

CHINA'S AVIATION INDUSTRY DURING THE COVID-19 PANDEMIC



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ABSTRACT

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This paper discusses the impact of the COVID-19 pandemic on the aviation industry in China. The major challenges facing the Chinese aviation industry is the reduction in passenger demand. In addition, the financial pressure facing Chinese airlines continues to pose unique challenges to the competitiveness of the aviation industry. Our PESTLE analysis shows that the Chinese government needs to be more proactive in developing solutions to help the aviation industry. MOST analysis also supports the aviation industry's goal of achieving global leadership through strategic alliances, aircraft investments, technological innovations, and improved consumer service. From the SWOT analysis, the Chinese aviation industry can leverage its innovative technologies and government financial support to gain a competitive advantage and meet consumer demands. Therefore, the challenges facing the Chinese aviation industry under the impact of the COVID-19 pandemic can be mitigated by recommendations that align with China's financial, social, and economic frameworks.

Contribution/ Originality: The aviation industry has been hit hard by the global lockdown during the COVID-19 pandemic. This study aims to qualitatively analyze the impact on China's aviation industry during the epidemic, and focus on the Chinese market to provide the industry with recommendations for adapting to the epidemic.

1. INTRODUCTION AND BACKGROUND

The first case of the COVID-19 pandemic was reported at the end of 2019, and what followed has been a catastrophic series of events that have impacted the globe. With the World Health Organization (WHO) taking the reins on the matter in February, the world has witnessed many changes in different industries. The high death rates and vulnerability of populations required the introduction of control measures that would stem the spread of the virus. As developed countries such as Italy, the United States (U.S.), and the United Kingdom (U.K.) witnessed heavy losses of life, the world realized the dire situation the pandemic had presented and would perpetuate in the coming years. Currently, the COVID-19 pandemic continues to pose major threats to the economic, social, and political frameworks of the world. In China and other parts of the world, critical impact has forced countries to make changes and evolve as they grapple with the consequences of the highly contagious virus. Notably, the health systems of countries globally have been impacted by the pandemic, and this created the need for regulations and restrictions that would reduce the spread of the pandemic. For instance, countries like South Korea, China, Australia, and New Zealand introduced financial shutdown frameworks as they focused on flattening the curve of infection.

The spread of the pandemic forced numerous countries to institute lockdown and social-distancing strategies. When passengers travelled to or arrived from overseas countries, they were forced into fortnight-long quarantine periods. With the decline of businesses, the economies of countries began to decline. In the U.S., the unemployment rate increased drastically, with many businesses filing for bankruptcy (Wang, Yang, Iverson, & Kluender, 2020). In response to this, governments introduced public policies that would allow the society a semblance of support, as the end of the virus seemed distant.

In this scenario, the aviation industry was affected, with reduced movement between countries and even states and cities (Wang et al., 2020). The International Air Transport Association (IATA) underlined the need for aviation companies to adopt strategies that would mitigate the loss in revenue and operations following the COVID-19 pandemic (Liu et al., 2020). The organization reported that there was a 38% reduction in the revenue passenger kilometers (RPK) rate in 2020 when compared to the previous year (Pearce, 2020). Furthermore, despite some form of relief from China's repaid response to the outbreak, the aviation industry will continue to suffer significant losses over the coming years.

Research into financial activities in the market post-COVID-19 pandemic indicated a vital decline in operations in the sector. According to Sharif, Aloui, and Yarovaya (2020), the COVID-19 pandemic has led to an unprecedented reduction in flights between China and other countries, as the country began by first closing its borders in response to the pandemic. In this context, uncertainty in financial markets has led to a drop in stock prices, with significant differences before and after the outbreak. Additionally, the effects were much more detrimental when compared to 2003, when China experienced the severe acute respiratory syndrome (SARS) pandemic (Siu & Wong, 2004). Loh (2006) posits that news about health volatilities, especially those involving infectious diseases, have a heavy impact on the stocks of airline companies. In this case, the high volatility witnessed led to an increase in the financial risks involved in the aviation industry.

Arguably, the global lockdown experienced is especially important to the global aviation industry. Thus, numerous Chinese airlines experienced a high degree of volatility bringing down stock prices, as the future looked bleak. Even as the Chinese aviation industry responded to the volatility by taking up new managerial tactics and rationalization policies, there continued to be a drastic decline in the share value of the airlines. For instance, while Shenzhen Airport implemented more positive strategies in the face of the pandemic, they were not enough to recover the financial decline faced by the industry (Liu et al., 2020).

The impact of the COVID-19 pandemic in China was felt heavily by the oil and aviation industry, as the two industries serve as critical drivers of the country's economy. As a leading consumer and importer of oil, China has depended on oil to drive its economic standing. As such, with the appearance of the COVID-19 pandemic, the country was concerned about meeting the demands of the oil and aviation fuel industries. Notably, the first months of the pandemic witnessed the decline of oil prices from 62 to 57 dollars in January and February of 2020 (Mhalla, 2020). Such values were validated by the reduction in demand in the Chinese market. According to reports by the Organization of the Petroleum Exporting Countries (OPEC), the COVID-19 pandemic had devastating impact for the economic framework of China with the decline of oil demand (Mhalla, 2020). Additionally, the regional body noted the impacts on the aviation industry, with China demanding less and less fuel resources. Keenly, the Chinese New Year period occurred as the pandemic was unravelling its devastating impacts, forcing many Chinese families to remain in their homes when they would have otherwise traveled abroad or visited their families.

