THE REPUTATION OF THE AEROSPACE COMPANY BOEING AND ITS REPERCUSSIONS IN THE MEXICAN MARKET. EFFECT OF THE CRISIS DUE TO ACCIDENTS IN 2019

José G. Vargas-Hernández* María Guadalupe Hernández Martínez**

ABSTRACT:
The air accidents of the months of October 2018 and March 2019 have caused the suspension of operations of the Boeing 737 MAX 8 model, one of the most sold in the world. The economic impact for this aerospace leader and its supply chain is a function of the actions taken to solve its customers and interested parties. Moreover, its reputation is at stake, one of the most valuable intangible assets for the company. This article analyzes the impact of the crisis that this company faces on its current and future reputation, as well as the consequences in the Mexican aerospace industry.

Keywords: Intangible assets, Boeing, Aerospace industry, Reputation, JEL. M210

INTRODUCTION

The aerospace industry is considered a strategic sector for the economic growth of Mexico, which has a competitive advantage derived from its geographical position, commercial activity, experience in high technology sectors and skilled labor (SE, 2012). This has been to attract foreign direct investment from companies with a global presence in the sector.

Our country has had an active participation in the aerospace industry since 1962, with the creation of organizations and support areas that contributed to the development of the appropriate technological activities, however, its performance was interrupted by the frequent economic crises in the country. This situation improved in the last 10 years, with the entry of high profile companies in aeronautics. Its economic impact at present is explained by the generation of good remuneration jobs, the trade surplus, its effect on GDP, its permanence in national territory and its relationship with other industries, as well as the generation of support sectors (SE, 2012).

The rapid acceptance of air transport in the world, due to its speed, efficiency and safety, has led to an exponential increase in the demand for aircraft for commercial use. However, with few companies that manufacture aircraft. Approximately 90% of the production is in the hands of American company Boeing and the European Airbus.

This document focuses on the Boeing company, analyzing its context and strategic performance, from the perspective of the theory of resources and capabilities. As well as the repercussion of its decision-making in the face of the current crisis for the national market.

BACKGROUND

A. Historical background of the industry in Mexico and the world

The aerospace industry originated and propelled after the Second World War, characterized by a rapid advance of aeronautics, jet engines and the replacement of radial engines by turbines. The threat of a nuclear war originated the "space race" between the nations, where the Soviet Union had the leadership in the launching of ballistic rockets (Nava, 2016).The most ambitious program of space activities for the international community took place in 1957-1958, with the placing in orbit of the first artificial satellite and other objects for study purposes. While 1969, man reaches the moon (Nava, 2016).

Mexico joined the space race in 1962, during the government of Adolfo López Mateos, with the creation of the National Commission for Outer Space, which aimed to take control and encourage the research, exploitation and use of air space for peaceful purposes. One of the main projects was the development of probe rockets. The same year, the UNAM created the Department of Outer Space today called Department of Space Sciences. In 1968, for the worldwide transmission of the Olympic Games, the first satellite station was built in Hidalgo, renting the ATS-3 satellite to NASA (Nava, 2016).

Unfortunately, this progress was interrupted in 1977 with the closure of the CNEE, by the Lopez Portillo government, derived from a strong economic crisis in the country. Until 1982, they acquired the first package of their own satellites called Sistema Morelos, which were put in orbit in 1985 and with that Telecomm

**Profesor Investigador, Universidad de Guadalajara* ********Universidad de Guadalajara*

was created. In 1993, the second satellite package was acquired or Sistema Solidaridad (Nava, 2016).

Given the technological dependency with the foreigner, in 1991 the UNAM created the University Program of Space Research and Development (PUIDE), which begins the design and construction of the first Mexican satellite UNAMSAT-1. Later, in 1994, several Mexican institutions sponsored by the Mexican Telecommunications Institute joined the SATEX-1 project, but again it was truncated due to lack of resources, when it was 80% complete. In addition, the satellite system was sold to an American company in 1997. The government did not re-acquire a satellite system, but until 2010, for national security, the company Boeing (Nava, 2016).

Despite this series of setbacks, in the last decade Mexico has positioned itself as a leader in aerospace manufacturing, which has generated new related national companies and clusters, which has led to the need to create new specialized careers (Nava, 2016).

