

THE VALUE OF THE PRODUCT AS AN ESSENCE IN MARKET ACTIVITY. EXAMPLE FROM PASSENGER AVIATION

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Abstract

In the article, on the example of a civil passenger plane used in transport air services, the essence of the value of a marketing product in market activity was presented. In order to answer the question regarding the assessment of the value of a passenger plane, as a marketing product, by two parties - carriers and producers - the method of comparative analysis of available source data on basic technical and operational parameters of the selected civilian passenger aircraft models manufactured and delivered to the aviation market by the corporation Boeing.

Key words: product, value, passenger plane, manufacturer, carrier, aviation market

Introduction

The success of any economic entity (see Antczak, 2016, p. 45) does not result directly from its attribution but from its functioning in the market. Findings from the analysis of market performance indicate that it is influenced not only by many conditions in its external environment, but also by the knowledge and skills employed by the leadership in managing it. An important management role is played by marketing aspects, which strongly contribute to the success or failure of any business organization in the market. To be effective, these measures also require considerable capital outlays from economic stakeholders. Nowadays marketing is dynamic not only because of the type of activities performed, but mainly because of the way they are performed. So far current experience indicates that the pressure of the business environment on each organisation will force it to look for ways to improve its market operations, including in particular offering innovative products with a sufficiently

high value for market participants while taking into account ecological factors to minimise adverse impact on the environment.

The above behaviour is also characteristic of activities in the air transport services market. In this business, an air service is a marketing product offered and provided by carriers using airports, and is aimed at passengers and other transport users and customers who have contracted them to carry out the distribution of various material products by air (air transport). In the above approach, the term marketing product should be understood as anything that can satisfy anyone's need and desire and has value (Kotler, 1994). In turn, the value of a product is the evaluation - made by its potential buyer (customer) and, in the long run, the consumer and user, as well as the manufacturer and intermediaries - of the extent to which their needs and/or desires are met (Antczak, 2016, p. 16). By contrast, the term air services market should be understood as a confrontation between two parties, at least one of which is related to aviation and is an integral part of the transport system in the structure of the global economic market (Rucińska, D., Ruciński, A., Tłoczyński, D., 2012). It also follows that, in the global economic market, airline operators can and are parties to the exchange of products. For the provision of transport services, in addition to infrastructure (point and line infrastructure), an aircraft is used as a basic material marketing product, which, having a value in use, is of interest to stakeholders in the aviation market. Also because of its value to both sides of this market, it is both a subject of exchange, as well as of satisfying social needs, including communication needs, as part of air transport. Transport is understood as the movement by air of individuals or material products, where the means of transport are aircraft, falling within the categories of aeroplanes and helicopters.

As the aviation issues in the marketplace are extensive and diverse, we will limit our considerations to indicating the role and importance of one of the products, which is the passenger airplane, adapted for the simultaneous carriage of several dozen to several hundred people, and its value for the parties to air services.

Passenger aircraft currently used and produced fall into three basic categories, such as - wide body, narrow body and regional (Aircraft, accessed: 11.03.2018). Wide body aircraft are the largest passenger aircraft, usually used for long-distance (transcontinental and transoceanic) flights. They include Boeing 747, Boeing 787, Airbus 330, Airbus 350, and the Airbus 380. For medium-haul flights smaller narrow body aircraft are most frequently used, such as: Boeing 737, Airbus 319, and the Airbus 320. Regional aircraft are used for short-haul passenger air services and include Boeing 717.

Material and methods

Using the content of theoretical studies, as well as available source data published by selected passenger aircraft manufacturers, their basic users (mainly air carriers) and opinions presented on the websites, we were particularly interested in answering

the following question: what is the relationship in the assessment of the value of a passenger aircraft, as a marketing product, between the two parties in the market - carriers and manufacturers? The basic research method was a comparative analysis of source data on the basic technical and operational parameters of manufactured and distributed aircraft of just one corporation, their main buyers, and users worldwide and forecasts of their impact on passenger air services.

Results and discussion

Worldwide, passenger aircraft are manufactured by several dozen companies and corporations, such as: Boeing, Airbus, Cessna, Learjet, Embraer, Bombardier. However, Boeing and Airbus are the largest companies producing and supplying the air services market with a significant proportion of large passenger aircraft.