An overview of the global aviation market indicates that China is third after the U.S. and U.K. However, with the onset of the pandemic, the country's rank fell all the way to 25, below Portugal and just above Vietnam. As airlines closed their airports, the decline in passengers and the closure of routes lowered the value of China's aviation industry significantly. The impact of the pandemic has also created significant challenges for the tourism industry in China, as international travel declined over the 2020 and 2021 period. Local travel, however, has been increasing at a slow rate, with the China Eastern company indicating increasing numbers. Both China Eastern and

Air China were formed in 1988 and have served as critical players in China's air transport industry. Notably, China Eastern Air Holding, China Eastern's parent company, invested nearly five billion dollars in the company in 2020, aiming to enhance the country's tourism industry, given the loss of more than one billion dollars in the first six months of 2020 (Hoque, Shikha, Hasanat, Arif, & Hamid, 2020). Ideally, the advantage of Chinese airlines lies in their links to the state, allowing for substantial financial investment to facilitate their operations and ensure competitiveness on a global scale.

A critical background for this report is an exploration of the challenges the SARS pandemic brought to the aviation sector in China. According to Liu et al. (2020) the development of SARS led to the infection of nearly 8,000 individuals, with its spread in 37 countries leading to the death of 774 individuals. The current COVID-19 pandemic and SARS exhibit similarities in their outbreak and spread to human beings. First, they have similar epidemiological impact, as they are both described as zoonotic viruses. Next, their modes of transmission to human beings are similar, as they lead to respiratory illnesses. In this context, the reactions that governments have had to the COVID-19 pandemic have their foundations in China's dealings with the SARS outbreak. Cooperation and collaboration between countries is mandated by the WHO as they team up with the Centers for Disease Control and Prevention to reduce the spread of infections. Notably, the dissemination of information to communities is mandatory in ensuring that health and safety measures are introduced to prevent the spread of such viruses.

The aviation industry is a critical component of China's share of the world economy. This importance is reflected in both the upstream and downstream sectors of the aviation industry. First, the aviation industry is linked to the upstream sector, including aircraft manufacturing and air transportation, which includes airport operations, refined petroleum manufacturing, and rental and leasing services. Of particular importance is the inherent link between the airport and the air transport industry. Many companies outline their operations at airports, using them as hubs for business interactions. In addition, the sector has a high degree of shared ownership, with private and public companies forming strategic alliances. Another aspect is the reliance of aircraft manufacturers on demand for aviation services through leasing companies or direct links with industry players. Notably, given the strategic decisions the industry requires, this paper provides an overview of the various industries impacted by the industry and makes recommendations to facilitate overall improvement in the industry.

Second, with regard to the downstream sector, it is worth noting the importance of the aviation industry in facilitating the movement of goods and services between different countries. As will be discussed, China plays a vital role in global supply chain, as it manufactures and imports products used in key industries that support the growth and development of regional institutions and member countries around the world. At the same time, an important determinant of the location of companies' headquarters is the business travel operations of airlines. With knowledge transfer imperative for developing competitive advantages for companies, the impact on the aviation industry is critical to the location of a company's headquarters (Dray, 2020). Tourism is also important to the economy, and many countries have seen a drop in the tourism revenue amid the impact of the pandemic. Therefore, it is critical for the sustainability of the industry that airlines are ready to transport passengers to designated areas. Notably, in addition to the linkages between the aviation industry and other sectors identified in the business framework, the former is also substitutable and complementary compared to other modes of transport that facilitate economic activity. With the International Energy Agency estimating that at least 14% of aviation operations could be substituted with medium-haul routes and high-speed rails, one can comprehend the impact of the COVID-19 pandemic for the economic operations in China. Nonetheless, the aviation industry remains a critical sector that facilitates development in intercountry operations.

2. IDENTIFICATION OF PROBLEMS

Discussing the impact of the COVID-19 pandemic to the Chinese aviation industry requires a general overview of the negative situations that have impacted and could impact the industry. As discussed, the pandemic has led to

the need for strict air travel restrictions as countries focused on controlling the spread of the virus. At the onset, these restrictions were critical in preventing the spread of the virus. According to [Chinazzi et al. \(2020\)](#) the introduction of air travel restrictions in Wuhan, China led to an 80% reduction in infection rate in the region, as well as on a global scale. [Rapaccini, Saccani, Kowalkowski, Paiola, and Adrodegari \(2020\)](#) however, point to the challenges these restrictions bring to the aviation industry, as they highlight a drop in demand for services. The development of green lanes that allow airlines to flow between designated countries was focused on managing reduced demand. However, this approach was taken with caution, given that the participating countries had to integrate stricter safety and health measures. [Goh \(2020\)](#) discusses existing green lanes between China and Singapore, New Zealand, and Australia as examples. However, the discussion highlights the need for bilateral agreements between the two countries to support the movement of people, a clear indication of their inefficiency in increasing demand for air travel. [Hou et al. \(2021\)](#) add that passengers are now more cautious and feel more anxious when using air travel to reach their destination. While previously, air travel was for leisure and business purposes, travel is discouraged by most passengers seeking leisure. In addition, tourists are finding it more cumbersome to use air travel due to the need to maintain social distancing and wear masks.