B. News of the industry in Mexico and the world

The growth of air traffic in recent years has increased aerospace production, reaching the amount of 582.6 billion dollars in 2015. The region with the largest share in this process is North America, with 51.1%, in second place this Europe with 31.02% and Asia Pacific with 13.93%. Being Mexico the fourteenth producer worldwide (SE, 2017). With respect to the attraction of aerospace projects, between 2009 and 2017, the first place is occupied by the United States with 186 projects, the United Kingdom in second place with 103 and Mexico in third place with 92 (SE, 2017).

The global value chain is made up of companies categorized by their specialization spread around the world: OEMs (Original Equipment Manufacture) which are the manufacturing companies of the final product, TIER 1 manufacturers of components that go to the assembly line final, the TIER 2 the suppliers of parts of the TIER 1 components (SE, 2017). The TERESA project (TEchnology Roadmap for Environmentally Sustainable Aviation), launched by IATA, marks the technological trend of the sector for the reduction of fuel consumption and its emissions, pointing to a road map that identifies the technologies in the areas of fuselage and engines (SE, 2017).

The world fleet forecasts to 2036 reported by FEMIA, is of a demand of 41,030 aircraft of different sizes. Annual deliveries of between 1,500 and 2,000 single aisle aircraft are expected (such as the B737 MAX and A320 models), where the Boeing and Airbus companies practically produce about 90% of the aircraft in equal parts (FEMIA, 2019).

In the case of Mexico, the industry has shown growth in recent years, which is demonstrated in the number of exports, number of jobs, investment and domestic product, which exceeds the average of the manufacturing industry. The industry came to an end with the arrival of OEM manufacturing companies and their leading suppliers worldwide, who found the ideal investment and quality conditions. Advantages such as the geographical position with respect to the United States, the free trade agreements that it has, the experience in the automotive sector and the qualified workforce, made Mexico the optimal country for aerospace production (SE, 2017).Among the global companies in Mexico are the following:

a) Aernnova de España
b) Airbus Group de Europa
c) Bombardier Aerospace de Canadá
d) Daher Aerospace de Francia
e) Eaton Aerospace de UK
f) Fokker de Holanda
g) General Electric de USA
h) GKN de UK
i) Gulfstream Aerospace de USA
j) Honeywell Aerospace de USA
k) ITP Group de España
l) Groupe Latecoere de Francia
m) MD Helicopters de USA
n) Meggit de UK
o) Safran Group de Francia
p) Sargent Aerospace de USA
q) Textron – Cessna, Bell Helicoper, Beechcraff de USA
r) United Technologies Aerospace Systems de USA
s) Zodiac Aerospace de Francia (FEMIA, 2019).

The Ministry of Economy, with the support of other agencies, recognized 330 economic units and support entities of the aerospace sector that generate approximately 50 thousand jobs and are distributed in 18 states of the Mexican Republic as follows:

a) Baja California- 86
b) Sonora- 53
c) Chihuahua-39
d) Jalisco- 13
e) Aguascalientes-1

f) Durango-1
g) Zacatecas- 1
h) San Luis Potosí- 5
i) Querétaro- 44
j) Ciudad de México- 13
k) Estado de México- 13
l) Puebla- 2
m) Guanajuato-4
n) Hidalgo-1
o) Nuevo León- 34
p) Tamaulipas-12
q) Coahuila- 6
r) Yucatan-2(SE, 2017).

Of the aerospace equipment manufacturing companies, 51.1% are small, generate 22.5% of the jobs in the sector and 6.9% of gross production; the medians are 17%, with 22.4% of the employed personnel and 12.3% of gross production, while the large companies with 15.9%, with 54.9% of employed personnel and 80.7 of gross production (INEGI, 2018). The establishment of world-class companies has allowed the generation of different conglomerates, excelling 5 clusters in different States: Baja California, Chihuahua, Nuevo Leon, Querétaro and Sonora. Each of these has its specialty, given the experience, capacity and regional characteristics:

a) Cluster in Baja California: electric and electronic, parts for motor, assembly of interiors and seats, instruments of control and navigation, engineering and design
b) Cluster in Chihuahua: Aerostructures, fuselage, precision machining for turbines.
c) Cluster in Querétaro: fuselage parts, landing gear, cables, harnesses, precision machining, MRO
d) Sonoran Cluster: Aluminum manufacturing, high precision machining of turbine components, harnesses and cables
e) Cluster in Nuevo León: Helicopter fuselage, harnesses and rings made of special materials. (SE, 2017).

