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NATIONAL AVIATION UNIVERSITY

Faculty of Transport Management and Logistics  
**Air Transportation Management Department**

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“            ” \_\_\_\_\_ 2020

# **MASTER THESIS**

## **(EXPLANATORY NOTES)**

**Theme:** Efficiency of resource potential usage at the aviation enterprise

**Done by:** Karyna I. Dierbunova

**Supervisor:** Valentyna S. Konovaliuk, PhD, Associated professor

**Standards Inspector:** Juliia V. Shevchenko, PhD, Associated professor

**Kyiv 2020**

МІНІСТЕРСТВО ОСВІТИ І НАУКИ УКРАЇНИ  
**НАЦІОНАЛЬНИЙ АВІАЦІЙНИЙ УНІВЕРСИТЕТ**

Факультет Транспорт, Менеджменту і Логістики  
**Кафедра організації авіаційних перевезень**

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**ДИПЛОМНА РОБОТА**  
**(ПОЯСНЮВАЛЬНА ЗАПИСКА)**

**ВИПУСКНИКА ОСВІТНЬОГО СТУПЕНЯ «МАГІСТР»**

**Тема:** «Ефективність використання ресурсного потенціалу авіапідприємства»

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**Київ 2020**

# NATIONAL AVIATION UNIVERSITY

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Air Transportation Management Department

Major (specialty): 275 “Transportation Technology”

APPROVED BY  
Head of the Department

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G. M. Yun

2020

## TASK

### of completion the master thesis

Karyna I. Dierbunova

1. Theme of the master thesis entitled “Efficiency of resource potential usage at the aviation enterprise” was approved by a decree of the Rector Order № 2401/st of October 17, 2019.

2. Term performance of thesis: from 14.10.2019 to 29.12.2019 and from 20.01.2020 to 09.02.2020.

3. Initial data required for writing the bachelor thesis: production and financial results of Turkish Airlines, route network, fleet size, types of services rendered by the airline.

4. Content of the explanatory notes: review of airline structure and strategy of development, overview of human resources of company, analysis of production and financial activity of the airline 2005-2019, review of the fleet of Turkish Airlines, comparative analysis of resource efficiency with Lufthansa Group, proposal to improve efficiency of aircraft fleet usage by replacement of old aircraft and justification of the chosen project.

5. List of mandatory graphic matters: passenger and cargo traffic of Turkish Airlines in 2005-2019, geographic distribution of revenue of the airline, dynamics of load factor over the estimated period, dynamics of revenue indicators in 2013-2019, route network representation and aircraft fleet capacity of Turkish Airlines.

#### 6. Planning calendar

№	Assignment	Deadline for completion	Mark on completion
1.	Collection and processing of statistical data	14.10.19 - 01.11.19	Done
2.	Writing of the theoretical part	01.11.19- 15.11.19	Done
3.	Writing of the analytical part	15.11.19- 01.12.19	Done
4.	Writing of the design part	01.12.19- 29.12.19	Done
5.	Writing of the introduction and summary	20.01.20- 01.02.20	Done
6.	Execution of the explanatory note, graphic matters and the presentation	01.02.20- 09.02.20	Done

7. Given date of the task: October 14, 2019.

Supervisor of the bachelor thesis:

Valentyna S. Konovaliuk

Task was accepted for completion:

Karyna I. Dierbuova

## EXPLANATORY NOTE

The explanatory note for the master thesis entitled “Efficiency of resource potential usage at the aviation enterprise” comprises of 113 pages, 26 figures, 35 tables and 25 references.

KEY WORDS: AIRLINE, PASSENGER FLIGHT, RESOURCE POTENTIAL, EFFICIENCY, PRODUCTION AND FINIANCIAL PARAMETERS, AGE OF AIRCRAFT FLEET.

*Object of the master thesis* is the company Turkish Airlines.

*Subject of the master thesis* is improvement the efficiency of the airline’s resource potential usage.

*Main task of the master thesis* is to investigate and analyze efficiency of resource potential usage of the airline and possibility to improve it by replacement of old aircraft and changing the age of aircraft fleet.

*Methods of analysis include* comparative analysis, analysis of the production and financial parameters, graphical methods, statistical methods, analysis of relevant literature.

During the completion of the master thesis it was established that efficiency usage of resources influences greatly on the revenue management of the airline and its success on air transportation market overall. The conducted analysis of production and financial parameters and graphics introduced of the chosen airline show how the subject of the study influences on airline’s activity. Comparative analysis of efficiency of resource potential usage of Turkish Airlines and Lufthansa Group explains which of the airlines uses its resources more efficiently.

The material base of this thesis is recommended to be used for the further researches, the educational process and for the professional practical implementation of the proposed improvements by Turkish Airlines.

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## **LIST OF ABBREVIATIONS**

ASK – available seat kilometers;

ATD – availability turndowns;

CEO – chief executive officer;

CFO – chief financial officer;

COO – chief operating officer;

CSR – corporate social responsibility;

IATA – International Air Transport Association

ICAO – International Civil Aviation Organization

IST – Istanbul Ataturk International Airport

Km – kilometer.

LCC – Low Cost Air Carriers

Pax – passengers;

RPK – revenue passenger kilometers;

TEC – Turkish Engine Center

THY – Turkish Airlines

# ***INTRODUCTION***

<i>Air Transportation Management Department</i>				<i>NAU.20.04.02 001EN</i>				
<i>Done by:</i>	<i>Karyna I. Dierbunova</i>			<i>INTRODUCTION</i>	<i>Letter</i>	<i>Sheet</i>	<i>Sheets</i>	
<i>Supervisor:</i>	<i>Valentyna S.Konovaliuk</i>					<i>D</i>	<i>9</i>	<i>3</i>
<i>Standards Inspector:</i>	<i>Juliia V. Shevchenko</i>				<i>FTML 275 0II-202Ma</i>			
<i>Head of the Department:</i>	<i>Gennadiy M. Yun</i>							

In today's environment, airlines are under increasing pressure to deliver innovative, technologically advanced services with shrinking budgets. As a result, resources must be fully utilized and focused on the highest priorities at any given time.

Resource management is the efficient and effective development of an organization's resources when they are needed. Such resources may include financial resources, inventory, human skills, production resources, or information technology (IT). Ineffective or suboptimal resource management will certainly lead to negative consequences such as poor productivity, delays, decreased quality, increased costs and missed opportunities.

Current market conditions, which have a significant impact on airlines, are characterized by the following main factors: liberalization of the global air transportation market; creation and development of airline alliances; changes in the preferences of passengers who are placing ever greater demands on the quality of service; strengthening the positions of low-cost airlines; trends towards the consolidation and internationalization of airline partners; development of new technologies in the airline industry (including e-commerce). The created conditions promote the strengthening of competition between domestic and foreign companies, more freely operating in the Turkish market. The above problems have a very specific monetary expression, directly affecting sales volumes and results of operational activities. In this regard, for each airline, the issue of implementing continuous performance monitoring in comparison with other carriers is relevant.

When comparing airlines, the best option is to analyze a set of key economic indicators. But carrying out such complex comparisons is accompanied by considerable difficulties, of which the latter is not connected with the problem of access to data. In addition, the structure of costs and revenues varies from airline to airline.

Airlines operating large aircraft flying along routes of considerable length differ greatly in the structure of operating costs resulting from fuel costs, landing fees, the costs of preparing an airplane for a flight, for air navigation services, etc.,

from airlines that serve mainly small routes extent. Just as the unit costs (per pax/km) depend on the length of the route, the specific revenues (per pax/km) increase with the decrease in the length of the route. Before the advent of low-cost airlines in the European air transport market, this dependence was clearly traced: the average revenue per 1 pax/km on European short-haul routes was significantly higher than on routes connecting Europe with America or with East Asia. A strong difference in the structures of costs and revenues leads to the conclusion that the use of economic indicators is ineffective in conducting a comparative analysis of the airline as the basis for others.

An even more important factor hampering the use of economic indicators is the profound differences in strategy. Airlines have different strategies in dealing with both other air carriers and with service providers. Some airlines prefer a significant share of technical maintenance of their aircraft to perform their own efforts, while others turn to third-party organizations. Carriers who do most of the work for their own efforts often have a contractual relationship to carry out such work for other airlines, thereby gaining significant money (and bearing tangible costs). Likewise, a number of leading airlines have rather powerful handling units providing preparation of aircraft for the flight (refueling, loading of luggage and passengers). A significant part of these services can be provided to other air carriers. As a result, revenues and expenses of airlines that provide services for other air carriers are quite difficult to compare with similar economic indicators of airlines adhering to the policy of maximum consumption of specialized enterprises. Considering the fact that the structure of income and expenses in airlines is in most cases different from each other, this article proposes to focus mainly on those indicators that reflect the results of the main production activity, rather than financial ones. Improving the values of such indicators, however, has a significant impact on the overall financial condition of the company.

# ***1. THEORETICAL PART***

<i>Air Transportation Management Department</i>				<i>NAU.20.04.02 001EN</i>				
<i>Done by:</i>	<i>Karyna I. Dierbunova</i>			<i>1.THEORETICAL PART</i>	<i>Letter</i>	<i>Sheet</i>	<i>Sheets</i>	
<i>Supervisor:</i>	<i>Valentyna S.Konovaliuk</i>					<i>D</i>	<i>12</i>	<i>27</i>
<i>Standards Inspector:</i>	<i>Juliia V. Shevchenko</i>				<i>FTML 275 OII-202Ma</i>			
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## **1.1. General overview of airline's resources**

### **1.1.1. Summary of business resources**

The purpose of the theoretical part is to show an assessment of the role and resource basis of the airline. The most characteristic features and parameters that can be successfully applied in practice are shown here. It is especially important in consulting projects with a minimum amount of data to give a resource assessment and possible alternative directions for the airline. The goal in our study is to develop a practical technology for the operation of an air carrier with a description of a resource complex for managing an airline.

In managing a complex object with no quantitative data, you can use high-quality techniques to make effective decisions. The set of business resources used during many years of practice of management consulting for complex restructuring and creating processes of positive continuous changes in organizations consists of the following list:

1. Norms, rules, values, traditions called **CULTURE**.
2. The concept and program of **FULL QUALITY**.
3. Developed, meaningful and accepted by all **STRATEGY**.
4. Relevant strategy, effective **STRUCTURE**.
5. Carefully designed **BUSINESS PLAN**.
6. Technologies and rules of activity - **STANDARDS**.
7. Organized binding processes - **COMMUNICATIONS**.
8. Changing the consciousness of personnel on the basis of **TRAINING**.

The goal of strategic planning is to ensure positive changes in the organization in the distribution and management of all types of resources and constant adaptation to the external environment.

### 1.1.2. Airline Resource Structure

The most important resources of an air carrier include: (1) personnel, primarily, flight technical; (2) fleet and its operational characteristics; (3) a network of air lines on which the main product is sold and the consumer's needs are satisfied; (4) a sales network — a key factor in efficiency and service; (5) management – integral resource, as a set of methods and the effect of the synthesis of previous resources (see Fig. 1.1). The effectiveness of a carrier in terms of the economy of the airline business has parameters common to undertaking any type of activity, as well as specific industry transport parameters.

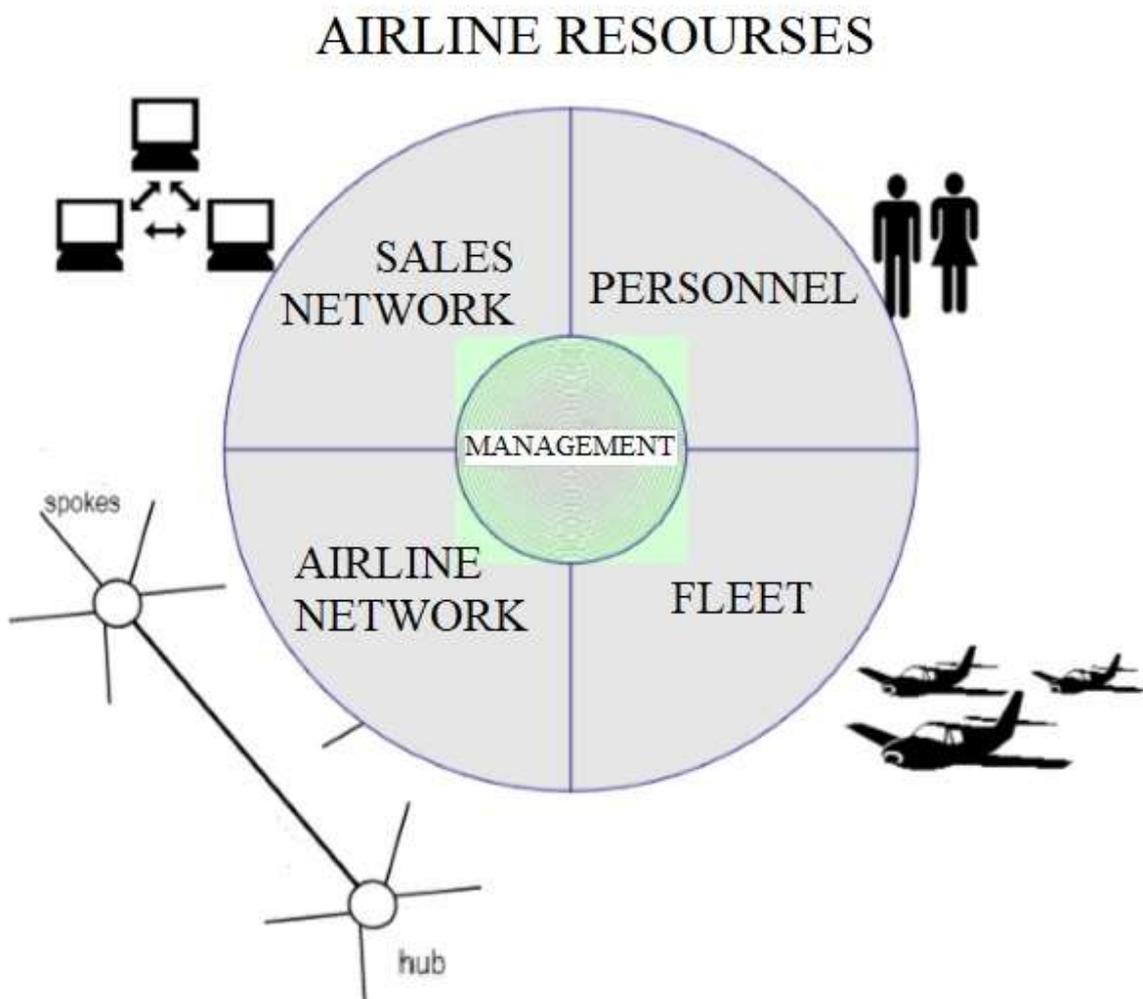


Fig.1.1. Structure of airline's resources

### 1.1.3. Strategic Management Complex

Only in the full range of strategic and operational management is the mission and the meaning of the air carrier's activities realized. The full complex is a three-layer set of interconnected technologies: (1) strategic — a field of primarily mental activity; (2) business planning - the area of settlement and analytical activities; (3) operational — level of physical activity (see Fig.1.2). The most responsible is the first level. This is the key to long-term business success. The most time-consuming and resource-intensive is the second level.



Fig.1.2. Strategic Management complex

Demand for air travel is determined by the gross national product (GNP), as an external factor, expressed in the form of traffic potential and is reflected in the form of internal and controlled parameters: tariffs, flight frequencies. These factors determine the actual pass-through rate and operating revenue. On the other hand, freight opportunities, or supply, depend on both internal factors and the prevailing market conditions.

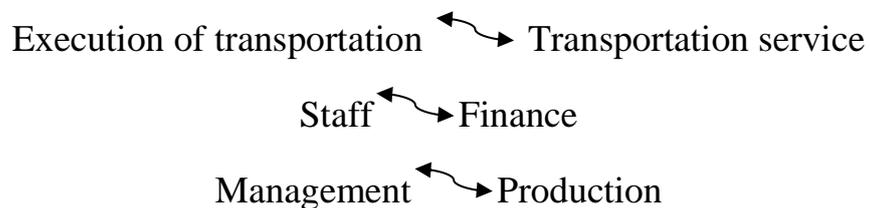
## 1.2. Management Resources

### 1.2.1. Carrier Sustainability Assessment

It was noted above that management is an integral special resource of an air carrier and any organization in general. The airline has its own characteristics, which are not endowed with any entity of air and ground transport. Special conditions for airline operations are as follows:

1. The extraordinary cost of basic resources: professional specialists and aircraft.
2. Special conditions of activity and labor ecology of flight operators.
3. The need to comply with a wide range of legal requirements in the markets. A special developed function – legal is needed.
4. Existence of complex standards of professional activity and business activity, requiring great competence and long-term large investments.
5. The need to manage resources in various places and time zones.
6. The presence of the client at most stages of business.
7. The presence of restless and stressful situations in customer service procedures.

The main points of friction within the airline are concentrated between the following pairs of functions:



Diagnostics of the state of air carriers and practical experience in consulting projects, the most common causes of structural deformations of airlines are:

- a) there is no market strategy for the company;
- b) poor management accounting
- c) flight attendant services (service) in the flight complex;

- d) there are no commercial specialists;
- e) there are no specialists in financial management.

In the process of strategic planning of an airline company's activities, business planning or consulting projects involving external consulting firms, there is a need for quick and reliable rapid assessment and diagnostics of an object in order to provide the best option for restructuring and making changes. For this, financial instruments are used to determine the structure of assets, working capital, and the ratios of fixed, financial, and investment activities. Sociological tools can also be used.