Fundamentally, the threat of pandemics and infectious diseases is particularly relevant to the aviation industry, posing a real threat to the operation of the industry as uncertainty and anxiety about its containment reduce consumer confidence in the industry. Increased urbanization poses a higher risk for the spread of pandemics and infectious diseases, as airlines provide an enabling environment for increased infection rates due to the congested nature of airports. In the 1960s, the world experienced a comfort zone with control and prevention measures for many infectious diseases. However, with emerging threats such as Middle East respiratory syndrome (MERS), SARS, and the COVID-19 virus, the aviation industry must contend with the effects of this biological anomaly. In reducing the spread of the virus, border closures and quarantine measures were implemented, contributing to the decline of operations in the aviation industry. According to McKinsey Insights (cited in [Tay et al. \(2020\)](#)): *“This sharp and sudden decrease in the demand for air travel is unprecedented. The impact of COVID-19 on global travel-sector revenues is much worse than the combined impact of the September 11 attacks in 2001 and the 2008 financial crisis, where the loss in revenue due to the pandemic is expected to be 314 billion (p. 460).”* Hence, this is a critical problem that the Chinese aviation industry must address by identifying problem areas and developing mitigation methods.

Another problem for the aviation industry caused by the COVID-19 pandemic is the decreasing demand for air travel, resulting in an oversupply of aircraft. [Ellwood \(2020\)](#) reveals a dramatic reduction in the air traffic of Middle Eastern airlines, with most airlines grounding more than 85% of their activities. The change has also impacted the air cargo market, with lower demand leading to high operating costs and lower profit margins. Consequently, changes in airline management operations have led to cost-cutting strategies that have resulted in massive job losses. Often, airlines opt to retire old aircraft or introduce furlough schemes for airline employees. These strategies have become even more dire for the workforce in response to an economic downturn. [Abdullah \(2020\)](#) notes that with the grounding of aircrafts, the impact on the maintenance, overhaul, and repair sector is increasing, and the small businesses responsible for such operations have little or no business operations in the airline. These issues are relevant to the Chinese aviation industry as they are widely applied across the industry, requiring an investigation of the methods that can be implemented to improve and sustain the aviation sector.

Determining changes in the behavior of air passengers following the COVID-19 pandemic is a major issue that must be addressed. Globally, demand for services in the industry has plummeted, and China has also been affected by consumer reaction. The IATA details that the 90% drop in consumer demand for global air services is unlikely to improve significantly, even if measures to combat the pandemic are rolled out ([Tay et al., 2020](#)). The shock the aviation industry has experienced has created a liquidity buffer for airlines, putting them under pressure even as they struggle with variability in operating costs. Notably, fuel costs for the industry are as high as 25% of total costs, and as oil prices have fallen, so have operating costs for airlines.

The mid-term impact of the pandemic reveals two uncertainties that pose challenges for China's airlines. First, the health measures put in place to curb the spread of the virus are costly. Airlines and airports must integrate additional health and safety requirements, including virus or temperature checks, personal protective equipment (PPE), and disinfection, because of their increased operating costs that must or may be passed on to consumers. In addition, the implementation of health and safety measures requires the application of social distancing strategies to reduce the number of seats occupied on each flight. This means a 50% reduction in passenger load factor. Second, the recovery of commercial flights will face a marked reshaping, as many airlines determine frameworks and strategies to ensure they achieve a return on investment while implementing the above measures. Global travel restrictions, reduced financial activity, and changes in consumer behavior in the transport industry could all be obstacles to the normal resumption of operations in the aviation industry. The recovery in the commercial aviation sector is expected to be rather slow, with flight numbers expected to be much lower than pre-pandemic levels

In the long run, demand for aviation services and products may change given changes in consumer behavior. Most companies involved in the aviation industry citing business travel have had to switch to a remote work strategy, and the trend is likely to continue, suggesting the industry will face challenges in persuading them to resume activity with the aviation industry. Supply shocks and negative demand for aviation services will have an impact on the short-, medium- and long-term operations of the aviation industry, thereby cementing the negative impact of the COVID-19 pandemic. As the virus shows signs of resurgence in different countries, fluctuations in aviation restrictions, and a potential second, third and fourth wave of infections will require operational restructuring of the aviation industry as they struggle to maintain profits and revenues.

Finally, different airlines have different operating structures to prepare for crises such as the COVID-19 pandemic. In this case, different companies that depend on the aviation industry will be severely affected. Therefore, given the varying prospects for the future of companies, the main challenges highlight the response of the government and the aviation industry, especially to adapt to these changes. In a nutshell, as airlines strive to survive in the current crisis, mergers, acquisitions, and bankruptcies are inevitable, and it is expected that the costs and prices involved in the industry may be affected, as well as negatively impact competition in the aviation industry.

