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## The evaluation of fleet structures in Turkish aviation industry from strategic management point of view

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### Abstract

Turkish airline industry became one of the fastest growing industries in Turkey, after liberalization allows airline companies to compete on scheduled flights. The change in government policy boosted number of domestic passengers and this growth resulted in a significant extension at fleets of airline companies. The fleet decisions became a critical issue which has a strategic importance. Composition and age of the fleet are critical factors that affect the competitiveness. Moreover, the range of the planes in fleet is strategically important. It affects the network structure and must be harmonious with the strategies of the company such as the total capacity. The aim of this paper is to analyze and evaluate the fleet structures of Turkish airline companies and their fleet decisions from strategic management point of view. Ability to operate successfully as announced to public by schedules, elasticity to meet the fluctuating demand and to secure growth and sustainability in market are all affected by fleet decisions.

*Keywords:* Fleet management, strategy, airline industry, competitive advantage

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### 1. Introduction

The main duty of a manager is using company resources efficiently. And a successful manager directs resources in order to reach organizational goals. Fleet managers are examples of critical decision makers that affect the success of transportation companies. Decisions about the types of vehicles, capacity of the vehicles and size of the fleet, range of the vehicles are main decisions of a fleet manager.

Airline transportation is one of the fastest growing industries in World and especially in Turkey. The number of aircrafts in aviation industry is expected to be doubled by 2029 (Airbus, 2009). The companies are changing according to the needs of the market. As the market grows, competition becomes harder. All passenger demand has to be satisfied and all operations have to be covered by the considered fleet. Competitiveness and profitability depend on efficient aircraft assignments (Andersen et al., 2009) The hard competition forces managers to revise their decisions and make tighter plans. Unit costs can be minimized with correct fleet decisions. Evaluating the market and choosing

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the appropriate size of aircraft is critical. Smaller aircrafts can result in loss of customer on high-demand routes and bigger aircrafts can result in big operational costs.

Not only the size of the aircrafts but also the size of the fleet is important. Fleet must be sufficient to overcome the operational needs. It must have enough capacity to meet the demand. But again oversized fleet can cause financial problems. The increase in the number of empty seats is the indicator of possible financial loss. Allocative inefficiency may result in high costs and may be effective on performance of an airline company as much as technical inefficiency (Merkert and Hensher, 2011). Renewal periods and extension decisions can also cause financial difficulties. Operating with full aircrafts means success so choosing the right vehicle size is critical. The aircraft must be small enough to avoid empty seats and must be big enough to meet the demand of every passenger.

Policy and strategies are important indicators of range decision in fleet management. A company that aims to be a global airline operating in several continents must form its fleet with long-range aircrafts. On the other hand, if the mission of a company is to operate domestically with high frequency then its fleet must contain short or middle-range aircrafts. Strategies of the company and the structure of the fleet must match each other. Furthermore, harmonization of fleet is important to meet the need of operational units during operations. Interchangeability of aircrafts can only be provided with the successful fleet formation. Also, the network type (liner or hub-and-spoke) can affect the fleet composition since each type of network require different types, sizes and ranges of aircrafts (Gelareh and Pisinger, 2011)

A change in fleet structure may be observed during some periods. For instance, during an economic boom airline fleets expand in size but years later a reduction or structural change(change in type) may be observed (Kilpi, 2007). Making the right decision about optimal fleet size and composition can boost the income. With the vigorous development of strategic alliances, airlines through a strategic alliance, such as the co-operation or sharing of resources, achieve greater cost-effectiveness. Therefore, if a strategic alliance exists, it is predicted that when the future shortage of aircraft capacity occurs, the airlines can increase or decrease their number of aircrafts with fleet harmonization. (Tsai et al., 2012)

## **2. Turkish Aviation Industry and Fleet Structures**

Turkish airline industry is growing after the liberalization in 2003. There are 12 companies operating in the industry as passenger transporters (DGCA, 2012). One of the airlines is national flag carrier and has almost the half of the number of aircrafts that form Turkish airline fleet since the industry has over 300 aircrafts for commercial passenger transportation. The other half is shared between privately owned companies which follow flag carrier. Privately owned airlines can be classified as scheduled and charter airlines. Another classification can be made by the fleet sizes, bigger and smaller ones.

Operating as scheduled airlines is harder but it is considered as real(or true) type of airline operation. Because offering services for at least one schedule period requires middle and long range planning. Network design and scheduling are the starting points of airline planning. Moreover, scheduled airline transportation networks give rise to very complex and large-scale network optimization problems which require hard decisions and innovative solution techniques (Bielli et al., 2011). Charter airlines are smaller in size, but less risky. They operate on high-demand routes without depending on a schedule. Civil aviation authorities set some standards and requirements for the companies that aim to fly scheduled in order to form a sustainable air service.