Can stress levels of airline staff be used as an indicator of the level of management and the degree of stability of the airline? Let's try to answer this question using data from a foreign survey. 839 pilots and their families from different airlines are in the process of deregulation. Moreover, some were in a state of relative stability, while others experienced a serious crisis. The data were processed and previously published by the author in the work «Pilot Ecology» in 1991.

In the context of our research, the situation and the state of the organization where psychological and social factors are evaluated are called the "model or profile of the social ecology of the object." The term "stress" in psychology came from technology, where it denoted the stress of the material and its tensile strengths. Similarly, short-term and long-term psychological stresses of a person began to be called stress. The concept of stress is synonymous with fatigue, depression, but they are distinguishable by reactions.

*Table 1.1.*

**Comparative characteristics of stable and crisis airlines**

	Stable	Crisis
Average age of pilots, years	43	54
Post structure:		
flight engineers	0.9%	11.7%

*Continue of Table 1.1.*

co-pilots	36.4%	46.8%
aircraft commanders	62.7%	41.5%
working less than 6 years in this airline	43.5%	8%
working more than 10 years in this airline	10.4%	22.9%

Depression is characterized as a state of depression of a person, expressed by him as "loss of energy", "inability to concentrate." Psychologists also introduce the stressful background in the sensations of a person, called stress mediators, into the concept of stress: a sense of self-control, a sense of self-esteem, and freedom from negative attitudes towards oneself. Physiological arousal, adrenaline rush in the blood, blood pressure, heart rate, muscle contraction, constriction (expansion) of the pupils, facial expressions, gestures and speech are considered reactions to stress or protective mechanisms. The most famous causes of pilot stress are unfamiliar routes and airports, complicated approach and approach patterns, difficult take-off and taxi conditions, fuel restrictions, night flights, bird collisions, equipment, engine and system failures, fatigue and insomnia. All these factors reflect the professional spectrum of the flight process. Another category of stress factors includes unpredictable flight schedules, irregular, arrhythmic duty and flight time, interruption of work and rest cycles, personal and social events. All of the above causes of stress, although they describe the low level of the ecology of the pilot's work, are considered to be a well-known "normal conditions" of this profession. The goal is to determine the impact of airline instability on this kind of "background" stress level for pilots and their families (Table 1.2.).

*Table 1.2.*

**Stress level in stable and crisis airlines**

<b>Indices</b>	<b>Stable</b>	<b>Crisis</b>
<b>General stress:</b>		
complaints of pilots on disability	7	21

Continue of Table 1.2.

increased alcohol consumption	4	13
more than two diseases in the last two years	5	17
drug intake	3	5
tranquilizer intake	1.4	2.5
increased smoking	7	12
<b>Office stress:</b>		
due to working changes	22	45
due to working events	2	7
<b>Family stress:</b>		
increased mental stress	11	33
conflicts of matrimony and with children	18	32
marginal conflicts in the family	2	11
<b>Stress mediators:</b>		
lack of self-control	11	35
low self esteem	3	12
significant sense of self-abasement	7	19
<b>Depression:</b>		
symptoms of depression	14	24
depression of wives	20	40
<b>Economic forces:</b>		
financial difficulties	3	19
feelings of economic pressure on the family	25	75
strong economic pressure on the family	10	37
<b>Satisfaction:</b>		
sense of recognition from airline	7	58
satisfaction with airline	4	83
optimism in views	1.5	49

### **Certain conclusions can be drawn:**

1. The average age of pilots of a stable airline is less than in a crisis.
2. The proportion of commanders in a stable airline is much higher, and the practical absence of flight engineers indicates its transition to two-member crews, which in itself can confirm progressiveness.
3. The official movement and rejuvenation of personnel in a stable airline makes it possible to win in competition with pilots whose qualifications are equal (or maybe lower) to the pilots of an unstable airline.
4. All psychometric indicators of a stable airline on average are three times different from unstable stress factors. The main conclusion that suggests itself from this analysis is that it was as if it was carried out for Ukrainian and Russian airlines during the period of intensive and almost uncontrolled restructuring of the 1990s.

### **1.2.2. The feasibility of comprehensive restructuring**

From time to time, the airline's activities are subjected to severe testing of the strongest competition for passengers, for redistribution and possession of routes, the struggle for profit, the need to increase productivity and the growth of contradictions between real processes and the level of management. This process, called deregulation or deregulation, is reflected primarily in the stress level of the pilots and exposes the failure of the existing management style in the airline, which encourages its replacement and development. According to Jack Trout, Southwest Airlines, created in the USA by Coat of Arms Keller, has become one of the most profitable and prosperous in America. Already at the foundation of the company, its main principle was laid down: "to be easier" At first, the aircraft of the same type were used, only the "Boeing 737". It was easier for pilots and technicians. Then Southwest Airlines refused to tighten the seats for passengers and introduced reusable plastic boarding passes. This meant that there was no need to look for available nearby seats when buying tickets. There was no need to board a plane half an hour before departure. More importantly, the company no longer has to sell

more tickets than there are seats. In Southwest, you sit in a chair, the plane takes off. You save time. It arrives on time. They do not have indecent food on board - in flight they do not feed at all. By the way, the money you save on a ticket is enough to go to a good restaurant. In addition, passengers do not have to wait for food containers to be loaded onto the plane. Southwest has no central airports. Airplanes fly directly to where you need, and not where the airline is convenient to make a transfer. They move along the shortest route between two points. It is faster. The company saves on fuel, so it can reduce ticket prices. Southwest avoids flights to major airports, in which passengers only need 40-60 minutes to find the desired exit. Easy to come, easy to leave - this is the philosophy of the airline. If you ask Herb Kelleher about the company's commitment to simple solutions, he will tell you this story: "When Southwest first started working (1971), we printed tickets at the cash registers, and they looked very much like buses. Passengers complained to us that: (1) due to their solid appearance, they accidentally throw tickets into ballot boxes; (2) they are eaten by domestic animals; (3) inadvertently, they send tickets to the laundry along with clothes. There was a proposal to establish a computerized ticketing system worth several million dollars. During the discussion, one of the vice-presidents proposed to make cash registers simply print on top of the ticket in capital letters: "THIS IS A TICKET". So we did this. The problems were completely removed."

### **1.2.3. Functional and organizational structures**

The averaged structure of the airline company contains the main functions and departments in the current world practice of air transport in approximately the following proportions in terms of the number of personnel: flight -10%, technical – 25%, commercial –50%, administration –15%. According to our estimates, based only on personnel proportions, conclusions can be drawn about the resource deformation of the airline. In the early stages of the development of air transport, in the context of a directive economy and regulation, airline management primarily

focuses on flight operations and safety. At such stages, when the market is simply divided between the airlines, it was traditionally managed by a technical specialist: the flight operator pilot. Later, world practice showed that in a competitive environment, not so much “people from the helm” cope with the role of the head of an air carrier’s organization, but managers who are able to operate with strategic categories, focus on the market and quality.

#### **1.2.4. Quality concept**

The airline quality concept is still in its early stages. In the mid-1980s, a quality program was developed at SAS. A quality strategy is currently being developed at many leading airlines, as it incorporates the most powerful security and competitiveness tools. Previously, quality and the concept of it, of course, existed and were presented to the crew as the final product in the form of an airplane. Now quality is considered in the process as a way of life for all airline personnel. It is interesting that quality always does not look the most important, not the most urgent, especially in a competitive environment. Then they try to save on costs and investments in quality. These savings are primarily hit by quality. The most common criterion for quality is safety. This is true, but not all. It is fair to always consider security alongside its “antagonist” economy. Then the short definition of quality given by Ian Carlson as President of SAS is most suitable: “Quality is the cost of a mistake that was avoided.”

#### **1.2.5. Airline Quality Program**

Obviously, according to two abstract indicators, such as security and the economy, it is very difficult to draw up a program that implements the philosophy of quality. Figure 1.3 shows the key components of security and the economy that

are needed to develop a program. Let's consider them in more detail.

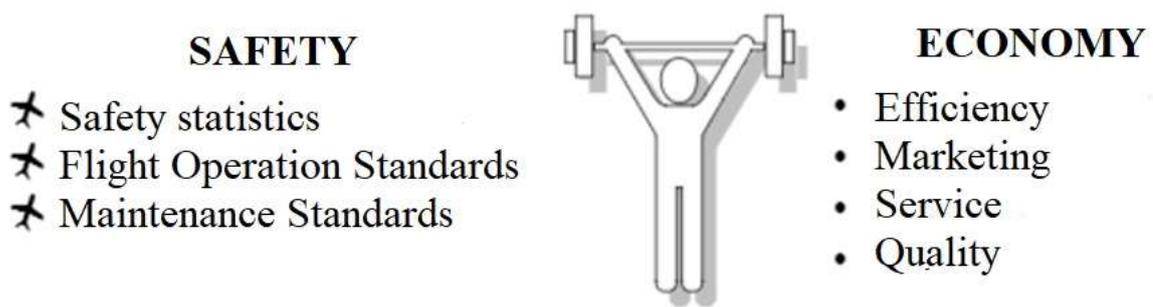


Fig. 1.3 Airline Quality Program

**Safety: safety statistics.** This is a very weak criterion for managing processes in an airline. The “last call” incident in the quality program can also serve as final estimates for a long period of time.

**Safety: flight performance standards** are the most important quality criterion. In airlines, as well as in any organizations, there are two sets of safety rules: written (published) and unwritten informal, which form the core of the airline’s actual culture. All operating procedures are usually carried out according to the latest rules. Making rules, it is better to publish what is meant, and to keep in mind what is published. This will reduce the amount of unwritten rules and increase confidence in the written.

**Safety: technical standards of operation.** This is the second indicator by value after the previous one. All of the above applies to him.

**Economics: efficiency.** Efficiency refers to achieving results with optimal use of resources. Efficiency and productivity are different concepts. Productivity implies volumes of products and cannot serve as a direct indicator of quality.

**Economics: marketing.** Narrowly, this is the structure of airlines, airports, and track equipment. There is a wider policy for the distribution of airlines, a strategy for finding perfect and economical aircraft, and the development of market information systems for booking. Thus, American Airlines receives from booking 35% of the profits.

**Economics: service standards.** Characteristically, traditional flight and technical standards do not leave room for conversation: they directly lead to safety. Standards and the concept of service are as complex as the concept of quality itself. Service standards cover everything from president contracts to a water tap in the airline's office. Service standards lead to quality. Quality leads to safety. The ideology of service is in the communications of all personnel who regard each other as mutual clients with personal quality standards. Everything is seen as a domestic market. The procedures for compiling a quality program have their own characteristics. An Airline Quality Council is being created. It includes the president, leading experts and consultants invited quality experts. Next, a Quality Program is drawn up with the participation of all airline personnel. All the above standards are formulated. It is very important that they are compiled by staff for themselves: people in groups verbally and in writing find out what they expect from each other, tests and questionnaires are used. In addition, quality education and training of personnel is carried out.

### **1.3. Expense management**

Cost management is a system of domestic investment. Henry Ford said: "the main thing is not profit, but where it is spent." Managing expenses is much more important than revenue. According to the cost structure, you can give a complete diagnosis of the state of resources of any organization. An analysis of income does not. Below, it will be shown how complicated the relationship between cost management and the overall strategy of the airline is.

#### **1.3.1. Fixed and variable operating costs**

Fixed or permanent costs are direct costs that are not dependent on the implementation of individual flights (or a number of flights). Undoubtedly, they are mandatory for the calendar period in question. Having compiled a schedule for

a separate period and determined the needs for the aircraft fleet, personnel and maintenance for its implementation, the airline cannot easily reduce the schedule and types of services due to the reaction of the consumer and her own obligations towards him (until the introduction of the following schedule). It is normal if a new schedule is introduced twice a year. If the airline decides to reduce the frequency of flights with the introduction of a new schedule, it is possible to reduce the fleet by selling several aircraft, reduce the number of employees, reducing repair and other overhead costs.

Fixed or permanent direct operating costs will be reduced, but only after a year or two, depending on how quickly the airline was able to change the schedule, reduce the fleet, change personnel and other resources.

Variable or flight costs are not completely inevitable. They can be avoided by canceling one or several flights. This includes fuel costs, crew working hours, other flight expenses in flight, landing fees, passenger meals, etc. They are obvious. Less obvious are the maintenance and repair costs, which should also be classified as variables. This is due to the fact that some repair costs, including labor costs and replacement of parts, are planned after a certain number of flight hours or the prescribed number of take-offs and landings. Chassis repair, for example, depends on the number of take-offs and landings. A significant part of the current repair depends on the raid and the number of takeoffs and landings. Neglect of current repairs is impossible due to safety conditions and immediately leads to a decrease in plaque. The main indirect costs are stable and do not depend on the number of flights performed, unlike others. Others include expenses for passenger service, such as in-flight meals, hotel, and other expenses for the flight attendant service. Charges to service agents or other airlines for ground handling of aircraft, passengers or cargo can be avoided if the flight is not operated, and some advertising or marketing expenses can also be avoided. Airlines, dividing the costs by the degree of their inevitability, part or all of the above costs, previously classified as indirect, are defined as fixed or variable direct operating costs. With this approach, indirect costs are not dependent on the activities of individual

services or flights and are constant. One of the possible cost sharing, based on the concept of optionality, is shown in the table. Here, all expenses for flight attendants, fees for passenger service and expenses for catering and accommodation of passengers, previously classified as indirect, are shown as direct. Suppose airline has expenditure statistics for a fiscal year:

- Direct operating costs:
  - variable 36.2 %
  - constant 22.3 %
- Indirect operating cost: 41.5 %
- Total 100.0 %

In more detail this structure is shown below (Table 1.3.). It is clear that in this case more than a third of the total costs are not absolutely inevitable. Previously, before rising fuel prices, variable costs accounted for about 50 or even more percent of all costs. The dominance of variable costs is of great importance for business planning and pricing. This shows that the greatest savings for the short-term period can be achieved by canceling one or a number of flights, the more the higher the price of fuel, since its increase leads to an increase in variable costs. Over a longer period, a year or so, many expenses, initially accepted as fixed, change. Aircraft can be sold, reducing depreciation costs, the number of employees can be reduced, and they themselves can be redistributed, sales agencies are closed, and representative offices are sold out. During this period, you can avoid both a certain part of the constant direct and indirect costs. In the end, all costs can be avoided. It is very important, and often forgotten, that 90 percent of all expenses can be changed either by the termination of operation, or by the partial cancellation of certain types of activities. Airlines may limit or terminate their operations more easily than most forms of public transport, since they do not have stable investments in navigation aids, runways, and airports. But there are a number of exceptions, as, for example, in North America, where the airline companies have their own airports.

Table 1.3.

Cost structure based on fixed and variable direct operating costs		
VARIABLE DIRECT	PERMANENT DIRECT	INDIRECT
1. Fuel costs fuel oil alcohol (if necessary)	7. Fixed costs for aircraft depreciation or rent insurance	11. Parking and ground charges
2. Variable crew costs salaries and bonuses	8. Annual crew costs fixed salary and other non- flying expenses	12. Passenger services passenger service staff
3. Variable costs for flight attendants salaries and bonuses	9. Annual expenses for cabin crew	insurance
4. Direct technical costs depending on the number of take- offs and landings depending on plaque	10. Technical costs fixed salary and other non- flying expenses flight attendant administration	13. Cost of sales
5. Airport and route fees landing fees and other airport taxes navigation fees	14. General and administrative	
6. Passenger service costs meals and accommodation for passengers service charges	expenses for the administration of technical staff, etc.	

*Note: flight attendant expenses, passenger meals and passenger service charges are here defined as direct expenses.*

### 1.3.2. Distribution of expenses

In order to use the concept of cost avoidance when making operational decisions such as closing or opening a new route, various fixed and variable costs

must be allocated to individual flights or routes. In general, the approaches adopted by different airlines are similar, but differences in detail are possible. The distribution of direct operating costs variables is the simplest, since they are individual for each flight individually (see Table 1.4.).

Fuel costs, variable costs for crew and cabin crew, airport and route fees and passenger service costs directly depend on the type and category of aircraft used and flight route and, of course, can easily be measured. Exceptions are variable technical or repair costs. Some averaging is needed here. Some inspections and part of the direct repair work are related to the number of flight hours, while other inspections depend on the number of take-offs and landings. Repair of parts of the aircraft experiencing the highest pressure during landing or take-off, such as landing gear or flaps, depends entirely on the number of take-offs and landings.

For each type of aircraft, the airline usually calculates the average repair cost per block hour and separately the average cost for take-off and landing. The variable technical costs for each individual flight can then be calculated on the basis of the number of block hours and take-offs and landings required to complete the flight.

Permanent direct operating costs are usually translated into unit hourly costs for each type of fleet aircraft. Then they can be distributed for each flight or route based on the type(s) of aircraft used and the time over sections of the route. Relatively easy to calculate the annual cost of the crew, because each type of aircraft has its own crew of captains of the aircraft, co-pilots and flight engineers.

