MBAD 822 – Marketing Management

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GROUP ASSIGNMENT 2

BOEING 747-8

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Submission date: 7 September 2019

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EXECUTIVE SUMMARY

The legacy of the Boeing 747 stretches more than 50 years and 1500 aircraft, with the 747-8 being the fourth and latest addition to the family. The 747-8 boasts an elongated fuselage, redesigned wings, more powerful engines, improved efficiency, and reduced emissions when compared to its predecessors (Ostrower, 2011). The 747-8 is offered in two versions, *viz.* the 747-8 Intercontinental (747-8I) for long-distance passenger transport and the 747-8 Freighter (747-8F) for long-distance cargo hauling (Boeing, 2019). According to Modern Airliners (2019), the Boeing 747-8 borrows many of its features from the Boeing 777 and the 787 Dreamliner, including engines and flight deck, which improves serviceability, reduces costs, and provides flexibility.

The Boeing 747-8 Intercontinental and 747-8 Freighter are the results of more than 40 years of experience in the jumbo airplane business and are affectionately referred to as the Queen of the Skies. The only other aircraft that trumps the 747's passenger carrying capacity, is the A380 super jumbo. Airbus has however announced that it will end production of the A380 in 2021 (Garcia, 2019), making the Boeing 747-8 the only jumbo that will be produced in the foreseeable future.

The historical resilience of the Boeing 747 demonstrates that the product development and marketing team had an in depth understanding of the product lifecycle, understood what their clients needed, made the correct product decisions, and employed appropriate service strategies.

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1. Introduction

The Boeing company is based in Seattle Washington, and is a multinational corporation founded by William Boeing in 1916. The organization consists of different divisions, *viz.* commercial, engineering, space & security, operations, shared services, Boeing capital and technology. Boeing has delivered in excess of 1500 of its 747-model to various airlines across the globe and is the largest exporter of goods in America. Aviall Services, Jeppesen, Boeing Aircraft Holding Company, Boeing Capital Corporation, Boeing Canada, Boeing Australia, Boeing Defence UK, Narus, and Boeing Commercial Space company are all subsidiaries of the Boeing company.

Millions of passengers have been transported across the globe by the Boeing 747 family over its more than 50 years in operation. Multiple upgrades and modifications have been introduced in the 747 with the 747-8 being the latest upgrade introduced in 2010. This case study will explore the relation between the specifications, applications, features and improvements, and the product specific design decisions that were made by the development team.

The main idea behind the 747-8, was to stick to the tried and tested formula that worked for Boeing for more than 40 years. Boeing focused on improving the on-board technology and incorporating some of the modern specifications that were present in their 787 and 777 passenger airplanes. The purpose of this was to reduce training or conversion time required to fly the newly introduced 747-8, and also to improve serviceability, reduce costs, and extend its lifetime due to sharing components and interfaces with other models.

The new 747-8I passenger variant is 16% more fuel efficient, has a 30% lower seat cost, while also being 30% quieter for passengers on board. Further to this, the 747-8 Intercontinental has a range of 14 800 km, which is a 1 350 km extension from the 747-400 which could only manage 13 450 km. Maximum take-off weight (MTOW) of the 747-8 has also improved with approximately 51 000 kg over the 747-400.

2. Purpose

The purpose of this case study is to analyse the Boeing 747-8 in terms of new product development, the product lifecycle, product decisions and service strategies, and price strategies.

3. Scope

This report and the analysis focus on the Boeing 747-8, but also what strategies Boeing implemented with regards to price, product, and services. Further to this, a brief view will be provided into the history of the Boeing 747 family to understand what made this product so resilient.

4. Methods of investigation

The qualitative and quantitative methods were used in this research. The main information channels that were used are YouTube, the internet, the library, and other relevant channels.

5. New product development and the product lifecycle

Product life cycles are the most common means for describing the evolution of markets and products.

Figure 1: The product lifecycle (Pettinger, 2018)

There are four distinct stages in the product lifecycle, *viz.* product development, introduction, growth, maturity, and decline. During transition from one stage to the next, variables such as consumer needs, sales, and profitability undergo specific changes. The marketing mix and product strategies therefore needs to be adapted to suit the specific stage in the product lifecycle (Lamb *et al.*, 2015).