The flag carrier company, with its diversified fleet, operates in short, middle and long range routes. Apart from the flag carrier, there are 7 airlines operating as scheduled (DGCA, 2012). They have a cost advantage because of their relatively smaller size. They are the critical companies that indicate the future of Turkish aviation industry. All of them are operating internationally but with limited number of destinations. None of them operate in long range routes because of their fleet structures. Some of the privately owned companies can be considered as low-cost airlines, a new approach in aviation for the last decade. They operate with single-type fleet in short and middle range routes (Arild et al., 2010). They sell tickets only on web, and they are also mentioned as no-frills airlines.

### *2.1. State Owned – Flag Carrier*

Flag carrier of Turkish airline industry has 176 aircrafts for passenger transport (DGCA, 2012). It has a diversified fleet structure with long and middle range aircrafts. The company operates globally and expands its network overseas with strategic alliances as it competes with privately owned companies in domestic market. There are 39 long-range

aircrafts, with economy, business and first class options and 137 middle-range aircrafts with economy and business class options (Turkish Airlines, 2012). The fleet structure is compatible with its strategies. Long-range aircrafts with high capacity are used to compete on global routes and these aircrafts can be assigned to high-demand daily operations. Employing small-sized aircrafts in domestic market increases profit and decreases unit costs. The interchangeability of aircrafts enable managers to use fleet efficiently and increase seat occupancy which means smaller unit costs or offer high capacity during high season.

### 2.2. Privately Owned – Scheduled Carriers

There are 7 privately owned airlines operating as scheduled carrier in passenger transportation. Distribution of aircrafts to airline companies is shown at Table-1.

Table-1: Distribution of Aircrafts to Airline Companies (Private – Scheduled)

Company	Number of Aircrafts		
	Long - Range	Middle and Short Range	Total
Company-A	4	12	16
Company-B	4	25	29
Company-C	-	36	36
Company-D	-	23	23
Company-E	2	12	14
Company-F	-	6	6
Company-G	-	6	6
Total	10	120	130

Source: Directorate General of Civil Aviation, 2012

According to the table, some fleet structure of 4 airline companies (C,D,F,G) are compatible with way of they do airline business. They operate domestically and in middle-range international routes and their fleet are designed according to their network structure. The next strategic step for these companies is to start flying to overseas destinations. This change in strategy may require long-range aircraft purchases. By diversifying the fleet cost and operational complexity is expected to increase and the way they do business may change. Hence, fleet managers have to make decisions in accordance with the corporate level managers. Having one or two aircrafts of different type can increase costs and cause some operational difficulties. So, diversifying the fleet is a strategic decision.

Companies A and B have diversified fleet structures so that they can offer overseas destinations to their customers besides domestic lines. Although they have technical capability, they do not operate in long range(overseas) routes which means incompatibility between fleet structure and policies. These companies use their long-range aircrafts with high capacity during high seasons in order to cope with boosted demand. Deciding on a new destination requires financial strength to insist on that route with low level of demand for months. So, private carriers choose to operate on routes with high demand. Company E has the same situation as it has diversified fleet but operates only domestically. Company C,D,F and G have single-type fleet composition as they are aiming to have the cost advantage of crew, training, maintenance and purchasing.(Merkert and Hensher, 2011).

### 2.3. Privately Owned – Charter Carriers

There are 4 privately owned airlines operating as charter (non-scheduled) carrier in passenger transportation. Distribution of aircrafts to airline companies is shown at Table-2.

Table-2: Distribution of Aircrafts to Airline Companies (Private – Charter)

Company	Number of Aircrafts		
	Long - Range	Middle and Short Range	Total
Company-H	-	8	8
Company-I	-	2	2
Company-J	-	7	7
Company-K	-	5	5
Total	-	22	22

Source: Directorate General of Civil Aviation, 2012

All of the aircrafts of privately owned, charter airlines are middle-range aircrafts. As they are followers of privately owned – scheduled airlines they operate in domestic lines with higher demand in high season. Considering their policies, they are far away from offering long-range and scheduled flights to their customers, at least in middle term. Hence, their fleet structures are compatible with their strategies. Operational costs are high as they do not benefit from economies of scale. Strategic alliances and mergers between these airline companies are probable in future to increase efficiency as their scheduled rivals develop and improve their financial conditions.

