

# Strategical Analysis and the Impact of Istanbul Airport on Turkish Airlines

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## Abstract

This study investigates the impact of Istanbul Airport on Turkish Airline (THY) and World Civil Aviation. We also present strengths, weaknesses, opportunities, and threats (SWOT) analysis, strategic suggestions for THY, examination of THY' new flight destinations, and properties of new airport to assess the new airport as well as future outlook of THY. In order for the Istanbul Airport to be successful, four different strategic directions will be examined in the future outlook.

*Keywords: Istanbul Airport, Turkish Airline, SWOT analysis, strategic suggestions, new flight destinations*

## 1. Introduction

Transportation has been an important and indispensable factor for people for thousands of years.

It is a sector very closely linked with many industries, both in countries' economies and in the global economy. One of its fast growing branches is the civil aviation industry and it has made important developments in parallel with the economic growth that took place in the late 20<sup>th</sup> century [1]. Airline transportation is also developing and the number of people who prefer airline transportation worldwide is increasing every year due to the speed and comfort that it provides [2].

Despite the global crisis experienced in the world in 2003, Turkish Civil Aviation continues its growth that started in 2002. This growth is expected to continue in the coming years and to achieve 2023 targets in civil aviation. the total number of passengers in Turkey's domestic and international flights reached 208 million in 2019 from 33.5 million in 2002, which means the number of passengers has increased 6 times in 18 years. Turkey, which has one of the world's largest airports, especially with the Istanbul Airport infrastructure, has gone through a significant change in 16 years, it has managed to capture that growth in the sector after liberalization. Turkey continues to reach the top levels in transportation with the investments made in every field of transportation in recent years. As people begin to prefer airline transportation, the number of businesses that will serve in the sector is increasing rapidly. For this reason, countries try to reach the best standards in transportation [3].

While Istanbul Airport was the 14<sup>th</sup> airport that hosted the highest number of passengers in the world in December 2019, it was the second airport that achieved the highest growth worldwide, with an increase of 8.4% in the number of passengers. Among the European airports, London Airport increased by 0.5%, Paris Airport by 4.2%, Frankfurt Airport by 1%, and Amsterdam Airport by 0.3%.

Among the 5 largest airports in Europe, Istanbul Airport is the one which increased its passengers the most. Istanbul Airport, where flights have started operations in April 2019, entered the list of airports with the highest number of passengers in the world as of August 15<sup>th</sup> [3].

In terms of the increase in the number of passengers they flew in the last month of 2019, Turkish Airlines (THY) was the 4th airline that has the highest increase in number of passengers in the world with a growth of 7.1% (Qatar 17.7%, Singapore 8.7%, China 7.9%). Considering the 32.9% share of the Asia-Pacific Region, where Qatar, Singapore and China Airlines are located, THY has achieved much more success than its competitors. Lufthansa, which is one of the European carriers in the world

list, has increased its passengers by 2.8%, Air France-KLM 1.6%, Ryanair 5%, British Airways 4.8%, while THY has increased its passenger in Europe with the increase of 7.1% [4].

There have been published some studies about Turkish aviation as follows: Torlak *et al.*, [5] analysed business competition from a management perspective in relation to the Turkish domestic airline industry by fuzzy TOPSIS multi-methodological approach in the Turkish domestic airline industry. A fuzzy ANP-based SWOT analysis of Turkish aviation industry is provided by Sevklı *et al.*, [6]. Acar and Karabulak [7] assessed the competition in Turkey domestic airline industry between full service network carrier and low cost carrier. Deveci *et al.*, [8] assessed service quality of domestic airlines in Turkey combining hesitant and interval type 2 fuzzy sets. Karagülle [9] evaluated the fleet structures of airline companies in Turkey and their strategic fleet decisions. Dursun *et al.*, [10] examined the transformation of Turkish Airlines from a regional airline to a global network carrier after privatization and domestic deregulation. Çiftçi and Şevklı [11] provided insights about capacity limitations of Istanbul airports and proposed a new HS system for Antalya. Deveci *et al.*, [12] applied interval type-2 fuzzy TOPSIS in order to find new aspects for feasibility analysis of a new route between Turkey-North American region destinations. Logothetis and Miyoshi [13] introduced a new model for hub connectivity and compared Turkish Airlines' hub Istanbul Atatürk Airport and Emirates' Hub Dubai International airport.