5.1. Introductory stage

This stage represents the introduction of a completely new product to the market. Typical characteristics of this stage are:

- Slow sales and high costs – Consumers are reluctant to change their typical purchasing habits. Resultant advertising costs are high to educate the consumer as well as to gain brand recognition – advertising focus on promoting primary demand. High costs can further be attributed to high retailers' margins as well as the building of production lines.

5.2. Growth stage

This stage represents products that have survived the introductory stage and have not completely failed. Typical characteristics of this stage are:

- Sales growth at an increasing rate
- Modest profits that increase to significant profits towards the end of the stage
- Competitive products that enter the market that do not offer considerable differentiation – Marketing focus therefore on promoting differences from competing brands and on advancing the company's brand
- Marginal sales decline towards the end of the stage due to increased competition

5.3. Maturity stage

A decline in the sales figures of a product signals the onset of the maturity stage. Typical characteristics of this stage are:

- Market reaches saturation.
- Typically the longest stage of the product lifecycle.
- Competitors with weak product differentiation drop out of the market due to price wars.

This stage can be further segregated into three phases, *viz.* growth maturity, stable maturity, and decaying maturity.

- Growth maturity – Decline in sales growth. No new distribution channels.
- Stable maturity – Market completely saturated. Purchases are now primarily replacement purchases and not necessarily first-time buyers.
- Decaying maturity – Decline in absolute sales. Consumers switch to other products or substitutes.

5.4. Decline stage

A long-term reduction in sales indicates the onset of the decline stage in the product lifecycle. Typical characteristics of the decline stage are:

- Reduction in sales – Can gradually decline or can reduce suddenly depending on the type of product and loyalty of consumers. Caused either by substitute products or new technological developments that pave the way for a new product altogether.

5.5. Boeing 747-8 product life-cycle stage

Boeing is well-established as an organization, has a good brand reputation, and also displays good market penetration. For the year 2018, Boeing had a total of 893 airliners on its order book compared to the 747 of its main rival Airbus (McCarthy, 2019) as presented in Figure 2.