### 3. Future Decisions of Fleet Managers

Purchasing new aircrafts is one of the critical responsibilities of a fleet manager. The company's needs and policies, compatibility of new aircraft with current fleet and cost are the main decisions in aircraft purchasing (Arild et al., 2010). Not only determining the right size, but also choosing the right aircraft type and supplier is crucial for the performance of the company. Single-type fleet has some cost advantages as it minimizes the number and type of technicians and spare parts. On the other hand single-type airline fleets are decreasing steadily. For airlines facing the shorter-term demand fluctuations policy makers may choose diversified fleet option with aircrafts of different capacities (Tsai et al., 2012). Besides single-type or diversified fleet dilemma, forming a harmonious fleet which are compatible with organizational goals makes their decisions harder. As the competition becomes harder, effectiveness in fleet decisions is expected to be the determinant of success. Moreover, fleet renewals may come into prominence as the companies compete with each other in terms of age and comfort of their aircrafts. New type, model and series of aircrafts with new technologies can be attractive for fleet managers. Safe-life and damage tolerance methods can also affect renewal decisions. In the past, fuel consumption was the main starting point of aircraft renewal but aging problems and fatigue are becoming more effective on renewal decisions (Hoffman, 2009).

Aircrafts with special internal design may be the focus of fleet managers. For instance, a seat configuration with reduced seat pitch in order to maximize seat numbers and reduce costs or a seat configuration with completely business class comfort may come into question in fleet decisions. Fleet optimization and considering the fleet structure of partners in case of an alliance are other factors that affect the decision of fleet managers. (Arild et al., 2010)

### 4. Conclusion

The fleet of Turkish airline industry is growing as demand to air transportation increases. The growth of the industry is supported by governments and fleet decisions may become one of the determinants of success as the aircraft numbers increase. The compatibility between fleet structures and airline management policies can be observed in Turkish aviation industry. Especially, flag carrier of the industry, representing more than the half of industry in fleet size, has a harmonious fleet which is compatible with its strategies.

On the other hand, some privately owned companies are forming effective and relevant fleet as they establish with new business models in aviation such as low-cost and low-fare carriers. Rest of the privately owned companies may have some problems to decide on the right size and composition of fleet, but their smaller size enables them to survive. High demand to air transportation, neutralize the negative effects of their inefficient fleet decisions, especially in high season. As the companies grow and institutionalize, the importance of fleet decisions will increase and be considered as a strategic tool in order to gain competitive advantage.

### References

- Airbus (2009), Airbus Global Market Forecast:2010-2029, Toulouse.
- Andersen, J., Crainic, T.G., Christiansen, M. (2009), "Service Network Design with Management and Coordination of Multiple Fleets", *European Journal of Operational Research*, Vol. 193, pp.377-389.
- Arild, H., Henrik, A., Marielle, C., Geir, H. (2010), "Industrial Aspects and Literature Survey:Fleet Composition and Routing", *Computers and Operations Research*, Vol.37, pp.241-261
- Bielli, M., Bielli, A., Rossi, R. (2011) "Trends in Models and Algorithms for Fleet Management", *Procedia Social and Behavioral Sciences*, Vol.20, pp.4-18
- DGCA (2012), Directorate General of Civil Aviation, <http://www.shgm.gov.tr/doc/hyi.xls> (26.03.2012)
- DGCA (2012), Directorate General of Civil Aviation, <http://istatistik.shgm.gov.tr/site/istatistik/aracsayipr.jsp?yil=2012&donem=1>, (26.03.2012)
- Gelareh, S., Pisinger, D. (2011), "Fleet Deployment, Network Design and Hub Location of Liner Shipping Companies", *Transportation Research:Part E*, Vol.47, pp.947-964

- Hofmann, P.C. (2009), "Fleet Management Issues and Technology Needs", *International Journal of Fatigue*, Vol.31, pp.1631-1637
- Kilpi, J. (2007), "Fleet Composition of Commercial Jet Aircraft 1952-2005: Developments in Uniformity and Scale", *Journal of Air Transport Management*, Vol.13, pp.81-89
- Merkert, R., Hensher, D. (2011), "The Impact of Strategic Management and Fleet Planning on Airline Efficiency – A Random Effects Tobit Model Based on DEA Efficiency Scores", *Transportation Research Part A*, Vol.45, pp.686-695.
- Tsai, W., Lee, K., Liu, J., Lin, H., Chou, Y., Lin, S. (2012), "A Mixed Activity-Based Costing Decision Model for Green Airline Fleet Planning Under the Constraints of the EU Emissions Trading Scheme", *Energy*, Vol.39, pp.218-226.
- Turkish Airlines (2012), [http://www.turkishairlines.com/tr-TR/corporate/about\\_us/fleet/index.aspx](http://www.turkishairlines.com/tr-TR/corporate/about_us/fleet/index.aspx) (26.03.2012)