The main contributions are as follows: (i) SWOT analysis of the Istanbul Airport, (ii) introducing the construction process and properties of new airport, (iii) examination of Turkish Airlines' new flight destinations in 2019 and 2020 and (iv) strategic suggestions for the future of Turkish Airlines.

## 2. Istanbul Airport

Istanbul Ataturk and Sabiha Gokcen Airports are operating at full capacity and a new airport is now needed to increase the overall passenger capacity. With the new airport to be built in Istanbul, transit flights from Africa, Far East and Asia to Europe can be made through Istanbul.

Istanbul Ground Airport (IGA) received the tender for 22 billion 150 million Euros excluding VAT in October 7, 2013, by a consortium with 5 partners to build Istanbul Airport and to operate it for 25 years. Currently, the consortium is continued with 4 partners; Kalyon, Cengiz, Mapa and Limak.

Istanbul Airport is 35 kilometres away from the city center. It will consist of two terminals and six runways with an annual capacity of 200 million passengers when it is fully completed. Istanbul Airport is planned to be completed in four phases and construction has been officially started on May 1, 2015 by General Directorate of State Airports Authority.

Istanbul Airport, which is the largest infrastructure project in the history of the Republic of Turkey and its first phase opened on October 29, 2018, serves its passengers with full capacity as of April 6, 2019. Covering an area of 76.5 million square meters, the new airport attracts attention as a global transfer center among the Asia, Africa and Europe continents.

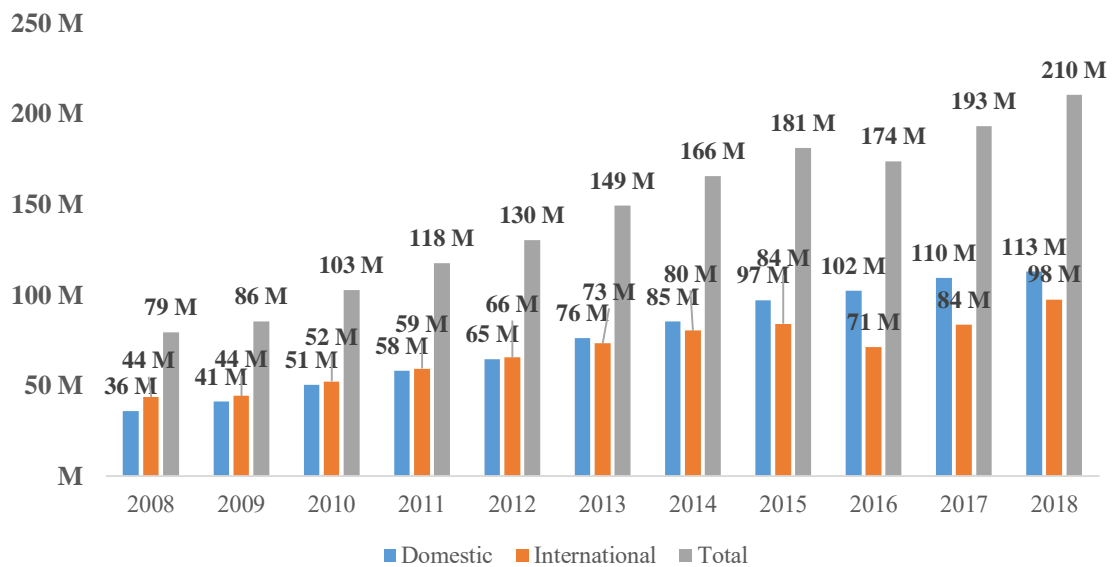
On April 6, 2019, two independent parallel runways, taxiways, apron, terminal building, air traffic, communication and meteorology systems and other service buildings were launched in the first phase of the airport. The first passenger terminal building is the largest terminal building in the world under a single roof, with 1.44 million square meters. Welcoming an average of 200 thousand passengers and 1200 aircraft per day, Istanbul Airport operates 2 runways and a terminal building with a capacity of 90 million passengers within the scope of the first phase. In 2019, Istanbul Airport served 329,799 aircraft, 82,325 domestic and 247,474 international flights. The airport hosted 52 million 578 thousand passengers, 12,720,826 domestic and 39,857,182 international flights. According to the data of January 2020, the airport hosted a total of 5,276,260 passengers and 1,263,808 of total passengers were domestic passengers.