3. ANALYSIS OF PROBLEMS

3.1. PESTLE Analysis

i. Political

The political factors surrounding the COVID-19 pandemic are of particular importance to the aviation industry. The outbreak has posed considerable challenges to the Chinese aviation industry. In response, the Chinese government has taken various measures to prevent the spread of the virus. China had an especially strict level of travel restrictions at the start of the pandemic. China was the first to take ground flights and air travel from Wuhan and other affected areas. According to [Salman, Seiam, and Fayaz \(2020\)](#) there were unprofitable routes and declining passenger numbers in Hong Kong and mainland China as bans from other countries impacted the aviation sector. As the pandemic continued to spread to other countries, China was more cautious, limiting the number of people entering and leaving the country ([Abu-Rayash & Dincer, 2020](#)). However, with the aviation industry's financial situation in jeopardy, the Chinese government has provided financial assistance to subsidiaries and foreign organizations in China. The inclusion of the regional body, the Association of Southeast Asian Nations (ASEAN), has also highlighted significant support for China's aviation industry as they call for ease of digital and technology trade efforts to improve supply chain activities in China and other countries in the ASEAN regional framework ([Djalante et al., 2020; Sobie, 2021](#)). China's top priority is to strengthen safety measures to prevent the spread of the COVID-19 virus as they prioritize health and safety measures. China has been more focused on beefing up data security as it uses its vast database to track infected coronavirus cases and keep citizens safe while traveling in

China. In 2021, ASEAN and the European Union established an aviation agreement to improve travel between the two regions as they look to increase air services during the pandemic (European Commission, 2021).

ii. Economic

The impact of the epidemic on China's economic structure is serious. A downturn in business inevitably leads to a drop in employment. 2020 was the country's slowest economic growth in 40 years. According to the International Labour Organization (2020): "*Apart from financial services and information technology, all other sectors were hit, many of them employment intensive. The first quarter decline in output of the accommodation and catering sector, for example, was 35 per cent; 18 per cent in wholesale and retail trade; 18 per cent in construction; 14 per cent in transportation, warehousing, and postal services; and 10 per cent in manufacturing* (p. 2)." Notably, the aviation sector faced a decline in operations, reducing their revenues drastically. While the passenger sector experienced a significant decline, the air cargo sector experienced a small decline as increased operations in the transportation of medical and protective equipment increased. In the aviation industry, categorizing the economic impact requires consideration of the financial impact involving contract changes, existing and new facilities, and reduced consumer demand as ticket refunds, bookings, and cancellations all change. In addition, operations were affected because of maintenance obligations, acquisitions and mergers, and the high likelihood of airline bankruptcy. Jalif (2020) suggests that the economic relief from governments was vital for improving the financial standing of airlines. The Chinese government responded with substantial financial contributions to its airline subsidiaries, as well as foreign companies, encouraging them to resume their operations.

If the Chinese aviation industry is to succeed in these economic challenges, strategic alliances must be formed to ensure that they can increase economic advantage. Therefore, reducing operation costs while developing synergies to attract customers is critical to their survival. The aviation industry can also focus on cargo operations, as they have experienced increasing demand globally. As countries continue to deal with the outbreak, the Chinese aviation industry can continue to cargo services, improving the financial capacity of the industry.

iii. Social

International and domestic travel in the aviation industry has fallen sharply after the WHO announced the impact of the pandemic and the travel restrictions that had to be implemented to prevent the spread of the pandemic. These restrictions affected families and even employees as they were forced to deal with the anxiety and disappointment of not being able to visit family, colleagues, and friends. Likewise, as employment rates fell, employees lost their jobs, leading to social disharmony and broken relationships. According to Fowler (2020) who quotes David Blustein, a counseling psychology professor at Boston College, the pandemic is expected to introduce and maintain high unemployment. This, in turn, affects the social harmony of the society, as people have less money to spend and less freedom to carry out their activities. Sanitary measures to contain the spread of the pandemic have also increased anxiety among airline employees, as they must remain disciplined in following the rules, even as they deal with large numbers of people.

iv. Technological

As the pandemic continues, the aviation industry's need for modern technology underpins the drastic changes the industry needs. Hygiene measures requiring social distancing and wearing masks make it necessary for China's aviation industry to introduce innovative devices that measure people's temperature and promote social distancing. Yu (2020) notes that the increase of robots in China's aviation industry is a technological development that will reduce the spread of the pandemic. So, as airport employees are replaced by robots, the safety of passengers and the remaining workforce is guaranteed. Innovation is also critical to developing a vaccine that permanently ends the threat of a pandemic.

As witnessed in China, modern technology has allowed the tracking of infected individuals because the government can immediately identify individuals infected with the virus. The widespread use of the WeChat app in China has helped the country prevent the spread of the pandemic as it supports the development of technology-related strategies for its end users (Wang et al., 2020). In the aviation industry, this technological improvement has been particularly important for China to resume international air travel, with the use of testing centers and smartphones helping the government reduce the spread of the virus. Providing information to prevent the spread of the virus is another technological issue that has been addressed with smartphones and tracking software, ensuring government officials can track the virus and prevent the spread of the pandemic.

v. Legal

There are regulations and policies that affect the aviation industry. In China, the government installs controls that regulate the operation of the industry. Since most airlines are state-owned, the legal impact needs to be carefully considered before any action is taken. Furthermore, with the unstable relationship between China and the U.S., a legal framework must be established to safeguard the interests of Chinese companies. Often, the legal and political aspects affecting the aviation industry in China are interconnected as they relate to passenger safety, airport security, taxation, and labour unions. In addition, Chinese airlines also have rights and laws to protect consumers.

vi. Environmental

Environmental factor affecting the Chinese aviation industry includes the sustainability issues that companies have been experiencing. The environmental efficiency of Chinese airlines has dropped significantly. This decline is related to a lack of environmentally friendly practices that will increase the sustainability of the industry (Kim & Son, 2021). In this regard, the aviation industry needs environmental stewardship to prevent its business from causing a global ecological decline. Given its contribution to the rate of global warming, the Chinese aviation industry must address this issue with zero-emission, electric and solar-powered aircraft.