Boeing (or rather Boeing Company) is an American aviation, armaments and space company based in Chicago. One of its two most important divisions is Boeing Commercial Airplanes, which is the world's largest passenger aircraft manufacturer and is based in Renton, Washington. Since 1958 the company has been manufacturing jet-propelled passenger aircraft. By 2017 a total of more than 18,700 aircraft have been manufactured which cover nine models: 707, 717, 727, 737, 747, 757, 767, 777 i 787 (Table 1). By 2005, the production and delivery of 707, 717, 727 and 757 models was completed and more than 4,040 aircraft were manufactured in total.

Currently, the company produces passenger (jet-powered) aircraft belonging to the 747, 767, 777 and 787 models (Dreamliner) at the Everett plant (60 km north of Seattle) and the 737 family at the Renton plant (21 km south of Seattle). By the end of 2017, approximately 14,700 aircraft belonging to the above models had been manufactured (Table 1).

In the first five years (1958-1962), 324 Type 707 aircraft were produced (Table 2). This was a narrow body, long-range passenger aircraft produced by Boeing, introduced into the air services market in 1958. Due to its high cruising speed (972 km/h), long-range (approx. 9,900km) and number of seats (202 in one class), it was marked by its cost-effectiveness. As the first passenger jet to be successfully operated commercially, it was the foundation of Boeing's long-term dominance in the aeronautical market for passenger aircraft manufacturers, despite the high number of accidents (241 over its lifetime), including 167 disasters with 2,739 fatalities (Boeing 707). Accidents. Accessed: 17.03.2019). Over the next five years (1963-1967), production was increased to 830 aircraft, including the new 727 model. In 1967, 4 medium-haul aircraft, of the most popular 737 model, were also manufactured, of which over 9,860 aircraft had been delivered to the air transport market by the end of 2017.

Table 1

Jet-powered passenger aircraft manufactured and delivered to the market by Boeing Commercial Airplanes between 1958 and 2018

Aircraft type	Number of aircraft produced	Years of manufacture
Boeing 707	1,010	1958 - 1992
Boeing 717	155	1998 - 2006
Boeing 727	1831	1963 - 1984
Boeing 737	9864	1968 -
Boeing 747	1542	1969 -
Boeing 757	1049	1982 - 2004
Boeing 767	1106	1982 -
Boeing 777	1534	1993(1995) -
Boeing 787	636	2009 -
Total	18727	1958 - 2017

Source: Civil aircraft. Accessed 11.03.2019.

Table 2

Passenger aircraft delivered to the aviation market by the Boeing Company from 1958 (Deliveries by year)

Boeing \ Year	Boeing									Total
	707	717	727	737	747	757	767	777	787	
1958-1962	324									324
1963-1967	324		502							830
1968-1981	283		1284	819	540					2,926
1982-1994	69		45	1,852	506	651	560			3,683
1995-2010		155		3963	372	398	434	910		6,232
2011-2012				787	40		46	156	49	1,078
2013				440	24		21	98	65	648
2,014				485	19		6	99	114	723
2015				495	18		16	98	135	762
2016				490	9		13	99	137	748
2,017				529	14		10	74	136	763
2,018				407*					164**	571
Total	1010	155	1831	10271	1542	1049	1106	1534	800	19,298

* Data as of the end of August 2018. (Production. Accessed: 17.03.2019).

** As at February 2019. (Boeing 787. Orders Accessed: 17.03.2019).

Source: Civil aircraft. Accessed on 17.03.2019.

In 1982 the first examples of two new Boeing passenger aircraft types were produced, the 757 and 767. The Boeing 757 is a long range narrow body aircraft, capable of carrying between 200 and 280 passengers and operating over a distance (non-stop) of between 4,700 and 7,240 km. A total of 1,049 aircraft were manufactured and delivered to the market by 2005. The Boeing 767 is a wide bodied long-range

aircraft (6,025-12,200 km), fitted with 181 to 375 seats, depending on the model version. In total, by January 2019, 1,135 aircraft of six versions of this model had been delivered to users (Table 3).

Table 3

Boeing 7X7 passenger jet aircraft (models ordered and delivered by January 2019)

Model Boeing 7X7	Orders		
	Total	Fulfilled	Unfulfilled
707	856	856	-
717-200	155	155	-
720	154	154	-
727	1831	1831	-
737 Original	1144	1144	-
737 Classic	1988	1988	-
737 NG	7074	6981	93
737 MAX	5011	350	4661
747	1418	1418	-
747-8	154	130	24
757	1049	1049	-
767	1244	1135	109
777	1687	1584	103
777X	326	-	326
787	1421	789	632
Total	25512	19564	5948

Source: Orders and deliveries Accessed 11.03.2019.