Third runway is expected to be open in June 2020, as the taxi times of the aircrafts will be shorter thanks to the new runway, delays will decrease and the capacity will increase. With the opening of the third runway, hourly descent and departure traffic will be increased from 80 to 120. New airline companies are also expected to fly from Istanbul Airport as the runway becomes operational as

capacity will increase. Istanbul Airport, which will carry passengers to 350 different destinations, is the world’s first digital and smart airport of its size [14, 15].

### 3. Turkish Airlines

Turkish Airlines is national carrier of Turkey and it was the only carrier until 1983 [16]. Domestic market has been deregulated since 2003 and from that year, passenger numbers, number of airlines and number of airports in the country are increasing. Turkish Airlines (59%), PGS (28.6%), Onur Air (7.9%), and Atlasjet (4.4%) has capacity share in the domestic market [10]. Yearly domestic and international passenger of Turkey is given in **Fig. 1** [17]. Except 2016 demand crisis, airline industry is grown by years. After 2016 crisis, industry recovers very quickly and continues to grow in 2017.



**Fig. 1.** Yearly domestic and international passenger figures of Turkey from 2008 to 2018

Turkish Airlines conducts its operations based in Istanbul in the Anatolian Geography, which is at the intersection of the European, Asian and African continents. The route map of THY is depicted in **Fig. 2** [18].



**Fig. 2.** Turkish Airlines route map

THY can reach 52 domestic destinations and 25 international destinations within a 2-hour flight time range, 117 international destinations with a 4-hour flight time range, 153 international destinations with a 6-hour flight time range, 176 international destinations with an 8-hour flight, 220 international destinations with an 8+ hour flight. This demonstration is shown in **Fig. 3**.



**Fig. 3.** Turkish Airlines geographical advantage

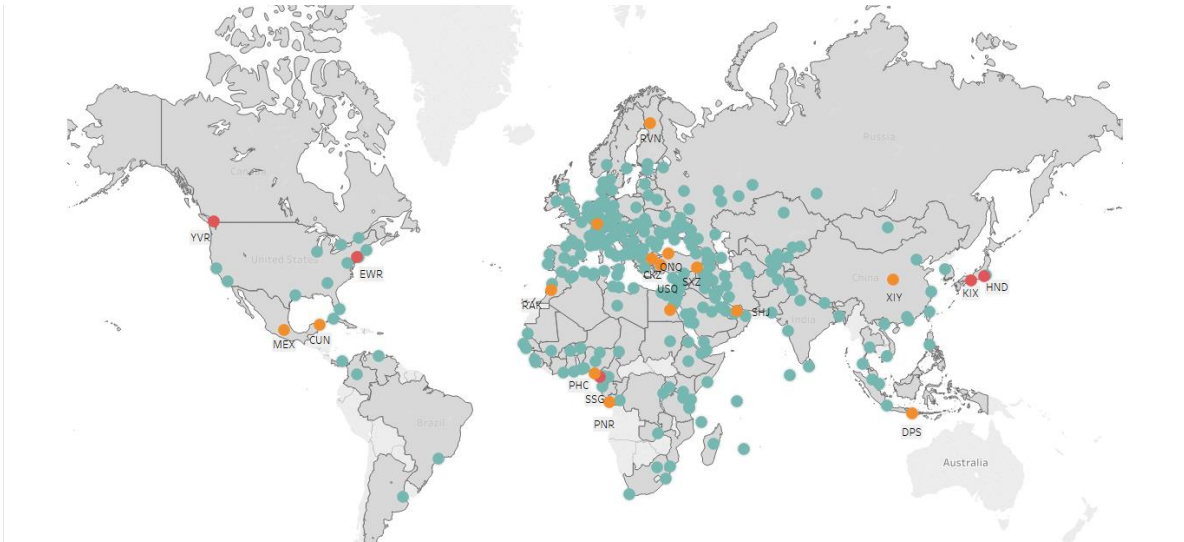
THY can reach all of Europe, North Africa and the Middle East and a significant part of Central Asia, India, Pakistan, and East and West Africa with narrow body aircraft.