*Table 1.4.*

<b>Expenses classified by the concept of inevitability</b>	<b>%</b>
Indirect operating costs:	41.5
result dependent	
Parking	7.7
Passenger service	1.5
Sales	18.3

*Continue of Table 1.4.*

General and administrative	10.5
Cargo specific	3.5
Variable direct operating costs:	36.2
activity dependent	
Fuel and oil	11.7
Crew and cabin crew	3.2
Direct maintenance	5.0
Airport and route fees	7.8
Passenger service	8.5
Permanent direct operating costs:	22.3
fleet size dependent	
Fixed costs for aircraft	9.2
Crew salary	4.6
Cabin crew salary	3.7
Maintenance Costs	4.8

In many cases, if there are several aircraft of the same type, such a fleet, in addition, has its own managing administration. Some crew costs, however, are independent of the type of aircraft and need to be allocated between different types, usually based on the number of aircraft or annual use. The total annual constant cost per crew for the fleet of individual types can then be divided into the total annual use (block hours) of all aircraft in the fleet in order to determine the crew cost per block hour for each type of aircraft.

A similar approach has been adopted with respect to other elements of direct operating costs. In the case of cabin crew, there are problems with the distribution of fixed annual expenses by type of aircraft, because, unlike the crew, cabin crew can work on different types of aircraft at any time. However, the annual cost of flight attendants can be divided by different types of aircraft based on the number

and seniority of flight attendants and flight sections. Some permanent repair costs are specific to the type of aircraft; others have to be divided between types, usually based on the required operating time of the technical staff for the various types. Therefore, for each type of aircraft, the airline can calculate the hourly expense for the crew and flight attendants and the hourly repair expense to highlight their permanent element.

Some airlines take this process further and calculate various hourly crew and repair costs for various types of routes. KLM, for example, uses a greater hourly consumption per crew for specific types of aircraft when the flight is carried out in short sections than in sections of longer length, which reflects the more intensive work of the crew in short sections. The last element of fixed direct operating costs is fixed costs for aircraft (depreciation and insurance). They are specific to the type of aircraft, as depend on the purchase price. These are fixed annual expenses based on the number of aircraft of certain types divided by their annual use, which allows determining depreciation and insurance costs for a block hour. Since all of the above direct costs are allocated to individual types of aircraft, some airlines designate them as “fleet”, that is, expenses associated with the operation of the fleet of aircraft of certain types.

Turning to the consideration of indirect operating costs, distribution problems appear, because these costs are independent of the type of aircraft used. Some indirect costs are specific to each route and can be avoided if the route is not operated. If an airline uses a particular route to another country, the cost of selling tickets and advertising in that country, as well as the cost of parking and ground handling costs at the airport, can easily be classified as specific to that route. But the largest indirect costs, separately and jointly, cannot be allocated to individual flights or routes except on an arbitrary basis.

The highest parking costs, indirect passenger service costs, and sales and marketing expenses, as well as administrative expenses, are usually allocated to individual services or routes based on calculation of paid ton-kilometers (RTK) or revenue generated. Each approach has its advantages and disadvantages. When

using RTK, long routes lose because although ton-kilometers are high, but revenues per km are low due to the fact that the fare decreases along with the costs with increasing distance. The distribution of indirect costs based on the revenue generated seems more impartial, but prejudices shorter routes where the fare per kilometer is high.

You can use several distribution methods. The costs of selling and servicing passengers can be divided between flights on the basis of the actual passenger turnover, specific freight costs can be distributed through the actual freight turnover. Using the distribution methods described above, when adapting them to your own requirements and calculation methods, the airline can allocate the variable and fixed costs of individual flights or routes. Comparing them with the income received, you can determine the desired frequency of flights on a particular route or the need for this route in general.

*Table 1.5.*

<b>The main groups of operating costs of the airline</b>						
Operating costs	For the aircraft	For the flight crew	For flight attendants	Technical	For commercial loading	Common
Permanent, independent of the volume of activity	Depreciation insurance ground handling	Fixed salary administration	Fixed salary administration	Fixed salary administration	Service staff	Administrative sales
Permanent, volume-dependent	Airport taxes, parking, fuels and lubricants	Salary Bonuses	Salary Bonuses	From flying hours from the number of take-offs and landings	Insurance service charges	Other

### 1.3.3. Balanced airline operating structure

There are two principal possibilities in the operating costs of an air carrier (see Fig 1.4.):

1. A normative classification list already established in international business: it may vary slightly depending on the size of the airline and the volume of its activities, but there is little room for manipulation.

2. The size and ratio of the share of costs: these are the main resource opportunities for active management.

One can say a lot about the airline, judging by these two parameters: strategy, financial situation, condition of the fleet, flight and technical resources, and even the political situation.

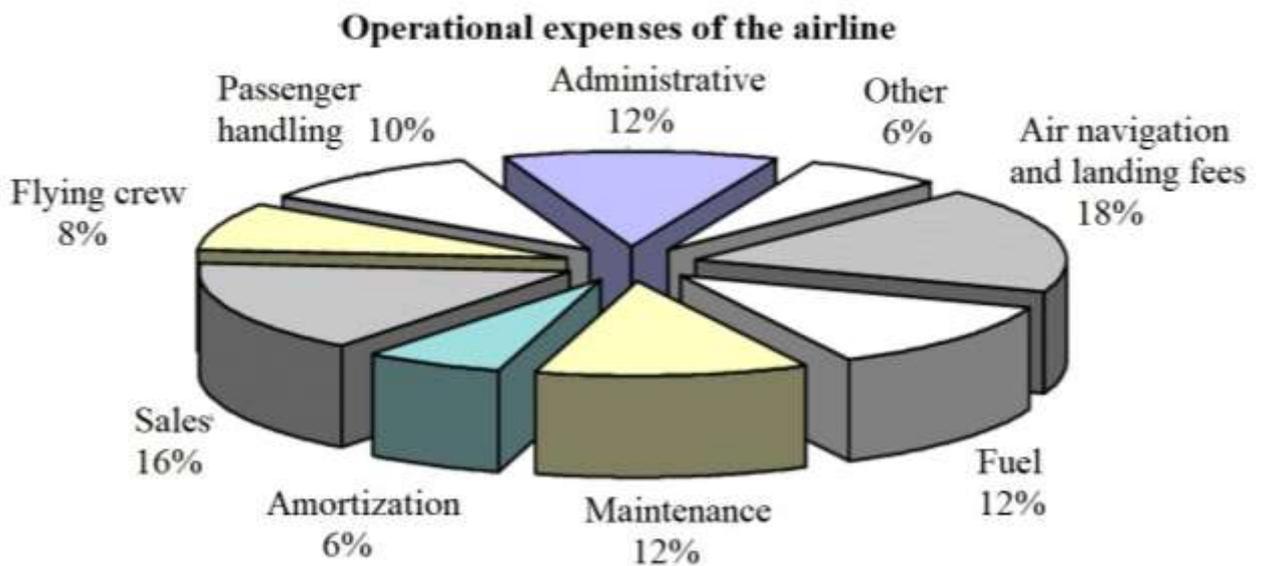


Fig. 1.4. Operational expenses of the airline

### 1.4. Airline Management Standards

There are several groups of the most important airline standards: management standards, professional standards of flight and engineering personnel, fleet standards and service standards (see Table 1.6). The main criterion for managing flight resources is the professionalism of flight personnel. When

compiling flight crews, the main thing is the pilot's compliance with flight standards. Personal qualities and psychological compatibility are also taken into account. Considerable attention has been paid to the design of standards in other chapters of this work. Here is the general structure of standards and a list of areas of activity to be standardized.

*Table 1.6.*

<b>The main areas of standardization of the airline</b>			
	<b>PROFESSIONALISM</b>	<b>FLEET</b>	<b>SERVICE</b>
<ul style="list-style-type: none"> <li>• Airline Management Guides</li> <li>• Structural Management Provisions</li> </ul>	<ul style="list-style-type: none"> <li>• Flight manuals</li> <li>• Qualification of flight and technical personnel</li> <li>• Availability of flight standards</li> </ul>	<ul style="list-style-type: none"> <li>• Aircraft commonality</li> <li>• Aircraft operational and technical data</li> <li>• Environmental characteristics of the aircraft</li> </ul>	<ul style="list-style-type: none"> <li>• Long-haul market</li> <li>• Medium haul market</li> <li>• Local market (short-haul)</li> </ul>

### **1.4.1. Specific types of management**

#### **Bankruptcy Management**

The bankruptcy of Russian airlines, including large regional ones, is a characteristic feature of the 1990s. Bankruptcy can be hidden, explicit, initiated, staged. Without touching on reasons, especially political ones, our projects proposed theses on the positive role of bankruptcy, if managed. On the contrary, uncontrolled bankruptcy leads to the dissipation of resources. What to do to maintain solvency and prevent bankruptcy? According to the presented list, a bankruptcy management program and an external management plan are compiled.

#### **Airline contract management**

In an open market, the airline has a complex, diverse system of contracts for a wide variety of activities. The total number of contracts in a large airline is in the

hundreds. There are three main types of examination of contracts: technological, legal and financial. Technological expertise is an assessment of feasibility by technological parameters and efficiency. Legal expertise verifies the legal validity of contracts, forms and procedures for legal standards. Financial expertise evaluates and monitors the economic and financial feasibility of the transaction, verifies the compliance of the contract with financial and accounting standards, budget plans and enterprise capabilities. In our projects for aviation enterprises, two normative approaches to managing the external environment are developed: centralized and targeted. Understanding these leaving is the key to managing external activities.

### **Centralized contract management**

This pattern prevails in the practice of Russian airlines. All organization contracts are managed by the so-called contract department. The department managers are divided into areas of activity and fully coordinate and organize all types of these examinations with their and external experts. As a rule, taking into account low automation, work with contracts turns into lengthy procedures with many unnecessary connections. The advantage of this approach is unity of management and responsibility.

### **Targeted contract management**

It is used in an open market. The contract is managed by the manager of the unit to which the contract relates in content. All types of expertise are organized here and the contract is monitored. If the contract is of strategic importance, associated with large financial resources, by decision of the management, a special group will be created that manages this contract. For critical contracts, there is a rule by which senior executives personally manage them. At the same time, the number of persons dedicated to the content of the contract is limited. The fundamental difference and advantages of the second method are obvious: the direct responsibility of the official of the unit to which the contract relates.

## 1.4.2. Bankruptcy Management Complex

It is allowed to increase prices:

- when improving quality
- with high service
- in high demand
- with a unique product

Variable costs can be reduced if:

- use cheaper materials or their substitutes
- with an increase in production
- with more efficient use of labor resources
- (2-shift mode)
- while reducing production time
- while accelerating the terms of payment for materials and receiving

discounts for it

- receiving cash discounts
- avoid discounts on offsets
- reduce travel expenses
- reduce the cost of advertising, training

Fixed costs can be reduced if:

• make an inventory of production and office space in order to reduce or lease

- move to a cheaper or resource-friendly premises
- urgently make a revaluation of all property: fixed assets, stocks,

materials, sell or lease

- reduce transportation costs
- sell property, transfer as a share of property to its employees in

payment

- to send workers on administrative leave, mainly with time wages

- reduce the number of employees with time wage

Sales structure can be improved by:

- influence on demand through discounts, installments
- changes in the distribution network and sales system

To increase sales, the following steps are needed:

- increase advertising costs
- increase marketing and advertising costs
- increase the number of outlets
- approach (move) to the buyer
- lower prices

Especially for the airline business

1. Conduct immediate certification of personnel.
2. Conduct preferential and voluntary reduction.
3. Replace management: accept by tender for the position of chief executive (possibly a manager not from the aviation business).
4. Carry out an inventory of the property and sell the excess.
5. Begin the transition to a corporate form of ownership.
6. Privatization: increase the share of private capital.
7. Make investments in the image: the form of personnel, heraldry, slogans, repainting of aircraft, hangars.
8. Balance fleet structure, sales network and airline network.
9. To study the prices in the market and introduce an even more flexible system of discounts, tariffs by classes and directions.
10. Conduct training for all management personnel.
11. Conduct flight attendant service training and certification according to height and weight tables

## **1.5. Conclusions to the theoretical part**

Let's draw conclusions to the theoretical part for the airline's resources.

Conclusion 1. Management of the airline's resources has been synthesized: from the most abstract — developing a common strategy, to the main components — personnel, fleet, sales network, airline network, and management.

Conclusion 2. The creation of a system of standards leads to cost reduction, otherwise - to optimize resources. It is characteristic that the development of a cost-cutting program also requires costs, investing in its development, staff training, maintenance and execution control.

Conclusion 3. The structure of the cost-cutting program is based on a system of operating costs and primarily on large items: fuel, airport, air navigation, maintenance.

Conclusion 4. Maintenance and provision of spare parts consists of the organization of spare parts pools, strategic warehouses, fleet community, and a fleet life extension program.

Conclusion 5. Professionalism and service are high-quality parameters that create the largest reserve of competitiveness.

Conclusion 6. General principles and methods of airline management are aimed at (1) building the airline's technology at all levels and levels, (2) economic mechanisms of the airline's work and (3) improving the airline's structure.

Conclusion 7. For the flight operation service, such a list would look like this: (1) the basic principles of the organization of flight operation management, (2) the structure of flight units, (3) the organization of flight methodological work, (4) training programs, (5) professional training and education facilities.

Conclusion 8. Management of vocational training includes: (1) careful scientific selection of candidates for the professional sphere for a whole set of characteristics, (2) periodic training cycles of vocational training, (3) training in complicated programs in classes or on full-scale samples, (4) the main method of

evaluating the introduced training systems and programs is a meaningful survey and questioning of flight personnel.

Conclusion 9. Personnel problems in airlines are solved by saving human resources, optimizing training processes and integrating training centers.

Conclusion 10. The main management of airline flight operations are two-tier structures that optimize information flows and control quality. The intractable problem of flight operation remains the standardization of procedures and a decrease in the volume of flight documentation.

Conclusion 11. The development of the optimal structure of the airline allows to find the necessary level of management. Environmental strategies in modern airlines should be led by managers with a broad common culture and educational background. Quality programs are the most advanced modern means of technological culture of airlines.

Conclusion 12. The shown strategic directions of quality can serve as the basis for the development of specific programs. It is likely that with such comparative surveys of companies with the highest level of management, it is possible to assign a threshold value to the stability profile. It may be slightly worse than the indicators for the most stable airline. The results can serve as the basis for major management decisions. In addition, knowledge itself is essentially the most powerful resource and enables both airline managers and an individual pilot to adequately respond to stress factors and use preventive and recreational programs.

## 2. ANALYTICAL PART

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## **2.1. General overview of Turkish Airlines**

### **2.1.1. Turkish Airlines as the leading airline market player**

Based at Istanbul's Ataturk International Airport, Turkish Airlines (THY) is the national airline of Turkey and the country's largest carrier. Turkish Airlines (see Fig.2.1.) operates a network of domestic and regional services throughout Turkey and the Middle East and international services to Europe, Africa, North America, South America and Asia. The carrier operates passenger services to over 270 destinations via Ataturk International Airport as well as secondary hubs at Esenboga International Airport and Adnan Menderes International Airport. Turkish Cargo is a freight division of the carrier, operating services to over 100 countries across its network. Turkish Airlines is also a member of the Star Alliance.



Fig.2.1. Logo of the company

Turkish Airlines runs a maintenance center at Istanbul Atatürk Airport. The maintenance center, called Turkish Technic, is responsible for the maintenance, repair and overhaul (MRO) of Turkish Airlines and third party aircraft, including airframe, landing gear, APU and other subsystems.

Turkish Technic opened an engine center in partnership with Pratt & Whitney at Sabiha Gökçen International Airport (SAW) called TEC (Turkish Engine Center) in January 2010. The facility provides engine maintenance, repair and overhaul services to customers worldwide.

Turkish Airlines won the Skytrax awards for Europe's Best Airline, Southern Europe's Best Airline, and the World's Best Premium Economy Class Airline Seat for three consecutive years in 2011, 2012 and 2013. It retained its status as the top European airline in 2014, 2015 and 2016, thereby holding the title for six years in a row. Additionally, Turkish Airlines was selected the Airline of the Year by Air Transport News at the 2013 Air Transport News Awards Ceremony. In November 2017, Turkish Airlines was recognized as "The World's 16th Best Airline For Business Travel" by the CEOWORLD magazine.

Also Turkish Airlines is the 6<sup>th</sup> largest airline in Europe (see Fig.2.2.) by total scheduled and chartered passengers.

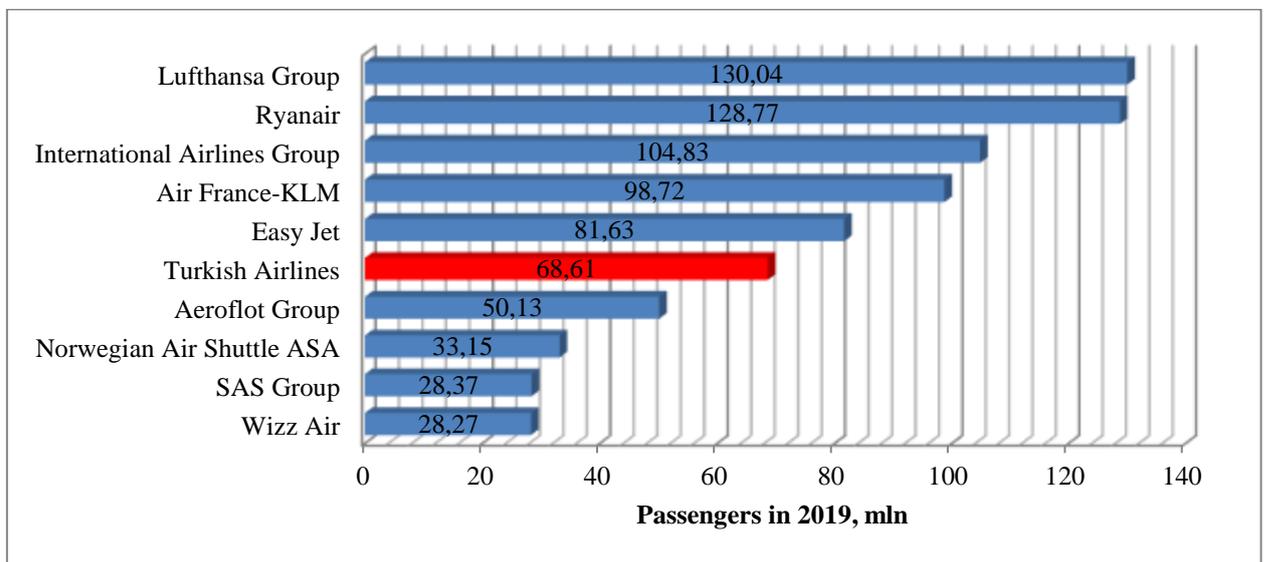


Fig.2.2. Largest European airlines and holdings (number of passengers carried in 2019)

### 2.1.2. Turkish Cargo

Turkish Cargo transports cargo to more than 290 destinations (see Fig.2.3.) and more than 116 countries by using Turkish Airlines passenger aircraft bellhold cargo capacity. Additionally, provide scheduled cargo flights to many destinations with freighters.