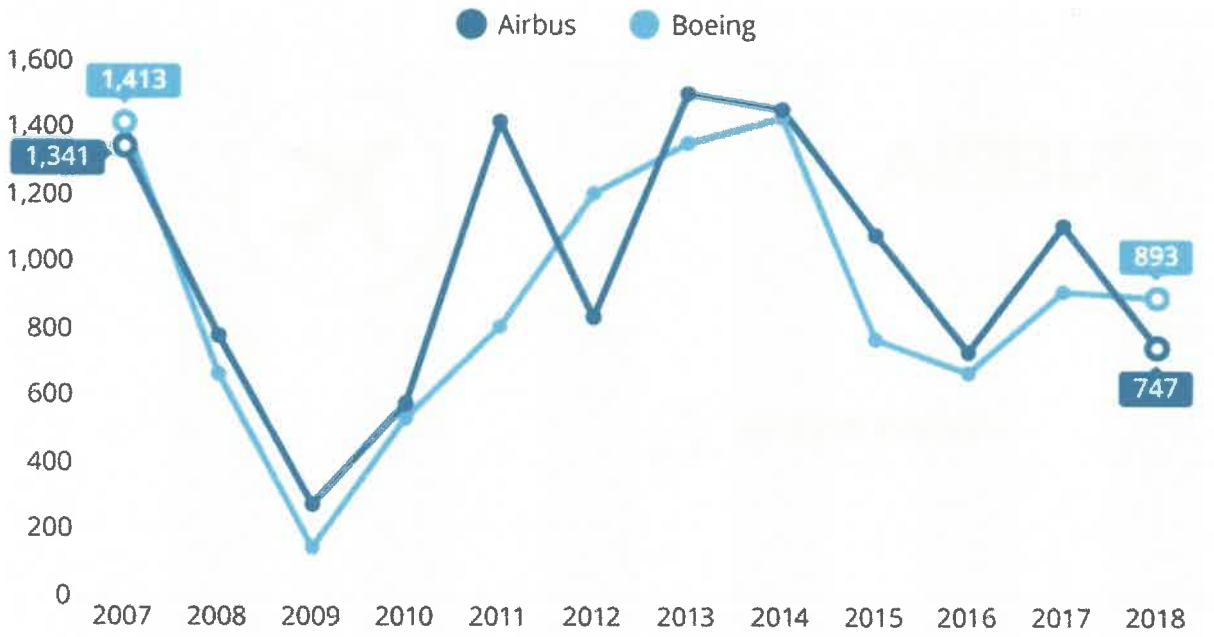

Figure 2: Boeing vs. Airbus total net airliners on order (McCarthy, 2019)

When considering the Boeing 747 family, Boeing continuously refreshed its offering to consumers, constantly adapting its designs to exactly what the client needed. Rather than allowing space for competitors to introduce their jumbo airliner versions with their own unique selling proposition, Boeing, in a sense, chose to compete with themselves by introducing new versions of the 747 during the previous version's maturity stage.

When considering strategies employed by Boeing during the maturity stage of the various 747 versions, the primary strategy was to reposition the product. In order to reposition the 747 in the market, Boeing did however implement various other strategies to support reposition, *viz.* to find new target markets for the product and to find new uses for the product. Apart from just having a strategy, Boeing executed it exceptionally well. The Boeing 747 line-up include freighter, extended range, convertible, combination, special performance (extra long range), domestic (additional seating), military, and even space exploration versions.

Boeing has not received any recent orders for the 747-8I. Further to this, they have already fulfilled all the orders for the same version. It can therefore be concluded that specifically the 747-8 Intercontinental version is in the decline stage of the product lifecycle. This can be attributed to twin-engine airliners that can now service the same routes which historically only quad-engine airliners could. Modern twin-engine airliners are significantly more reliable than their historic counterparts and are therefore not subject to as stringent ETOPS regulations (as discussed in detail later in the document). Airline operators prefer twin-engine above quad-engine airliners due to the operational economics, access to additional airports, and increased flexibility.

Contrary to the zero demand for the 747-8I passenger version, Boeing still had 20 outstanding orders for the 747-8F by the end of July 2019 (Modern Airliners, 2019). This is however only a portion that is left to deliver from the 107 Boeing 747-8F orders that were placed since its inception. It can therefore be concluded that the 747-8F is also moving from the maturity stage into the decline stage. The decline should however be gradual.

Figure 3: Cargolux Boeing 747-8F

6. Product decisions and service strategies

In planning a product and product strategy, the marketer needs to think in terms of five levels of the product. Each level adds more customer value than the previous level, and the five levels constitute a customer value hierarchy. This customer value hierarchy is presented in Figure 4.