Using the advantage of its geographical location, THY conducts scheduled passenger flights to 321 airports in 318 cities in 126 countries in America, Asia, Africa, Europe continents. 52 of these destinations are domestic and 269 are international ports. As a flag carrier, it operates to all domestic airports that are open for civil aviation.

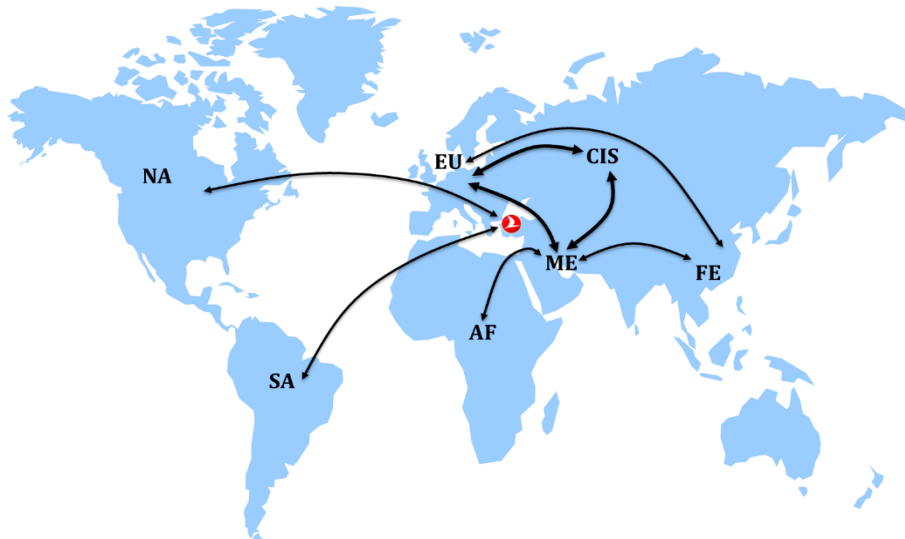
Turkish Airlines have added 15 new destinations to its network in 2019. Four of these destinations are domestic respectively, Uşak, Siirt, Zonguldak and Çanakkale flights are started. International flights from Istanbul to Sharjah, Marrakech, Strasbourg, Port Harcourt, Bali-Denpasar, Pointe Noire, Mexico City, Cancun, Luxor, Rovaniemi and Xian have also started in 2019.

It is planned to add Newark (New Jersey-USA), Vancouver (Canada), Malabo (Equatorial Guinea), Haneda (Tokyo-Japan) destinations to the flight network in 2020. It is also planned to restart flights that have been suspended in 2017 at Osaka.

These destinations are illustrated in **Fig. 4**. Blue dots show the current network, orange dots show the airports that are added to the network in 2019 and red dots show the airports that are planned to be added to the network in 2020. The connecting passenger regions of Turkish Airlines are also shown in **Fig. 5**.



**Fig. 4.** Turkish Airlines current flight network and new destinations



**Fig. 5.** Turkish Airlines' connecting passenger regions

#### 4. SWOT Analysis of Istanbul Airport on Turkish Airlines

Turkish Airlines has a strong position in Istanbul and expansion opportunities in Istanbul Airport.

As a hub airport that is serving worldwide destinations, it offers a platform to compete for continuous leadership. To maximize the performance and provide that airport capacity increase is not leveraged against Turkish Airlines by competitors, especially low-cost carriers (LCCs), will require management of Turkish's fleet, hub structure and network management, as well as ensuring that the opportunities available to Turkish Airlines are fully utilized. **Fig. 6** shows the SWOT analysis Istanbul Airport on Turkish Airlines.