Also, Turkish Cargo uses Interline/SPA agreements in cooperation with other airlines to expand its network to provide more routing options to business partners.

Currently, Turkish Cargo has SPA (Special Prorate Agreement) with over 80 airlines. These agreements open up new markets for the two airline's customers.

Turkish Cargo have SPA agreements for offline destinations such as Australia (Sydney, Melbourne, Perth), New Zeland (Auckland), capital cities in Latin America and Africa.



Fig.2.3. Flight route map of Turkish Cargo in 2019

Turkish Cargo can also accept cargo for many destinations in Far East via Interline agreements.

The interline agreements work on new destinations where TC have no flights, to meet customer demand. By providing this kind of solutions Turkish Cargo is going to make more contribution to the international logistic solutions. When experts look at the air cargo industry, the increase of cargo capacity in excess of the capacity offered in recent years, the deficiency in global trade, oil prices and prices in downfall trend have a critical importance for air cargo profitability predictions. The demands shifting towards the maritime transport stand out as a thread in terms of the air cargo market. Wide-body passenger aircraft deliveries

bring along a remarkable additional cargo (belly cargo) capacity. Particularly, in certain lines of merchandise, wide-body passenger aircraft will be effective in determining the dynamics of these markets, thanks to the additional cargo capacity they bring along. According to IATA figures, cargo capacity in 2016 increased by 5.3% while cargo traffic rose by 3.8%, falling behind the available capacity. This has led to a decrease in cargo load factor. Cargo load factors receded down up to 43% levels.

Air cargo carriers have been developing different strategies against demanding and varying market conditions. Joint Business Agreements are made between the carriers. Some air cargo companies establish new companies with local partners in different countries, to expand outside their own target markets. Therefore, they distribute the potential risks by appearing in diverse markets.

A number of significant carriers turn to special cargo (livestock, previous cargo, medicine, etc.), aiming at standing out with different and special services they offer in the shrinking market. Airlines intend to step forward in the competition with loyalty programs they began to offer to the cargo customer, just like the passenger loyalty programs.

Another strategy followed by some airlines focusing on cost-reducing measures is to discontinue the flights which suffer losses and purchase cargo aircraft capacity from a secondary air carrier in an effort not to lose their major cargo markets. New cargo terminal projects or capacity boosting projects of some air carriers based in Middle East and Europe, focusing on some special cargo types for the future, draw the attentions.

According to the prediction of DHMI (State Airport Administration), in 2019, it is expected to achieve an increase by 3.5% in Turkish domestic cargo shipping; 10.2% in Turkish international cargo shipping. In 2017, increase rate in domestic flights was 3.6% and increase rate in international flights was 10.8%. These figures will allow us to deduce that the State Airports Administration has a cautious optimism.

## **2.2. Turkish airlines destination network and cooperation with other airlines**

### **2.2.1. Destination network**

As of August 2019, it operates scheduled services to 315 destinations in Europe, Asia, Africa, and the Americas, making it the largest mainline carrier in the world by number of passenger destinations (see Table 2.1.). Turkish Airlines flies to 50 domestic and 242 international destinations in 122 countries, excluding those only served by Turkish Airlines Cargo. Following is a list of destinations Turkish Airlines and Turkish Airlines Cargo fly to as part of scheduled services, as of December 2019. The list includes the city, country, the codes of the International Air Transport Association (IATA airport code) and the International Civil Aviation Organization (ICAO airport code), and the airport's name, with the airline's hub, focus airports, cargo services, future and terminated destinations marked.

The continents with most destinations outside Turkey are Europe with 107 (including Transcaucasia, Cyprus and Siberia), Asia with 64, Africa with 52 (including Sinai Peninsula) and the Americas with 19. Outside Turkey, the countries with the largest number of airports served by the carrier are Germany with 14; Russia with 10; Italy and the United States with 9; France with 8; Saudi Arabia and Ukraine with 7; Egypt, Iran, Iraq, Spain and the United Kingdom with 5 each (see Fig.2.4.).

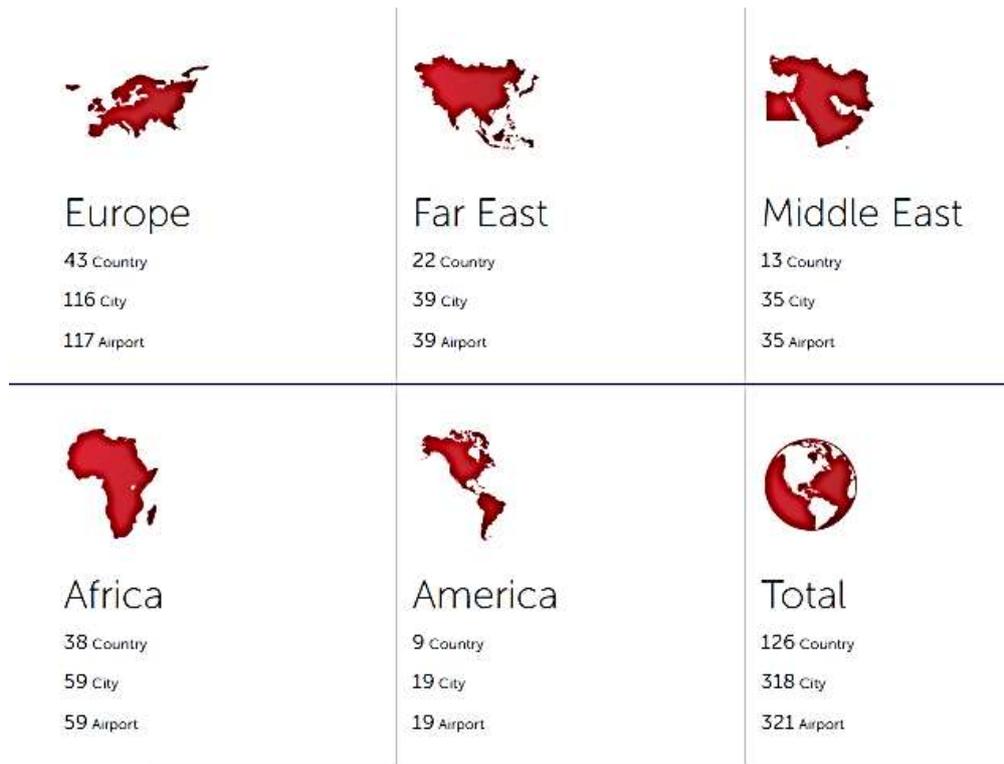


Fig.2.4. Number of routes served by Turkish Airlines

The map of Turkish Airlines became wider every year. Actual situation can be shown at Fig.2.5.

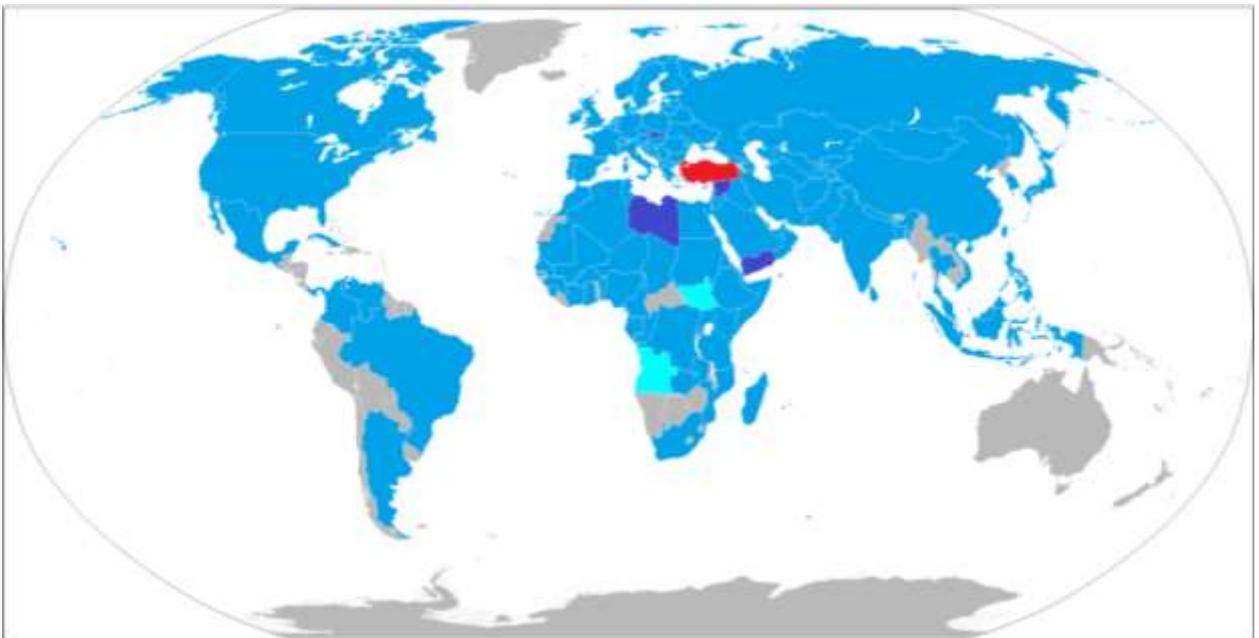


Fig.2.5. Destination map of Turkish Airlines in 2019, including announced future destinations.

Table 2.1.

**List of routes served by Turkish Airlines**

<p>International</p>	<p>Abidjan, Abu Dhabi, Abuja, Accra, Addis Ababa, Ahvaz, Alexandria, Algiers, Almaty, Amman, Amsterdam, Antananarivo, Ashgabat, Asmara, Astana, Athens, Atlanta, Baghdad, Baku, Bamako, Barcelona, Bari, Basel, Mulhouse, Freiburg, Basra, Batumi, Beijing, Beirut, Belgrade, Berlin, Bilbao, Birmingham, Bogota, Bologna, Bordeaux, Boston, Bremen, Brussels, Bucharest, Budapest, Buenos Aires, Cairo, Cape Town, Caracas, Casablanca, Catania, Chicago, Chisinau, Cluj-Napoca, Cologne Bonn, Colombo, Conakry, Constanta, Constantine, Copenhagen, Cotonou, Dakar, Dammam, Dar es Salaam, Dhaka, Delhi, Djibouti City, Dnipro, Doha, Douala, Dubai, Dublin, Dubrovnik, Durban, Dushanbe, Duddeldorf, Edinburgh, Entebbe, Frankfurt, Friedrichshafen, Ganja, Gassim, Geneva, Gothenburg, Graz, Guangzhou, Hamburg, Hanoi, Havana, Helsinki, Ho Chi Minh City, Hong Kong, Houston, Hurghada, Isfahan, Islamabad, Karachi, Karlsruhe Baden-Baden, Kathmandu, Kazan, Kharkiv, Khartoum, Kherson, Kiev, Kigali, Kilimanjaro, Kinshasa, Kosice, Kuala Lumpur, Kuwait City, Lagos, Lahore, Leipzig, Libreville, Lisbon, Ljubljana, London, Los Angeles, Luxembourg City, Lviv, Lyon, Madrid, Mahe, Malaga, Male, Manama, Manchester, Manila, Maputo, Marseilles, Mashhad, Mazar-i-Sharif, Medina, Miami, Milan, Minsk, Mogadishu, Mombasa, Montreal, Moscow, Munich, Mumbai, Muscat, Munster Osnabruck, N Djamena, Nairobi, Najaf, Nakhchivan, Naples, New York City, Niamey, Nice, Nicosia, Nouakchott, Nuremberg, Odessa, Oran, Oslo, Ouagadougou, Panama City, Paris, Phuket, Pisa, Podgorica, Port Louis, Porto, Prague, Pristina, Riga, Riyadh, Rome, Rostov-on-Don, Saint Petersburg, Salzburg, Samara, San Francisco, Sarajevo, Seoul, Shanghai, Sharm El Sheikh, Shiraz, Singapore, Skopje, Sochi, Sofia, Stavropol, Stockholm, Stuttgart, Sao Paulo, Tabriz, Taif, Taipei, Tallinn, Tashkent, Tbilisi, Tehran, Tel Aviv, Thessaloniki, Tirana, Tokyo, Toronto, Toulouse, Tunis, Turin, Ufa, Ulaanbaatar, Valencia, Valletta, Varna, Venice, Vienna, Vilnius, Voronezh, Warsaw, Washington D.C., Yanbu, Yaounde, Yekaterinburg, Zagreb, Zanzibar, Zurich</p>
<p>Domestic</p>	<p>Adana, Adiyaman, Agri, Alanya, Ankara, Antalya, Batman, Bingol, Bodrum, Bursa, Canakkale, Dalaman, Denizli, Diyarbakir, Edremit, Elazig, Erzincan, Erzurum, Gaziantep, Hakkari, Hatay, Isparta, Istanbul, Izmir, Igdir, Kahramanmaras, Kars, Kastamonu, Kayseri, Kocaeli, Konya, Kutahya, Malatya, Mardin, Merzifon, Mus, Nevsehir, Ordu/Giresun, Samsun, Sanliurfa, Sinop, Sivas, Sirnak, Tekirdag, Trabzon, Van</p>

## 2.2.2. Turkish Airlines as a Star Alliance Member

Turkish Airlines is a member of Star Alliance (see Fig.2.6.) - the world's largest airline community, consisting of 26 members from leading companies in the global aviation sector. Star Alliance was established on May 14, 1997, and Turkish Airlines joined in April 2008, becoming its 21st member. This membership allows customers to benefit from a wider flight network, special passenger programs, and special offers.



Fig.2.6. Airlines Star Alliance Members

Star Alliance in figures:

- 4,338 aircraft
- 18,000 flights a day
- 439,232 employees
- 1,269 airports
- 193 countries
- Over 1,000 private passenger lounges

### 2.2.3. Codeshare agreements of the airline

Turkish Airlines **codeshares** with the following airlines:

*Table 2.2.*

Adria Airways	Aegean Airlines	Air Algérie
Air Astana	Air Canada	Air China
Air Europa	Air India	Air Malta
Air Namibia	Air New Zealand	All Nippon Airways
Asiana Airlines	Avianca	Avianca Brazil
Azerbaijan Airlines	Belavia	Copa Airlines
Croatia Airlines	EgyptAir	Ethiopian Airlines
Etihad Airways	EVA Air	Garuda Indonesia
Gulf Air	Hawaiian Airlines	Iran Air
JetBlue	LOT Polish Airlines	Luxair
Middle East Airlines	Malindo Air	Oman Air
Pakistan International Airlines	Philippine Airlines	Royal Air Maroc
Royal Brunei Airlines	Royal Jordanian	RwandAir
Scandinavian Airlines	Singapore Airlines	TAP Air Portugal
Thai Airways	Ukraine International Airlines	United Airlines
Utair	Uzbekistan Airways	

### 2.3. Fleet of Turkish Airlines

As of December 2017, the number of aircraft in the Turkish Airlines fleet was 329 including 16 cargo aircraft, with an average fleet age of 7.7 years. In 2013, the Incorporation ordered 117 aircraft from Airbus and 95 aircraft from Boeing which will all be delivered until 2023. With these additions, Turkish Airlines fleet will reach a total of 424 aircraft.

As of December 2019, the Turkish Airlines fleet consists of the following aircraft (see Table 2.3.):

Table 2.3.

**Passenger and cargo fleet of Turkish Airlines**

Aircraft	In service	Orders	Passengers		
			C	Y	Total
<b>Turkish Airlines passenger fleet</b>					
<u>Airbus A319-100</u>	6	—	12	114	126
<u>Airbus A320-200</u>	17	—	12	141	153
<u>Airbus A321-200</u>	68	—	12	176	188
			20	158	178
<u>Airbus A321neo</u>	14	78	20	162	182
<u>Airbus A330-200</u>	18	—	22	228	250
			30	190	220
			22	259	281
<u>Airbus A330-300</u>	39	1	28	261	289
<u>Airbus A350-900</u>	—	30	TBA		
<u>Boeing 737-700</u>	1	—	—	149	149
<u>Boeing 737-800</u>	98	—	16	135	151
			12	147	159
			20	135	155
<u>Boeing 737-900ER</u>	15	—	16	135	151
<u>Boeing 737 MAX 8</u>	11	54	16	135	151
<u>Boeing 737 MAX 9</u>	1	9	TBA		
<u>Boeing 777-300ER</u>	33	—	49	300	349
			28	372	400
<u>Boeing 787-9</u>	6	24	30	270	300

*Continue of Table 2.3.*

<b>Turkish Airlines cargo fleet</b>			
<u>Airbus A300-600F</u>	1	—	Cargo
<u>Airbus A310-300F</u>	3	—	Cargo
<u>Airbus A330-200F</u>	10	—	Cargo
<u>Boeing 747-400F</u>	4	—	Cargo
<u>Boeing 777F</u>	6	2	Cargo
<b>Total</b>	<b>351</b>	<b>198</b>	

In October 2016, due to a downturn in air traffic, the airline had announced it was delaying delivery of 39 Boeing and Airbus aircraft (exact details were not specified) from its outstanding commitments for 167 aircraft (92 Airbus A321neos, 65 Boeing 737 MAX 8 and 10 Boeing 737 MAX 9s). It was set to receive just 10 of 32 aircraft due in 2018, but all outstanding orders are expected to be fulfilled by 2023.

