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AVIATION INDUSTRY IN IRAN: INFRASTRUCTURE, CURRENT SYSTEM, AND FUTURE PLANS AND DEVELOPMENT

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AVIATION INDUSTRY IN IRAN: INFRASTRUCTURE, CURRENT SYSTEM, AND
FUTURE PLANS AND DEVELOPMENT

by

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A Research Paper

Submitted in Partial Fulfillment of the Requirements for the
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RESEARCH PAPER APPROVAL

AVIATION INDUSTRY IN IRAN: INFRASTRUCTURE, CURRENT SYSTEM, AND
FUTURE PLANS AND DEVELOPMENT

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Dana Khidhr

A Research Paper Submitted in Partial

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for the Degree of

Master of Public Administration

in the field of Aviation Administration

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TITLE: AVIATION INDUSTRY IN IRAN: INFRASTRUCTURE, CURRENT SYSTEM, AND FUTURE PLANS AND DEVELOPMENT

MAJOR PROFESSOR: Dr. David A. NewMyer

This research paper examines the commercial aviation industry in the Islamic Republic of Iran and the affects that sanctions have had on the country's airlines, airports, and aviation technology, as well as on the greater society, culture, and economy. The paper also includes a history of the aviation industry from its early beginnings in the 1920's until the present day and provides information about the present state of Iran's airlines and airport infrastructure because of the sanctions. There is information about the different airlines in Iran and comparisons with countries around the world that have similar sized populations. Furthermore, the research paper examines recent developments taking place in Iran as a result of the lifting of sanctions with the signing of the Joint Comprehensive Plan of Action (JCPOA) on July 14, 2015. In particular, the paper summarizes Iran's efforts to acquire new aircraft from Boeing and Airbus in an effort to update their airlines and begin the process of rebuilding. The paper shows that overall the sanctions had a negative impact on the industry and asserts that now, in the wake of the lifting of sanctions, that there will a new period of rapid development of the commercial aviation industry and many opportunities for western commercial airline and aircraft manufacturers to develop relations with Iran's airlines.

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INTRODUCTION

The purpose of this research paper is to provide an overview of the aviation industry in Iran and the developments it is experiencing as it emerges from a long period of economic sanctions and isolation. For over three decades since the 1979 Iranian Revolution, Iran has lived under a long series of economic sanctions imposed by the United States and other countries around the world. These sanctions targeted such things as investments in oil, gas, and petrochemicals and were also extended to other products and services. Moreover, many of the sanctions were designed to limit Iran's access to western products and technologies. In addition, some of the sanctions encompassed banking and insurance transactions and were specifically designed to keep Iran isolated from sources of international financing and credit.

Many of these sanctions directly targeted Iran's commercial and civilian aviation industry. The country was prohibited from purchasing new aircraft and aviation technologies including much needed spare parts from the United States and many of its allies. As a result, the airplanes used by airlines in Iran are among the oldest of any country in the world and its passenger traffic are often at risk because of the aging nature of the aircraft. However, all of these things are changing because of the comprehensive nuclear accord, known as the Joint Comprehensive Plan of Action (JCPOA) and commonly referred to as the Iran Plan, signed on July 14, 2015 between Iran and the five permanent members of the United Nations Security Council China, France, Russia, United Kingdom, and the United States, as well as Germany (Katzman, 2016). This treaty will lift the sanctions on Iran's commercial aviation industry and allow the country's airlines to acquire new airplanes and technologies and enter into a new period of development.

Consequently, the following research paper is significant because it looks at several different issues connected to the present state of Iran's aviation industry and provides students and researchers some ideas about the prospects for its future development and its future potential for competition. The paper is also significant in that it includes a brief historical overview of Iran's aviation industry compiled from many sources and then, transitions to an analysis and literature review of the direct effects that sanctions have had on Iran both economically and culturally.

First, the paper includes a short description of the methodology used by the author to guide the research. Then, there is a section on the present organization of Iran's aviation industry as it exists today, as well as an analysis of the present condition of the country's airports and airlines. The paper also includes a comparison of Iran's aviation industry to other countries of similar size that have not experienced several decades of sanctions. Finally, the paper concludes with a short review of the present transition phase. This phase includes a discussion of recent contracts between Iran and Airbus and Boeing to purchase new aircraft. These activities are taking place at the present time. Finally, the paper concludes with a discussion of the future prospects for the Iran aviation industry.

METHODOLOGY

The methodology used in this research includes many sources gathered from the literature available related to the specific issues addressed in the paper. These include published reports about the effects of sanctions on Iran from sources as diverse as official government publications, the United Nations, human rights organizations, main stream media, and Iranian sources. Moreover, several studies and academic sources have also been used like Bal's, (2012) *Sanctions against Iran and Their Effects on the Global Shipping Industry* and the Zahedi (2013) report *A Growing Crisis: The Impact of Sanctions and Regime Policies on Iranians' Economic and Social Rights*. Most of the literature used in the paper includes some detailed descriptions of the information much like would be found in an annotated bibliography.

Also, the methodology will be mostly qualitative relying on information and several reports published by the aviation industry. These include such sources as the *Aerospace and Defence Magazine*, *Transportation Research*, and *Aviation Week*. Other industry publications like the online *Airlines International Magazine* published by the International Air Transport Association (IATA) and the *Flight Global Magazine* which provides information about the international aviation industry have also been used. Statistical information used in the paper has been noted and referenced.

Many reports and news stories about the effects of sanctions have been used from sources like the *Wall Street Journal*, *The New York Times*, *British Broadcasting Corporation* (BBC) and *Al Jazeera*. These sources have all been noted and referenced as reports and used as “qualitative” types of references. Some industry peer related journals such as the *Journal of Aerospace Information Systems*, *Journal of Aircraft*, and the *AIAA Journal* from the American Institute of Aeronautics and Astronautics have been used and referenced accordingly. Also,

official government information about Iran has been used and noted accordingly from sites like Iran Air made available from the Airline of the Republic of Iran. Moreover, some information has been used and noted such as the United States' Central Intelligence Agency's (CIA) *World Fact Book*.

The methodology has also used information from the "Official" websites and publications of corporations like Boeing, Airbus, and Trans World Airlines and government organizations like the Federal Aviation Administration and USA.gov. Overall, the methodology is primarily qualitative in nature and does use some statistical and quantitative information when necessary. All sources and references have been included in the Bibliography.

DEFINITION OF IRANIAN AVIATION INDUSTRY

The Iranian aviation industry discussed and researched in this paper is mostly focused on the commercial sector. This section traces the history of aviation from its beginning in 1927 (Atrvash, 1997) through to the present time when we see Iran entering into a new period of major development, including trying to purchase a large new fleet of commercial airlines (Wilkin & Hephher, 2016).

It is important to note that included in the general definition of the Iranian Aviation industry is the fact that in Iran there are both publicly and privately owned airlines and airline services. As a result when the many issues of sanctions are discussed they are focused on their effects on these two areas. This paper does not discuss the effects of sanctions on Iran's military air program. Moreover, it is important to note that there are limited academic references on the actual organizational model of Iran's civilian aviation industry from sources outside of Iran. This fact is pointed out in a report by Ali Dadpay which substantiates that there is no single organized data bank for the Iranian aviation industry (Dadpay, 2012). Consequently, the section on "Iran's Present Aviation System and Organization, Style and Scope" has relied on many sources made available by Official organizations within the Government of the Islamic Republic of Iran. This is particularly true in relation to the number and locations of civilian airports and the structure of the Iranian Civilian Air Administration.

The major limitation on the research in this paper, as pointed out by (Dadpay, 2012) above is the lack of information available about the actual internal organizational structure and operating principles of the Iranian aviation industry. As a result, much of the information used in this section of the paper is from "official" Iranian sources and are limited in nature.

BRIEF HISTORY OF IRAN'S AVIATION INDUSTRY

The History of the Iranian Aviation Industry is documented in different sources including aviation enthusiasts and aviation historians, as well as in official government information, sources from the aviation industry, and by the Iranian Airline industry including Iran Air. However, to date, there is no book long-hard cover analysis or history found in the literature review that could be called “the definitive” source on the domestic air industry and its history. As a result, this short history has relied primarily on two main sources, as well as some other writings by Iranian air historian Abbas Atrvash. The two main sources on Iran’s commercial aviation history are Abbas Atrvash’s article (Atrvash, 2008) and Ali Dadpay’s article (Dadpay, 2012). On the other hand, the history of Iran’s military air defenses, aviation war record of the 1980’s Iran/Iraq war, military aircraft history, and other related military aviation topics are well documented and recorded.