**Fig. 6.** The SWOT analysis of Istanbul Airport

#### 4.1 Strength of THY Strategy on Istanbul Airport

➤ *Large home market and geographic location*

Turkey and Istanbul as a country and city has a very high tourist potential [19]. By using this potential, THY can start flights to many new destinations. The slot capacity required to start these flights is available at the new airport and the required fleet is also provided. In addition, geographically, the intersection of continents stands out as a good transfer point for those traveling by air transport. It is advantageous for both east and west travel as well as between north and south.

Europe-Far East, Europe-Africa, Europe-Middle East, North America-Middle East and North America-Africa markets can be counted as the inter-geographical passenger flow to which this advantage is best used.

➤ *Hourly movement capacity*

In order to utilize the increased hourly slot capacity of Istanbul Airport compared to Ataturk airport, THY should increase the frequencies and adjust the schedule of its existing flights. This will also increase connectivity by adding new flight destinations to its network. With the transition from Ataturk Airport to the Istanbul Airport in 2019, THY has already started flights to 15 new destinations with direct flights. These 15 new destinations that are added to its flight network in 11 countries as given in **Table 1**.

**Table 1.** The new destinations from Istanbul Airport

| # | COUNTRY | CITY          | AIRPORT CODE | ROUTE     | INAUGURAL FLIGHT | FREQUENCY |
|---|---------|---------------|--------------|-----------|------------------|-----------|
| 1 | TURKEY  | UŞAK          | USQ          | ISTUSQIST | 16.01.2019       | 3         |
| 2 | TURKEY  | SIİRT         | SXZ          | ISTSXZIST | 06.03.2019       | 7         |
| 3 | TURKEY  | ÇANAKKALE     | CKZ          | ISTCKZIST | 15.03.2019       | 3         |
| 4 | UAE     | SHARJAH       | SHJ          | ISTSHJIST | 04.04.2019       | 7         |
| 5 | MOROCCO | MARRAKECH     | RAK          | ISTRAKIST | 15.04.2019       | 5         |
| 6 | TURKEY  | ZONGULDAK     | ONQ          | ISTONQIST | 12.05.2019       | 3         |
| 7 | FRANCE  | STRAZBURG     | SXB          | ISTSXBIST | 31.05.2019       | 4         |
| 8 | NIGERIA | PORT HARCOURT | PHC          | ISTPHCIST | 24.06.2019       | 4         |

|    |           |               |     |              |            |   |
|----|-----------|---------------|-----|--------------|------------|---|
| 9  | INDONESIA | BALI/DENPASAR | DPS | ISTDPSIST    | 17.07.2019 | 7 |
| 10 | CONGO     | POINTE-NOIRE  | PNR | ISTLBVPRIST  | 30.07.2019 | 3 |
| 11 | MEXICO    | MEXICO CITY   | MEX | ISTMEXCUNIST | 22.08.2019 | 3 |
| 12 | MEXICO    | CANCUN        | CUN | ISTMEXCUNIST | 22.08.2019 | 3 |
| 13 | EGYPT     | LUKSOR        | LXR | ISTLXRIST    | 23.09.2019 | 4 |
| 14 | FINLAND   | ROVANIEMI     | RVN | ISTRVNIST    | 05.12.2019 | 3 |
| 15 | CHINA     | XIAN          | XIY | ISTXIYIST    | 30.12.2019 | 3 |

Turkish Airlines plans to add 5 new destinations to its flight network in 4 different countries in 2020 as given in **Table 2** [20].

**Table 2.** The planned flights from Istanbul Airport to other countries

| # | COUNTRY           | CITY      | AIRPORT CODE | ROUTE        | INAUGURAL FLIGHT | FREQUENCY |
|---|-------------------|-----------|--------------|--------------|------------------|-----------|
| 1 | JAPAN             | OSAKA     | KIX          | ISTKIXIST    | 14.04.2020       | 5         |
| 2 | USA               | NEWARK    | EWR          | ISTEWRIST    | 25.05.2020       | 7         |
| 3 | JAPAN             | TOKYO     | HND          | ISTHNDIST    | 29.03.2020       | 7         |
| 4 | CANADA            | VANCOUVER | YVR          | ISTYVRIST    | 09.06.2020       | 3         |
| 5 | EQUATORIAL GUINEA | MALABO    | SSG          | ISTPHCSSGIST | 07.02.2020       | 3         |

#### 4.2 Weakness of THY Strategy on Istanbul Airport

##### ➤ *Too many destinations with too little frequency*

Turkish Airlines existing bank structure limits the competitiveness of the market in the short-haul regions especially in Caucasus, Ukraine and Eastern Europe. In addition, Turkish Airlines current strategy to create market share and preference 3 or 4 frequency per week or daily but at different times on different days. Turkish Airlines could have more market share and preference in case of the planning of schedule with the same departure time every day with small gauge aircraft would be better service to offer daily service.