3.2. MOST Analysis

i. Mission

Examining the mission of the Chinese aviation industry requires exploring the mission statements of various companies in the industry. Air China's mission statement and future vision are to meet consumers' needs and create sustainable value for consumers (Air China, 2021). In addition, the organization is focused on providing consumers with high-quality service, with a focus on ensuring comfort, choice, convenience, and credibility, while seeking global consumer recognition. China Southern Airlines intends to be the airline of choice for its consumers and employees (China Southern Airlines, 2021). The company is based in China, focuses on the Asia-Pacific region, and connects the world, aiming to deliver sustainable economic principles change the world, and ensure that the organization is the best in the world. China Eastern's mission emphasizes providing a luxury travel experience to its global customer base as it ensures delicate, accurate, and precise service (China Eastern, 2015). Notably, the company's focus is to become a top global airline with Asian roots and excellent hospitality. Therefore, Chinese airlines clearly want to be the top international players in the aviation industry as they provide high-quality, sustainable and consumer-centric services. These missions support the development of the Chinese aviation industry, which has gained momentum after experiencing its first COVID-19 infection.

ii. Objectives

As implied in the mission section above, the objective of the Chinese aviation industry is to become a top global player. Companies in the industry have highlighted their desire to provide world-class services to air transport

consumers as they strive to compete fiercely with the world's leading players, including the U.S. and the U.K. As evidenced by the Center for Aviation (CAPA) (Wang et al., 2020) this is a goal achieved by China in 2020 as the COVID-19 pandemic impacted other players in the market. This objective has seen the government's investment in boosting the industry's aircraft manufacturing capabilities, as the move to locally produced products will allow airlines to obtain cheaper aircraft, thus boosting investment in the services they provide to consumers.

iii. Strategies

The strategies employed by the Chinese aviation industry are varied as airlines focus on different goals and missions. For China Eastern Airlines, investments in international marketing, manufacturing and operational process improvements, as well as customer service and fleet technology allow the company to leverage its value and continue to increase expansion, investment, and revenue (Yan, Fu, Oum, & Wang, 2019). In contrast, China Southern Airlines has sought partnerships with other companies in the aviation industry, as it intends to improve its competitiveness. This strategy focuses on increasing the capacity of the airline, with a plan to have 1,000 more aircrafts in operation (Boon, 2018). For Air China, achieving its objectives means the company continues to develop a competitive advantage as a major airline with a long history in China. In developing innovative technologies to improve customer satisfaction, the airline is building on its edge as it evaluates the tactics its competitors are using and creates new ones that set it apart. Therefore, the Chinese aviation industry is focusing on differentiation and cost reduction strategies to improve its position in the market. Hence, the industry provides consumers with unique and high-quality services as it continuously evolves to meet their needs.

iv. Tactics

Several companies in the Chinese aviation industry have been increasing the capacity of their airlines. For example, China Eastern Airlines and Air China both acquired Boeing 737 MAX aircraft in anticipation of a full reopening of the aviation industry (Low, 2021) to boost their passenger operations. Their investments in their airline subsidiaries are also critical to advancing the airline's goals. Backed by such funding, Chinese airlines have been investing in innovative technologies to improve services for consumers. Mergers and acquisitions have also occurred in the Chinese aviation industry; in 2002, nine companies merged to form China Southern Airlines Group, China Eastern Airlines Group, and Air China Group. In turn, these three companies have played a vital role in expanding the financial capabilities of the Chinese aviation industry.

3.3. SWOT Analysis

i. Strengths

One of the strengths of the aviation industry in China is that economic development has significantly boosted the industry. In 2019, the industry transported at least seven million tons of cargo, an increase of about 2% from 2018. The growth trend of the industry underlines the country's focus on the industry, which suggests that China's macroeconomic trends are improving (Li, 2020). Notably, China has been on the economic front as China continues to prioritize growth in the industry. Under such circumstances, experts predict that China will continue to invest the aviation industry to improve its economic position in the world.

Another strength is the increase in cargo airlines. Budd and Ison (2017) argue that specialized cargo airlines highlight the improvement of efficiency and safety for China's air service. As of 2020, China has 175 dedicated freighters providing specialized services to the industry (Li, 2020). In 1997, the state postal company China Post, along with other companies China Southern Cargo, Air China Cargo, and Air China Cargo, developed their initial cargo airline, offering similar services from 1998 to 2003. In addition, YTO and SF Express were established in 2015 as private express delivery agencies, and their business has continued to expand since then. To complement the lucrative trucking company's strengths, SF Express acquired DHL's supply chain as it developed into a supply

chain company. Going forward, affiliate strategies are predicted to be the future of airlines in the aviation industry as they combine cargo and passenger airlines.

ii. Weaknesses

The Chinese aviation industry is also facing challenges, with insufficient air cargo capacity. Given that cargo aircrafts only amount to 4.5% of the total aviation activities, industry experts warn that this could hamper its growth in the long run (Centre for Aviation, 2020). Currently, the Chinese aviation industry uses the belly hold of passenger aircrafts and cargo aircrafts for transporting cargo. The aviation industry has slumped sharply due to the COVID-19 pandemic, with most of the cargo carried by passenger planes grounded as countries impose lockdowns. Arguably, demand for PPE and medical supplies has improved the aviation industry in 2020, although China's capacity continues to lag significantly compared to the rest of the world's dominant aviation industry.