According to both Atrvash (2008) and Dadpay (2012) Iran’s commercial air transportation history which began in 1927 was an outgrowth of Iran’s early Air Force and since that time has gone through between 5 and 8 distinct periods of development and transformation (Atrvash, 2008), (Dadpay, 2012). Also, Atrvash (2008) writes, “in just over 80 years, from 1923 till now, the Iranian air transportation and airline industry has gone through eight periods (Atrvash, 2008).” Atrvash says these eight periods can be divided into the following:

1923 - 1927: Iranian Air Force

1927 - 1932: Junkers Airlines in Iran

1932 - 1938: Absence of commercial air transport

1938 - 1946: The airline of the Ministry of post and telegram or "Iranian State Airlines"

1945 - 1961: Iranian Airways and Persian Air Services

1961 - 1962: United Iranian Airlines

1962 - 1979: Iran National Airlines (Iran Air), the flourishing years

1979 - Now: Post Revolution, the era of multiple airlines

In 1964 Iran Air became a member of the International Air Transportation Association (IATA) and a year later purchased its first Boeing 707 (Dadpay, 2012). In a few short years, during the period of the 1970's, the greatest expansion of the commercial aviation industry in Iran was taking place. During this decade Iran Air acquired a fleet of Boeing 737's, 727's and 747's and made an order for the Airbus 300. Airports were modernized and technologies were updated. Moreover, the government instituted new flight training schools and engaged with many foreign governments to provide all types of new services and management ideas.

The expansion of the industry during this period is noted in many sources (Dadpay, 2012), (Imperial Iranian Air Force, 2014) and (Farrokh, 2014). By the time of the Iranian Revolution in 1979 Iran Air had grown into an "extremely" (Dadpay, 2012) well managed national and international airlines with a skilled workforce of over 12,000 personnel. Moreover, according to Atrvash, "although it was a government-owned airline, it remained a profitable enterprise and its financial self-sufficiency was unprecedented in Iran as well as internationally for the whole period until 1979 (Atrvash, 2008)."

After the Islamic Revolution of 1979 in Iran and the rise of the Ayatollah Khomeini, Iran Air entered into a long period of decline and was isolated from doing business in many areas of the world. Almost immediately after the overthrow of Shah Reza Pavlavi many western powers implemented sanctions and altered their business arrangements with the new Islamic Republic of Iran. (*The effects of the sanctions and the history of sanctions will be discussed in the next section.) Many of these sanctions remained in effect until recently with the signing of the Joint

Comprehensive Plan of Action (JCPOA), commonly referred to as the Iran Plan, signed on July 14, 2015. However, even under sanctions Iran Air managed to continue services. Atrvash writes, “despite the deficiencies they were encountering in doing their jobs, much credit should be given to the employees as well as the group of junior and middle managers for their determination and efforts to hold on to the remnant of what was once one of the best airline in the region (Atrvash, 2008).”

Other observers have written about the “success” of Iran Air continuing to operate under the pressures of sanctions. In his article “Post-1979 airline industry” by Nader Saad he writes with much pride about Iran’s accomplishments in the face of sanctions. He says “Iran Air, with 9,900 employees, 16 wide body aircraft, and 20 narrow boy aircraft in 1995, carried 5,776,000 passengers. In the same year, Saudi Airlines, with 24,000 employees, 52 wide body aircraft and 20 narrow body aircraft, carried 5,676,000 passengers. This shows Iran Air staff—all 9,800 of them—have done a great job under difficult circumstances” (Saad, 1997).

The history of the aviation industry in Iran continues forward. Today, Iran is entering into a new period of expansion and is looking forward to a new future in light of the lifting of international sanctions. The future of Iran’s commercial aviation industry is discussed later in this research paper.

HISTORY OF SANCTIONS AND THEIR EFFECT ON IRAN AND THE AVIATION INDUSTRY IN IRAN

Introduction

Sanctions against Iran began as early as 1979, as a result of the Islamic Revolution in Iran, and were added to over the decades by the United States and its allies. Initially, these sanctions targeted such things as investments in oil, gas, and petrochemicals and were extended to exports of refined petroleum products. Specifically, sanctions targeted any business dealings with the Iranian Revolutionary Guard. Later many sanctions were imposed that targeted banking and insurance transactions, including the Central Bank of Iran, and went on to encompass shipping, web hosting services, services for commercial endeavors, and even domain name registration services. Moreover, many sanctions directly affected Iran's aviation industry including the acquisition of aircraft from western countries (Bal, 2012), (Zahedi, 2013) and (Erdrink, 2012).

The effects of sanctions by the United States and others in the international community on Iran have been widely studied, analyzed, debated and continue to be a source of ongoing political dialogue and dispute. There are many who continue to work to overturn the lifting of the sanctions and warn about Iran's threat to the region's peace and stability. There are even many who have called on returning to the sanction and embargo period and further isolating the country (Dershowitz, 2015). Consequently, the effects of the sanctions have been studied by scholars in many fields, including state department, human rights, and military analysts. In this section several sources have been used that discuss the effects of sanctions on different areas of the Iranian economy and society.

General Effects of Sanctions on the country of Iran

The history of sanctions and their effects on Iran have been written about in many sources from the mass media to academic studies. One general and timely source is available from the Congressional Research Service by Middle East specialist Kenneth Katzman. This March 23, 2016 report summarizes the broad international sanctions imposed on Iran during 2010-2013 and reports on the economic harm the country experienced. Some of the key findings for this period show that Iran's crude oil exports fell by 2.5 million barrels per day. In addition the sanctions froze over \$120 billion of Iranian assets making them inaccessible to the country. The report estimates that the economy "shrank by 9% in the two years ending in March 2014" (Katzman, 2016) and effectively stopped Iran's ability to "procure equipment for its nuclear and missile programs and to import advanced conventional weaponry (Katzman, 2016)."

In addition the report noted that the sanctions have had severe humanitarian related effects in several sectors including isolating the country from Western-made medicines, such as expensive chemo-therapy medicines. Specifically, in the aviation sector the report says that many Iranian pilots have complained "publically and stridently that U.S. Sanctions are causing Iran's passenger airline fleet to deteriorate to the point of jeopardizing safety (Katzman, 2016)." Moreover, the report cites the claims made by Thomas Erdbrink (Erdbrink, 2012) that since the imposition of U.S. sanctions in 1979 1,700 passengers and crew have been killed in air accidents and several of these were caused by difficulty in acquiring spare U.S. parts (Katzman, 2016).

Effects of Sanctions on Iranian society and economy

There are many sources of information about the effects of sanctions on Iranian society in the literature. Besides the numerous newspaper articles and reports from Non-Governmental Organizations (NGO's) about the sanctions effects, there are also many scholarly journal articles

about how the sanctions have impacted all areas of Iranian society. An article in the *Journal of Research in Pharmacy Practice* speculates that the sanctions have had consequences on health and health care delivery systems in Iran (Kheirandish, Rashidian, & Bigdeli, 2015). The authors concluded this after tracking and monitoring increases in the use of terms like “shortages of medicines,” “medicines related issues” and “deaths because of shortages” appearing in the Iranian media and found a 39% increase of such terms since 2011 (Kheirandish, Rashidian, & Bigdeli, 2015).

Another report prepared by the *International Campaign for Human Rights in Iran* (Zahedi, 2013) looks at what an Iranian NGO reports about the sanctions effects on the country. This report covers economic sanctions from the beginning of the Khomeini Period in 1979 up until the year 2013. The report outlines that the sanctions have had a crippling effect on the Iranian economy, manufacturing production and the lives of blue collar workers and the urban poor. In addition the report claims that sanctions have deprived the middle class and small business owners of capital resources and trade goods, and dramatically lowered the standards of medicine and health care delivery systems. The report provides a bibliography of source data and material used by the NGO to compile its information for further scrutiny (Zahedi, 2013).

The effects of sanctions on the people of Iran, often on the poorest and most vulnerable, are reported in many sources besides ones allied with the government and regime in Teheran. A search through relevant literature spanning back over the years of embargoes and sanctions will find titles like “The human costs of the Iran Sanctions” in a 2013 article from the *Foreign Affairs* magazine *FP The Magazine* (Gordon, 2013), “U.N. chief says sanctions on Iran affecting its people” in *Reuters* from 2012 (Nichols & Charbonneau, 2012), and “A Side Effect of Iranian Sanctions: Tehran’s Bad Air” from *Time Magazine* in 2014 (Baker, 2014).

The article by Baker (2014) in *Time Magazine* shows how the sanctions have resulted in unintended consequences by polluting the air in many large urban cities. Baker (2014) says that although Iran has the “fourth largest proven petroleum reserve” in the world, it does not refine very much of its own oil. She writes, “In order to keep Iran’s 26.3 million cars, trucks and motorcycles on the road, government officials were forced to convert petrochemical factories into ad hoc refineries, an expensive and inefficient process that produces a low-grade fuel choked with pollutants (Baker, 2014).” According to Baker these low grade fuels have been “devastating” to the air quality and environment. She reports that the World Health Organization’s 2013 assessment says the air pollution is contributing to Iranian ill health as seen in rising rates of childhood asthma cases and lung disease. In her article she interviews Rocky Ansari, an economist and sanctions expert at Cyrus Omron International, a firm that advises international companies about doing business in Iran. Ansari says, “Sanctions significantly contributed to pollution, and particularly the kinds of pollution that are damaging to health (Baker, 2014).”