In 1995, a new model of twin-engine wide-body passenger aircraft named Boeing 777 was introduced onto the aviation market. This is the world's largest twin-engine plane. There are more than 300 passenger seats on board and its range, depending on the version, is between 9,695 and 17,370 km. This model has been fitted with a six-wheeled main carriage and equipped with the largest diameter jet engines that passenger planes have so far operated in the air services market. This model was designed to replace older wide-bodied jets and to fill the gap between the Boeing 747 and 767 models (Table 3). By the end of January 2019, 1,584 of the 1,687 aircraft ordered up to that time had been delivered to the market. (Boeing 777. Accessed: 11.03.2019).

The next model introduced to the market in 2011 was the Boeing 787 Dreamliner. This is a medium-sized, wide-body, long-range passenger aircraft. By January 2019, 789 units had been delivered to the market from the 1,421 aircraft ordered by that time (Orders and deliveries. Accessed: 11.03.2019). Indeed, the utility of the Boeing 7X7 family of passenger aircraft, particularly in the final years of the last decade, can be seen from the increasing production volumes of its three basic models (737, 777 and 787) per annum: 2013 - 603 units, 2014 - 698 units, 2015 - 728 units, 2016 - 726

units, 2017 - 740 units. Table 2. The dominant models are the 737 (in 2017 - 529 units) and the 787 (in 2017 - 136 units).

Since the delivery in 1958, of the first passenger aircraft of the 707-model belonging to the Boeing 7X7 family, out of the total number of 25512 ordered, 19,524 aircraft have been delivered to the market by January 2019. More than 5,948 model passenger aircraft are still awaiting delivery: 737NG, 737MAX, 747-8, 767, 777, 777X and 787 (Table 3). Of the aircraft delivered from this family, 10,988 are still in active use in the market (Table 4).

Table 4

Models and numbers of Boeing passenger aircraft operated by air carriers (as of 31.12.2017)

Model	707	717	727	737	747	757	767	777	787	Total
In active service	0	154	57	6,864	489	689	744	1,387	604	10,988

Source: Civil aircraft. Accessed:15.03.2019.

One of the many passenger aircraft models of the Boeing 7X7 family is the 737 series. Since 1967, aircraft belonging to the three main generations of this model have entered the market. They are known as: Original, Classic and Next-Generation (NG) (Table 5) as well as eight other versions of Boeing 737 (Table 6).

Table 5

Order and delivery status of passenger aircraft of the three generations of Boeing 737 (Original, Classic and Next-Generation) (as at August 2018)

Model series	Boeing 737											Total
	Original		Classic			Next-Generation						
	100	200	300	400	500	600	700	800	900	900ER	MAX	
Orders	30	991	1113	486	389	69	1128	4991	52	505	4783	14537
Deliveries	30	991	1113	486	389	69	1128	4913	52	471	218	9860

Source: Boeing 737. Production. Accessed 06.03.2019.

Table 6

The order and delivery status of passenger aircraft versions not belonging to Original, Classic and Next-Generation families of the Boeing 737 (as at end August 2018)

Model series	Boeing 737									Total
	T-43	200C	700BBJ	700C	700W	800A	800BBJ	900BBJ		
Orders	19	104	121	22	14	138	23	7	448	
Deliveries	19	104	120	20	14	105	21	7	410	

Source: Boeing 737. Production. Accessed 06.03.2019.

The Original is a 737-100 as well as 737-200 aircraft produced between 1967 and 1988, of which 1021 units were delivered to the market. The Classic includes models 737-300, 737-400 and 737-500, and was produced from 1983 to 2000, with 1988 units entering the market. Next-Generation (or 737NG) includes models 737-600, 737-700, 737-800, 737-900, and 737-900ER, which were manufactured from 1997 until the present day. By the end of August 2018, 6633 aircraft had been delivered to the aviation market, out of a total of 9,745 ordered (Table 5). By the end of February 2019, another 76 aircraft of this generation had been delivered to the market, including 54 units of the 737-800 and 22 units of the 737-900ER (Table 7).

Table 7

Orders and delivery of Boeing 737 Next-Generation passenger aircraft February 2019

Model Boeing	Orders		
	Total	Fulfilled	Unfulfilled
737-600	69	69	-
737-700	1128	1128	-
737-800	4991	4967	24
737-900	52	52	-
737-900ER	505	493	12
Total	6745	6633	36

Source: Boeing 737NG. Orders and deliveries Accessed 14.03.2019.