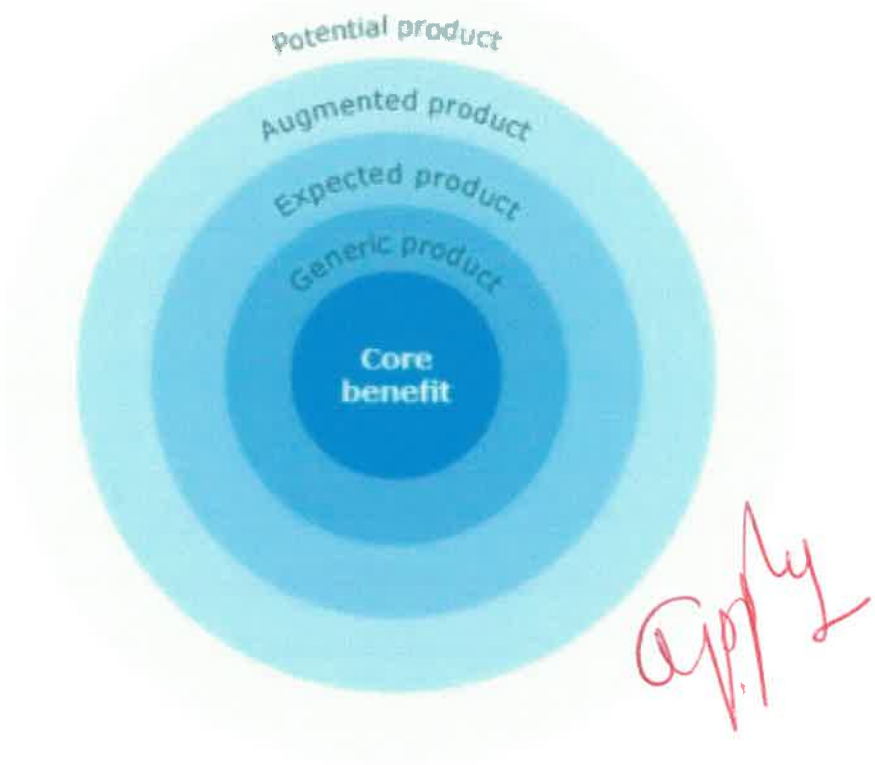

Figure 4: The customer value hierarchy (Anand, 2016)

First level - Core benefit: The service or benefit that the customer is willing to buy.

Second level - Basic/generic product: The core benefit is converted into a basic, tangible product which is able to supply the benefits that the customer requires.

Third level - Expected product: These are the attributes or benefits that the customer expects to receive when paying for the product or service.

Fourth level - Augmented product: Improved product that will not only fulfil the needs of the client, but most likely exceed them.

Fifth level - Potential product: Includes all the revisions that a product might undergo in order to fulfil future customer needs.

6.1. Boeing 747 in history

The first Boeing 747 test flight took place on 9 February 1969 (Dorminey, 2019). This year (2019), therefore marked the 50-year anniversary of the iconic jumbo jet. The Boeing 747 reigned supreme as the only jumbo passenger aircraft until the introduction of the Airbus A380 in October of 2007. Throughout its half century in operation, Boeing introduced multiple upgrades and variants to the initial 747 offering. Apart from the variants that were offered for passenger and freight transport, Boeing also developed various military versions of the 787. Table 1 provides a brief summary of the various Boeing 747 variants throughout its 50-year history:

Table 1: Boeing 747 variant summary

Model	First flight	Purpose	Capacity [Passengers / MTOW]	Range [km]
747-100/SR/B	1969-02-09	Mass passenger movement. Reduced congestion. Reduced air fares.	452 Passengers 333 400 kg	9 800
747-200	1970-10-11	Increased range and increased take-off weight.	452 Passengers 374 850 kg	12 700
747-200F	1971-11-30	Freight carrier based on 747-200.	374 850 kg	6 695
747-200C	1973-03-23	Convertible passenger/freighter based on 747-200.	374 850 kg	12 700
747-200M	1974-11-18	747-200 Freight and passenger combination.	374 850 kg	12 700
747SP	1975-07-04	SP – Special Performance. Designed for ultra-long-range flights. Shortened fuselage.	331 Passengers 304 000 kg	12 320
747-300M	1983-02-14	Increased capacity. Combination between freight and passengers.	374 850 kg	12 400
747-300/SR	1983-10-05	Short range. High capacity.	584 374 850 kg	[redacted]

747-400	1988-04-29	Increased range. Improved cruising speed. Reduced to flight crew of two. Passenger carrier.	524 Passengers 396 900 kg	13 450
747-400M	1989-06-30	747-400 Freight and passenger combination.	396 900 kg	13 450
747-400D	1991-03-18	747-400 Domestic.	624	
747-400F	1993-05-04	747-400 Freight.	396 900 kg	8 675
747-400ER	2002-07-31	747-400 Extended range passenger.	524 Passengers 396 900 kg	14 205
747-400ERF	2002-09	747-400 Extended range freight.	396 900 kg	9 200
747-8F	2010-02-08	Quieter, more economic, and reduced emissions. Increased payload from predecessor (16%).	448 000 kg	8 130
747-8I	2011-03-20	Quieter, more economic, and reduced emissions. Increased capacity.	605 Passengers 448 000 kg	14 800

Source: Boeing 747, 2017.