Another weakness of the Chinese aviation industry is its lack of participation in global markets. Typically, the Chinese aviation industry accounts for at least 30% of passengers and cargo to and from China. For instance, during the Lunar New Year period, inbound flights to China decreases significantly and many airlines reduce their operations in China. The outbreak of the COVID-19 virus has led to more drastic changes in the aviation industry, and China needs a lot of medical supplies. As China reduces the impact of the pandemic, activity in the aviation industry has increased, as many passenger flights are converted to cargo.

iii. Opportunities

China must consider some notable vacancies in the aviation industry as it seeks to increase its market share in the global market. First, China must use the support provided by the government to improve its aviation industry. Dobre (2021) note that government policies play a key role in improving the aviation industry as they provide a framework for increased activity and smooth operations in the industry. Dash, Dash, and Sethi (2021) state: "Government intervention is crucial in ensuring the survival of the aviation industry, where it is a systemically important industry. For example, the federal government in Australia has waived \$75 million worth of fees and charges for domestic airlines as the Australian aviation industry suffers from COVID-19" (p. 51). As China's State Council is aware of the challenges facing the industry, it offers many investment opportunities and strategies to strengthen its business at home and abroad. Notably, with the COVID-19 pandemic, the Chinese government has provided strategies and channels to enhance the delivery of emergency medical supplies to countries in need. Meanwhile, China has allowed passenger airlines to transform their operations into cargo operations, strengthening operations aimed at transforming the industry.

As the proliferation of technology provides consumers with more online shopping opportunities, there is also a growing demand for e-commerce express delivery. The World Economic Forum (2018) states that by 2010, at least 1% of the global e-commerce market share was allocated to China, and by 2018 this figure increased to 42%. At the same time, e-commerce companies have been improving the supply and delivery of products, for example, the aviation industry has an opportunity to facilitate express delivery as demand for products and services rises. YTO and SF are the dominant players in this sector, as they facilitate the operation of the aviation industry through delivery services, especially during the peak holiday season (Li, 2020). In addition, cross-border e-commerce is on the rise, facilitating the movement of people and goods across different countries. With the capacity to link more than 51 cities around the world, the Chinese aviation industry is expected to continue to improve. Arguably, the Chinese aviation industry has been boosted by pilot free trade zones that allow more aviation activity to and from China. Experts pointed out that during the epidemic, the opening of new air routes between China, the U.S., and Russia has become the basis for strengthening transportation activities between the countries.

The momentum of new technologies in the modern world is an opportunity for the Chinese aviation industry to strengthen operations. Notably, the COVID-19 pandemic has boosted the technological innovation needed to move

medical and preventive equipment in and out of China. In this regard, aviation can integrate more technologies to reduce travel risks by complying with established health regulations. For example, SF Express has launched drones that deliver supplies to various regions of China, providing relief for the health challenges they face. Logistics in the aviation industry also offers another avenue for improvement; for example, China's airlines have invested in blockchain technology to better analyze and evaluate their operations.

iv. Threats

China's changing foreign trade environment requires more mitigation strategies to protect the Chinese aviation industry. Even without considering the impact of the COVID-19 pandemic, China's external financial framework and operations face serious challenges. In 2020 and before, China encountered obstacles in its trade war with the U.S. The turmoil continues to affect business operations between the two countries, leading to a drop in activity rates in the aviation industry. With the U.S. blocking the import and export of certain entities and products to China, opportunities to increase its world market share are limited.

Notably, China's Belt and Road Initiative offers a glimmer of hope for the aviation industry as it is expected to open up different regions across the globe (Li, 2020). However, this development has been hindered by the different economic and political situations in the countries concerned. Currently, China has been accused of interfering in developing countries, raising concerns about its investment projects. In addition, with the volatile political and economic situation in participating countries, the Belt and Road Initiative poses a major threat to the aviation industry. The instrument for measuring economic development and international trade is the aviation industry, as it enables countries to continuously engage in import and export business, thereby increasing their market share. As a result, an unstable economic framework related to China continues to threaten the viability of the aviation industry.

The impact of the COVID-19 pandemic is similar to that of the SARS pandemic that occurred in 2003, but this time the threat is more dire because the COVID-19 pandemic has yet to show a decline in infection rates. As a result, competition in the global aviation industry has become more intense, preventing the industry from earning significant profits. In this context, the pressure on the aviation industry to generate high revenue and thus justify investment in the industry has challenged China's approach to the aviation industry to increase its position in the global market share.

4. DISCUSSION AND RECOMMENDATIONS

The COVID-19 pandemic has hit the Chinese aviation industry particularly hard, requiring significant changes to improve the industry. The aviation industry is very important as the health strategy remains a priority in the response to the pandemic, as it is necessary to transport goods to different countries. As a result, social responsibility has become an important consideration for the aviation industry, working to ensure that different regions have access to health care and food supplies as the COVID-19 pandemic persists and subsides. Therefore, as the pandemic affects everyone around the world, the aviation industry must foresee a recovery, with different sectors in different regions needing air transport services to achieve their goals. The Chinese aviation industry must pay more attention to social well-being in anticipation of increased demand for cargo services. This expectation includes increasing their cargo capacity while also responding to the growing global demand for e-commerce services.