#### 4.3 Opportunities for THY strategy on Istanbul Airport

##### ➤ *Introduction of new generation wide body aircrafts*

In 2017, Boeing 787-900 Dreamliner and Airbus 350-900 aircraft types have been ordered. Thanks to the fuel efficiency and range of these new generation wide body aircrafts, THY will have the opportunity to add new flight destinations to its network by profitably. Currently, Boeing 787-900 Dreamliner aircrafts has started to join the carrier's fleet in 2019. With the arrival of these aircrafts into the fleet, cities such as Bali, Mexico and Cancun, which have not been operated before, have been added to the THY's network and the connectivity of the Istanbul Airport has been increased.

The use of the hourly flight capacity of the new airport is also increased and it contributed to the growth of THY. It is planned to join the first Airbus 350-900 type aircraft to the Turkish Airlines fleet in March 2020. In addition, with the phase in of new generation aircraft types to the fleet, maintenance costs and fuel consumption rates will decrease. It is also expected that this will cause the removal of old aircraft types from the fleet and the age of the fleet will be rejuvenated.

#### **4.4 Threads for THY strategy on new airport**

➤ *New (LCC) competitors*

It is expected to see in a large and fast-growing market as Turkey is insulated from the level of LCC competition. The limited slot environment in IST-Ataturk was an effective barrier to entry to limit the LCC growth. In the context of new airport hourly slot capacity, we can expect LCCs to grow in IGA, taking advantage of its higher capacity. The impact of this growth can be expected to create various threats that Turkish Airlines must manage, such as, slot and gate competition, congestion in the peak hours etc.

➤ *Horizontal agreement with the EU*

The European Union and Turkey are still unable to complete the horizontal agreement in the legal provisions of the agreement they have initiated in 2010. The horizontal agreement is based on the acceptance of all European Union countries as a single country. The European Union implements similar agreements within itself and wants to apply it to other countries. For example, the Irish-based company Ryanair can travel from many different countries within the European Union to different countries within the Union. In case of Turkey by the same agreement: For example, Germany-based Lufthansa Airlines will be able to add flights from the capital of France, Paris, to Antalya. Turkey-based carrier will also be able to perform without a frequency constraint to any country in the European Union. However, carriers that are based in Turkey, will not practice the same as carriers in Europe for the time being since Turkey is not a member of the European Union. This situation will lead to unfair competition for Turkey based carriers especially for the Turkish Airlines.

➤ *A380 capacity*

Airbus A380 type aircraft could not land at Ataturk airport due to technical reasons and slot capacity problems, but these problems have disappeared at Istanbul airport. Especially, Gulf carriers will want to fly to Istanbul Airport with high capacity A380 aircraft. In this case, it will cause the passengers of the Middle East and Far East departing and arriving from Istanbul to be lost to these connector airlines and eventually Turkish Airline lose market share.

➤ *Demand shocks*

Geopolitical factors, pandemics, wars, conflicts, terrorist events, political developments and the bilateral relations between countries have always been determinant in the airline travel industry.

Recently, in 2015 due to downed Russian fighter jet after a political crisis between Russia and Turkey, passenger demand of Antalya and Istanbul decreased 84% from Russia [21, 22].

Turkey's border with neighbouring civil war in Syria, which began in 2011, Turkish Airlines was forced to cancel flights to Damascus and Aleppo. It was also exposed to terrorist threats from Syria.

Such negative impacts should always be considered as an external threat for flights in the Middle East and Africa.