On 28 June 2014, Boeing supplied its 1500th 747, approximately 45 years after the first 747-100 flight (Boeing, 2019). This is testament to Boeing's ability to evaluate the market needs, and in turn make the right product decisions, and decide on the correct service strategies.

6.2. Initial offering

Boeing developed the first 747-100 upon a request from Pan AM's president, Juan Trippe, to build a passenger airplane that was double the size of the Boeing 707 in order to fill the large demand for air travel during the 1960's (Beresnevicius, 2019). The Boeing 707 could only accommodate up to 219 passengers.

At the time many major airplane manufacturers, including Boeing, were busy developing supersonic passenger aircrafts (Dorminey, 2019). Boeing therefore viewed the 747 passenger versions as an interim solution to the crowded skies until supersonic passenger aircraft would take over. This foresight on Boeing's part, led to them already developing strategies for the maturity stage of the 747 even before it was designed. Boeing's strategy was to find other uses for the 747 and therefore target

other markets than passenger air travel. Passenger, freight, combination, domestic, and extended range versions were all 747 demand specific versions that Boeing developed to ensure their dominance in the market for over 50 years. Boeing, and other manufacturers, however cancelled their supersonic air travel development as air liners did not deem supersonic air travel as profitable (Beresnevicius, 2019). The demise of the supersonic air liner therefore allowed Boeing to assert its dominance in the passenger air travel market.

6.3. Boeing 747-8

For the purpose of this case study, the Boeing 747-8 will be evaluated specifically according to the customer value hierarchy and as the development team would have approached the product decisions.

Core benefits: The core benefit will be economical, mass long-distance transport.

Basic or generic products: The Boeing 747-8 Intercontinental will offer 4x engines, fuselage, wings, passenger seats, windows, cockpit with controls, landing gear, and stowage.

Boeing 747-8 Freight will offer 4x engines, fuselage, wings, easily accessible cargo hold, cockpit windows, cockpit with controls, landing gear, and stowage.

Expected product: The customer expectation will be for the Boeing 747-8 to be reliable, economic, have an improved flight deck, have improved engines, and to be able to fly long distances without refuelling.

Augmented product: The Boeing 747-8 will boast quieter operation, more economic flights, reduced emissions, increased payload or passenger capacity, increased volume, customisable liveries, interchangeable components with other Boeing models (including engines), and customisable class arrangement.

The potential product: The potential future products stemming from the Boeing 747-8 will most likely have industrial, military, or transport applications. Likely products will include more powerful engines, improved aerodynamic design, improved fuel economy, further reduction in emissions, increased payload, crew reduction,

retrofitting for military or space exploration purposes, retrofitting for firefighting purposes, and an upgraded flight deck.

6.4. Future product decisions and service strategies

The Boeing 747, and other jumbo passenger aircraft such as the Airbus A380, historically had two primary advantages above smaller twin engine aircraft, *viz.* their range for intercontinental flights and the ability to carry more passengers (Modern Airliners, 2019). This has however deteriorated to only one primary advantage which is to carry more passengers than their smaller counterparts.

The Federal Aviation Administration (FAA) implemented Extended-range Twin-engine Operational Performance Standards, or ETOPS, during the 1930's (Modern Airliners, 2019). This entails that a twin-engine aircraft can only fly over the ocean wherever it can get to a suitable airfield within a specific amount of time operating on one engine only. Modern twin-engine aircraft have however proven their reliability and therefore the ETOPS rating have significantly improved on these aircraft. The improved ETOPS ratings, therefore, allows modern twin-engine aircraft like the Boeing 777 and Boeing 787 to service routes that historically could only be serviced by quad-engine aircraft such as the Boeing 747.

With these new entrants to the long-distance niche market, Airbus announced during February 2019 that it will cancel production of the A380, which is the 747's main competitor. The A380 was however only positioned to carry passengers and not freight.