Next, the Chinese aviation industry needs to improve the application of digital technology in logistics operations. The convergence of new technologies is suitable for expanding the scope of services and operations in different business areas. For the aviation industry, the adoption of better technology means that companies can better manage their operations, providing effective and efficient services to different stakeholders. For example, the use of big data is useful in tracking consumer data, allowing services to be tailored to meet the needs of individual customers. As the COVID-19 pandemic continues to disrupt economic and social activities, the Chinese aviation

industry can use this as an impetus to improve services and facilitate the delivery of needed equipment across regions. Furthermore, the use of digital logistics technologies ensures that the supply chains used by global organizations are enhanced for maximum efficiency and effectiveness.

It is also important for China to improve integrated services within the supply chain of organizations involved in the aviation industry. Integrated services enable companies to network and interact closely with suppliers and their consumers. In this way, they can better understand the needs of their stakeholders as they simplify the supply and delivery of products and the movement of passengers to different regions. Airlines that specialize in air cargo services have the opportunity to continuously enhance their supply chain as their business scope expands. In this case, consumers can also access important data about how they interact with the aviation industry, thereby avoiding the pitfalls of reducing their satisfaction with the service they receive.

Likewise, improving customer service is expected to be a key development for the aviation industry. Tailoring services to suit the individual needs of customers is one way to ensure loyalty and enhance the brand value of the aviation industry in China. For instance, with increasing demand for e-commerce services, the Chinese aviation industry can develop better and more flexible pricing and after-sales services to demonstrate their commitment to improving interactions between participating companies and consumers. In addition, the cargo sector can benefit greatly from the use of tracking technology to inform consumers of delivery deadlines and dates for goods and services ordered.

Synergy between different sectors is important to support the business development of the aviation industry as well. For example, synergies between the Chinese aviation industry and other businesses such as hydrogen technology, big data, and space technology could expand the industry's potential for post-pandemic success (Jiang, Doukas, & Liu, 2003). Crucially, this synergy will be relevant to the climate impact of aviation and help reduce production costs. So, as industry stakeholders develop strategies to mitigate the COVID-19 pandemic, they are also supporting approaches to the climate challenges that are holding the industry back. Fundamentally, synergies between the Chinese aviation industry and regional organizations in Asia and Europe may provide companies with investment and financing opportunities (Dobre, 2021). The funding impacts customer engagement and improvements in technical and operational frameworks that increase the effectiveness and efficiency of the aviation industry. As a regional leader in Asia, China's aviation industry can benefit broadly as it builds a shared vision that aligns with its competitive advantage in manufacturing.

In the case of the COVID-19 pandemic, airlines can develop technological solutions that are consistent with the methods used to mitigate the spread of the virus. For example, installing isolation kits on planes will help to identify infected passengers immediately and reduce infection rates. Therefore, with the aviation industry's pandemic-specific protocols and rules, consumers can develop a higher level of confidence and trust in an airline's ability to prevent infection. The Chinese aviation industry could also demand the development of aircrafts with passengers farther apart to support the social distancing measures necessary to prevent infection. Crowd management strategies and operations at airports must also refocus on reducing virus infection rates.

The improvement in the Chinese aviation industry highlights the need to meet the needs of domestic and foreign consumers, as China's airlines align their operations and structures with a global model that all consumers can expect. In this context, technology investment continues to underline its importance in meeting international standards, which will help the Chinese aviation industry compete favorably with other industry players. In this regard, investment in digital technologies is essential to developing opportunities in line with consumer needs during and after the COVID-19 pandemic. As such, big data analytics is considered a key and innovative technology that can transform the global aviation industry (Olaganathan, 2021). Ideally, the technology allows for the collection of vast amounts of data on aviation industry consumers, stakeholders, operations and other activities as it develops working models that respond to real-time information gathered from consumers. According to Wamba et al. (2017) big data analytics is defined as "a holistic approach to managing, processing and analyzing the 5 Vs of data-

related dimensions (i.e. volume, variety, velocity, veracity and value) to create actionable ideas for delivering sustained value, measure performance and establishing competitive advantage” (p. 356). Therefore, big data analytics is expected to improve operations in the aviation industry as they support decision-making frameworks based on data analysis from consumer and stakeholder.

The application of big data analytics in the Chinese aviation industry ensures that mitigation measures are in place to support recovery from the COVID-19 pandemic. The high uncertainty of the pandemic stipulates that regions will ease travel restrictions at different times as they deal with infection and vaccination rates. It is noted that partnership and collaboration among companies in the aviation industry will support their growth in the wake of COVID-19. Singapore Airlines, for example, has been experimenting with a digital health verification strategy that will build on IATA’s travel pass structure in developing modern solutions to the pandemic. The technology provides consumers with the ability to store and present health information consistent with strategies used to prevent the spread of the pandemic. According to Wamba et al. (2017) such strategies require “a new level of cooperation across airlines, airports, air navigation organizations, partners, security agencies, support services, commercial and retail services, regulators and customers” because of the increased awareness of new technologies. The demand calls for “the collection and sharing of data, greater investment in digital technologies, and possibly agility, flexibility and innovative thinking in every area of the business” (p. 3). Ultimately, the recommendations of big data analytics will contribute to the development of the Chinese aviation industry in different ways.