As previously indicated, one of the most popular models of medium range narrow body passenger aircraft is the Boeing 737. It has been produced in many versions, continuously since 1967 (current generation since 1996), by Boeing in the United States. It is also the most frequently purchased passenger aircraft in the world. By the end of August 2018, 10270 aircraft out of a total of 14985 ordered aircraft had entered the air services market (Table 5 and Table 6). This model was included in the Guinness Book of Records after 10,000 units were produced. This also meant that at the time it was the jetpropelled passenger aeroplane produced in the largest number of units. The milestone aircraft of the Boeing 737-800 type with the markings N8717M and the serial number c/n 42571 was delivered on 26 March 2018 to Southwest Airlines¹. Currently, most commercially operated

¹ Southwest Airlines (owned by Southwest Airlines Co.) is the principal airline in the United States based in Dallas, Texas. It is the world's largest low-cost carrier. It was founded in 1967 by Herb Kelleher as Air Southwest Co. Southwest Airlines Co., adopted its current name in 1971. Initially, it operated as an airline in the state of Texas and operated services between Dallas and San Antonio. The airline has about 58,000 employees and has about 4,000 daily departures during the peak season, using more than 750 Boeing 737 passenger aircraft (as of September 2018). Since February 2019, Southwest Airlines carries the most domestic passengers, operates 99 scheduled flights in the United States and an additional ten in other countries. In March 2019, it started to operate to four destinations in Hawaii (Fleet. Accessed 06.03.2019).

Boeing 737 aircraft belong to the Classic and Next-Generation families. Their value, as an aeronautical marketing product, is testified by selected technical and operational parameters (Table 8).

Table 8

Selected technical and operational data for the 737 Classic and Next-Generation passenger aircraft

Model	Max Number seats	MTOW* (kg)	Range at MTOW (km)	Take Off Run (TOR) MTOW (m)	Operating ceiling (m)	Cruising speed (km/h)	Power unit
737-300	149	56742	5475	2300-2600	11280	785	CFM56-3
737-400	168	62882	5185	2300-2600	11280	785	CFM56-3
737-500	140	62823	5745	2300-2600	11280	785	CFM56-3
737-600	132	66000	5970	2400-2500	12500	825	CFM56-7
737-700	149	70080	6037	2400-2500	12500	825	CFM56-7
737-800	189	79010	5765	2400-2500	12500	825	CFM56-7
737-900	189	79002	5930	2400-2500	12500	825	CFM56-7
737-900ER	180 - 215	85130	6045	2400-2500	12500	823	CFM56-7

* MTOW (Maximum Take off Weight or Maximum Take-off Mass) - The maximum take-off mass defines the size (e.g. in kG) at which the aircraft is certified to fly.

Source: Boeing 737. Technical Data. Accessed: 10.03.2019.

For example, the 737-300 model, which can carry up to 149 passengers and with a maximum take-off mass (MTOW) of 56,742 kg., can cover a distance of 5,475 km at an operating ceiling of 11,280 m at a cruising speed of 785 km/h, confirms the above statement. Other models (737-400 and 737-500) belonging to the Classic generation are operated by LOT Polish Airlines. In April 2010, 2 737-400 aircraft established the new fleet of Polish charter airline Enter Air.

The next models of passenger aircraft produced by Boeing belong to the Next Generation. In this series of aircraft, the trimmers were modernised, the analogue guage technology was replaced by liquid crystal displays (so-called Glass cockpit) in the cockpit. The control systems (IRS, APU) and de-icing were also improved. Additionally, the wing spars and engine mountings (Boeing 737) were reinforced. Airplane versions. accessed: 10.03.2019). The initial versions of this generation are the 737-600, 737-700 and 737-800. As the first produced, the 737-600 was to replace the passenger aircraft of the Classic 737-500 series. The first unit left the production line in 1995 and entered service in 1998. The first aircraft was delivered to Scandinavian Airlines System². 737-600 model aircraft, mainly due to the cost-

² Scandinavian Airlines System (currently - Scandinavian Airlines, SAS AB) is the largest carrier registered in the Nordic countries. Its main airports are Stockholm-Arlanda Airport (Sweden), Oslo-Gardermoen Airport (Norway) and Copenhagen-Kastrup Airport (Denmark). Scandinavian Airlines System. Accessed on 10.03.2019.

effectiveness being achieved only over long distances, have not found recognition among carriers, and are no longer produced. During the scheduled passenger service, they used the same fuel as the larger 737-700 and 737-800 models, allowing them to carry more passengers, 149 and 189 respectively, compared to 132 737-600 models (Table 8).