The distribution of aerospace operations is mainly concentrated in the manufacture of parts and components with 72.3%, engineering and design with 13.2% and maintenance and repair with 11.1%. Therefore, most of the companies in the sector have TIER 2, with 29%, and TIER 1, with 27% (SE, 2017).

The demand for qualified personnel for this highly specialized industry has fostered the creation of undergraduate and Advanced University Technician degree programs, such as Aeronautical Engineering, which have produced 4,523 graduates in the last 7 school cycles, between 2010 and 2017 (INEGI, 2018). This effort is paying off, given that aerospace companies generate high-paying jobs. According to INEGI data, the average salary of an employee in the manufacture of space equipment was $ 20, 772 pesos per month against $ 14, 737 pesos per month of the manufacturing industry average in 2017 (INEGI, 2018). The Gross Domestic Product of the aerospace equipment manufacturing keeps in constant growth since 2010 as shown in table 1:

Table 1: GDP of manufacturing of aerospace equipment in thousands of pesos at constant prices

Year	GDP of manufacturing of aerospace equipment
2010	8.6
2011	10.1
2012	13.8
2013	15.1
2014	17.0
2015	19.8
2016	21.7
2017	21.9

Source: Own preparation based on INEGI (2018).

Production that represented 0.78% of the total manufacturing in 2016, reaching a value of 2.7 million pesos (SE, 2017). On the other hand, foreign trade activities have maintained constant decrease rates in the last 12 years. In 2016, a trade surplus of 1.3 million was generated, given that exports reached the amount of 7.2 billion dollars and imports were 5.9 million (INEGI, 2018). The main commercial partner is the United States, which receives 80.7% of exports of aeronautical products in 2016, followed by Canada, with 4.7% (SE, 2017).

Among the strategies of the aerospace agenda for Mexico, are the following:

a) Promotion and development of internal and external markets.
b) Strengthening and development of capacities.
c) Development of human capital.
d) Technological development, science and innovation.
e) Development of transversal factors (SE, 2017).

While within the goals that are planned to be achieved by 2015, the following are included:

a) Locate the country within the first 10 places internationally, in terms of exports.
b) Export more than 12,000 million dollars of aerospace goods.
c) Have a solid index of the employment base of the industry and encourage its growth.
d) Maintain an added value of the sector above 20%. (SE, 2017).

In the territory of our main trading partner is one of the leading producers in the aerospace industry: Boeing. It was founded in 1916 in Washington with the mission and vision of "connecting, protecting, exploring and inspiring the world through aerospace innovation". Currently, it has reported revenues of $ 94.6 million dollars in 2016, presence in 150 countries (including Mexico), contracts with more than 20,000 suppliers and a workforce of 145,000 employees (Boeing, 2017)

DELIMITATION OF THE PROBLEM

Despite being a leading company in its branch, Boeing is at a time of crisis, product of the accidents that occurred in the months of October 2018 and March 2019, with balances of 189 and 157 dead respectively, where two aircraft model of Boeing 737 MAX 8 collapsed (Young, 2019). This led to the suspension of the commercial operation of this model in various parts of the world (Expansión, 2019). The 737 model is the bestselling airplane model in the world, in this recent version MAX 8 was included a more advanced and high engine with respect to the location of the wing, a sensor and connected software of different functionality, so it was requested the airlines will update the flight information manuals. But despite the efforts, the aerospace company has not given a final answer on the causes of the mentioned accidents (Young, 2019).

For the Mexican market this has an impact since Boeing is a client and supplier of companies related to aviation and the aerospace industry. Both the airlines and the manufacturers of parts and components depend to a large extent on the performance and management of the aerospace leader, not only in the short term, but in the long term, as their reputation is affected.

Research question:

Derived from the analysis, the following research question is generated. How would the crisis caused by air accidents affect the reputation of Boeing and, with it, the Mexican aerospace market?

THEORETICAL-CONCEPTUAL BACKGROUND

In this section, it is analyzed the theory of resources and capabilities, which is what explains the reputation as a sustainable intangible asset of the company that develops over time and is difficult to imitate.