All of these articles report about various negative effects of sanctions on the people and country of Iran. In Bernardo Cervellera (2014)’s news report he says that milk powder for children, medical drugs and X ray machines are all in short supply because of the sanctions. In his article he claims that “Pollution caused by the embargo on coal gas causes 22,000 deaths per year in Tehran alone (Cervellera, 2014).” Moreover, he reports that the sanctions have caused more unemployment and has resulted in more smuggling and illegal activities. He claims that these illegal activities have caused “radicals to enrich themselves” and caused more hardships on the Iranian people. He writes, “Ordinary Iranians find themselves facing shortages of food as well as hard-to-get medical drugs and equipment and other goods (Cervellera, 2014).”

It seems clear that these reports from both organizations aligned with the Iranian government and many independent and western sources show that the sanctions have had a negative effect on almost every area of Iranian life. The sanctions have affected the economy causing large scale unemployment and causing an increase in illegal smuggling activity. Moreover, they have caused shortages of necessary medicines and medical supplies and indirectly caused air pollution which is causing more medical problems. Most importantly for the purposes of this research paper the sanctions have caused problems for the Iranian aviation industry which some observers say have resulted in air crashes and death. The effects of the sanctions on the aviation industry are discussed in more detail in the following section.

Effects of sanctions of Iran's civilian aviation industry

There is a considerable amount of information available regarding the effects of sanctions on the aviation industry in Iran. After a short reading of titles and article sources, including news article headlines and industry magazines, it is clear that many of these sources claim that the sanctions have had a negative effect and have been responsible for the slow progress and general state of Iran's declining airports and airlines (Erdbrink, 2012), (Scores die in Iranian air crash, 2005), (Iran plagued by poor aircraft safety, 2003), (Iran plane crash kills 117, 2002). In fact, the implicit dangers of the sanctions on Iran's aviation industry and their links to air disasters were recognized (Handjani, 2014).

In the popular and influential Congressional Blog *The Hill* of August 20, 2014 the headline read "Sanctions cause Iranian airplane crashes" (Handjani, 2014). The article is the story of the August 14, 2014 crash of an Iranian Sepahan Air regional airliner which killed 39 passengers and crew. According to an official report issued by the head of Iran's Airports Company the accident was the result of one of the engines failing (Dozens dead in plane crash at

Tehran airport, 2014). However, in the article for *The Hill* Handjani (2014) reports that the crash of the Iranian Sepahan Air regional airliner in a Teheran neighborhood was partly due the effects of sanctions. Handjani (2014) writes, “This latest incident is just one in a spate of air accidents in Iran, where the imposition of sanctions by the West has severely impacted the safety of civilian aircraft” (Handjani, 2014, p. para 1). In the article Handjani references sources ranging from a 2005 report by the International Civil Aviation Organization to U.N. General Secretary Ban Ki Moon acknowledging that the sanctions have had a catastrophic effect on Iranian aviation (Charbonneay, 2012). The article mentions that “although under the interim nuclear deal Iran has been allowed to purchase some spare parts for its aging fleet, there remains no way for Iranian airlines to purchase sorely needed new aircraft (Handjani, 2014, p. para 4).”

The airline involved in the August 10 crash was an “Iranian-built-140, a domestic version of the Russian Antonov An-140 (Handjani, 2014).” Although, the Russians are a part of the United Nations Security Council and a signatory of many of the sanctions, they have been able to provide Iran with some domestic airplanes and technologies (Press, Russia threatens to change Iran stance over US sanctions, 2014). However, according to Handjani (2014) the skeptics who claim that the sanctions are not responsible for these types of accidents are wrong. Handjani (2014) says these skeptics claim the problems are because of the Iranian’s use of outdated Soviet-era designs. Handjani writes in the article:

“Iranians have little choice but to fly these planes because U.S. sanctions prohibit Iran from purchasing Boeing or Airbus planes on the open market, even second hand. Iran’s aging civilian fleet includes planes, which first entered service before the Iranian Revolution in 1979, when the U.S. first began to institute sanctions on the country. In the subsequent years, airlines have struggled to source parts and technical support for their aircraft.” (Handjani, 2014, p. para 3)

It is important to mention again that the recent March 2016 report by Katzman to Congress repeats this same information from *The Hill* article. (Katzman, 2016)

A further look through the literature finds many articles in sources like the *New York Times* reporting about the sanctions effects on airlines and the dangers of flying in Iranian-owned planes. In a 2012 *New York Times* article the headline said “Iran’s Aging Airliner Fleet Seen as Faltering under U.S. Sanctions” (Erdbrink, 2012). In the article reporter Thomas Erdbrink tells the story of the Iranian Captain Houshang Shahbazi of Iran Air who is now called the “Iranian Captain Chelsey Sullenberger” (Gendar, McShane, & Gillette, 2009). Like the hero “Sully” of the remarkable water landing of US Airways Flight 1549 in the Hudson River near Manhattan, New York City on January 15, 2009, Iranian Captain Shahbazi made an emergency crash landing on October 11, 2011 at Tehran’s Mehrabad airport when the plane’s front landing gear jammed and failed to deploy. All 94 passengers and 19 crew survived without a single injury (Esfandiari, 2012).

The New York incident was the result of the plane hitting a flock of birds, whereas the Tehran incident was linked to a “lack of hydraulic pressure, a typical consequence of wear and tear.” Many, including Shahbazi, blame the accident as well as the deaths of 1,700 Iranians since the embargoes on the sanctions. Shahbazi said in the interview, “our planes are completely worn out” and he maintained that the mechanics were doing all they could with recycled and black market parts to keep the planes flying” (Erdbrink, 2012). He added, “In reality, each flight can be our last” (Erdbrink, 2012, p. para 6). After the accident Captain Shahbazi went on to campaign (Associated Press, 2012) for the lifting of the sanctions and became an outspoken critic of using embargoes and sanctions against civilian air travel. (*For more about Capt. Shahbazi see Esfandiari, 2012)

There are many reports about the effects of the sanctions in Aviation journals and magazines, and reports like the International Civil Aviation Organization’s 2006 Paper,

“Continuity of the United States Trade Embargo on the Civil Aviation of the Islamic Republic of Iran and The Safety Deficiencies Arising out of it” (“Continuity of the United States Trade Embargo”, 2006). Although this report is ten years old it is not clear whether or not this particular situation was ever corrected. However, there is a report in 2013 about a deal between Boeing and Iran to sell some plane parts for the aging fleet (Hepher, 2013).

In the 2006 report the Islamic Republic of Iran asserts that the sanctions have adversely affected the safety of civil aviation. In particular they claim the sanctions denied the Iranians “export licenses to Boeing Aircraft to permit the modification of struts on five Boeing 747 cargo aircraft being operated by SAHA Airlines, an Iranian company (“Continuity of the United States Trade Embargo”, 2006).” They say that this denial will make the planes unsafe even though they will be forced to put them back into operation without the modifications. Also, they say the radars at the terminal approach in Tehran and Shiraz, the two largest airports in Iran, need parts to continue to operate safely. Chiefly the radar parts needed are of U.S. origin from the Raytheon ASR/SSR system. The sanctions will not allow the purchase of these parts. The Iranians point out in the report that these restrictions put the lives of everyone at risk who flies on such airlines as Air France, Alitalia, Australian Airlines, British Mediterranean Airways, Emirates, Lufthansa, Malaysia Airlines, KLM - Royal Dutch Airlines, Qatar Airways and more. All of these international carriers use these two primary Iranian airports (“Continuity of the United States Trade Embargo”, 2006, p. 4).

In this report the Iranians discuss other areas that have been impacted by the sanctions. For example, they claim the sanctions have denied Iranian pilots the use of American-manufactured simulators and barred Iranian pilots from “all Falcon 20 training and proficiency checks for Iranian pilots and navigation facilities” (“Continuity of the United States Trade

Embargo", 2006, p. 4). The report says all training was suspended, but does not explain the reason for the action. Moreover, the Civil Aviation Organization needs avionics equipment for their Falcon 20 aircraft and these parts and upgrades have been denied by U.S Government. In conclusion, the Iranians say that any political differences between the United States and Iran must not be used as an instrument of foreign policy to put the lives of air passengers at risk. The Iranians requested the United States honor its commitment and “note that the imposed trade embargo by the United States of American on the Islamic Republic of Iran, which, as per the findings of the International Civil Aviation Organization mission, is detrimental to the safety of civil aviation and does originate safety deficiencies” (“Continuity of the United States Treade Embargo", 2006).

There are other reports that shed some light on other things that are often not generally thought about in connection with the sanctions and air travel. In a report by Abhinayan Basu Bal (2012) “Sanctions against Iran and Their Effects on the Global Shipping Industry” the author discusses an often forgotten feature of the air industry—the air transport system and its role in international trade. In the report the author discusses how the sanctions imposed broad travel bans on educational exchanges and international tourism (Bal, 2012). Moreover the air freight system was subject to vast new restrictions and new inspections. These new restrictions and inspections resulted in loss of trade and the loss of contracts according to the report. The net effect of these measures, was to further degrade the trade relationships between Iranian carriers and international businesses (Bal, 2012).