In addition, after the coronavirus (covid-19) outbreak that emerged in Hubei province of China in the last days of 2019, many airlines (including THY) in the world aviation industry cancelled their flights to China as the first precaution for 2 months. According to IATA, the total demand loss of the aviation industry will be at the level of 5% and the income loss will be 30 billion USD due to the virus outbreak. In addition, such outbreaks do not threaten aviation for the first time. Previously, SARS in 2003, MERS epidemics occurred in 2012 and affected the airline industry enormously.

Finally, it should be noted that such outbreaks are always a threat not only for THY but also for the whole aviation industry [22].

➤ *Passenger modal shift (highway and high speed railway to other important cities)*

The newly opened Izmir Highway, North Marmara Motorway, Osman Gazi bridge in Turkey and rail projects has emerged faster alternative opportunities for travel between two largest cities (Ankara



and Izmir) of Turkey from Istanbul. Considering the distance of the Istanbul airport to the city center and the obligation to be at the airport about 1 hour before the air travel requires, transportation by road and rail is a substitute option to Izmir and Ankara, which is 5 hours away by road. In this case, Izmir and Ankara flights may see some decrease in flight services. In the current situation, there are shuttle services to Ankara and İzmir which means one flight for every hour for each city. However, due to decrease in the demand, the distribution of passengers in the existing flights to Izmir and Ankara will shift towards the transfer passengers coming from abroad. In addition, some of the potential passengers on the Anatolian side of Istanbul will also prefer International Sabiha Gokcen Airport (SAW) due to the distance of Istanbul Airport, unless there is not any service to where they want to go from SAW, they will prefer the Istanbul Airport.

## 5. Future Outlook of Thy on New Airport

Turkish Airlines should focus on four different strategic directions in order to be successful at the new Istanbul Airport. To capture the international transfer market and increase connectivity, the new capacity available at the Istanbul Airport should be used as soon as possible. The way forward is to strengthen strong targets with new frequencies/additional capacity in line with their redesigned schedules and to strengthen the corresponding connecting regions. In order to provide profitability contribution with this new capacity, it should be managed in coordination with revenue management and sales departments. THY should maintain its level of service against competitor airlines and hub airports. It should also consider operational and commercial risks due to the new playground of future competition

### ➤ (1) *Capture international transfer market*

THY should keep on its successful strategy to focus on building a sustainable and industry-leading position for all international markets (in the Turkey-World market) with enough local (Istanbul non-stop) passenger potential to warrant nonstop service. However, Turkish Airlines can improve this strategy by creating more frequency depth in the mature markets (e.g., Europe). It should ensure that its network expansion plans are coherent with other national development plans and Turkish businessmen investments. For example, Africa flights can be prioritized by THY due to the availability of Turkish engineering companies.

### ➤ (2) *Connectivity*

The number of connection opportunities between both existing destinations in the network and possible new destinations can be increased. New origin and destination pairs can be created by establishing better connections between existing destinations and also establishing attractive connections to new destinations. These will result as taking market share passengers from other carriers.

Turkish Airlines should reduce average transfer times by changing departure and arrival times of the flights according to IGA's higher slot capacity than the Atatürk Airport.

### ➤ (3) *Keep service level against the competitors*

The possible differentiation points are as follows: (i) free stopovers in Istanbul, (ii) duty-free, (iii) long haul arrival facilities, (iv) higher standards of on time performance and baggage handling, (v) frequent flyer partnerships and policies promoting the use of IGA, (vi) friendly, multi-lingual ground staff and cabin crew and (vii) shorter/hassle-free connecting times etc.

### ➤ (4) *Minimize the operational and commercial risks*

It is expected a decrease in the income and load factors with growth. Adding new destinations and frequencies to the existing network will force promotional fees to reduce unit passenger income. Taxi times are longer in the Istanbul Airport than the Ataturk Airport because of the structure of the

runways and terminal. These situation poses a risk. Fuel costs will increase due to taxi times until the third runway is opened.

Introduction of the new aircraft types, (e.g., Boeing 787-900 and Airbus 350-900 are new aircraft types for THY) always requires more effort than the current fleet types, such as, trainings, certifications and approvals from relevant authorities. Cabin and cockpit crews need new trainings and type ratings. Ground and flight operation manuals should be updated, maintenance plans are required to be changed.