The theory of resources and capabilities proposes that the extraordinary profits of the company are obtained from the valuable resources that they have under control (Fong, 2005) In other words, the performance of a company is a function of its resources and capabilities, which they are characterized by certain aspects of value categorized in the VRIO framework (value, rarity, imitation and organization), which can direct the company towards constant competitive advantage and consistent performance (Peng, 2010). The main postulates are summarized, including the contributions of some of the key authors such as Barney, Dierickx & Cool, as well as the recent discussions about it.

REVIEW OF THEORETICAL LITERATURE

The vision based on resources is the perspective basically proposes that the performance of a company is based on its resources and capabilities. Which are the assets that companies use to choose and implement strategies (Peng, 2010). At the time, thinking about the competitive strategy focused on the ways in which companies could create markets for imperfectly competitive products in order to obtain a higher normal economic return, but with the knowledge that the economic performance of the companies depends on the cost of implementing those strategies; It is necessary to calculate this cost so that companies really obtain a higher economic performance (Barney, 1986).

To help analyze the cost of implementing product market strategies, Barney (1986) introduces the concept of "strategic factor market", defined as "a market in which the necessary resources to implement a strategy are acquired". For companies seeking greater economic performance, strategic options should flow primarily from the study of their unique abilities and capabilities, rather than from the analysis of their competitive environment. Therefore, management skills are a necessary resource for the successful implementation of strategies (Barney, 1986).

The resources and capabilities are tangible and intangible assets. The resources tangible capacities, are practically those that can be seen and quantified more easily, are divided into four categories: resources and financial, physical, technological and organizational capabilities. Some examples could be the ability to generate internal financing or collect external capital, access to raw materials and distribution channels, use of patents, trademarks or copyrights, and systems of control, direction and

planning in form (Peng, 2010). With regard to intangible resources and capacities, it can be specified that they are resources and capacities that are difficult to see and quantify, and that also include a classification: human resources, capacities, innovation and reputation (Peng, 2010).

Virtually the vast majority of goods are produced through a value chain. It consists of two areas: primary activities and support activities. However, each activity requires a number of resources and capabilities and since no company possesses enough assets to be good in all primary and support activities, it is prudent to examine to see if they have the necessary elements to perform a particular activity superior to its competitors (Peng, 2010). Another of the dilemmas that companies face is in the use of labor or external elements or if they continue carrying out all the activities internally. This decision will depend on whether the capacity of the company allows or does not perform each task (Peng, 2010).

In sum, an analysis of the value chain commits managers to perform a SWOT analysis to determine the strengths and weaknesses of their company based on an activity, in relation to their competitors (Peng, 2010). Likewise, to sustain itself as a competitive advantage, resources and capabilities must comply with the VRIO Framework, which is based on aspects of value (V), rarity (R), imitation (I), and organization (O):

1) Value: the resources that add value can direct a company towards competitive advantage. So, if companies are not able to get rid of the resources and capabilities that do not add it, they are at risk of diminishing their performance.
2) Rarity: It is not enough to have good resources and capabilities, it is convenient that these are valuable and rare, since only these assets have the potential to provide some temporary competitive advantage.
3) Imitation: in addition to taking care of possessing valuable and rare resources and capacities, it will also be necessary to take care
4) Organization: only the valuable, rare and difficult to imitate capabilities that are impregnated with the organization and are exploited can generate a constant competitive advantage and consistent performance (Peng, 2010).

This is relevant given that the sustainability of a company's asset position depends on the ease with which assets can be substituted or imitated. Imitability is linked to the characteristics of the process of accumulation of intangible assets: the diseconomies of time compression, the efficiency of assets, interconnection, the erosion of assets and the causal ambiguity (Dierickx & Cool, 1989).

As previously mentioned, Barney stated that the factor market provides the inputs required for the implementation of a strategy. Many of these necessary inputs can be bought and sold in this market. The concept proposed by Barney is undoubtedly useful for evaluating the opportunity cost of implementing these assets. However, the deployment of such assets does not represent a sustainable competitive advantage, precisely because they are freely negotiable. On the other hand, some factors are simply not negotiated in open markets. Therefore, a complementary framework is required to measure the sustainability of the flow of benefits generated through the implementation of non-tradable assets. Examples of this type of assets are loyalty and trust (reputation) which are not commercialized, cultivated and obtained over time (Dierickx & Cool, 1989).