These sources show that the sanctions imposed on Iran have had a net effect of causing the aviation industry serious problems. Overall, the reports indicate that sanctions caused airlines to operate airplanes with outdated and recycled parts, caused airport improvements to cease,

denied Iran access to important safety technology, and cancelled contracts for new airplanes and aviation technology from the west. Whether or not the sanctions against Iran's aviation was a factor in influencing Iran's present course or not was not investigated. Now, that the sanctions have been largely lifted Iran is looking forward to a new period of growth and modernization.

IRAN'S PRESENT AVIATION SYSTEM AND ORGANIZATION - STYLE AND SCOPE

Introduction

Since the revolution in 1979 the commercial airline industry in Iran has had a difficult and problem filled operational history. For several years flights were restricted to only two airports; one in Teheran and the other in Shiraz. Since the late 1990's, even under international pressure and sanctions, air transportation was widely expanded and today, there are 30 airports that have some type of international service and several more that offer domestic flights (WorldData, 2016). There has also been considerable growth over the years in the volume of passengers flying Iranian airlines and a growth in the number of airline companies. In fact, according to the World Bank since the 1990's air passengers have increased from around 5 million annual passengers to over 15 million (World Bank, 2015).

In the following section the present state of the Iranian commercial aviation industry will be discussed and a number of graphs and statistics will also be presented.

Organization and resources of Iranian civilian aviation industry:

Airports

According to the report by Ali Dadpay "A Review of Iranian Aviation Industry" (Dadpay, 2012) there is no single organized data bank for the Iranian aviation industry. However, Dadpay (2012) claims that the Iranian Civil Aviation Organization's (IR-CAO) annual reports are accurate for statistics on air travel passengers, air cargo and air mail for Iran and other data on passenger loads and problem reports (Dadpay, 2012). At the same time Dadpay recognizes that the Iranian CAO is highly politicized and many of their decisions are made under a cloud of secrecy and with international considerations involved (Dadpay, 2012). Dadpay (2012) cites the Iranian CAO's 2011 report and says that it contains detailed reports on many air

incidents which the government invariably says are the fault of “international sanctions”, “profit seeking executives, and “aviation dealers” (Dadpay, 2012). It should be noted that these reports are not published in English and all copies and reports obtained by the author are in the Persian/Farsi language.

Dadpay’s report references many of these CAO Iranian sources and has detailed charts and statistics on the growth of the airline during the sanctions period up until the year 2011. He acknowledges the accomplishments made by Iran under the heavy burden of sanctions and market volatility. He writes, “In postwar era [Iran/Iraq War] it experienced a large [in] increase in domestic travels due to the ending of hostilities. Then it grew constantly [constantly] since then. The total number of domestic air travel passengers rises from 4.2 million in 1988 to 12.8 million in 2008, demonstrating a threefold increase (Dadpay, 2012).” See Figure 2: Total Passenger Traffic in Iranian airports. This paper also has an important section on the development of the semi-private sector of the Iranian air industry which began in the late 1980’s and shows that after Iran’s war with Iraq the Iranian government, “embarked on an ambitious expansion of domestic airports network (Dadpay, 2012).” As a result they developed several free trade zones in the Kish Island and Qeshm Island in the Persian Gulf and Chabahar port on Oman Seas (Dadpay, 2012).

Today, Iran has both privately and publicly-owned airline companies operating domestically and internationally. As we have seen there are numerous resources that tell the history of the modern aviation industry in Iran and how international sanctions have affected the country and the air transport system. Unfortunately, there are not as many sources about how the aviation industry including Iran’s airline and airports are governed, regulated and controlled in the Islamic Republic of Iran today. Many of these sources are official government web sites

mainly in Farsi. However, some are in English like the official Iran Air website and it has a considerable amount of information about the history of the airline and its present operations (Iran Air, 2016). On this website you can find out all of the destinations where Iran Air operates. You can also reserve tickets and get information about special tourism packages, rates, and other important data. The section on Corporate Identity explains the organization's philosophy and guiding principles. The site reports, “IranAir has so far tried to stretch its wings as wide as demanded by its sincere and faithful clients. Thanks to the warm welcome of clients, we were able to expand our flights to 63 destinations both inside and outside the country and carry over 6.3 million passengers in our domestic and 1.6 million more in the international network last year” (Iran Air, 2016).

The Center of the Iran Air operations are located at the main bases of the Tehran Imam Khomeini International Airport for international flights and at the Tehran Mehrabad Airport for domestic flights. Since the official website of this airport is in Farsi, you can get some information about these airports and their operations ON ((IKA) Imam Khomeini International Airport Overview, 2016). The following Table-1 is a 2016 list from WorldData (2016) of the top 30 Iranian airports and lists the number of airlines doing business at each airport and the number of destinations serviced by each airport:

Table 1: Airports in Iran (Source: WorldData, 2016)

No.	IATA	Name	City	Airlines	Destinations
1	IKA	Imam Khomeini International Airport	Tehran	21	43
2	MHD	Mashhad International Airport	Mashhad	12	39
3	SYZ	Shiraz Shahid Dastghaib International Airport	Shiraz	8	26
4	TBZ	Tabriz International Airport	Tabriz	7	10
5	IFN	Esfahan Shahid Beheshti International Airport	Isfahan	6	14
6	GSM	Gheshm Airport	Gheshm	5	5
7	AWZ	Ahwaz Airport	Ahwaz	5	13
8	KIH	Kish International Airport	Kish Island	5	8
9	THR	Mehrabad International Airport	Tehran	5	37
10	BND	Bandar Abbas International Airport	Bandar Abbas	5	12
11	KSH	Shahid Ashrafi Esfahani Airport	Kermanshah	4	3
12	RAS	Sardar-e-Jangal Airport	Rasht	4	7
13	AZD	Shahid Sadooghi Airport	Yazd	4	4
14	ABD	Abadan Airport	Abadan	3	3
15	SRY	Dasht-e Naz Airport	Sari	3	4
16	LRR	Lar Airport	Lar	3	6
17	OMH	Urmia Airport	Urmia	3	2
18	ZAH	Zahedan International Airport	Zahedan	3	7
19	BUZ	Bushehr Airport	Bushehr	2	4
20	KER	Kerman Airport	Kerman	2	4
21	ADU	Ardabil Airport	Ardabil	2	2
22	ZBR	Konarak Airport	Chabahar	2	5
23	DEF	Dezful Airport		1	1
24	MRX	Mahshahr Airport		1	2
25	KHD	Khoram Abad Airport		1	1
26	SDG	Sanandaj Airport		1	1
27	BXR	Bam Airport		1	1
28	XBJ	Birjand Airport	Birjand	1	2
29	BJB	Bojnord Airport	Bojnord	1	1
30	AFZ	Sabzevar National Airport	Sabzevar	1	1

For more information on airports see a site called the *Great Circle Mapper* operated by Karl L. Swartz which provides detailed data on each of the airports (listed above) in Iran including maps, elevations, distances of runways, number of runways, Satellite images of the

airport, a sectional chart with a compass, nearby airports, and detailed NOTAM information (Swartz, 2016). Moreover, this site has information on a total number of 282 airports operating in the Islamic Republic of Iran, including the larger airports operating international flights. As a result this website can provide important information for a more comprehensive look at the present state of Iranian commercial airlines facilities in the country.

According to CAPA-Centre for Aviation's Report on Iran ("CAPA Country Report: Iran", Country Report: Iran, 2015) the five largest airports in the country are Imam Khomeini International Airport, Mashhad International Airport, Shiraz Shahid Dastghaib International Airport, Tabriz International Airport, and Mehrabad International Airport. CAPA was established in 1990 and claims to be the leading provider of independent aviation market intelligence, analysis, reports and data services. CAPA claims to have over 25,000 industry leaders as members of their organization and provides a bi-monthly strategy journal of important aviation industry issues. In the report about Iranian airports it describes that all of these airports are operated by the Iran Airports Holding Company (IAC) which is a state owned entity under the jurisdiction of Iran's Ministry of Roads and Urban Development. Moreover, the report says that Tehran airport could potentially emerge as an international hub in the future, but "networks will be limited initially and Iranian carriers, for now, lack the brands that hub carriers in the Gulf or Turkish Airlines have ("CAPA Country Report: Iran", 2015)."

Also, in this report CAPA (2015) observes that Iran is entering into a new period of airport development. CAPA reports that Iran is making plans to construct five new airports in Araz, Qom, and the Ikiya regions with a total investment of 8 billion US ("CAPA Country Report: Iran", Country Report: Iran, 2015). Moreover, the report explains that two other plans have been outlined for a new Boushehr Airport and Ahvaz Airport with an additional 1 billion dollar

investment. The new Boushehr Airport will feature a modern terminal, VIP facilities, runway improvements and cargo facilities. In addition, a new four-star hotel is planned for the complex that is estimated to cost \$12.7 million dollars. CAPA reports that these developments are expected to be completed in 2022 ("CAPA Country Report: Iran", Country Report: Iran, 2015).