First, tracking the progress of the COVID-19 pandemic is an important strategy that will highlight countries’ efforts to respond to the virus as they are integrated into the operational functions of the aviation industry. The use of big data allows Chinese airlines to easily identify countries where they can resume operations with a low risk of infection to their employees and passengers. In this case, through the collaboration between the Chinese aviation industry and the World Health Organization, airlines can launch routes that comply with health and safety regulations when operations resume. Second, tracking demand for international air travel will help the Chinese aviation industry capture available market share, as many airlines remain grounded in different countries. In this context, big data analytics helps to understand changing consumer demands, giving airlines the opportunity to plan their operations in different regions of the world. Notably, the growing demand must be matched by the operating costs that Chinese airlines will incur, so that their resumption of flights to certain regions should result in a high or acceptable return on investment.

Arguably, the growing demand for e-commerce operations requires airlines to engage directly with consumers as they gain experience tailored their needs and wants. This requires the collection of large amounts of user data for marketing and other commercial activities to increase market engagement. As airlines adopt big data analytics, the Chinese aviation industry will continue to develop personalized services that meet the expectations of domestic and foreign passengers. Additionally, with the data collected through this technology, Chinese airlines can begin to develop strategies to prepare for the post-COVID-19 pandemic period. Precise analytics ensures that Chinese airlines can identify customer bookings and predict the profits and losses they may incur in the industry. As a result, the decision-making process is more refined and precise to meet the needs of consumers.

As the disruptive impact on the airline industry continues, the Chinese government must support the financial activities of airlines that need more capital injections. The IATA has revealed that airlines’ debt levels could increase by more than 25% as they cannot afford the high operating costs required to return to full capacity. Without capital injections, airlines may face a lack of new investment, especially for some airlines with lower levels of solvency. Arguably, the COVID-19 pandemic has jeopardized the various financial plans introduced for airlines related to their sustainability efforts. For example, airlines may suspend commitments to reduce carbon pollution levels in the industry due to the challenges of liquidity and rising debt. This has limited Chinese airlines’ efforts to buy more fuel-efficient planes.

The government has a responsibility to ensure that the pandemic does not affect the level of competition in the aviation industry. For example, with the support of the Chinese government, small airlines can remain competitive and prevent them from disappearing from the market. On the other hand, with increased capital injections into Chinese airlines, the industry may witness support from its global competitive advantage. Therefore, the Chinese government must ensure balanced support for the aviation industry to prevent the adverse impact of reduced competition in the industry. Against this backdrop, the government should seek to provide more financial support to local airlines in the short and long term.

With the impact of the COVID-19 pandemic on the Chinese aviation industry, some policies are definitely needed to make the industry sustainable. The challenges facing the aviation industry today are dwarfed by the impact of climate change caused by aviation emissions. As a result, as countries grapple with the COVID-19 pandemic, the associated low-carbon investments that hold promise for the industry may face neglect. The Chinese government must consciously support cleaner fuels and aircraft for the aviation industry, as this may align with the changing preferences of consumers in their quest for more sustainable brands and products (Wang, Yang, & Wang, 2019). Arguably, the investment of the Chinese government in the aviation industry must be geared toward realizing its long-term vision for more energy-efficient aircraft. In encouraging these transitions, the Chinese government can make their aircraft-making sector more sustainable than existing foreign companies, increasing their appeal to consumers.

The investment of the Chinese government investment in the aviation industry has been aimed at increasing demand for commercial and freighter planes, putting increasing pressure on large aircraft manufacturers. However, given the airline's solvency, this "intervention" would bring risks to aircraft orders due to additional costs (Meng et al., 2021). Therefore, support should also be on smaller airlines to provide them with the necessary financial assistance to ensure they compete with the bigger players in the industry. This focus on small and mid-sized airlines in the aviation industry will shorten the deadline for developing sustainable aircraft, in line with the vision to make the aviation industry greener.

5. CONCLUSION

The COVID-19 pandemic has had a significant impact on various industries and sectors of the business world, and as this report focuses on its impact on the Chinese aviation industry, it is necessary to explore what industry players and top management need to consider and implement. First, the short- and long-term impacts of the pandemic require different strategies to mitigate the challenges experienced. In the short term, airlines have had to integrate and implement short-term solutions to the challenges they had early in the pandemic. For example, managers have had to change their strategies to embrace risk management as the best way to ensure their businesses can withstand the pandemic and survive. In this context, having strong internal policies is critical, as they amount to managing the immediate risks the company faces. Such policies are designed to reduce adverse effects on their brand value and status. For example, Shenzhen Airport shifted from passenger to cargo. The move also benefits from their response to the channels the Chinese government has developed to facilitate the delivery of medical and emergency equipment to areas hard hit by the COVID-19 pandemic.

Top management must also interact and respond to stakeholders, including organizations and government agencies. Friendly relationships with government agencies help to develop financial strategies that protect the company's interests on a global scale. As has been witnessed in countries such as the U.S. and Australia, the government's response to corporate distress has kept some businesses from going bankruptcy as their revenue channels have thinned. In China, such a strategy will be funded to increase its competitiveness in the global aviation market. Notably, interactions with organizations allow for the exploration of new business opportunities to replace services lost post-pandemic.

As far as the long-term development and sustainability of China's airline sector is concerned, a more comprehensive plan should be established in the organization's operations. The plan is designed to increase consumer confidence and expectations. Airlines can offer more flexibility in bookings as they can meet consumer demand. In this case, as consumer confidence improves, organizations can develop better strategies to attract them and maintain their business operations. As a result, businesses will benefit from greater financial stability as consumer confidence improves.

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