The first model 737-700 aircraft belonging to the new Next-Generation, initially designated as the Boeing 737-300X, was completed on 8 December 1996, and flew on the 9 February 1997. It can carry 126 passengers in a two-class configuration or 149 single-class configuration. At the MTOW 79,010 kg it achieves a range of 6,037 km at a cruising speed of 825 km/h at an altitude of 12,500 m. The aircraft was the Boeing Corporation's response to the European Airbus consortium's launch of the A319³ The 737-700 model is currently being used by some airlines on relatively expensive for passengers, however, this makes transatlantic routes between Europe and North America profitable for carriers.

The subsequent Next Generation model is the 737-800, which in its basic version can take up to 189 passengers on board. With a MTOW of 79,000 kg the maximum range is 5,765 km, cruising at 825 km/h and at an altitude of 12,500 m. The next of this generation of passenger aircraft is the 737-900 model. It made its first flight on 3 August 2000 and entered the air services market on 15 May 2001. Its technical and operational data are only slightly different from those of the Boeing 737-800 model (Table 8). At a MTOW of 79,000 kg, the maximum range is 5,930 km (cruising speed 825 km/h, operating ceiling 12,500 m, single class version capacity up to 189 passengers). This model is quite popular in the USA, but not in Europe. The only European air carrier operating these aircraft is KLM Royal Dutch Airlines⁴.

As a result of modernisation of the above model, the 737-900ER version was launched on the market with new exit doors, fuel tanks, modernised wings, and improved aerodynamics. This allows for a scheduled flight, at MTOW 85,130 kg, with 180 passengers in two-class or 215 passengers in single-class configuration, over a distance of 6,045 km (cruising speed 823 km/h, operating ceiling 12,500m).

3 The Airbus A319 passenger aircraft has been manufactured since 1996 by the European Airbus consortium. It can carry up to 156 passengers. At the MTOW 55,000 kg its range is 7,500 km at a cruising speed of 828 km/h at 12,000 m (Airbus A319. Accessed: 13.03.2019).

4 KLM Royal Dutch Airlines (legally Koninklijke Luchtvaart Maatschappij N.V., KLM - Royal Dutch Airlines) - Dutch airline, part of the Air France-KLM holding company. They cooperate with Delta Airlines and also belong to the Sky Team Aviation Alliance. Its main hub is Amsterdam-Schipol. It is the oldest airline in the world, established and continuously providing air services since 1919 and is currently highly successful. It employs about 33,000 workers, of which about 28,000 work in the Netherlands. As of 03.05.2018, its fleet, consisted of 183 aircraft of which about 80% were Boeing models, such as: 737-700, 800 and 900 - 50 aircraft, 777-200ER and 300ER - 29 aircraft, 787-9 - 12 aircraft and constituting the largest combined fleet in the world 747-400, 400ERF and 400M - 36 aircraft (Royal Aviation Society. Accessed: 13.03.2019).

The first aircraft of this model produced on 9 August 2006 was delivered to the Indonesian low-cost airline Lion Air⁵.

In December 2011, the pressures of the aviation (passenger) market forced Boeing to launch a new Boeing, the 737 MAX, to compete with the Airbus A320neo⁶ model. The most important change in the new models of the 737 MAX are the CFM International LEAP-1B engines, which consume 13% less fuel, without changing the other parameters of the aircraft. Hence, already at the beginning of January 2013, orders amounted to more than 1,000 planes, with deliveries starting in 2017. By the end of February 2019, more than 350 aircraft of this model were delivered to the aviation market out of a total of more than 5,100 ordered (Table 9).

Table 9

Boeing 737 MAX passenger aircraft orders and deliveries (data as of 19 February 2019)

	2011	2012	2013	2,014	2015	2016	2,017	2,018	2019	Total
Orders	150	908	668	861	409	530	759	694	106	5111
Deliveries	-	-	-	-	-	-	74	226	20	350

Source: Boeing 737MAX. Orders and deliveries Accessed:15.03.2019.