Figure 1 shows the passenger enplanement for the five largest airports in Iran. The Chart shows that Mehrabad airport has the largest volume of traffic. This is because most of the air traffic in Iran is domestic. Since Mehrabad Airport is designated for domestic traffic consequently it has the largest percentage (43%) of passenger traffic in Iran. Mshhad is the second busiest airport in Iran with 25% of passenger traffic. Imam Khomeini, which is the airport for international flights, is the third busiest (19%) and the Shiraz and Tabriz Airports are fourth and fifth respectively.

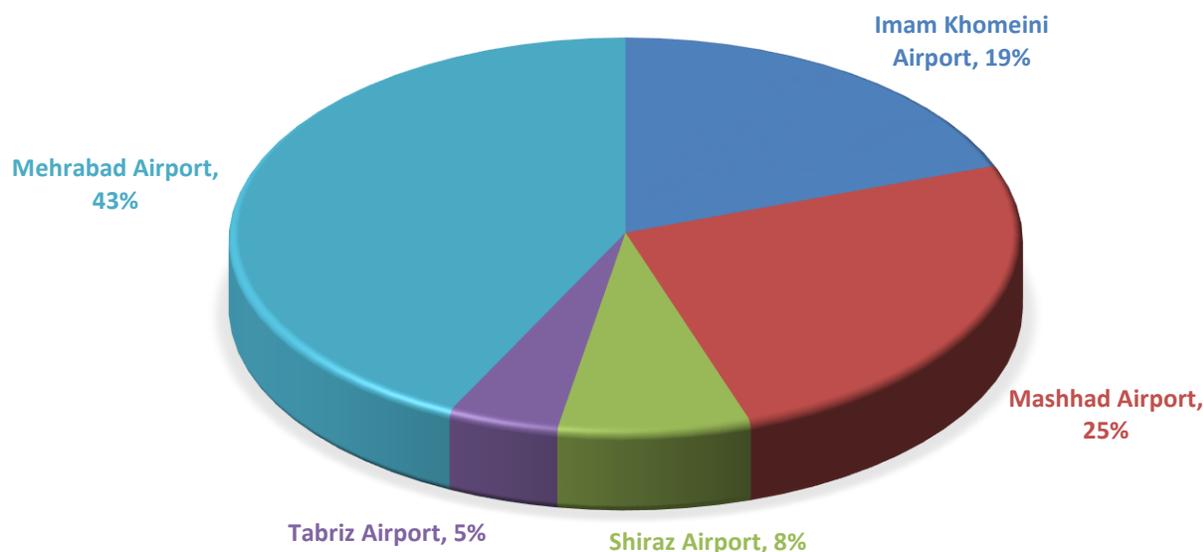
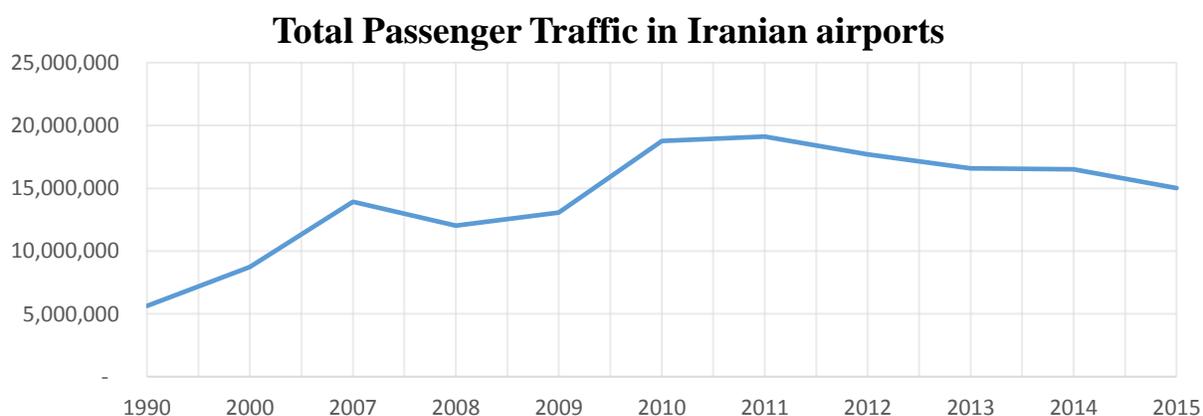


Figure 1: Airport's passenger traffic for 5 largest airports in Iran. (Source: CAPA Country Report: Iran, October 2015)

Passenger Traffic

According to several sources and statistical studies the use of Iran's commercial airlines and consequently Iran's airports has increased steadily since 1990 at the end of the Iran/Iraq war despite the imposed sanctions. As mentioned by Dadpay (2012) the volume of Iranian's traveling by air increased "threefold" from 4.2 million in 1988 to 12.8 million in 2008 (Dadpay, 2012). Since that time these numbers have continued to rise to a high of 19,113, 946 passengers in 2011 and have since declined to 16,5 in 2014 and 15 million in 2015 (WorldData, 2016). In a CNN news story by Kleron Monks (Monks, 2015) from 2015 the reporter interviews Mohammad Khodakarami, director of Iran's Civil Aviation Organizations. Khodakarami says "We have more than 20 million domestic passengers a year and six million international passengers on Iranian carriers. We have growth of 6% despite sanctions and if they are lifted we think the increase will be more than 10% for 10 years (Monks, 2015)."

The following graph (Figure 2) shows passenger traffic in Iran from 1990 to 2015 (WorldData, 2016).



Indicator Name	Air transport, passengers carried (IS.AIR.PSGR)
Long definition	Air passengers carried include both domestic and international aircraft passengers of air carriers registered in the country.

Figure 2: Total Passenger Traffic in Iranian airports. Source: World Development Indicators-The World Bank

Figure 3 reveals the passenger enplanement by airlines in Iran for 2014. Although Iran Air is the flag carrier airline of Iran, Mahan Air has a larger percentage of passenger share in Iran. Based on the CAPA report (2015), figure 3 has been created to show the passenger traffic by airlines ("CAPA Country Report: Iran", 2015). Mahan Air has 37% of passenger traffic in Iran and is the busiest airline in Iran. The second largest airline by passengers is Iran Air which has 31% of passenger movement. Iran Aseman Airline is the third largest by passenger and has a 10% passenger market share.

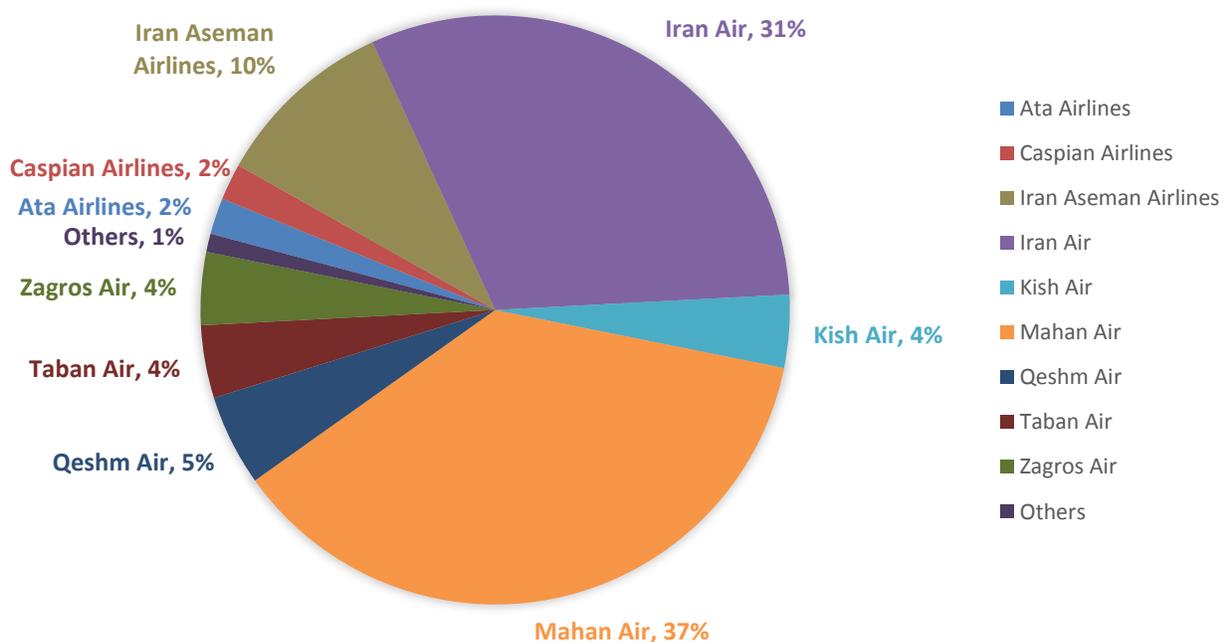


Figure 3: Passenger enplanement by Iranian airlines for 2014. (Source: CAPA Country Report: Iran, October 2015)