## REFERENCES

1. Saribas, H., & Tekiner, I. (2015). Türkiye Sivil Havacılık Sektöründe Yogunlasma/Concentration in Turkish Civil Aviation Market. *Finans Politik & Ekonomik Yorumlar*, 52(610), p. 21.
2. Doganis, R., 2006. *The Airline Business*, 2nd Edition. London, Routledge, pp. 147-195.
3. <http://web.shgm.gov.tr/>
4. <https://www.icao.int/Pages/default.aspx>
5. Torlak, G., Sevkli, M., Sanal, M., & Zaim, S. (2011). Analysing business competition by using fuzzy TOPSIS method: An example of Turkish domestic airline industry. *Expert Systems with Applications*, 38(4), pp. 3396-3406. doi: 10.1016/j.eswa.2010.08.125.
6. Şevkli, M., Oztekin, A., Uysal, O., Torlak, G., Turkyilmaz, A., & Delen, D. (2012). Development of a fuzzy ANP based SWOT analysis for the airline industry in Turkey. *Expert Systems with Applications*, 39(1), pp. 14-24. doi: 10.1016/j.eswa.2011.06.047.
7. Acar, A. Zafer & Karabulak, Selçuk. (2015). Competition between Full Service Network Carriers and Low Cost Carriers in Turkish Airline Market. *Procedia-Social and Behavioural Sciences*. 207, pp. 642-651. 10.1016/j.sbspro.2015.10.134.
8. Deveci, M., Özcan, E., John, R., & Öner, S. C. (2018). Interval type-2 hesitant fuzzy set method for improving the service quality of domestic airlines in Turkey. *Journal of Air Transport Management*, 69, pp. 83-98.
9. Karagülle, A. Ö. (2012). The evaluation of fleet structures in Turkish aviation industry from strategic management point of view. *Procedia-Social and Behavioural Sciences*, 58, pp. 93-97.
10. Dursun, M. E., O'Connell, J. F., Lei, Z., & Warnock-Smith, D. (2014). The transformation of a legacy carrier – A case study of Turkish Airlines. *Journal of Air Transport Management*, 40, pp. 106-118. doi: 10.1016/j.jairtraman.2014.06.003.
11. Çiftçi, M. E., & Şevkli, M. (2015). A new hub and spoke system proposal: A case study for Turkey's aviation industry. *Journal of Air Transport Management*, 47, pp. 190-198.
12. Deveci, M., Demirel, N. Ç., & Ahmetoğlu, E. (2017). Airline new route selection based on interval type-2 fuzzy MCDM: A case study of new route between Turkey-North American region destinations. *Journal of Air Transport Management*, 59, pp. 83-99.
13. Logothetis, M., & Miyoshi, C. (2018). Network performance and competitive impact of the single hub – A case study on Turkish Airlines and Emirates. *Journal of Air Transport Management*, 69, pp. 215-223.
14. <https://www.istairport.com/tr>
15. <https://www.mynet.com/>
16. Korul, V., & Kucukonal, H. (2003). Türk Sivil Havacılık Sisteminin Yapısal Analizi. *Ege Academic Review*, 3(1), pp. 24-38.
17. DHMI. (2019). Annual Statistics of Turkish Airports. Retrieved 01 June 2019 from <https://www.dhmi.gov.tr/sayfalar/istatistik.aspx>
18. <https://www.oag.com/>
19. Aksu, A., & BAYAR, K. (2019). Development of Health Tourism in Turkey: SWOT Analysis of Antalya Province. *Journal of Tourism Management Research*, 6(2), pp. 134-154.
20. [shorturl.at/govKQ](http://shorturl.at/govKQ)
21. Kurban, V., & Cabbarlı, H. Türkiye-Rusya ilişkileri ve uçak krizinin Rus-Türk kamuoyundaki yansısı. *Ege Stratejik Araştırmalar Dergisi*, 10(2), pp. 105-118.
22. [shorturl.at/gsyLW](http://shorturl.at/gsyLW)
23. [shorturl.at/GLPRU](http://shorturl.at/GLPRU)