Following the 737 MAX 8 crash, which took place on 10 March 2019 in Ethiopia, only five months after a similar crash on 29 October 2018 over the Java Sea, many operators around the world “grounded” their 737 MAX 8 and 9 aircraft in the interests of passenger and aviation personnel safety. Due to the manufacturer’s pending update of the flight stabilisation and control system software, it is not currently (15.03.2019) possible to predict how long Boeing 737 MAX aircraft will continue to be grounded. This issue has caused an “image crisis” for the world’s largest passenger aircraft manufacturer and a 13% drop in Boeing’s share value (over \$32 billion).

⁵ Lion Air (legally PT Lion Mentari Airlines), a low-cost Indonesian airline. Lion Air is based in Jakarta and is the largest private airline in the country and the second largest low-cost airline in South East Asia (after Air Asia - the largest airline in Indonesia). The airline operates domestic and international flights. The airline’s fleet(as of February 2019) comprises 125 aircraft currently in operation (123 are Boeing models, of which 71 are 737-900ER). There are also 249 aircraft on order of which 245 are from Boeing.(Lion Air Fleet. Accessed: 13.03.2019).

⁶ The Airbus A320neo is an improved Airbus 320 of the A 320 family upgrade programme with a MTOW 77,000 kg., a maximum range 5,700 km, a cruising speed 833 km/h and a one class capacity of 180 passengers. The A320neo is the final step of the A320 Enhanced (A320E). The main changes compared to the A320 are the new engines (CFM International LEAP-1A or Pratt & Whitney PW1100G) and sharklets (larger rounded wing tips). Aircraft of this variant are characterized by lower fuel consumption (15-20%), lower noise and exhaust emissions in relation to earlier generation A320. The A320neo has a new cabin arrangement (the so-called Cabin Flex) with the possibility of an additional 20 passengers without losing in-flight comfort. The first A320neo with CFM LEAP-1A engines was delivered on 19 July 2016 to Pegasus Airlines, a Turkish airline based in Istanbul. (Versions. Accessed: 13.03.2019).

Notwithstanding the above, the 737 MAX series passenger aircraft are perceived to offer value in service and at a good price (Table 10). They continue to be of great interest to their users.

Table 10

Selected technical data for the Boeing 737 MAX passenger aircraft series

Variant	737 MAX 7	737 MAX 8	737 MAX 9	737 MAX 10
Maximum number of seats	153 - 172	178 - 200	193 - 220	204 - 230
MTOW* (kG)	80286	82191	88414	89765
Maximum payload (kg)	20882	20882	20882	20882
OEW** (kg)	45070	45070	45070	45070
Fuel capacity (l/kg)	25816 /20730	25816 /20730	25816 /20730	25816 /20730
Engine type (x2)	CFM International LEAP-1B	CFM International LEAP-1B	CFM International LEAP-1B	CFM International LEAP-1B
Cruising speed (Mach or km/h)	0.79 or 839	0.79 or 839	0.79 or 839	0.79 or 839
Operational ceiling (m)	12000	12000	12000	12000
Take Off Run (m)	2500	2500	2600	2600
Landing (m)	1500	1500	1700	1700
Average price (USD million)	99.7	121.6	128.9	134.9

* MTOW (Maximum Take off Weight or Maximum Take-off Mass) - The maximum take-off mass defines the size (e.g. in kG) at which the aircraft is certified to fly.

** OEW (Operating Empty Weight) - Operating empty weight or Basic operating weight or empty working weight is the standard weight (in kg) for a specific series or any configuration of an aircraft.

Source: Boeing 737 MAX. Parameters. Accessed: 15.03.2019.

On the basis of the data, as of 12 March 2019, provided by Boeing (Andrea. Accessed as of 15.03.19), it can be seen that from the ordered 5,111 aircraft belonging to all models of the 737 MAX series by more than 100 customers, 4,761 orders are awaiting completion. Of this number, 2,471 orders come from 48 airlines, 1,045 from unidentified customers and over 1,240 from leasing companies. The largest number of orders have been placed by Southwest Airlines (249), flydubai⁷ (237) and Lion Air (187). In addition, the management of Boeing Corporation hopes to start supplying the largest version (737 MAX 10) in 2020, so that it can return to the mid-market segment of the passenger aviation market which it lost, after ceasing production of the Boeing 757, to the more spacious Airbus models the 737 MAX 9 A321⁸ and Airbus A321neo offered by the European Airbus consortium in Toulouse.