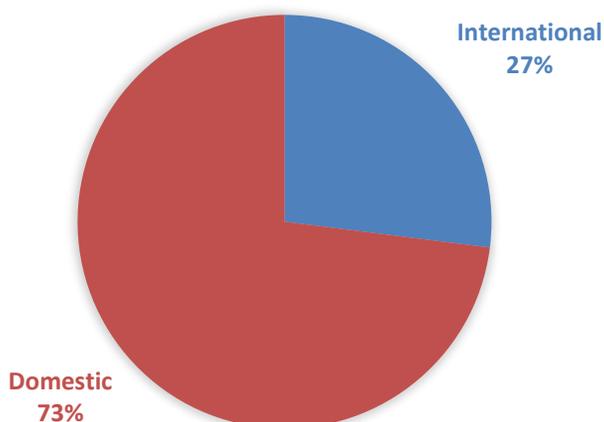


Figure 4: Iranian passenger distribution between domestic and international. (Source: CAPA Country Report: Iran, October 2015)

Since Iran has good business and cultural relations with the United Arab Emirates many Iranians live in UAE. As a result there are many flights to the UAE from Iran. As shown in Figure 5, the total seats that have been used for flights to the UAE are 33.2%. The second most common destination for Iranians is Turkey. A total of (24.9%) of Iranian flights go to Turkey ("CAPA Country Report: Iran", 2015).

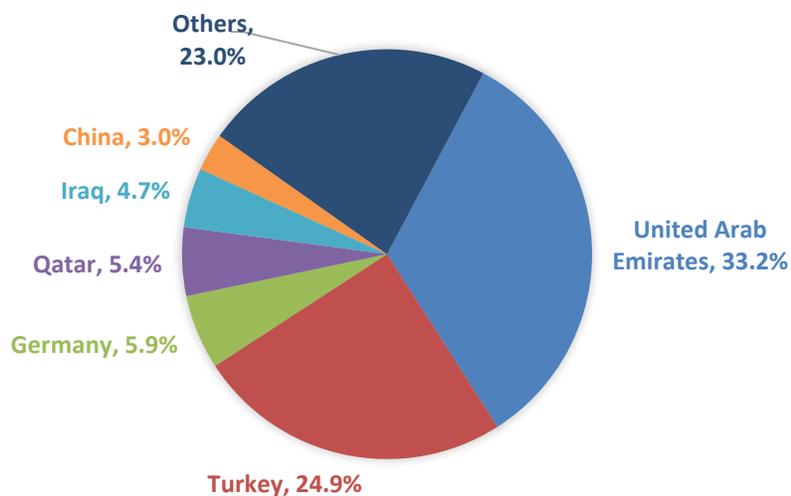


Figure 5: Country served from Iran by seats. (Source: CAPA Country Report: Iran, October 2015)

Airlines

According to an Iranian website (MyAviation.ir) there are presently 13 airline companies in Iran (Iran Airlines Fleet List, 2016). Of these Mahan Air, Iran Air, and Iran Aseman Airlines are the largest and comprise a combined share of 78% of the Iranian passenger market (Figure 3) and have a combined total fleet of 135 aircraft (CAPA Country Report: Iran, 2015). CAPA (2015) reports that there are a total of 243 operating aircraft in the country's entire commercial aviation fleet, so these 3 main airlines have 56% of the operating planes. Of all of the airlines, Iran Air is the oldest operating airline company which was founded in 1962. The small Iran Airtour company with six commercial planes was founded in 1973. Iran Aseman Airlines was founded in 1980 followed by Mahan Air in 1991. Today, Mahan is the largest operator in the country with 60 planes in its fleet (CAPA Country Report: Iran, 2015).

Mahan Air is a full service airlines and was Iran's first private airline company to be created in the Islamic Republic of Iran. According to Mahan Air's official English website, the company now has a staff of 3,330 people. It reports that all of the flight attendants must complete an intensive six month training course before serving on their first flights. Mahan Air claims that this is one of the longest and most comprehensive flight attendant training programs of any major airline (Mahan Air, 2016). Also, CAPA reports that Mahan Air operates scheduled international passenger services to 24 international destinations in Europe, the Far East and the Middle East (CAPA Country Report: Iran, 2015). According to CAPA these destinations include Munich, Milan, Moscow, Paris, Shanghai, Beijing, Bangkok, Kuala Lumpur, Erbil, Beirut, and Kabul ("CAPA Country Report: Iran", 2015). In a March, 2016 report Chini (2016) Mahan air reported opening a new service from Tehran to Kiev in the Ukraine where it will fly 3 times weekly and soon plans to open an office in the city. The article claims that the airlines is

planning to open a new weekly service to Southern Ukraine's largest city of Odessa (Chini, 2016).

Iran's oldest and second largest airline company is Iran Air, which was discussed in some detail in the history section of the paper, and it has a fleet of 39 aircraft and carries around 6 million passengers annually (Iran Air, 2016) and (WorldData, 2016). According to CAPA Iran Air also operates a cargo fleet called Iran Air Cargo and these operations are based at the Tehran Imam Khomeini International Airport in Tehran ("CAPA Country Report: Iran", 2015). In an article by Deena Kamel for (Kamel, 2016) *Bloomberg* the author reports that Iran Air presently flies to 28 domestic and 30 international destinations including London, Istanbul, Doha, Abu Dhabi, Amsterdam, Milan, and Nicosia, where it also has offices. In the article it is reported that Iran Air also operates charter flights from 17 cities in Iran during the Hajj season and carries tens of thousands of pilgrims to Jeddah, Saudi Arabia which is the air gateway to the city of Mecca. Kamel (2016) also reports that in light of the new international sanctions agreement that Iran Air is making plans to serve new destinations across Australia, Europe, Canada, and even the United States (Kamel, 2016).

Iran's third largest airline is Iran Aseman Airlines. According to CAPA Country Report: Iran (2015) Iran Aseman Airlines was founded in 1980 and is a privately owned regional air service. Most of Aseman flights originate from the hubs in Tehran's Mehrabad and Imam Khomeini airports and at Shiraz and Mashad airports. The company is owned by the Civil Service Pension Foundation ("CAPA Country Report: Iran", Country Report: Iran, 2015).

The three airlines discussed above make up 78% of the passenger services provided by Iran's commercial aviation industry ("CAPA Country Report: Iran", 2015). These three organizations dominate the industry and are the largest airlines. However, the other 22% of

business and airline services are provided by an additional nine airlines with a combined total of 90 aircraft. Among these nine airlines, Qeshm Air, founded in 1993, has 21 aircraft and its operations are based on the Iranian Qeshm Island in the Strait of Hormuz. Qeshm Island has a population of nearly 30,000 inhabitants and is a popular destination for tourists, especially ornithologists because the island is home to many rare bird species (Sadigh, 2007). According to Qeshm Air website, the airline has twenty four regular domestic flights to destinations like Tehran, Abadan, Kerman, Kish Island, and Mashhad. In addition, Qeshim has several regular direct international flights to destinations like Turkey, United Arab Emirates, Romania, Croatia, Bulgaria, and Iraq (Qeshm Air , 2016).

Another example of a smaller Iranian airline company is Iran’s newest Airline. This company is called Atrak Air and was founded in 2013. Although they have three planes in their fleet only one is currently in use (Airbus A320) (Atrak Air Fleet, 2016). In a recent News Release from the online magazine AirWorldToday on March 11, 2016 it reports that Atrak Air has acquired “six Embraer Regional Jets and three A320ceo airline. The three Airbus Industrie (AIB, Toulouse Blagnac) twinjets will reportedly deliver in June of this year, adding to the carrier's existing fleet of three A320-200s (ch-aviation, 2016).”

Table 2: Iranian Airlines (Source: MyAviation.ir)

Airlines	ICAO Code	IATA Code	Fleet
Ata Airlines	TBZ	I3	10
Atrak Air	ATR	AK	3
Caspian Airlines	CPN	RV	10
Iran Aseman Airlines	IRC	EP	36
Iran Air	IRA	IR	39
Iran Airtour	IRB	B9	6
Iranian Naft Airlines	IRG	NV	9
Kish Air	IRK	Y9	10
Mahan Air	IRM	W5	60

Meraj Air	MRJ	IJ	12
Qeshm Air	IRQ	QB	21
Taban Air	TBN	HH	9
Zagros Air	IZG	ZV	18
Total fleet			243

KEY : ICAO stands for International Civic Aviation Organization. These are the codes for each airport in Iran. IATA stands for International Air Transport Association.