It is a priority for companies to have this type of intangible assets, which are usually built as a result of adhering to a constant set of policies over a period of time. Therefore, a key dimension of the formulation of the strategy can be identified as the task of making appropriate decisions about strategic expenditures, in order to accumulate resources and skills required. Critical or strategic stocks are those assets that are not tradable, imitable or substitutable (Dierickx & Cool, 1989).

Likewise, the sustainability of a company's privileged creditor position depends on the ease with which it can be replicated. If the imitation of a particular stock of assets could be slow or costly, this depends on the relative ease with which rival companies are able to accumulate a similar stock. This is a function of the characteristics of the process by which it can be accumulated. These factors are:

a. Diseconomies of understanding of time: its concept is based on the law of diminishing returns, when time remains constant.
b. Efficiency in the mass of assets: sustainability will be reinforced to the extent that it increases the ease of massive accumulation of assets.
c. The interconnection of asset populations: the accumulation of increases may not depend only on the level of a stock, but also on the level of others. The difficulty of building an action is related to the low initial level of its complement.
d. Asset Erosion: In general, the increase in decomposition rates weakens the inherent asymmetry between companies that have stocks of important assets and those that have the stock levels of the lower assets. However, it is important to keep in mind that the dominant position of a company can be sustainable, although its underlying asset base is subject to rapid decomposition, as long

as it faces lower "maintenance" costs. This may be the case when a company enjoys greater efficiency in the accumulation of asset mass efficiency and / or asset interconnection. On the other hand, the presence of time compression deconomics, in addition to the rapid erosion of assets, makes it very difficult to maintain asymmetric stock levels.

e. Causal ambiguity: this exists over the process of asset stock accumulation and is captured by the notion of "uncertain imitability", which suggests that it is sustained by differences in performance can be found even in the perfect competition industry environments (Dierickx & Cool, 1989).

Finally, the vision based on resources and capabilities is subject to four leading debates that are detailed below:

1) Firma versus industry-specific performance determinants: At the heart of this vision is the proposal that the performance of the firm is primarily determined by its capabilities and resources, while in the industry-based view the argument is that the performance of a firm is based on the specific attributes of the industry.

2) Static resources versus dynamic capacities: It is considered that tacit knowledge could be the most valuable resource, unique, difficult to imitate andof greater organizational complexity, which represents the maximum dynamic capacity that a company can have in its search for the competitiveadvantage. These types of assets range from knowledge about customers through years of interaction, to knowledge about the product development process and political connections. With this it is given cavity to the subject of hyper competition that is a way of competing focused on dynamic maneuvers designed to unleash a series of small, unpredictable but powerful actions to undermine the competitive advantage.

3) Internationalization versus non-internationalization: Really how favorable internationalization can be depending on the ethical behavior of the companies, since it could have consequences such as affecting the employment rate in the countries of origin, lack of responsibility and even, lead to problems of national security.

4) Domestic versus international capabilities: the philosophy of thinking globally, acting locally, emphasizes the importance of thinking about big designs on global strategy, without neglecting the details that make a local market gain (Peng, 2010).

To conclude, to develop an intelligent strategist it must be built strengths based on the VRIO framework; the persistent imitation or standardization, although important, does not seem to be a successful strategy, since the following firms tend to mimic the most visible, more obvious and consequently less important practices of the winning firms; Finally, a competitive advantage that is constant does not imply that it will last forever, so it is necessary to develop resources and capacities for future competition (Peng, 2010).

METHODOLOGY

We used a qualitative methodology that facilitated the description and explanation of the object of study. This included an investigation of secondary data to delve into the characteristics of the aerospace industry, its importance and historical development in the world and national market, as well as the problems raised by recent events, together with the theoretical review of literature related to the theory of resources and capabilities.

ANALYSIS OF RESULTS

As analyzed in the literature, reputation is an intangible asset that is built over time. Boeing is a company with more than 100 years in the market that has achieved a higher participation in the manufacture of aircraft, whose reputation is difficult to tear down. However, the facts suggest an inefficiency in crisis management, given that a final response and solution to the clients has not been obtained, as one would expect from a global company of its level and importance. An example of this is the suspension of 6 aircraft of the mentioned model of the Mexican airline Aeromexico, which has been economically affected and could continue to be so if the problem is not resolved with the appropriate promptness.

