and China are boarding more planes at the mass. As of November 19, 2023, Boeing backlog is 5,239 planes

Market Share:

Boeing Co. is a large company and is involved in many industries. The company is considered a leader in the products that they invest heavily in product lines like commercial

planes and military aircrafts.

As mentioned, Its commercial aviation market is Boeing's most popular product line. According to forbes, Boeing acquires around 64% of this market with Airbus closing in at around 20%. Yahoo finance reports that five companies, namely Airbus SE, ATR, Embraer, The Boeing Company, and United Aircraft Corporation account for 90.62% with small companies with companies such as Mitsubishi Aircraft Corporation (MAC) and Aviastar-SP taking up the last 9.38%.

Boeing Co. is also a leader in the military aircraft market and the defense industry. Boeing strives to be a leader in this department as well. Forbes reports that Boeing accounts for around 30% of the defense industry. Boeing dominates the US market with multiple defense contracts from the US government. Boeing also holds contracts from allies of the United States such as India, Taiwan, and Japan. The biggest competitors in the defense industry include Airbus, Lockheed Martin and Raytheon technologies.

Overall Boeing Co. is considered One of the key players in the aviation market, almost reaching 50% in the aircraft market. This causes Boeing Co. to be a leading firm in an Oligopoly market. The three different industries in which Boeing dominates have a small number of firms as it is very hard and expensive to enter the aviation market. Forbes considers Boeing to be a top ten company in all of its product line.

Competition:

The aircraft market and airline industry is considered one of the most competitive markets in the world. This is because this is a market which has members from every developed country and takes a lot of money to get in. Boeing faces international competitors who wish to take over their market share. According to economists who studied Boeing Co., they would

group Boeing's competitors into 3 different groups. They are Commercial Aircraft manufacturers, Defense contractors, Space manufacturing and exploration companies.

Boeing has 4 main competitors in the commercial aircraft industry. They are Airbus, Comac, Embraer and Bombardier Aerospace who all have a prominent position in the industry. All 4 of these companies are headquartered in different countries and are the main company in their home country. Embraer, for example are headquartered in Brazil and own the majority of market share of Brazil and South America

BDS also faces competition from all market segments, especially large companies that specialize in the defense industry such as Lockheed Martin, Northrop Grumman, Raytheon Technologies Corporation, SpaceX and General Dynamics. Note. All of these companies are American companies which control the majority of the defense industry, but there are other non-US companies such as BAE systems and Airbus Group which have a preeminent position in the industry.

Boeing recently started investing into space aviation products and does have few competitors in this space. SpaceX, Blue Origin, Roscosmos, and United Launch Alliance are some of the biggest names in the Space industry. Boeing manufactures multiple products for NASA and hopes to receive the majority of NASA contracts in the future. Currently SpaceX and Blue Origin hold most contracts from NASA.

Geographic Diversification

Boeing strives to become the premier international aviation company and to reach a global audience. The company has a geographic presence in more than 65 countries across the world. The company has both clients in 150 countries across Europe, the Americas, Africa, the Middle East and Asia-Pacific. In FY 2021, The United States where Boeing is currently in

accounts for 62.8% of its company revenue followed by Europe (14.4%), the Middle East (7.5%), Asia (9.4%), Canada (1.6%), Oceania (1.8%); and Latin America, Caribbean and Other (2.2%) and Africa (0.4%). This diversified presence and revenue streams safeguards its overreliance on any single market which mitigates business risks in the volatile industry. This diversification also allows Boeing to capitalize on opportunities across diverse markets and truly be an international company.

Revenue by Region

Sales in millions										
	DEC '13	DEC '14	DEC '15	DEC '16	DEC '17	DEC '18	DEC '19	DEC '20	DEC '21	DEC '22
	365 Days	365 Days	365 Days	366 Days	365 Days	365 Days	365 Days	366 Days	365 Days	365 Days
Total	86,623	90,762	96,114	94,571	93,392	101,127	76,559	58,158	62,286	66,608
United States	37,592	37,842	39,287	38,765	42,331	44,676	42,681	36,979	39,076	39,218
Asia	-	-	-	-	-	-	-	-	5,845	8,393
Europe	10,622	11,898	12,248	13,790	11,457	12,976	10,366	7,961	8,967	7,916
Middle East	9,165	9,243	10,846	13,297	12,287	9,745	9,272	5,308	4,653	5,047
Latin America, Caribbean & Other	2,725	2,596	1,875	1,936	1,494	1,458	1,015	229	1,376	2,412
Canada	1,486	1,901	1,870	2,076	2,197	2,583	2,019	1,302	969	1,612

Oceania	1,657	1,757	2,601	1,843	2,061	2,298	2,006	832	1,147	1,576
Africa	621	2,596	1,398	1,999	755	1,486	1,113	114	239	418

Shown above is Boeing's revenue split into different continents/countries. We can see that the United States and its companies are currently Boeing's main client. We can also observe that Boeing does have revenue streams from different continents and countries such as Europe in the Middle East. Main clients from Europe include British Airways and the EU's military. Main clients from the Middle East include Etihad, Emirates and Qatar airways.