⁷ flydubai - a low-cost airline based in Dubai, was established on March 19, 2008, and started operating on June 1, 2009. (Flydubai. Accessed: 15.03.2019).

⁸ The Airbus A321 is a mid-range passenger aircraft produced by the European Airbus consortium in Toulouse. It is the largest of the A320 series and the world's largest medium-range passenger aircraft (MOTW 89000kg, cruising speed 840km/h, flight altitude 11900m, range 5600km, number of seats 220) (Airbus A321. Accessed: 15.03.2019).

As already indicated above, a new family of Boeing 787 Dreamliner passenger aircraft, constructed and built by Boeing Commercial Airplanes, has been operating in the air services market since 2011. The first aircraft was delivered on 26 September 2011 to All Nippon Airways⁹ and its first commercial flight took place on 26 October 2011, on the route from Narita airport in Tokyo to Hong Kong. Depending on the configuration of seats, it can carry from 210 to 330 passengers. This is the first passenger aircraft in which the fuselage and wings are made almost entirely of carbon fibre-reinforced composite materials (about 50% of the aircraft's weight, including 80% of the material volume), and in comparison with previous versions the engines consume less fuel (up to 20% according to estimates). The new model is intended to "provide much higher comfort" and to realise Boeing's vision of point-to-point aviation, without the need for stops on long haul flights (Boeing 787. History Accessed: 18.03.2019). The Boeing 787 Dreamliner is offered in three versions (Table 11): the base version is the 787-8 for 210-250 passengers; the extended version is the 787-9 for 250-290 passengers and the longest version is the 787-10 for 290-330 passengers.

Table 11

Selected technical data for the Boeing 787 Dreamliner passenger aircraft series

Variant	787 - 8	787 - 9	787 - 10
Maximum number of seats	210-250	250-290	290-330
MTOW* (kG)	215910	244940	
Fuel capacity (l)	124700	138700	
Engine type (x2)	GE GENx or RR Trent 1000	GE GENx or RR Trent 1000	GE GENx – 1B or RR Trent 1000
Cruising speed (Mach or km/h)	0.85 or 903	0.85 or 903	0.85 or 903
Operational ceiling (m)	13100	13100	13100
On the market (year)	2011	2013	2,018
Average price (USD million)	229.5	270.4	312.8

Source: Boeing 787. Parameters. Accessed:15.03.2019.

Due to the initial operating problems of the Dreamliner aircraft family on commercial flights (technical faults in the electrical and fuel systems, glass breakage, fuel leaks, battery fires), on 16 January 2013, the Japanese airline ANA (ALL NIPPON AIRWAYS) and JAL (JAPAN AIRLINES) decided to stop flights. At the same time, the US Federal Aviation Authority and the European Aviation Safety Agency declared aircraft of type Boeing 787 Dreamliner unfit to fly and pending inspection. Although it was difficult to determine why the batteries overheated, it was

⁹ All Nippon Airways is a Japanese airline based in Tokyo and the largest airline in Japan. Their fleet is made up of approximately 220 aircraft. This includes Boeing 787-8 and 787-9 aircraft out of which 59 are operational and 4 are on order (All Nippon Airways. Accessed: 17.03.2019).

Boeing who suggested installing a cooling ventilation system and ceramic insulation. On 12 March 2013, the corrective plan was approved by the FAA (FEDERAL AVIATION ADMINISTRATION - the US Aviation Regulatory Authority) (FAA. Accessed: 8.03.2013). Additionally, the batteries on an aircraft produced for LOT were replaced and tested in flight on 25 March 2013. Furthermore, on 5 April the same aircraft performed a certification flight in the presence of FAA representatives, and on 19 April the improved battery system was approved by the FAA, which allowed the start of modifications to all aircraft of this model. Also, on 23 April EASA (European Aviation Safety Agency - (ESA), approved the battery system modification. Grounded from January 2013. 50 of these aircraft were located in 15 airports in 9 countries, 23 of which were in Japan. The upgrade was simultaneously carried out by 10 teams of technicians. Finally, the FAA directive of April 26, 2013 ruled on the airworthiness of the 787 Dreamliner type once modified. (Służba w lotnictwie. Accessed: 25.03.2019).

With reference to the operating parameters and performance characteristics of the Dreamliner family of passenger Aircraft, of which over 650 units have been delivered to the aviation market since 2011 (as at the end of February 2018) and over 630 orders are awaiting completion (Table 12).