The loyalty and confidence of the customers is a key element of Boeing's competitiveness, however, the current situation could affect the long-term perception of the market and, in turn, the economic performance of the company and its chain of supply.

CONCLUSIONS

The aerospace industry has seen accelerated progress in recent years due to the growth of air traffic. It has a wide value chain that expands across the globe, facing a huge demand for aircraft, whose main manufacturers are two internationally recognized companies: Boeing and Airbus. Boeing is a leading brand that, although it does not have operations in Mexico (Boeing, 2019), has Mexican suppliers and customers that depend on its optimal compliance.

The performance of a company is based on its resources and capabilities, which are both tangible and intangible

assets. Within these last ones the reputation enters.

Reputation is a sustainable asset given the difficulty of imitation, which implies a competitive advantage over outgoing. This privileged position is achieved by factors such as the diseconomy of understanding time, efficiency in the accumulation of assets in a massive way, the interconnection of the accumulation of asset populations, the erosion of these and the uncertain inimitability.

Boeing faces an unfavorable situation caused by accidents of the last 8 months, which is affecting its operations with the suspension of model 737 MAX 8 aircraft. The impact could be greater by affecting its reputation, both in the short and long term, since it would lose one of its important competitive advantages. Of course, the decisions and actions taken by Boeing will have an impact on the economy of its entire supply chain, where Mexico plays a relevant role. Even, it could be taken advantage of by its main competence and displace it in the leadership that it occupies today.

REFERENCES

- Barney, J. (1986). Strategic factor Markets: Expectations, Luck, and Business Strategy. Management Science, 32: 1231-1241.
- Boeing (2017). Presentación General de Boeing.Recuperado de https://www.boeing.es/resources/sp_ES/acerca-de-boeing/environment/Presentaci%C3%B3n_General_de_Boeing.pdf
- Boeing (2019). Where we are. Chicago, Ilinois: Boeing CompanyRecuperado de https://www.boeing.com/company/key-orgs/horizon-x/#/where
- Dierickx, I. and K. Cool (1989). Asset stock accumulation and sustainability of competitive advantage. Management Science, 35: 1504-1511
- Expansión (2019). México suspende "hasta nuevo aviso" operaciones de aviones Boeing 737 MAX. CDMX, ExpansiónRecuperado de https://expansion.mx/empresas/2019/03/13/mexico-suspende-hasta-nuevo-aviso-operaciones-de-aviones-boeing-737-max
- Fong, C (2005) La Teoría de Recursos y capacidades, fundamentosmicroeconómicos. Guadalajara, Jal: Universidad de Guadalajara
- FEMIA (2019). Acerca de la Federación Mexicana de la IndustriaAeroespacialRecuperado de https://docs.google.com/viewer?url=http://femia.com.mx/themes/femia/ppt/presentacion.pdf
- FEMIA (2019). Estructural. CDMX, México: Federación Mexicana de la IndustriaAeroespacial, AC. Recuperado de https://www.femia.com.mx/index.php?module=femia&section=2
- INEGI (2018). Conociendo la industriaaeroespacial. Recuperado de https://www.gob.mx/cms/uploads/attachment/file/315125/conociendo_la_industria_aeroespacial_23mar2018.pdf
- Nava, R (2016). Historia de la industriaaeroespacialen México y suvínculo con la aeronáutica .Ciencia UANL. No.81 septiembre-octubre 2016, pp 17-25
- Peng, M. (2010). Estrategia Global. México: Centage Learning.
- SE-Secretaria de Economía (2012). Proaéreo 2012-2020. Recuperado de http://www.2006-2012.economia.gob.mx/files/comunidad_negocios/industria_comercio/proaereo_resumen_ejecutivo.pdf
- SE-Secretaria de Economía (2017). Proaéreo 2.0Recuperado de https://www.gob.mx/cms/uploads/attachment/file/314141/ProA_reo2.0_publicar_050418.pdf
- Young, R (2019). Accidente de Ethiopian Airlines: cómoes el Boeing 737 MAX 8, el nuevomodelo de aviónimplicadoen 2 accidentes con cientos de víctimasenmenos de 5 meses.ReinoUnido, BBCRecuperado de https://www.bbc.com/mundo/noticias-47518347