In February 2022, Boeing secured a contract worth US\$99.8 million from the Air Force Life Cycle Management Center at Tinker Air Force Base, Oklahoma. This contract shows how Boeing is dominant in the US market. The table shows that the majority of Boeing's revenue does come from the US market. In fact in FY2022, it was 58.9% of its total. This is because America is a very developed country that uses aviation products for a variety of reasons. Its air force is considered the best in the world, NASA is considered the best space program, and at any given day, there are 2.5 million passengers traveling across America by plane.

The company stands to gain from the expansion of the global airline industry. According to Boeing's project, the total aircraft market, which includes both passenger and freighter aircrafts in anticipated to reach US\$5.6 trillion by 2024. Predictions indicate that there will be a 5% annual growth in passenger traffic and a 4.7% growth in cargo traffic. The company also predicts a demand for 38,050 new airplanes by 2032. The Asia-Pacific region is expected to constitute 40% of the new aircraft market with Europe and North America accounting for 20% each in the new market. The remaining 20% is spread across regions such as the Middle East, Latin America, the Commonwealth of Independent States, and Africa.

Research and Development Capabilities:

Boeing makes it a priority to innovate and improve existing products and services and to design/develop new products. Currently Boeing spends more than 2 billion dollars on research and development(R&D) activities which accounts for around 4% of its company revenue. Its strong focus on R&D supports the need to develop new products and systems in order to have a competitive advantage. In the past years its R&D department has helped its products become one of the most efficient aircrafts in the world and also the most comfortable to use. Its current focus is to improve its military aircrafts, weapons systems, missile systems, satellite, space exploration vehicles and intelligence systems. Notably, Boeing is actively investing in the development of commercial aircrafts exemplified by the 787-10, 737 MAX and 777x aircrafts. Concurrently Boeign is ramping up production of the 737 and 787 series that is positioned the company to meet the escaping demand for both passenger and cargo aircrafts. Below shows Boeing R&D expenses compared to their main competitors.

R&D expenses (US\$ millions)

Company Name	2022	2021	2020
The Boeing Co	63,106	59,269	63,843
Airbus SE	56,888	56,189	57,806
BAE Systems Plc	23,750	24,406	22,684
General Dynamics Corp	2,411	2,245	2,192
Raytheon Technologies Corp	61,780	59,853	56,178
Lockheed Martin Corp	57,697	57,983	56,744
Northrop Grumman Corp	33,001	31,996	32,734

Future Plans:

1. Increase in UAVs.

Unfortunately, the world is witnessing a rise in conflicts and warfare. This contributes to the demand for UAVs(unmanned aerial vehicles) and multiple aircrafts globally. According to Boeing's in-house research, the global military UAV market is expected to reach US 17.4 billion by 2030 which is also projected to dominate the market with a share of 39.4% by 2030. Boeing currently manufactures popular UAVs such as the MQ-25, QF-16 and Insitu's Scan Eagle aircraft used by various government agencies.

2. Increase in cybersecurity in the aviation industry

Boeing currently provides cybersecurity products and services ensuring the needs of its international customers. The growth of big data in the industries Boeing is a part of grows the need for cybersecurity services due to the increase of hacking and threats of terrorist attacks. Boeing's clients also need to increase its priority in securing its maritime and offshore installations necessitating investments in cybersecurity globally. The cybersecurity market is expected to reach US\$48,815 million by 2030.

Conclusion:

Overall we have shown why Boeing is considered a revolutionary corporation and leader in their field. Boeing has demonstrated in the last 100 years its commitment to innovation and cutting-edge technology. As the 54th biggest business, according to Forbes, the company has proven to be a trailblazer in aviation technology, Boeing continues to set industry standards, leaving a lasting impression on developments that not only sculpt its own success, but leave a lasting impact on the broader landscape of aerospace and defense.

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