In discussing the airlines in Iran it is important to look at the present state of the 243 aircraft that make up the entire commercial fleet of Iran. As discussed earlier in the paper the effects of sanctions on Iran's commercial aviation industry have resulted in many difficulties and have even been pointed to as causing accidents that have resulted in the loss of life (Handjani, 2014). A 2015 CAPA report recognized the aging nature of most of Iran's aircraft and speculated that the lifting of sanctions would result Iran acquiring "sorely needed" new planes and technologies to bring the fleet up to date and meet world standards ("CAPA Lifting of sanctions to spur Iran travel", 2015). In this article CAPA provides a number of graphs and statistics which show the facts about the present state of the aircraft fleet. According to CAPA (2015) 36 (in operation) of the 39 planes in the fleet of Iran Air are over 25 years old with an average age of 26.2 years ("CAPA Lifting of sanctions to spur Iran travel", 2015). Moreover, CAPA: Lifting of Sanction (2015) reports that 13 of Iran Air's Airbus 300's are 30.5 years old and 16 of their Fokker 70/100's are approaching 24 years of age ("CAPA Lifting of sanctions to spur Iran travel", 2015). These statistics and figures have been substantiated by the Wall Street Journal in a recent 2016 article. According to the article "Years of sanctions, some imposed in the wake of its revolution in 1979 rather than over the country's nuclear program, have left Iran with one of the world's oldest aircraft fleets, which it is eager to modernize (Wall R. , 2016)."

TRANSITIONS: LIFTING OF SANCTIONS AND THE FUTURE OF IRANIAN CIVIL AVIATION

In the year leading up to the lifting of sanctions against Iran with the signing of the Joint Comprehensive Plan of Action (JCOPA) on July 14, 2015 and in the year and a half since there have been literally hundreds of articles published discussing what this action might mean for Iran's commercial aviation industry. Many of these articles reported that the lifting of sanctions would mean major new purchases of American and European aircrafts by Iran's thirteen domestic airlines, as well as substantial new investments into Iran's airport infrastructure. Moreover, it is interesting to see how these stories have changed during the duration of this research from its inception until the submission of the paper for final approval.

Beginning in a 2015 article by John Ydstie of National Public Radio he reported that U.S. industry officials said that lifting of sanctions "could mean sales of 400 aircraft worth \$20 billion in the next decade (Ydstie, 2015)." An earlier 2014 report by CAPA reveals that, "the lifting of sanctions could breathe life into the aging fleets of Iran's airlines ("CAPA Iran aviation: lifting of sanctions", 2014)." Yet, another CAPA report's headline from the same period announced, "Iran aviation: the possible withdrawal of sanctions opens the door to OEMs and airlines alike ("CAPA Iran aviation: the possible withdrawal", 2014)." Over a year before the signing of the COPA agreement Haaretz interviewed the head of Iran's Civil Aviation Organization Ali Reza Jahangirian who stated, "Iranian airlines will be ready to buy 40 passenger planes every year for 10 years if sanctions are lifted (Reuters, 2014)."

Within six months of the signing of COPA many of these predictions came true. On January 16, 2016 it was reported that Iran intended to buy 114 Airbus SE group Jets. According to the article in *Bloomberg News* Iran's Minister of Roads and Urban Development Abbas

Akhoundi did not waste any time in announcing to the world Iran's intentions. On the 16th Akhoundi said that the deal to curb Iran's nuclear program had cleared the way for Iran Air to "purchase sorely needed aircraft to renew an aging fleet, feed domestic demand at its 50 airports in a nation of 80 million people and expand international flying" (Kamel, 2016). The article also says that Iran is considering purchasing the Boeing 737 narrow-body jet to serve the domestic market and the 777 twin aisle jets for "long haul routes" (Kamel, 2016).

This news was covered in newspapers and other media across the world, including in Aviation magazines and journals and other industry periodicals and media sources. The *New York Times* headline said "Iran's Sanctions Lift, and the West Goes to Talk Business" (Clark & Krauss, 2016). Moreover, there were other reports in *The Wall Street Journal* substantiating the news. Their headline read "Iran Plans to Buy 114 Civilian Aircraft From Airbus" (Wall, 2016). The 118 number was also reported by *CNN Money*. Their headline announced, "Iran selling oil to France and buying 118 Airbus planes" (Boulden, 2016).

Most of these reports speak glowingly about the economic opportunities in all of the stakeholder countries for job creation and for economic development in Iran. One report says Iran claims that the lifting of sanctions can create at least a million new jobs in the coming years in the Aviation sector for young educated Iranians (Wharton College, 2015). In fact, in the past months there have been many reports that say Iran has already begun to sign deals for aircraft. The article in the *Seattle Post Intelligencer* on February 2, 2016 reports that Iran signed a deal with French Italian aircraft manufacturer ATR to buy 20 new passenger airplanes. The deal also calls for an additional purchase of 20 more aircraft in the next few years. This article also says that American Boeing officials are in talks with Tehran about purchasing Boeing aircrafts in the near future ("Iran signs deal to buy 20 more airplanes", 2016). On the official *Airbus Press*

website the company details the new deal signed with Iran. Airbus says that the agreement for “118 new aircraft signed by Mr Farhad Parvaresh, Iran Air Chairman and CEO, includes 21 A320ceo family, 24 A320neo family, 27 A330ceo family, 18 A330neo (-900), 16 A350-1000 and 12 A380” (Airbus, 2016). Moreover, in the press release Airbus President and CEO Fabrice Bregier says, “The skies have cleared for Iran’s flying public and Airbus is proud to welcome Iran’s commercial aviation back into the international civil aviation community. Today is a significant step in the overhaul and modernisation of Iran’s commercial aviation sector and Airbus stands ready to play its role in supporting it” (Airbus, 2016).

In the most recent news about the Iran deals with Airbus and Boeing there are reports that Iran is downsizing some of the purchase orders. A September 19, 2016 *Fortune* article says that in the new deal between Airbus and Iran “there are six fewer aircraft” (Fortune, 2016). This means that instead of 118 new Airbus aircraft Iran will only purchase 112 planes. The exact models of aircraft to be purchased is not clearly identified in the article. However, the article says of the 112 planes, “these include 12 A380 superjumbos but Iran has not yet decided whether to take the double-decker jets, and has an option to convert them to smaller models” (Fortune, 2016). A September 21, 2016 Associated Press report also confirms the purchase reduction of 6 planes. The article reports the U.S. government has granted both Airbus and Boeing permission to proceed with the sales (Gambrell, 2016). Moreover, the article says that Airbus needed this approval from the United State’s Treasury Office of Foreign Assets Control because at least 10% of the manufacturer’s components are of American origin (Gambrell, 2016).

According to the Associated Press article the Airbus/Iran deal includes 17 base model A320’s priced on average of \$98 million each, while A330’s start at \$231.5 million. These prices make the first round of the deal worth \$1.8 billion and “possibly much higher based on list

prices, though buyers typically negotiate sizable discounts for bulk orders (Gambrell, 2016).” In addition, AP reports that under the Boeing deal Iran Air will buy 80 aircraft with a total price of \$17.6 billion. AP says that deliveries for the Boeing’s will begin as early as 2017 and run through 2025. Boeing spokesman Marc Sklar says in the article Boeing has received all of the necessary licenses from the US government and continues its talks with Iran Air about delivery issues and price points (Gambrell, 2016). All of these reports discuss the positive benefits of the lifting of sanctions for the Iran commercial aviation industry. Moreover, they also report about the economic benefits of the deals for companies in Europe and the United States.

Finally, in yet another more recent news story the status of the Boeing and Airbus deals with Iran have changed again. In an article by Reuters Hefher and Aboudi (2016) it reports that the Iran deal with Boeing has been signed and the deal totals \$17 billion . The article also says that the deal with Airbus should be finalized soon (Hefher & Aboudi, 2016). Then, in a December 19, 2016 article in the online Air Transport World Karp (2016) magazine reports Iran Air has finalized its aircraft order with Airbus but has reduced the number of A380’s by 12 aircraft. According to the article each of these planes cost \$400 million dollars each and this will reduce the price of the deal to less than \$10 billion total (Karp, 2016).

Comparisons

One way to analyze both the affects of sanctions on Irans civil aviation industry and the prospects for future development because of the Joint Comprehensive Plan of Action (JCPOA) agreement is to compare Iran with other nations of similar size. If we look at data from the World Bank and other sources like CAPA on countries such as Turkey, Thailand and Germany, which all have similar population sizes, and compare their civil aviation industry with Iran’s the results are noteworthy. The graph below shows that Turkey, Germany, and Iran have very

similar population sizes and that Thailand has about eleven million less inhabitants. We can see from Table 3 that, although there are differences in numbers of airports and airlines, they are not as great as the differences in passenger traffic experienced by the countries. Perhaps, most striking, are the differences in the numbers of passengers served in Iran and Turkey. Both countries have an almost identical total population and number of commercial airlines, yet, Iran only serves 15 million passengers annually compared to Turkey's serving over 96 million. This difference is substantial and reinforces the position that sanctions have had a dramatic effect on Iran's airlines as claimed by Dadpay (2012) in his article "A Review of Iranian Aviation Industry: Victim of Sanctions or Creation of Mismanagement?" (Dadpay, 2012).