On 26 June 2019, the first Boeing 787-9 Dreamliner from the airline's March 2018 order was delivered to the airline.

In August 2019, Turkish Airlines chairman İker Aycı stated that the carrier was looking into receiving its orders of long-haul aircraft, such as the Airbus A350-900, earlier than planned. In addition, the airline is interested in the Airbus A220 and Embraer E190/E195 in order to serve new destinations (see Fig.2.7.)

	Type	Owned	Financial Lease	Opr./Wet Lease	Seat Capacity	Average Fleet Age	Total
<b>Wide Body</b>	A330-200	2	3	11	4.122	10,5	16
	A330-300		29	8	10.807	4,2	37
	A340-300	4			1.332	20,0	4
	B777-3ER		27	6	11.670	4,4	33
	<b>Total</b>	<b>6</b>	<b>59</b>	<b>25</b>	<b>27.931</b>	<b>6,1</b>	<b>90</b>
<b>Narrow Body</b>	B737-900ER		15		2.355	4,8	15
	B737-800	25	42	20	14.227	9,7	87
	B737-700			1	124	12,1	1
	A319-100		6	1	924	7,4	7
	A320-200	5	7	10	3.504	11,1	22
	A321-200		62	6	12.360	5,8	68
	B737-800 WL			19	3.591	10,6	19
<b>Total</b>	<b>30</b>	<b>132</b>	<b>57</b>	<b>37.085</b>	<b>8,5</b>	<b>219</b>	
<b>Cargo</b>	A330-200F		9			4,3	9
	B777F		2			0,3	2
	Wet Lease			7		22,7	7
	<b>Total</b>		<b>11</b>	<b>7</b>		<b>11,0</b>	<b>18</b>

Fig.2.7. Characteristics of actual fleet of Turkish Airlines

Turkish Airlines has signed a Memorandum of Understanding (MoU) to acquire 25 A350-900 aircraft plus five options, underlining its strong confidence in the global market-dynamism and growth.

“This significant order will continue to enable our flag carrier to further compete, expand and reach new short and long-range destinations nonstop from our hubs in Istanbul, and Ankara.” said M. İlker Aycı, Turkish Airlines Chairman of the Board and the Executive Committee. “As Turkish Airlines, we are committed to offering our passengers on every route the best flying experience possible and we order on that promise as the Airbus’ A350 XWB provide comfort and convenience in spacious cabins, all matched with seamless reliability.”

## **2.4. Review of Turkish Airlines Subsidiaries**

### **2.4.1. Turkish Aviation Academy**

The Company was established on 21 June 2012 as a wholly-owned subsidiary of Turkish Airlines. Yet to commence operations, it was established to operate Aydın Çıldır Airport, provide aviation training, organize sports-training flights and conduct all activities related to the transportation of passengers with aircraft types appropriate to prevailing runway length. The airport is used as a base for Turkish Airlines Flight Academy and since the first half of 2013 provides flight training for Turkish Airlines Pilot Nominees.

As of 31 December 2019, Company has 33 employees. Name of the company has been changed from THY Aydın Çıldır Havalimanı İşletme A.Ş. to THY Uçuş Eğitim ve Havalimanı İşletme A.Ş.

### **2.4.2. THY Airport Real Estate Investment and Operation**

The Incorporation has decided to establish, "THY Havaalanı Gayrimenkul Yatırım ve İşletme Anonim Şirketi", in order to operate principally in the fields of airport operations and investments and also according to the fields of other activity that is specified in the Articles of Association of the Company. The aforementioned Company, which is wholly-owned by Türk Hava Yolları A.O, has been registered by Istanbul Trade Registry Office on 15 November 2017 and is established with the cash capital of 50.000 TRY. (Fifty thousand Turkish Lira).

The Group has nine joint ventures. The affiliates are controlled by the Group jointly, and are accounted for by using the equity method.

The Table 2.4. sets out consolidated joint ventures and indicates the proportion of ownership interest of the Incorporation in these joint ventures as of 31 December 2019.

Table 2.4.

### Turkish Airlines Subsidiaries

Name of the Company	Principal Activity	Direct Participation Rate	Indirect Participation Rate	Country of Registration
Sun Express Turkey	Aircraft Transportation	50%	-	Turkey
Turkish DO&CO	Catering Services	50%	-	Turkey
Turkish Ground Services	Ground Services	50%	-	Turkey
Turkish Opet Aviation Fuels	Aviation Fuel	50%	-	Turkey
Aircraft Seat Manufacturing Industry & Trade, Inc.	Cabin Interior	45%	5%	Turkey
Turkish Cabin Interior Systems Industries, Inc.	Cabin Interior	30%	20%	Turkey
Pratt Whitney THY Turkish Engine Center (TEC)	Maintenance	-	49%	Turkey
Goodrich Turkish Airlines Technical Service Center	Maintenance	-	40%	Turkey
Tax Free Zone, Inc. (Tax Refund)	VAT Return and Consultancy		-	Turkey

#### **Sun Express – Turkey**

Founded in 1989, SunExpress is a joint venture of Turkish Airlines and Lufthansa, in which each holds a 50% stake. The Company has a fleet of 22 aircraft for AnadoluJet operations of THY and with a fleet of 27 aircraft serves its

customers in both charter and scheduled business with 3,768 employees as of 31 December 2018.

SunExpress flies to 15 domestic and 70 international destinations, which brings the total number to 85 destinations. In 2011, SunExpress Germany was founded as a joint venture of Stiftung and SunExpress, in which each holds %50-50 stake. As of 31 December 2018, SunExpress Germany conducts operations to 12 domestic and 29 international destinations with its 14 Boeing 737-800 passenger aircraft.

### **Turkish DO&CO**

Founded in September 2006, commencing operations in 2007, Turkish DO&CO is a joint venture of Turkish Airlines and DO&CO Restaurants & Catering AG (Austria based), in which each holds a 50% stake. The Company provides inflight catering services to Turkish Airlines and other domestic and international airlines.

As of 31 December 2018, 4,606 employees are working for the Company.

### **Turkish Ground Services (TGS)**

The Company was established on 26 August 2008 as a wholly-owned subsidiary of Turkish Airlines, in order to provide ground-handling services. By signing the articles of association in the framework of the Board Decision dated on 19.12.2008, 50% of shares was transferred to HAVAŞ Havaalanları Yer Hizmetleri A.Ş. On 1 January 2010, the Company began to provide services to Turkish Airlines. The Company provides ground services for Turkish Airlines in 8 airports in Turkey. TGS is employing 9,711 personnel as of 31 December 2018.

### **Turkish Opet Aviation Fuels**

Turkish Opet Aviation Fuels, established in 2009, engages in the domestic and international sale, importation, exportation, distribution, and transport of various petroleum products, chemicals, lubricants, and paints for all kinds of aircraft. The Company commenced operations on 1 July 2010. Kuzey Tankercilik A.Ş. and Güney Tankercilik A.Ş., were established on 1 November 2012, as wholly owned subsidiaries of THY Opet Havacılık Yakıtları A.Ş. in order to

provide transportation of petroleum and petroleum products. As of 31 December 2018, the Incorporation has 436 employees.

**Aircraft Seat Manufacturing Industry & Trade, Inc.**

Founded in 2011, the Company was set up to design and manufacture airline seats, and to make, modify, market, and sell spare parts to Turkish Airlines and other international airline companies. Stakes of 50%, 45%, 5% are respectively held by Assan Hanil Group, Turkish Airlines, and Turkish Tecnic. As of 31 December 2018, 91 employees are working for the company.

**Turkish Cabin Interior Systems Industries, Inc.**

Established in December 2010, TCI's objective is to undertake the design, manufacture, logistical support, modification, and marketing of aircraft cabin interior systems and components. Stakes of 30%, 20% and 50% are held respectively by Turkish Airlines, Turkish Technic and Türk Havacılık ve Uzay Sanayi A.Ş. (TUSAŞ – TAI). As of 31 December 2018, the Company has 134 employees.

**Pratt Whitney THY Turkish Engine Center (TEC)**

The Company provides aircraft engine maintenance, repair, and overhaul services to customers in Turkey and its hinterland. Established on 10 October 2008, stakes of 49% and 51% are held respectively by United Technologies, a subsidiary of Pratt&Whitney, and Turkish Airlines. Operating out of a maintenance center with an area of around 25,000 m<sup>2</sup> at Istanbul Sabiha Gökçen International Airport, 329 employees as of 31 December 2018.

**Goodrich Turkish Airlines Technical Service Center**

Established in 2010, the Goodrich Turkish Airlines Technical Service Center is a joint venture of Turkish Technic (40%) and TSA-Rina Holdings (60%), the latter a subsidiary of Goodrich Corporation. Services for maintenance and repair of nacelles, thrust reversers, related parts and rotatable support is provided. As of 31 December 2018, the Company has 33 employees.

### **Turbine Technical Gas Turbines Maintenance & Repair, Inc.**

Established on 28 June 2011, as a joint venture of Turkish Technic and Zorlu O&M Enerji Tesisleri İşletme ve Bakım Hizmetleri A.Ş., in which each holds a 50% stake, in order to provide maintenance, repair and overhaul services for gas turbines and industrial gas turbines. As of 08.12.2018, Türk Hava Yolları Teknik A.Ş. (Turkish Technic) has transferred of its shares in Turkbine Teknik Gaz Türbinleri Bakım Onarım A.Ş (50% held by Turkish Technic) to Zorlu O&M.

### **Tax Free Zone, Inc. (Tax Refund)**

The Company is established on 1 September 2014 as a joint venture of THY (30%), Maslak Oto (45%) and VK Holding (25%) to carry out brokerage operations of value added tax return regarding the goods bought in Turkey by non-residents. As of 31 December 2018, 19 employees are working for the company.

The Incorporation is responsible for the full and joint control over subsidiaries and affiliates through Board of Directors. In addition, operations of subsidiaries and affiliates are monitored by Senior Vice President of Subsidiaries located within the means of the Parent Company. The internal audit and control functions in the Incorporation are carried out by SVP of Inspection Board, SVP of Quality Assurance and other relevant expertise and financial departments.

## **2.5. Organizational Structure and human resources of Turkish Airlines**

Turkish Airlines is a publicly traded company and there is a clear separation between management and ownership. As of May 2018, chairmanship is held by İlker Aycı. Bilal Ekşi holds the deputy chairman and CEO positions. Temel Kotil is an aeronautical engineer and serves as the General Manager of the company (see Fig.2.8.).

The Board of Directors is comprised of nine members elected by the general assembly. At least eight out of nine Board Members should be elected from Class A shareholders with the highest vote, and one member should be chosen from among Class C share shareholders. At least six Board Members, including the

Board Member representing the Class C share, must be Turkish citizens. The term of office for Board Members is 2 years. The General Assembly may terminate the membership of a Board Member before the end of his/her term. Board Member whose term has expired may be reelected.

Three members of the Board of Directors are appointed to the Executive Committee, and the other six are non-executive members. Among the non-executive Board of Directors three are independent members of the Board. Therefore, Turkish Airlines Chairman of the Board of Directors and Executive Committee is the same person, the CEO is not the Chairman of the Board of Directors. No one has unlimited power to make decisions in Turkish Airlines.

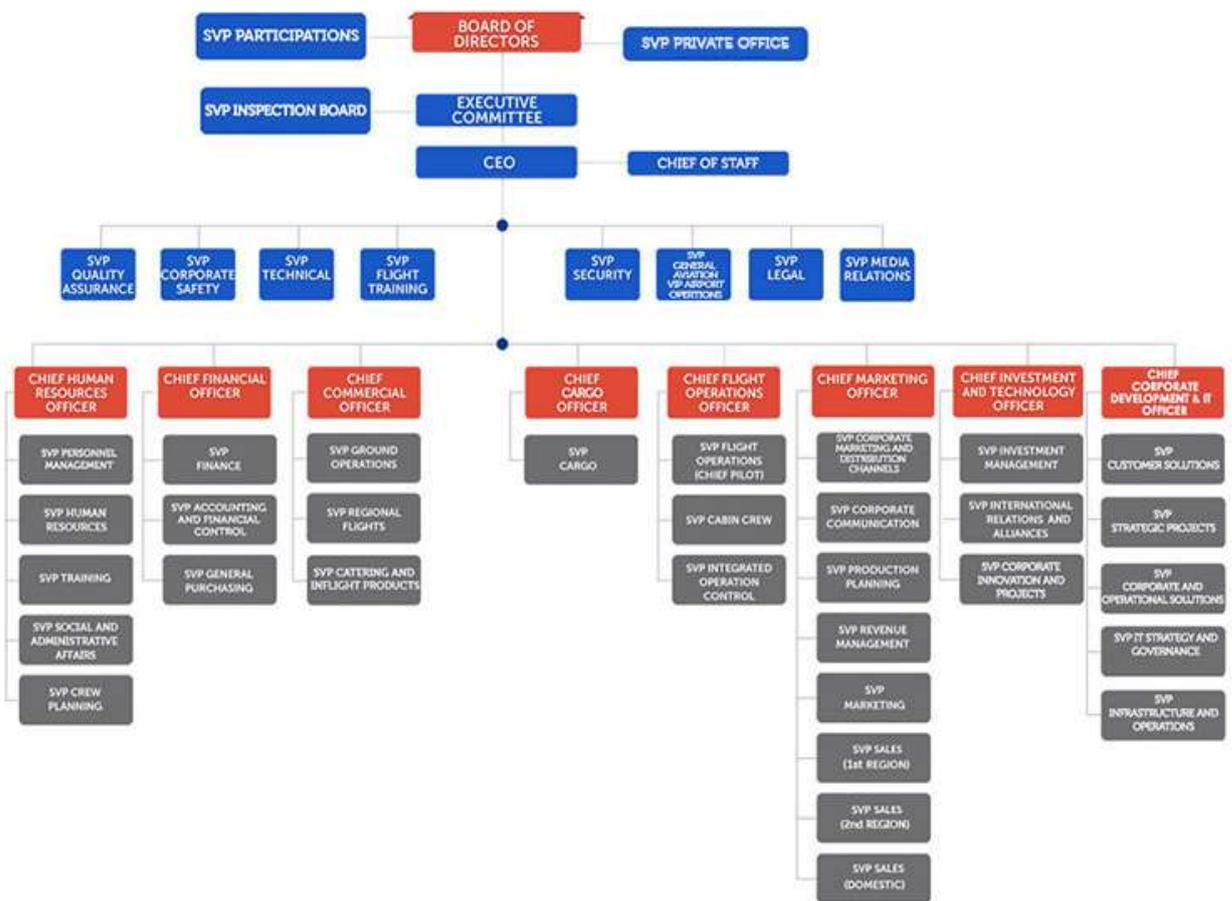


Fig.2.8. Organization structure chart of Turkish Airlines

Personnel numbers according to classes are as follows:

*Table 2.5.*

Cockpit Personnel	4,509
Cabin Personnel	9,798
Aircraft Maintenance Tech.	71
Staff Abroad	3,191
Domestic Staff	6,506
TOTAL	24,075

In Turkish Airlines, Government's shares are in minority but because of the "Golden Share" system which allows Government to control the management, Government has the greatest power among the management.

Members of the Board who were on duty as of 31 December 2019 are listed below in Table 2.6.

*Table 2.6.*

M. İlker AYCI	Chairman of the Board and the Executive Committee
Bilal EKŞİ	Vice Chairman of the Board and the Executive Committee, General Manager
İsmail Cenk DİLBEROĞLU	Member of the Board and the Executive Committee
İsmail GERÇEK	Member of the Board
Prof. Dr. Mecit EŞ	Member of the Board
Orhan Birdal	Member of the Board
Ogün ŞANLIER	Independent Board Member
Arzu AKALIN	Independent Board Member
M. Muzaffer AKPINAR	Independent Board Member

## **2.6. Sponsorship and promotion agreements of the airline**

Turkish Airlines has been the official carrier of several European football clubs such as FC Barcelona, Borussia Dortmund, Galatasaray, Olympique de Marseille, Aston Villa, FK Sarajevo, Hannover 96, and A.S. Roma.

The airline has also made sponsorship and promotion deals with renowned athletes and actors, including Lionel Messi, Kobe Bryant, Caroline Wozniacki, Kevin Costner, Wayne Rooney and Didier Drogba.

The company has been the primary sponsor of the Turkish Airlines Euroleague since 2010 and was among the sponsors of the 2010 FIBA World Championship.

On 22 October 2013, Turkish Airlines and Euroleague signed an agreement to prolong their existing sponsorship deal by five years until 2020.

Turkish Airlines is the sponsor of the Turkish Airlines Open, a European Tour golf tournament played annually in Turkey since 2013.