Table 12

Orders and deliveries of Boeing 787 Dreamliner passenger aircraft (28 February 2018)

	Orders	Fulfilled	Unfulfilled
787-8	418	350	68
787-9	705	306	399
787-10	171	2	169
Total	1294	658	636

Source: Boeing 787. Orders Accessed: 18.03.2019.

The high interest in this family of passenger aircraft, mainly by airlines, can be supported by data on the status of orders and deliveries to operators (Table 13). Their analysis shows that there are several users who have ordered more than 50 of these aircraft (e.g: All Nippon Airways, Etihad Airways, Qatar Airways and United Airlines) are now operating 35 and more (e.g: All Nippon Airways, United Airlines, Japan Airlines i American Airlines). The leasing company ILFC has also ordered 74 and received 56 aircraft.

Table 13

**Orders and deliveries of Boeing 787 Dreamliner passenger aircraft for selected airlines
(28 February 2018)**

Airline	Orders				Deliveries			
	787-8	787-9	787-10	Total	787-8	787-9	787-10	Total
Air Canada	8	29		37	8	25		33
Air India	27			27	27			27
All Nippon Airways	36	44	3	83	36	27		63
American Airlines	20	22		42	20	15		35
British Airways	12	18	12	42	9	16		25
Etihad Airways		41	30	71		19	1	20
ILFC*	23	51		74	23	33		56
Japan Airlines	29	20		49	25	11		36
Qatar Airways	30	30		60	30			30
United Airlines	12	25	14	51	12	25		37
LOT Polish Airlines	8	7		15	8	3		11

* ILFC (International Lease Finance Corporation)

Source: Boeing 787. Orders Accessed: 18.03.2019.

Conclusions

In the introduction, we noted that market pressure on commercial entities forces them to look for ways to improve their performance in the market. In particular, this concerns offering innovative products with a sufficiently high intrinsic value for market participants. In addition, it is important to take into consideration, the impact of ecological factors to minimise adverse effects on the environment. Such forms of behaviour are also characteristic of the activities of participants in the air transport services market. In the content presented above, based on the example of selected aviation products and their use in the aviation services market. Attempts were made to find an answer to the question concerning the relationship in the assessment of the value of passenger aircraft as a marketing product, by the two sides of the market - carriers and manufacturers - and the importance of the passenger as a consumer of air services to them.

It is also assumed that the term “marketing product” is understood as anything that can satisfy anyone’s need and desire and has value. In turn, the value of the product was understood as the (subjective) assessment - made by the potential buyer (customer) and, in the long run, the consumer and user, as well as the manufacturer and intermediaries - of the extent to which their needs and/or desires were met. By contrast, the term ‘air services market’ was understood as a contest between two parties, at least one of which is related to aviation and was an integral part of the transport system within the global economic market structure. It also follows from the above that in the global economic market, aviation operators are parties to the exchange of products. However, for the provision of transport services, in addition to

the infrastructure (point and route), the basic material marketing product used is the passenger aircraft and Due to its intrinsic value (e.g. utility), it is of interest to parties in the aviation market (e.g. air carrier - passenger aircraft manufacturer; air carrier - passengers). Due to its value for both sides of the market, it is an entity of exchange, as well as meeting the social needs, including communication needs, of air transport.

Only some of the figures and technical and operational data of selected passenger aircraft models manufactured and delivered to the market by one manufacturer (Boeing Commercial Airplanes) since 1958 were used in the analyses. An analysis of the available data shows that of the more than 25,000 units ordered and 19,300 delivered to customers, approximately 11,000 of the dozens of models and variants of Boeing 7X7 passenger aircraft are still in service, including approximately 7,000 of the most popular mid-range Boeing 737 family aircraft. Due to their value for passengers and air carriers, more than 9,860 aircraft were delivered to the market from over 14,500 of those ordered (out of that number more than 350 of the latest model 737 MAX from over 5100 ordered). For similar reasons, the value of the 787 Dreamliner family's long-range planes is assessed, in particular with regard to their range (up to 15,000 km non-stop), number of passengers carried, fuel economy and reduced environmental impact.

The above mentioned, indicators showing the value of a tangible product such as passenger aircraft do not take into account the intangible benefits (e.g. long-distance transport services in a relatively short period of time), or the level of safety (e.g. passengers transported), etc., which contribute to the subjective assessment of the value of such a specific product as a passenger aircraft. For the time being, it is an essential and irreplaceable means to satisfy the needs and desires of passengers en masse in order to provide marketable air services.

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