Boeing also has not seen any recent orders for the 747-8I, with all orders for the passenger version having already been fulfilled. Cancellation of the A380 programme does however mean that Boeing is again the only supplier of a jumbo passenger aircraft. Unlike Airbus, Boeing positioned the 747-8F as a cargo airplane as well. This attracts a completely different target market. End of March saw Boeing selling more than double freight variants of the 747-8 than passenger versions.

When considering the decline stage of the Boeing 747-8, Boeing ensured that it will remain serviceable and economic for years to come. Technology and engines used in other Boeing aircraft such as the 787 and 777, were incorporated into the design of

the 747-8. Maintenance of the 747-8 will therefore not skyrocket as soon as production is stopped on the specific plane making the 747-8 a viable long-distance transport option for the foreseeable future. Conversion costs for pilots are also greatly reduced as the training required for each aircraft is minimised due to operational similarities. The continued serviceability of the Boeing 747-8 will therefore be key in marketing the carrier to future clients.

Figure 5: Outgoing Airbus A380

7. Pricing strategies

According to Lamb *et al.* (2015), to service highly competitive markets, firms need pricing objectives that are specific, attainable and measurable. Realistic pricing objectives then require periodic monitoring to assess the effectiveness of the firm's strategy.

Pricing policy of Boeing is dependent on environmental analysis. According to Fortune Magazine, Boeing was ranked at 27th position in 2015 after recording sales of 96.11 billion dollars (Bhasin, 2019). All Boeing's products are of premium quality and it has maintained a premium pricing policy for its products. The company is trying to achieve economies through manufacturing and designing process. It faces competition from various rival companies, but its quality products help the organization to maintain premium prices for its products. It has adopted value-added pricing strategy by maintaining high prices for premium products. Every airline is sensitive to schemes and discounts which can bring down prices. Boeing has also adopted a discount pricing strategy to attract new clients and retain its loyal customers. Like any other manufacturer and retailer, it cuts down its prices periodically to make a sale. Sometimes the company offers up to 20% on new purchases to create sales and ultimately revenues.

7.1. Pricing strategy of the company, Boeing

Below is the pricing strategy in Boeing marketing strategy (Mbaskool, 2019):

Boeing and Airbus have a duopoly in the market. Thus the marketing mix pricing strategy of Boeing is mostly premium. The pricing is competitive only with respect to some similar products of Airbus. There is fierce competition for some of its products while some are unchallenged. For highly similar aircrafts the company has offered even high discounts to beat the prices of Airbus. The pricing used for different carriers depends on the willingness and the size of the orders carriers use to price the planes. Thus due to duopoly, the player has the ability to use price discrimination in its pricing.

7.2. Pricing strategy of Boeing 747-8:

While the 747-400 and the 747-400ER are still available, Boeing is trying to steer customers to the 747-8, which the company announced in 2005, delivering the first plane in 2008. The 747-8 is longer than the 747-400 and uses the same engines and cockpit technology as the 787 Dreamliner. The passenger version, referred to as the 747-8I, is designed to carry 467 passengers at a cruising speed of 650 miles per hour. The plane carries 64,055 gallons of fuel (Ausick, 2014).

The price of the 747-8 includes four engines, compared with two on the 787 Dreamliner and on the $375,5 million 777-300. Boeing claims the new plane will be 10% lighter per seat and consume 11% less fuel than the A380 from its chief rival Airbus, which is designed to carry 555 passengers. The 747-8 carries a list price of $418,40 million. The more advanced engines, the more sophisticated cockpit technology, the larger carrying capacity — all these add up to a new 747-8 that costs more than double the original's inflation adjusted price (Statista, 2019).