Turkish Airlines was the kit sponsor of Galatasaray for the 2014–15 UEFA Champions League and for Bosnian club FK Sarajevo. Since then, the airline has also been the kit sponsor for the European campaigns of Turkish clubs such as Fenerbahçe and Başakşehir.

On 10 December 2015, Turkish Airlines and UEFA signed a sponsorship deal for the UEFA Euro 2016, becoming the first airline sponsor of UEFA European Championship tournaments.

On 29 January 2018, Turkish Airlines announced its partnership with Warner Bros. to sponsor the film *Batman v Superman: Dawn of Justice*. In the movie, a pivotal scene unfolds aboard an A330 Turkish Airlines plane. That year, the airline also teamed up with a number of Turkish tourist agencies in the production of romantic comedy film *Non-Transferable*.

## 2.7. Analysis of business activity of Turkish Airlines

### 2.7.1. Turnover and net profit analysis

Maintaining the accounts of a company is important for calculating the annual turnover of a company or the yearly profit and loss details of a company. It helps in deciding whether a company is running in loss or making profits from its business activities. Therefore, maintaining the details in a perfect way is important to decide the future of the company.

Activity and company growth can be seen on turnover graph (see Fig.2.9.) that shows significant growth during past 15 years. It means development of Turkish Airlines business activity. But past 5 years are more interesting for investigation. The sales in 2015 increased by 19.3% over the year to USD 9.8 billion. Gross operating profit amounted to USD 657.5 million and net profit reached USD 357 million.

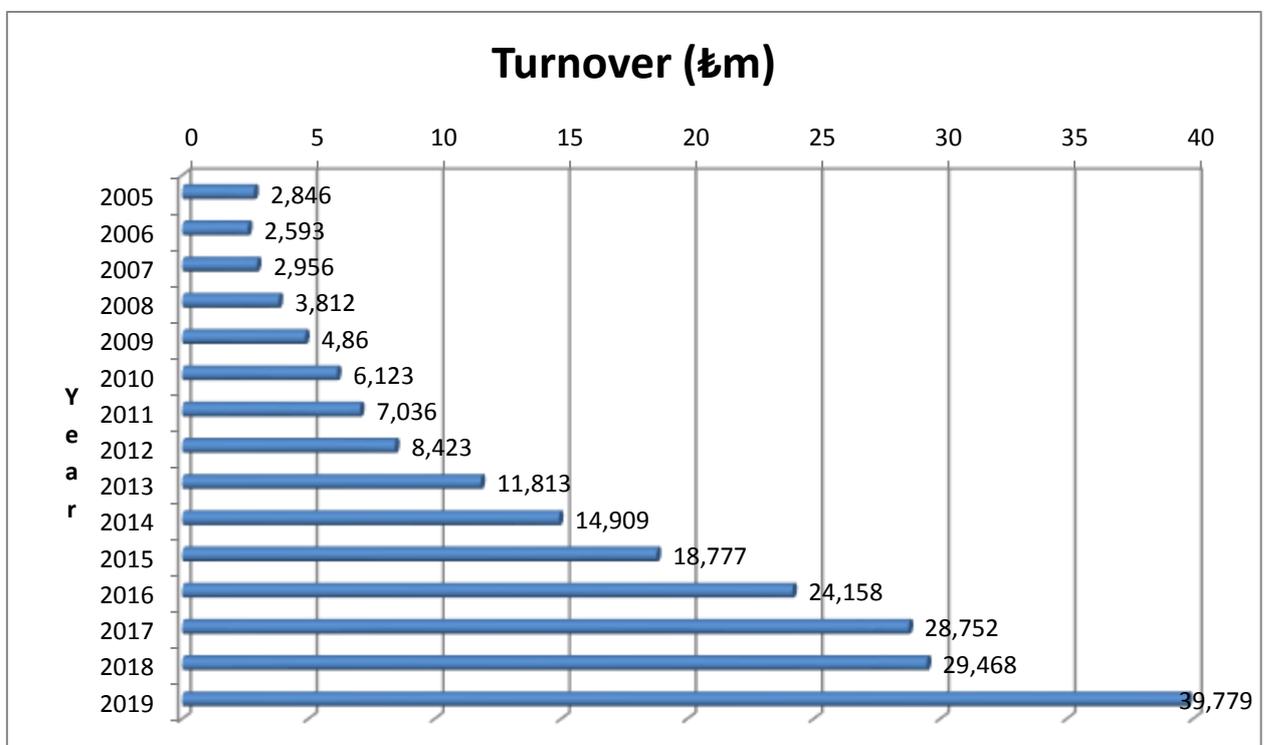


Fig.2.9. Turnover of Turkish Airlines over 15 years measured in Turkish lira

Thanks to efficient cost management in addition to sharp decrease in fuel prices, Turkish Airlines increased its net profit by 137% over the previous year. While the global profit margin was 3% in 2016, Turkish Airlines nearly tripled this figure with an attained profit margin of 8%(see Fig.2.10.).

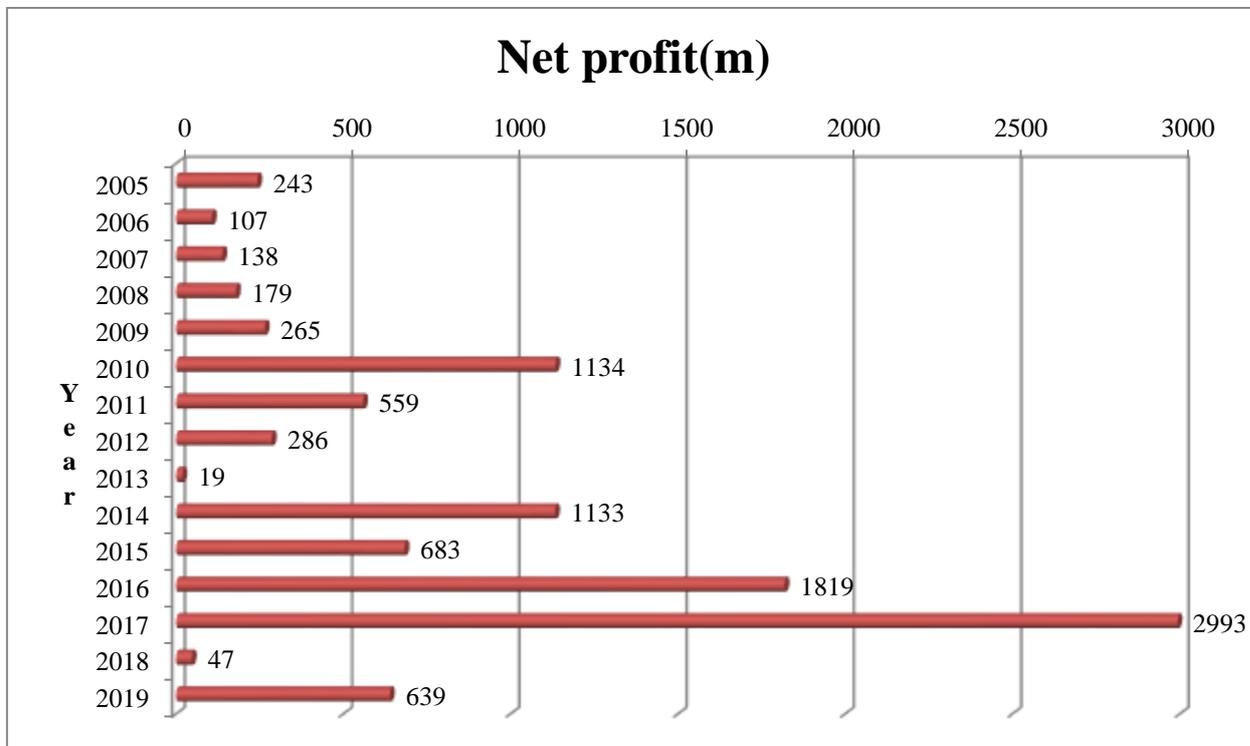


Fig.1.9. Net profit of Turkish Airlines over 15 years measured in Turkish lira

2017 has been a challenging year in many aspects, both for the aviation industry and for Turkish Airlines specifically. Up to 35% decrease in fuel costs, which represents the highest cost item for airlines, brought in increased capacity and as a result, increased competition in the industry. According to IATA data, global passenger and cargo revenues of airlines declined by 5.7% and 17.5%, respectively due to increased competition. Fluctuation in exchange rates was another factor that had an influence on demand and airline financial metrics. Depreciation of Euro, in particular, and the currencies of all developing countries against US Dollar caused the industry to have a hard time in pricing and planning issues. Still, global passenger traffic increased by 6%, the highest growth rate recorded for many years. As costs decreased, profitability of airlines rose significantly. In 2017, Turkish Airlines managed to limit the decrease in its

revenues thanks to its effective revenue management and geographically diverse source of revenues. Total sales revenues of the Company decreased by 4.9% to US\$ 10.5 billion. Passenger revenues represented 89% and cargo revenues accounted for 9% of total revenues in 2017. Turkish Airlines has the most effective cost management compared to its competitors in the industry, and despite the decline in its total revenues, the Company managed to increase its net profit by 26% to approximately US\$ 1.1 billion in 2017, the highest level ever achieved in its history. According to IATA statistics, average net profit margin of airlines was around 5% in 2017, however Turkish Airlines increased its profit margin from 7.6% to 10.2%, which is well above the industry average.

The year 2017 turned out a challenging year for both aviation industry and Turkish Airlines in many aspects. The decrease by up to 20% experienced in fuel prices, which is the biggest cost item of the airlines, has led to a capacity increase by up to 6%, along with the increased conditions of competition in the industry. Another factor which played a key role in demand and airline financials was the fluctuation in exchange rates. Especially the decrease in value of the currencies of the developing countries against US Dollar has caused the industry a hard time in pricing and planning matters.

The total revenues of Turkish Airlines decreased by 6.9% compared to last year, due to the unfavorable events that took place in our country in 2018, as well as the global impacts. According to IATA, airlines passenger revenues and cargo revenues worldwide declined by 2.7% and 9.5%, respectively. And the decline in the revenues of Turkish Airlines was 8.3% above the average of the industry while the cargo revenues, unlike the industry, increased by 6.5%, despite the unfavorable conditions. The passenger revenues in 2016 made up of 89% of total revenues while cargo revenues were recorded as 9%. In 2019 there was a significant growth of net profit of an airline which equals 639 millions Turkish lira.

### 2.7.2. Number of passengers carried analysis

Number of passengers carried (see Fig.2.11.) by a particular airline is an important performance indicator. Passengers carried are the number of passengers transported for a certain period of time. The unit of observation in the statistics of passenger transport is a passenger journey. The moment of the account of the sent passengers is defined on the moment of departure of an aircraft.

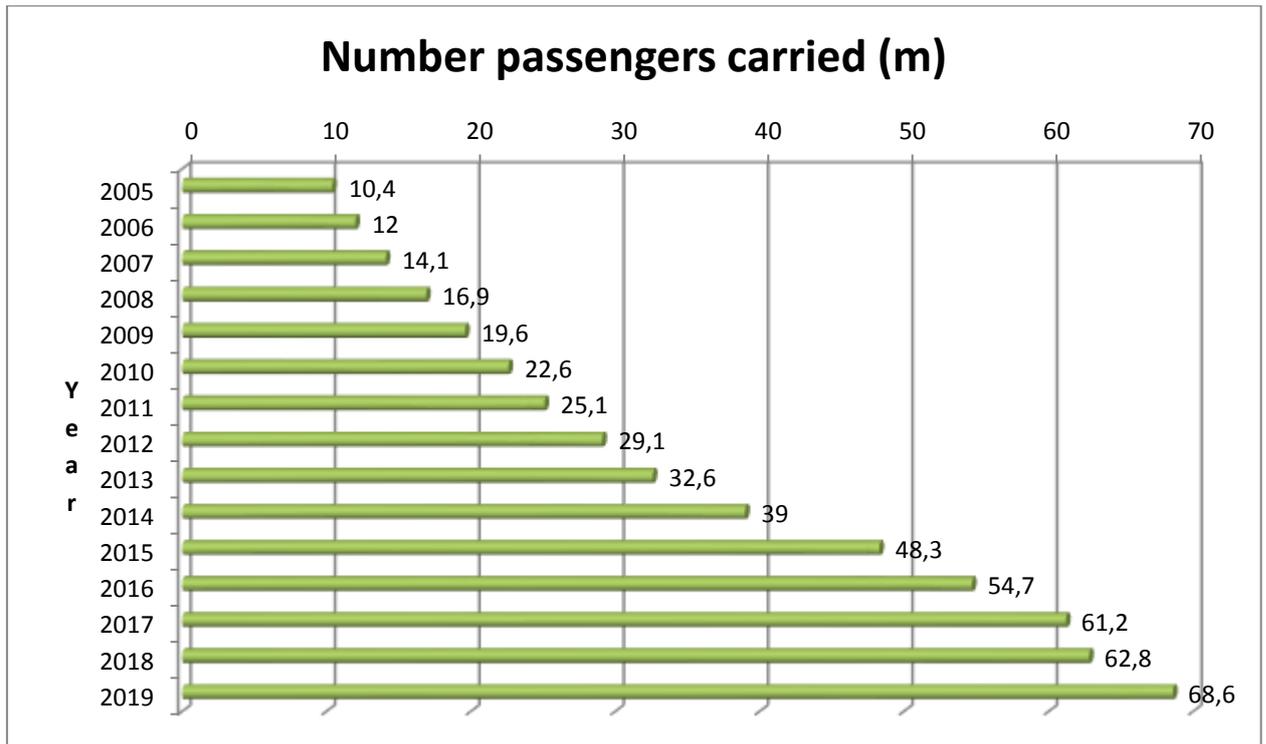


Fig.2.11. Number of passengers of Turkish Airlines over 15 years

The data on the transportation of passengers are given taking into account passengers enjoying the right of free and privileged travel. The moment of arrival in the statistics of passenger transportation in practice, with the exception of air transport, is not used.

In 2015 Turkish Airlines carried 28.2 million international and 20.1 million domestic passengers; which results in a total of 48.3 million passengers. Number of passengers increased by 13.3% from 48.3 million in 2015 to 54.7 million in 2016. The Company's passenger volume increased by 12.0% year-over-year to 61.2 million in 2017. Passenger volume grew in 2017 by 15.8% on domestic routes and

9.3% on international routes. The number of passenger aircraft landings increased by 9.6% to 452,982.

Company's passenger volume in 2018 reached 62.8 million with an increase by 2.5% compared to 2017 year. The increase in passenger volume was 3.8% in domestic flights and 1.5% in international flights. Passenger aircraft landings increased in 2018 to 475,303 with an increase by 2.7% per year.

Number of passengers carried by Turkish Airlines includes regular, additional, charter and Hajj-Umrah flights (see Table 2.7.).

*Table 2.7.*

**Additional, Charter and Hajj-Umrah Flights**

	Flights	Additional	Charter	Hajj-Umrah
2015	Domestic	1,589	1,258	-
	International	502	2,946	3,601
2016	Domestic	1,705	1,670	-
	International	601	3,263	3,675
2017	Domestic	2,042	1,261	-
	International	836	2,106	3,728
2018	Domestic	1,767	1,503	-
	International	1,431	2,008	3,909
2019	Domestic	1,309	1,321	-
	International	1,530	6,463	4,593

Air charter is the business of renting an entire aircraft as opposed to individual aircraft seats (i.e., purchasing a ticket through a traditional airline). While the airlines specialize in selling transportation by the seat, air charter companies focus on individual private aircraft and itineraries, urgent or time-sensitive cargo, air ambulance service, and other forms of ad hoc air transportation.

The Umrah is an Islamic pilgrimage to Mecca, Hijaz, Saudi Arabia, performed by Muslims that can be undertaken at any time of the year, in contrast to

the Hajj which has specific dates according to the Islamic lunar calendar. Number of such passengers are given in Table 2.8.

*Table 2.8.*

Number of passengers carried by additional, charter and Hajj-Umrah flights

	<b>Number of Passengers</b>				
	2015	2016	2017	2018	2019
Additional	114,584	125,215	159,115	301,079	550,334
Charter	619,498	763,373	621,018	628,934	1,348,352
Hajj-Umrah	305,039	390,890	458,737	465,178	574,548

### **2.7.3. Passenger load factor analysis**

Passenger load factor (see Fig.2.12.) is an important parameter for the assessment of the performance of any transport system. Almost all transport systems have high fixed costs, and these costs can only be recovered through selling tickets. Airlines often calculate a load factor at which the airline will break even; this is called the break-even load factor. At a load factor lower than the break even level, the airline will lose money, and above will record a profit.

The environmental performance of any transport mode improves as the load factor increases. The weight of passengers is normally a small part of the total weight of any transport vehicle, so increasing the number of passengers changes the emissions and fuel consumption to only a small degree. As a vehicle is more highly loaded, the fuel consumed per passenger drops, and fully loaded transport vehicles can be very fuel efficient.