Table 3: Countries Comparison. (Sources: WorldData, AirFleets, Iran Airline Fleet List, & General Directorate of State Airports Authority)

Country	Population	GDP per capita \$US(2014)	No. of Airports	No. of Airlines	Based Aircraft*	Average Fleet Age	Passenger Traffic (2015)
Iran	79,109,272	5,442.9	30	14	46	27.5	15,003,958
Turkey	78,665,830	10,303.7	55	15	285	6	96,604,665
Thailand	67,959,359	5,969.9	31	20	81	11.3	54,259,629
Germany	81,413,145	47,902.7	49	21	276	9.6	115,540,885

*: These numbers only reflect based aircraft which means that they are the aircrafts for the national airlines. There are other planes for the other airlines.

Another important way to compare Iran with these other countries is to look at the age of the airline's fleet in the country. From looking at the data above (Table 3) it seems clear that Iran's commercial aviation fleet is substantially older than all of the comparison countries. For instance, most of the aircraft in Iran's fleet are over 25 years old and the average age of the fleet is 27.5. If we compare this to Turkey's average fleet age of 6 years it immediately becomes clear that this issue is of major significance. In comparison to Iran's planes averaging 27.5 years of age, Germany's fleet is only 9.6 years old on average. Moreover, there are only 7 planes in Lufthansa—all Boeing 737's—which are over 24.7 years old. By comparison virtually all of the planes in Iran's fleet are over 20 years old. If we compare Iran with the country of Thailand we

see that the average age of their planes is 11.3 years old and that they only have 2 planes in the entire fleet of 80 aircraft over 23.5 years of age. It seems very clear, as Dadpay asserts, that sanctions have had a dramatic effect on Iran's ability to acquire new planes and that this is the reason for the age of their fleet. Moreover, it should be of both interest and concern to consider the major differences in the ages of these airlines fleets especially from a safety perspective (Dadpay, 2012).

We have seen that there are many reports and news articles which maintain that the lifting of sanctions will increase Iran's needs for new airplanes and what this will mean for the economies of many countries. There are also many articles about new business opportunities in the Iranian tourism market. For example, a *New York Times* February 2016 article published just a few months after the JCOPA agreement was already reporting a surge in bookings for tour operators in Iran. The article reports, "Tour operators say the demand has been so acute that they are racing to add new departures and selling them in record time" (Glusac, 2016).

Since international tourism and aviation are fundamentally two sectors of the same market the lifting of sanctions is expected to have a huge impact on both industries. For example, there are many articles with headlines such as "Lifting of sanctions to spur Iran travel. Turkish Airlines and Gulf carriers have large presence" airlines (CAPA Iran aviation: lifting of sanctions, 2014). Other reports in CAPA discuss how this tourism trade will benefit airlines like Turkish Airlines, Emirates, flydubai, Qatar Airways and Etihad Airways. Moreover, airlines in Western Europe like those that currently serve Iran including Austrian, Alitalia, Germania, and Lufthansa, are expected to be joined by Air France, British Airways, and KLM according to reports by CAPA. There are even talks between the Iranians and Greek Aegean Air about expanding its very limited monthly flight to Iran. airlines ("CAPA Iran aviation: lifting of sanctions", 2014).

An October 2015 CNBC article and news story entitled “Iran preparing for ‘tsunami’ of tourist” claims that the country is hoping to expand its tourism to 20 million visitors a year by the year 2025 and this will mean that the industry will generate over 30 billion US dollars annually. The article quotes Masoud Soltanifar, who is also Iran's Cultural Heritage, Handicrafts and Tourism Organization chief as saying the country plans to moderate its policies and ease visa rules and open more doors to foreign tourists. (Iran preparing for 'tsunami' of tourists, 2015). Moreover, this tourism boom will also require many new hotels and tourist centers, cultural events, and businesses that cater to international tourism. The Iranian tourism department is excited and optimistic about the future, as are many international tourism businesses. For example, an article in the *New York Times* talks about an American travel company based in California, Wilderness Travel, that has been working on exotic specialty trips to the Iranian saffron harvest and other special tourism packages for extreme hiking and mountain travel. The article substantiates the information in CNBC. The article says “The Associated Press last fall said that about five million foreign travelers visited Iran in 2014, and that the country aims to attract 20 million tourists, spending \$30 billion, by 2025” (Glusac, 2016).

CONCLUSION

The sources in this research paper show that sanctions on Iran have had a negative effect on the country's commercial aviation sector, as well as on many other areas of the economy and society for over three decades. Perhaps, the best evidence for the sanction's effects on the commercial airline industry can be seen by comparing Iran's aging fleet of aircraft with countries of similar populations that have about the same numbers of airlines and airports. For example, the average age of aircraft in Iran is 27.5 years old. When we compare this number with countries like Turkey, Germany, and Thailand it clearly shows that the airplanes in Iran are on average well over fifteen years older than their nearest competitors. Since the sanctions prohibited Iran from purchasing new planes from western manufacturers this age discrepancy between Iran's fleet and the other countries substantiates the claims that the sanctions were the responsible factor. This fact alone explains why Iran has been rushing to sign contracts and attempting to purchase new aircraft from Boeing and Airbus even before the lifting of sanctions with the signing of the JCPOA.

Another important finding of this research paper can be found in the statistics for the total of based aircraft in each country. The effects of sanctions can be seen in the information provided by Airfleets website in Table 3. In Iran, the national flag, Iran Air, has only 46 total aircraft compared to 276 planes in Germany (Lufthansa) and 285 in Turkey (Turkish Airlines) (Iran Air Fleet, 2016). Since the sanctions blocked Iran's ability to purchase new aircraft, it is evident that this is the major reason for the smaller size of the country's "based aircraft." Moreover, this difference in the overall size of the fleets also explains the large differences in passenger traffic. If we compare Iran and Turkey with their populations of 79 and 78 million respectively and then compare the numbers of passengers flying on the countries airlines the

differences are profound. In 2015, the last year of sanctions against Iran, only a little over 15 million passengers flew on Iranian airlines compared to over 96 million flying on Turkey's airlines and over 115 million on German airlines.

This research paper has also looked at events taking place in light of the recent Joint Comprehensive Plan of Action (JCPOA), commonly referred to as the Iran Plan, signed on July 14, 2015 and what this means for the future of the commercial aviation sector. Since the signing of this agreement over the past year Iran has signed several business deals with companies like Airbus and Boeing to acquire billions of dollars of new aircraft for their aging fleet. According to some of the latest reports these deals will involve the purchase of over 150 planes from these companies and total in excess of \$50 billion US dollars. Although, the terms and exact numbers of aircraft being purchased have been subject to change over the past year, one recent report says Boeing is expected to sell 80 airliners to Iran (Northan, 2016) and Airbus around 118 jetliners to Iran (Fortune, 2016).

Moreover, the paper has summarized what this means for the future development of Iran's commercial aviation industry, airports, tourist industry, and also for their effects on creating new jobs in both Iran and other countries. The positive benefits of this new period have been widely reported about and many of the reports suggest that Iran's aviation sector will be a good investment for the future (Bozorgmehr, 2016), (Bhaskara, 2016), (Fortune, 2016). Even sources like *Fortune Magazine* report that the lifting of sanctions against Iran will have positive benefits for workers and companies in the United States like Boeing (Fortune, 2016). As a result, over the next ten years if the JCOPA is allowed to remain in effect, it is not unlikely that Iran can achieve parity with countries like Germany, Thailand, and Turkey in the number of "based aircraft" and even have a newer and more modern fleet. This would also mean that Iran would be

poised to dramatically expand its passenger traffic and begin to compete on a world scale for passengers across the globe.

Overall, this research paper has shown that sanctions are the primary factor responsible for the present state of Iran's commercial aviation industry. However, as the sources in this paper clearly show the future prospects for major development and modernization of the industry is very possible if the JCOPA remains in place and Iran is able to purchase new aircraft. If Iran is able to acquire a new fleet of planes it is also very possible that passenger traffic will rapidly expand and that eventually it might become a major carrier in the region and reach parity with the airline companies in Turkey, Thailand, and Germany.

Finally, this paper has shown that there are many areas where future research needs to be conducted. One area would be to have fluent Farsi speaking researchers/students analyze and translate available reports, data and media articles about Iran's commercial aviation industry which are accessible on-line and in many printed sources. This information could be compared with western sources and analyzed to present a better picture of the current state of aviation in Iran. There are also some sources of data and information about Iran's aviation industry that require memberships or paid fees in order to access. One of these sources is the International Civil Aviation Organization (ICAO). Although, some of this organization's data is publically available many of their studies and in-depth reports require annual memberships. In addition, future researchers may want to compare the Iranian aviation industry with more countries than are considered in this research paper. This research only compared Iran with three other countries of similar population size. Future research could extend these comparisons to more countries and include other factors such as per capita income and geographical locations.

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