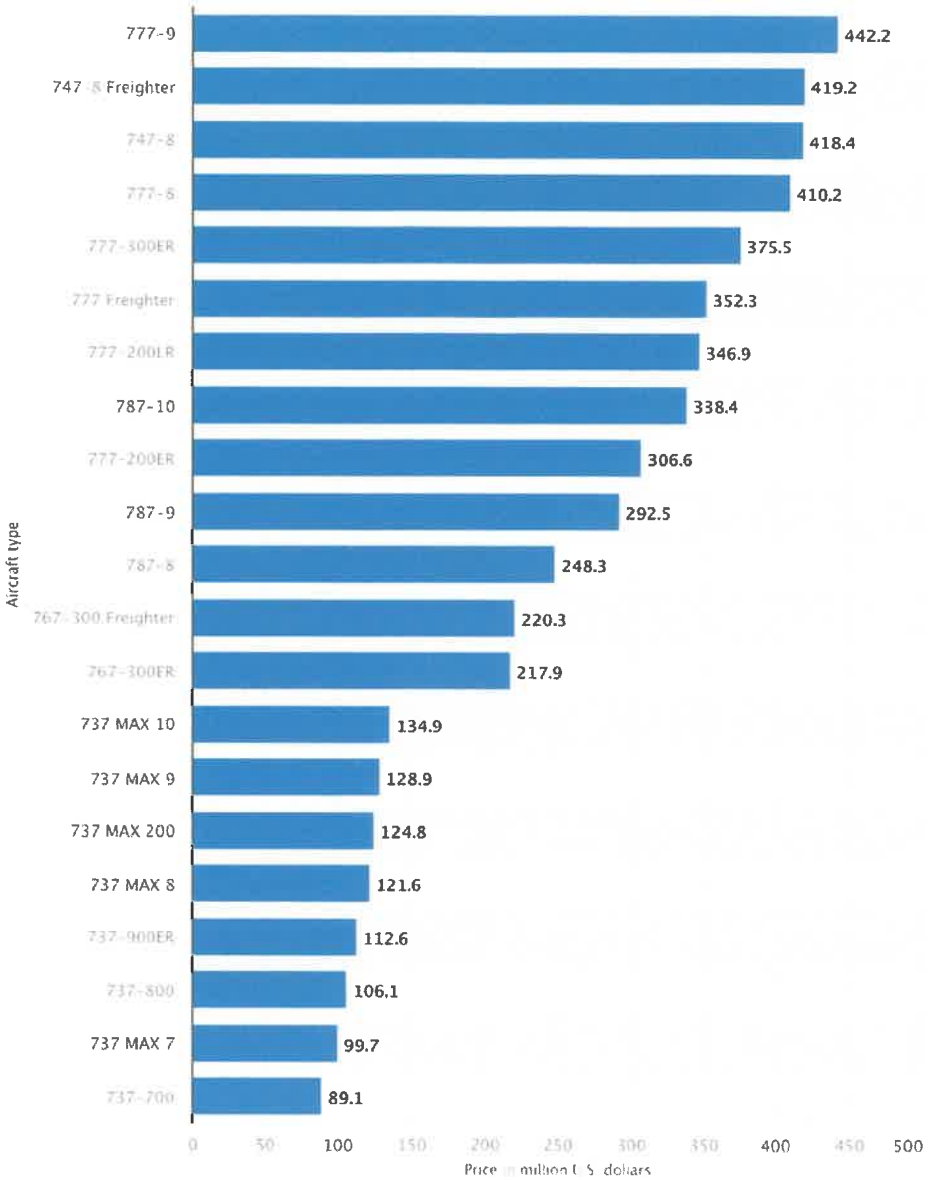

Figure 6: Average Boeing passenger aircraft pricing (US $m) - January 2019 (Statista, 2019)

Figure 6 shows the average prices for Boeing aircraft as of January 2019 by type. The 737-800 model had a list price of 106.1 million U.S. dollars. The Boeing 777-9 is the company's most expensive model. The Boeing 747-8 is the company's second most expensive model.

8. Conclusion

The marketing environment is bound to change due to competitors entering the market with similar or substitute products and through the introduction of new technology. Boeing did however ensure an extended existence for the 747 through a valuable understanding of market preferences, a good knowledge of competitors' products, and an appreciation for the product lifecycle. By having an intricate understanding of this, Boeing could make the correct product decisions and implement appropriate service strategies to enable the 747 legacy to exist for more than 50 years.

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10. Appendix A

Figure 7: Boeing 747-series size comparison