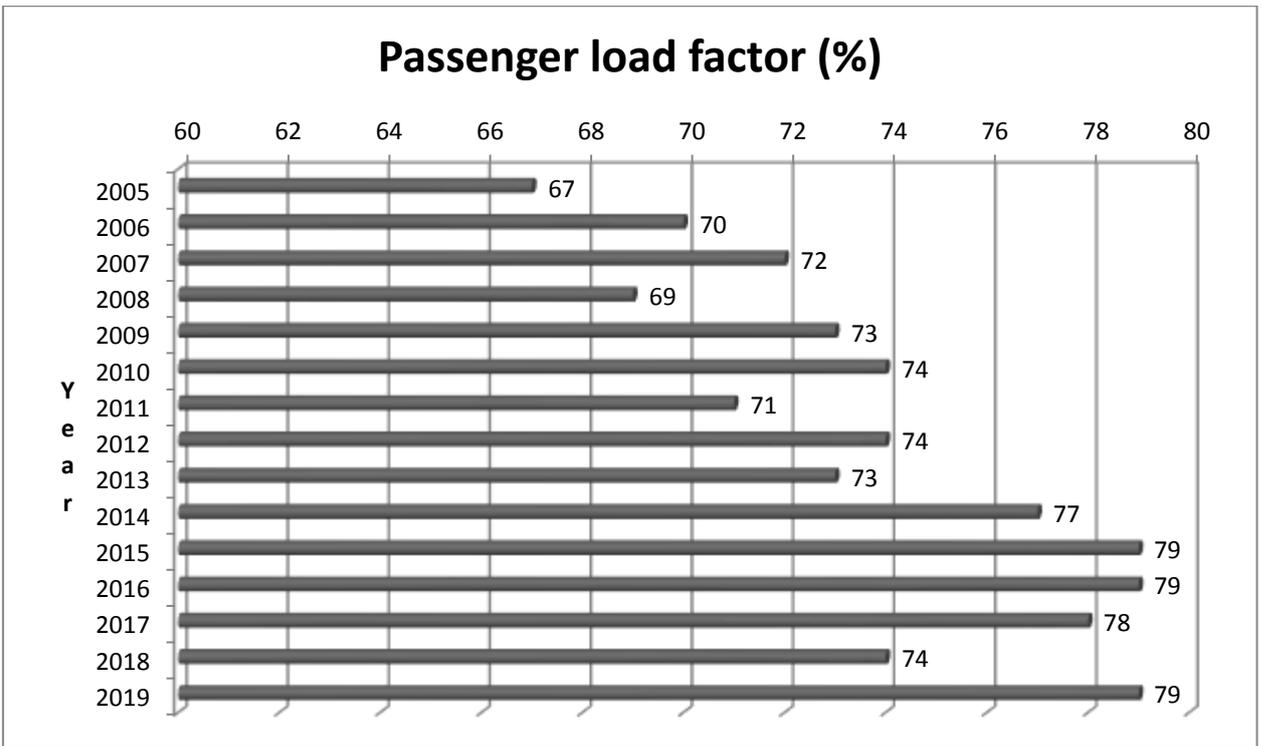


Fig.2.12. Passenger load factor of Turkish Airlines over 15 years

In spite of capacity increase of 21.1%, passenger load factor increased by 1.6 pt to 79.0% in 2015.

The unstable geopolitical environment occurred in the south eastern side of Turkey, the terrorist incidents started to happen in 2017. Turkish Airlines has compensated the decrease in direct traffic with transfer traffic with the help of its wide network and secondary city penetration skills. Along with 11% increase in capacity during, negative situations caused a decrease in load factor and an increase in pressure over yields. During the year 2017, decrease in fuel prices, the biggest cost item of airlines, has also continued in 2018. That circumstance led the capacity increase and competition in the sector to maintain. Despite the negative events in Middle East and Europe, during the period of January-December 2016 the global traffic has increased by 6%.

The terrorist incidents continued in 2018 and increasing security issues had a negative effect on passenger traffic in Europe and Turkey. In order to alleviate the impact of these negative events, Turkish Airlines has started a cost cutting program and an active capacity management in the second half of 2018 and planning to

maintain these initiatives through 2019. At the same time, decreasing security concern and global tourism development have stimulated passenger demand. In 2019, the number of foreigners visiting Turkey rose 28% compared to 2018. At the result of these facts, Turkish Airlines load factor has reached record rates successively and ended the year 79,1% load factor.

#### 2.7.4. Cargo carried analysis

Air cargo is any property carried or to be carried in an aircraft. Air cargo comprises air freight, air express and airmail. Turkish Cargo serves 73 destinations with 16 freighters besides 300 destinations with 313 passenger aircraft. Turkish Cargo global market share in revenue has increased from 0.6% in 2009 to 2.4% in 2018 (see Fig.2.13.).

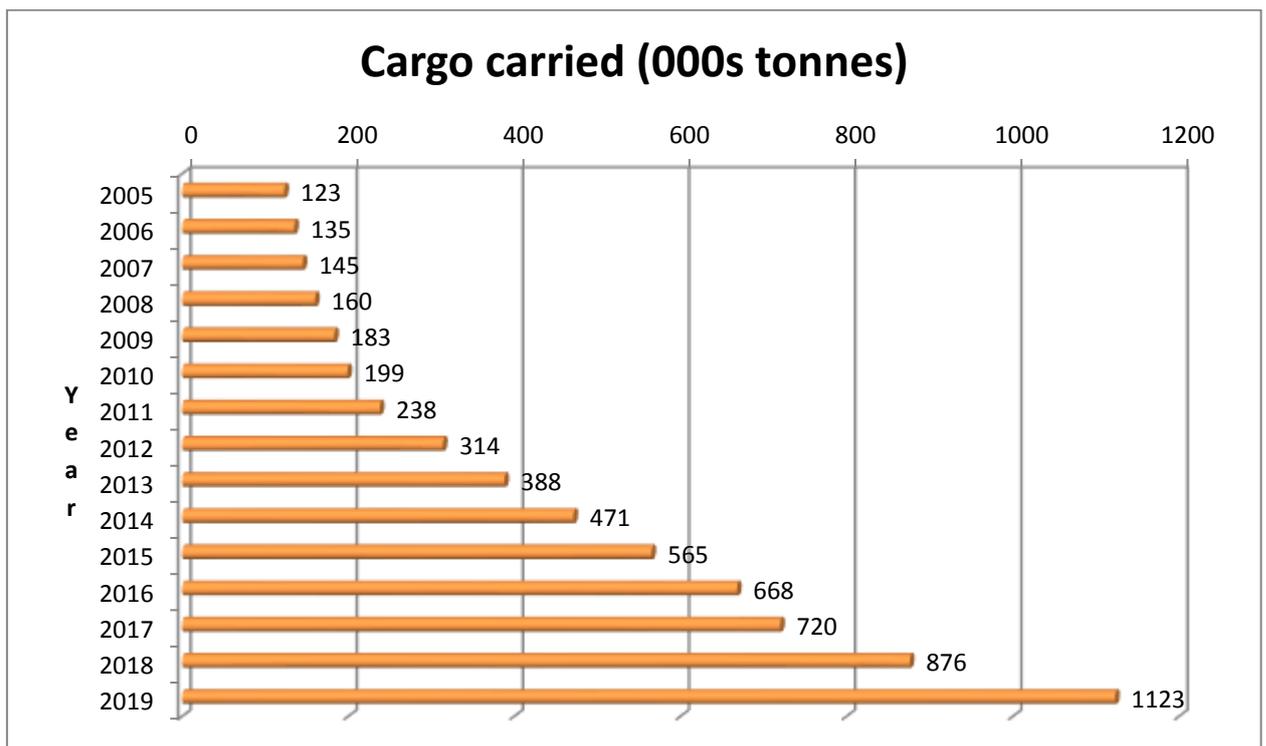


Fig.2.13. Cargo carried by Turkish Airlines over 15 years

In 2015 cargo and mail transportation grew by 20.1% to 565,391 tons. Cargo and mail transportation rose in parallel to the passenger increase and grew by 18.1% to 667,743 tons in 2016. Cargo-Mail transportation volume has also risen

by 7.9% to 720.440 tons in 2017. In 2018, Cargo-Mail transport also increased to 887,164 tons with an increase by 23.1% per year.

In 2018, while World FTK grew by 9%, Turkish Cargo FTK grew by 26% compared to previous year. New Cargo Terminal, which was opened at the end of 2016, has 1.2 million tons of cargo capacity and 43,000 m2 closed warehouse area. And in 2019 1123 tons of cargo and mail were transported.

### 2.7.5. Number of aircraft

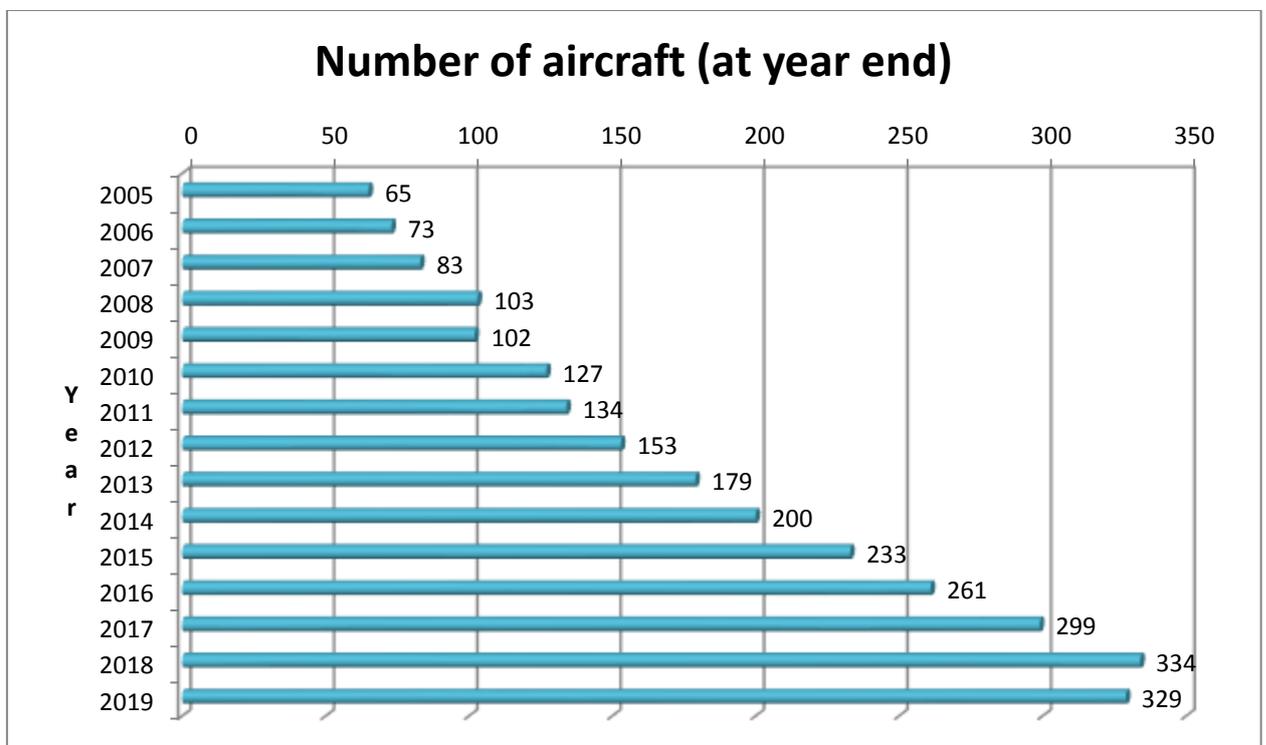


Fig.2.14. Number of aircraft of Turkish Airlines over 15 years

By the end of 2017, Turkish Airlines increased the number of aircraft in its fleet to 299 from 261 as at the end of 2016. The fleet consisted of 73 wide body and 216 narrow-body and 10 freighter aircraft. By late 2018, Turkish Airlines increased the number of aircraft to 334 from 299 as at the end of 2017 (see Fig.2.14.).

## 2.7.6. Number of destinations

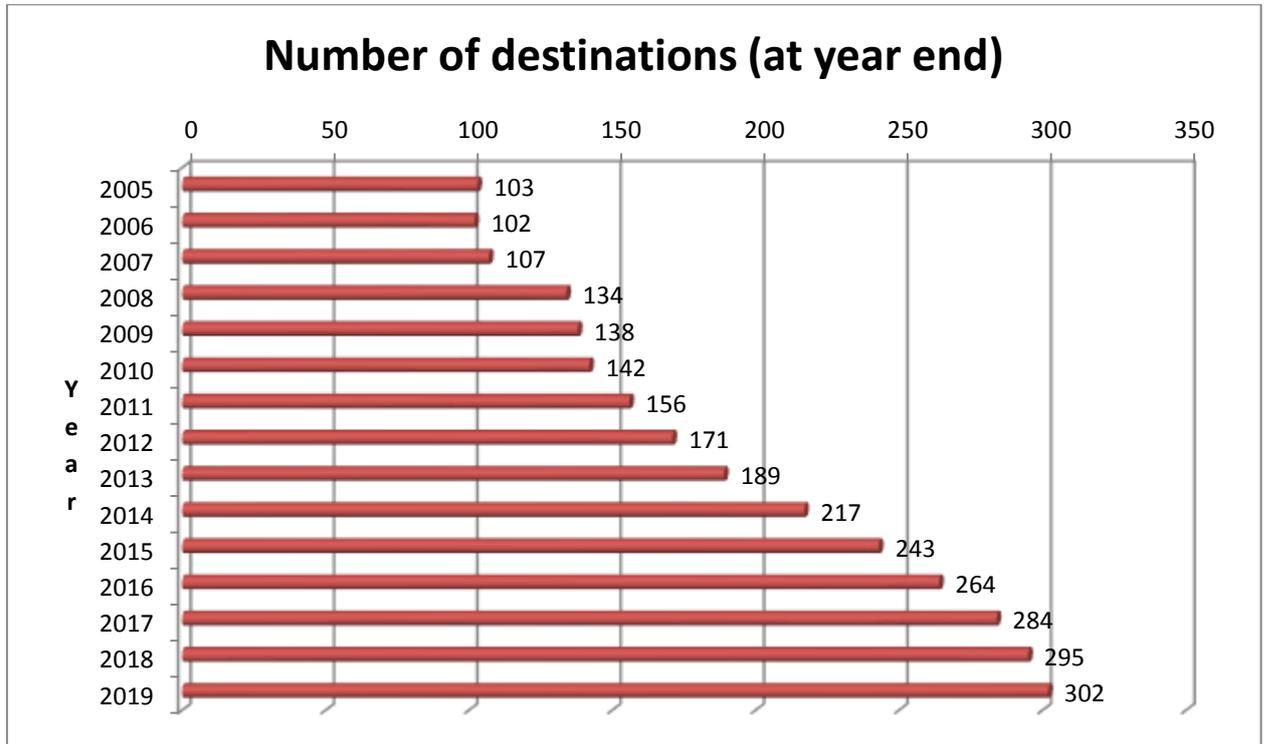


Fig.2.15. Number of destinations of Turkish Airlines over 15 years

By the end of 2015, Turkish Airlines introduced 26 new destinations and upgraded the number of flight points to 245 in 105 countries. Turkish Airlines flew to 45 domestic and 219 international destinations, which brought the total number to 264 destinations in 2016 (see Fig.2.15.).

As of 2017, Turkish Airlines flew to 287 destinations in total with 51 domestic and 236 international destinations. Turkish Airlines flew to 298 destinations, 51 of which are domestic and 247 are international, as at 2018. And now Turkish Airlines flies to 302 destinations.

In Table 2.9. there are generalized results of Turkish Airlines analysis over 15 years.

Table 2.9.

<b>Year</b> <b>Indicator</b>	<b>2005</b>	<b>2006</b>	<b>2007</b>	<b>2008</b>	<b>2009</b>	<b>2010</b>	<b>2011</b>	<b>2012</b>	<b>2013</b>	<b>2014</b>	<b>2015</b>	<b>2016</b>	<b>2017</b>	<b>2018</b>	<b>2019</b>
Turnover (£m)	2,846	2,593	2,956	3,812	4,860	6,123	7,036	8,423	11,813	14,909	18,777	24,158	28,752	29,468	39,779
Net profit (£m)	243	107	138	179	265	1,134	559	286	19	1,133	683	1819	2993	47	639
Number of passengers carried (m)	10.4	12.0	14.1	16.9	19.6	22.6	25.1	29.1	32.6	39.0	48.3	54.7	61.2	62.8	68.6
Passenger load factor (%)	67	70	72	69	73	74	71	74	73	77	79	79	78	74	79
Cargo carried (000s tonnes)	123	135	145	160	183	199	238	314	388	471	565	668	720	876	1,123
Number of aircraft (at year end)	65	73	83	103	102	127	134	153	179	200	233	261	299	334	329
Number of destinations (at year end)	103	102	107	134	138	142	156	171	189	217	243	264	284	295	302

## **2.8. Analysis of Turkish Airlines activity by regions**

### *Europe*

In 2018 the terrorist acts experienced in the European region and decreasing demand have adversely affected aviation industry and forced the air carriers in Europe to seek alternative solutions to get out of the bottleneck suffered due to loss in their revenues. The airlines strive to provide their customers with a better service and communication network, with the bilateral agreements and joint ventures with other air carriers, along with the new strategies they determined, to get out of this bottleneck. This type of agreements was expressed to continue in 2017 as well. Besides, the fact that low-cost air carriers (LCC) have increased their shares forces other air carriers to act through different strategies.

According to IATA data, in 2020, approximately 3% growth is expected in revenues in European region and a decrease is expected in profits per passenger on USD basis. Airlines have made some changes in their end-of-year forecasts as a consequence of the events experienced throughout 2019.

Moreover, the uncertainty caused by the Brexit decision and the impacts of this decision, likely to cause on aviation and entire region, make the air carriers a bit worried. It is still unclear whether the fall of Pound against USD will continue. In 2020, oil prices are expected to be higher compared to 2019. It is expected that this will put an enormous pressure in reducing the costs.

Given all these circumstances in Europe, even though an increase is expected in the revenues and the number of passengers, it is expected that these increases will not be as in the previous year and rates of return will be affected adversely.

### *Asia*

Asia Pacific is a region which involves a fast growing class, consists of 31% of global GDP and plays host to 4 billion people. Asia-Pacific, having the highest passenger capacity share with 30.2% in the world, is the fastest growing market after the Middle East, in terms of annual capacity, traffic and passenger capacity

changes. According to IATA data, 7.6% capacity growth and 7% traffic (RPK) growth is expected for 2020 in Asia-Pacific region.

Total net profit of the air carriers in this region, which was 7.3 billion USD in 2019, is estimated to decrease to 6.3 billion dollars in 2020.

Although the busiest lines of the world, in terms of available capacity, are based in Asia-Pacific region, the tension and uncertainty in global economy and strong competition force the leading Asia-Pacific carriers to take some measures. Intense competition, insufficient infrastructure capacity and slot deficiencies at the airports put pressure on ticket prices and profitability. While low-cost carriers in Europe and North America use less-busy and lower-cost secondary airports to help with their recovery, this is not as applicable for the countries in Asia, which in turn creates a cost pressure for low-cost carriers in the region. Regulatory restrictions, infrastructure at the airports and slot deficiencies limit the development of low-cost carriers, too.

Some carriers in the region aim at increasing their flight networks and thus the number of passengers by getting into partnerships with the carriers based in Europe and Gulf Region. Furthermore, the efforts of the eight low-cost carriers within Value Alliance founded in 2018, to establish closer connections, indicate the trends of the low-cost carriers in the region to produce better traffic and financial results in 2019.

### *Middle East*

The oil prices and exchange rate fluctuations that occurred in 2018, economic developments and ongoing social event across the world were the factors that affected the airlines in the Middle East.

While regional airlines increased their capacities by 13.9% in 2018, they underperformed in traffic (RPK) increase with 10.8%. Net profitability in 2016 decreased by 18%.

Regional airlines implemented some actions such as purchasing, establishing strategic partnerships as well as purchasing precious slots, limiting the capacity,

shifting the capacity and closing down some of the lines, against the unfavorable developments and increasing protective policies.

In addition, new players emerged in the region as a result of the global developments and as the gaps in the market were filled up.

In 2019, Middle East-based carriers are expected to carry on their investments in the East and West and get into partnerships with other air carriers, in an attempt to both compete with their rivals and spread their risks. Some airlines are expected to review and update the investments they have made in previous years. Besides, the postponing in aircraft orders is expected to continue, with capacity and operation updates which have been disclosed or planned to be disclosed.

In 2018, total net profit of the carriers in the region is expected to decrease by 67%; traffic increase by 9% beyond the two-digit growth trend and the capacity growth by 10.1%.

#### *Africa*

Notwithstanding the remarkable growth potential of African Aviation industry, structural issues, ongoing political and economic instabilities, protective and interventionist nature of the governments and poor management of the companies affect the development of aviation industry.

The negative situation in net profitability, which began in 2012, continued in 2016 and this negative situation is expected to continue in 2018 as well.

While the capacities of African carriers rose by 6.2% and traffics (RPK) by 5.8%, the capacity is expected to increase by 4.7% and traffic (RPK) by 4.5% in 2018. Africa has the lowest load factor among the regions.

#### *North America*

The regional airlines which announced remarkable profit figures in 2015 and 2016 have gained more than half of the net profit that the whole region achieved, with a total of 20.3 billion USD net profit figure they announced in 2016. It is expected that similar situation will continue in 2017 and the industry will achieve 18.1 billion USD net profit. While the regional air carriers increased their capacities by 3.8% in 2016, traffic (RPK) growth rose by 3.2%.

The capacity is expected to increase by 2.6% and traffic by 2.5% in 2020.

It also expected that the air carriers of Middle East region would adopt an expansionist policy in North America region and get into a partnership with an air carrier in the region.

### *South and Central America*

Latin America faces challenging market conditions, along with the poor domestic market conditions and depreciating currencies. In the past years, the air carriers in the region have postponed their aircraft deliveries. Infrastructural deficiencies, high taxation and regulatory restraints of some countries within the region are some of the major factors that affect the industry.

The fact that some of the carriers based in Gulf region became partners with the airlines in Latin America and the projects that some of the air carriers based in Middle East, Europe and North America have planned for Latin America, stand out as factors to shape the aviation sector of the region.

While the capacity grew by 3.5% and traffic (RPK) by 2.2% in 2018; they were expected to rise by 4% and 4.8%, respectively, in 2019. The ratio of debts to net profit has been rising since 2015 every year.

Revenue distribution by region is shown on Fig.2.16.

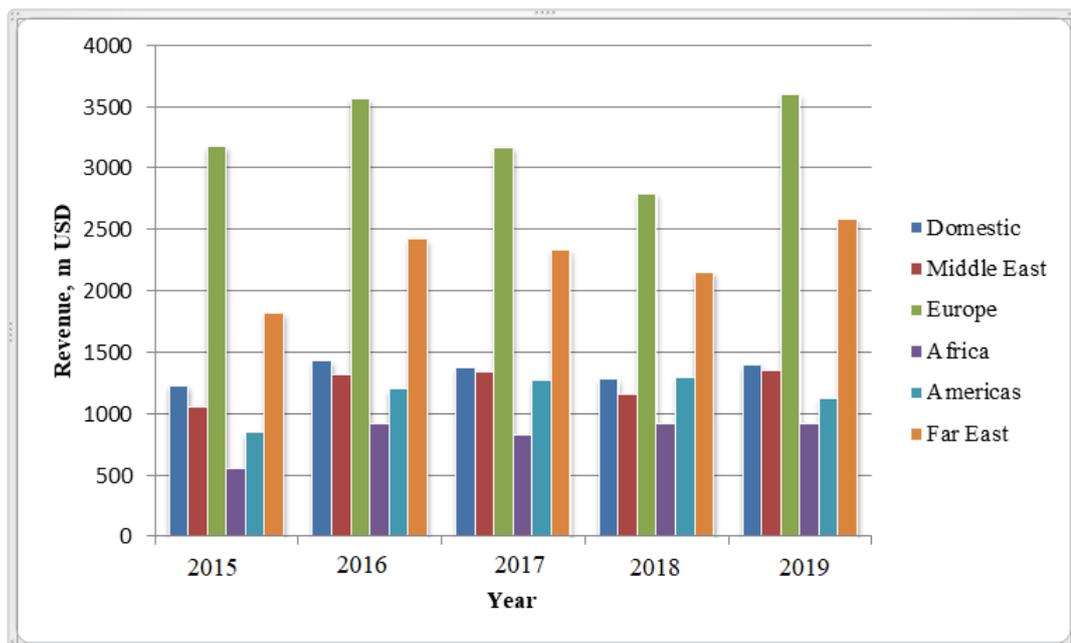


Fig.2.16. Revenue of Turkish Airlines by geographic distribution in m USD

## 2.9. SWOT analysis of Turkish Airlines

Table 2.10.

### Analysis of competitiveness (SWOT) of Turkish Airlines

<b>Strengths</b>	<b>Weaknesses</b>
<ul style="list-style-type: none"> <li>•Has large fleet size</li> <li>•Member of Star Alliance which is the global airline networks</li> <li>•High quality flying experience</li> <li>•Direct flights to many destinations</li> <li>•Customer loyalty</li> <li>•First airline company in Turkey</li> <li>•Has 67% share in Turkish market</li> <li>•Huge profit and growth even though European firms made smaller profit</li> <li>•Has experienced staff</li> <li>•Has a strong financial structure with the support of the Government</li> <li>•Good advertising strategies by using famous sports teams(Barcelona, Manchester United) and Hollywood celebrities</li> <li>•Has profitable subsidiaries such as Anadolujet, Sunexpress, Turkish Airlines Technic, Turkish Airlines Flight Academy</li> <li>•Is the leader at cargo transportation</li> </ul>	<ul style="list-style-type: none"> <li>•Higher prices than its competitors</li> <li>•Most of the flights are only from Ataturk Airport which is not preferred by people located in Asia side of Istanbul</li> <li>•Has limited participation on social responsibility projects</li> <li>•Has limited cold beverages (limited sources to satisfy the passenger demands)</li> <li>•The company website causes bad user experience for their customers</li> </ul>
<b>Opportunities</b>	<b>Threats</b>
<ul style="list-style-type: none"> <li>•Turkey's geopolitical location</li> <li>•Its local competitors have limited international flights</li> <li>•Third airport opening at Istanbul</li> <li>•Turkey's touristic attractions</li> <li>•Turkey's high population</li> <li>•Due to demand increases for abroad, international flights are getting more important</li> <li>•No visa required for some countries</li> <li>•Increasing number of travel agencies</li> </ul>	<ul style="list-style-type: none"> <li>•New entrants in domestic market</li> <li>•Change in fuel prices which leads to increased ticket cost to customers</li> <li>•Risk of international players entering Turkish market</li> <li>•Terrorist attacks</li> <li>•Promotions by competitors</li> </ul>

### **3. DESIGN PART**

<i>Air Transportation Management Department</i>				<i>NAU.20.04.02 003EN</i>				
<i>Done by:</i>	<i>Karyna I. Dierbunova</i>			<i>3.DESIGN PART</i>	<i>Letter</i>	<i>Sheet</i>	<i>Sheets</i>	
<i>Supervisor:</i>	<i>Valentyna S.Konovaliuk</i>					<i>D</i>	<i>76</i>	<i>31</i>
<i>Standards Inspector:</i>	<i>Julia V. Shevchenko</i>				<i>FTML 275 OII-202Ma</i>			
<i>Head of the Department:</i>	<i>Gennadiy M. Yun</i>							

### **3.1. Resource efficiency of Turkish Airlines. A pseudo-physical resource model of an air carrier**

Model "Components of the resource efficiency of the airline" (Figure 3.1.) shows the resource flows of the air carrier. Demand for air transportation is determined by gross national product (GNP) as an external factor, expressed in the form of traffic potential and is reflected in the form of internal and controlled parameters: tariffs, flight frequencies. Actual passenger turnover and operating revenue depend on these factors. The carrying capacity depends on both internal factors and the prevailing market conditions. These are the capital, composition and structure of the fleet, an airline network formed by an air carrier, pricing and service standards in the market and accepted by the airlines. Intangible resources, such as service standards, are particularly complex and difficult. Available passenger turnover and the amount of operating expenses these components depends on these components. Both streams are connected by a set of superstructural benchmarks: load factor, prime cost, specific income. The remaining part of the resource complex is practically no different from the financial model of any enterprise of any industry and type of activity. After a heuristic description of the activity model a set of values - performance indicators are determined. The task is to reduce this variety of forms and content to knowledge of the subject domain. This approach is called pseudophysical logic of observation.

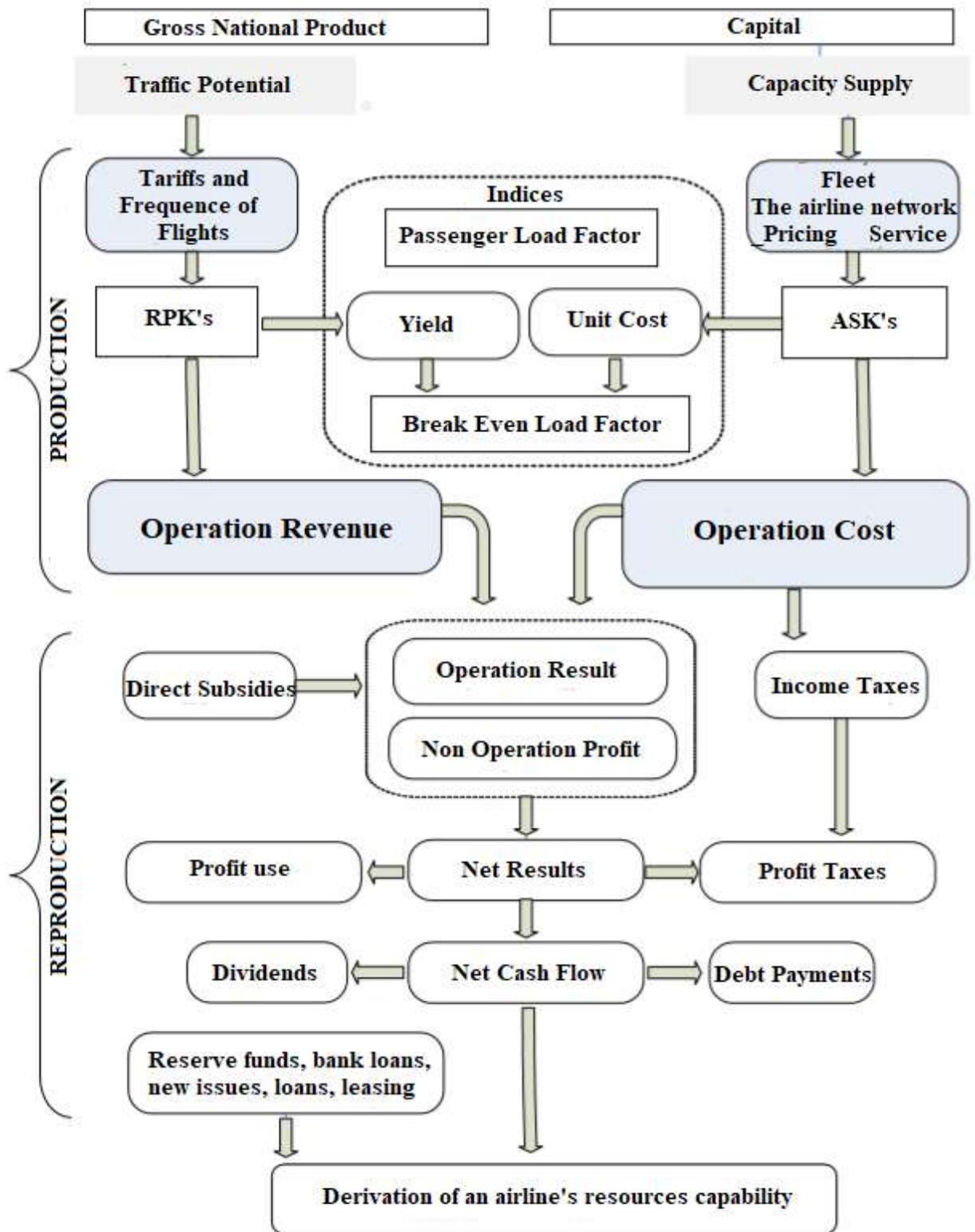


Fig.3.1. Components of Resource Efficiency of an Airline

## **3.2. Integrated rating of airlines in a competitive market**

### **3.2.1. Technology of the method**

The technology consists of the following procedures:

Procedure 1. Determine, on the basis of accounting data, annual performance indicators. To display them in Table 3.1.

Procedure 2. Calculate the operating coefficients (Table 3.2.).

Procedure 3. Calculate reference indicators. The indicators can correspond to the airline's formalized strategy, or the averaged data of the "reference" airline-competitor, equal in number of aircraft and in the number of personnel. Quantitative data is obtained from available databases, directories. For comparison, the relative values of the coefficients are calculated (Table 3.3.).

Procedure 4. Construct analytical charts for all parameters or for individual parameter groups.

Procedure 5. To revise business and management strategy. This is the main objective of the resource analysis of the air carrier.

### **3.2.2. Choice and brief overview of competitor for analysis**

Estimating the market gap in the airline's resources can be performed relatively quickly with the aim of making strategic adjustments and adjusting activities.

For implementation of this method the comparison with another airline is needed. Lufthansa Group was chosen for comparison with Turkish Airlines.

*Deutsche Lufthansa* (sometimes also as Lufthansa German Airlines), is the largest German airline and, when combined with its subsidiaries, also the largest airline in Europe both in terms of fleet size and passengers carried during 2017. Lufthansa is one of the five founding members of Star Alliance, the world's largest airline alliance, formed in 1997.

Besides its own services, and owning subsidiary passenger airlines Austrian Airlines, Swiss International Air Lines, Brussels Airlines, and Eurowings including Germanwings (referred to in English by Lufthansa as its Passenger Airline Group), Deutsche Lufthansa AG owns several aviation-related companies, such as Lufthansa Technik, as part of the Lufthansa Group. In total, the group has over 600 aircraft, making it one of the largest airline fleets in the world.

Lufthansa's registered office and corporate headquarters are in Cologne. The main operations base, called Lufthansa Aviation Center, is at Lufthansa's primary hub at Frankfurt Airport, and its secondary hub is at Munich Airport.

The essence of the method is to quickly identify the balance of resources in accordance with the strategy of the airline and the market indicators of competitors (Table 3.1.)

*Table 3.1.*

<b>Indicator</b>	<b>Turkish Airlines</b>	<b>Lufthansa</b>
Annual Passengers	68,616,740	131,426,527
Employees	24,075	50,190
Airline Fleet	329	617
Fleet seats	65,688	125,189
Revenue (m USD)	10,958	43,655
Operational Costs (m USD)	8,762	40,029
ASKs–Available Seat Kilometers (m pkm)	173,073	331,458
RPKs–Revenue Passenger Kilometers (m pkm)	136,946	268,813
Load Factor	79,1%	81,1%
ATKs – Available Tonne Kilometers	11,538,196	15,589,578
RTKs- Revenue Tonne Kilometers	9,781,894	11,671,362

### 3.2.3. Calculation of the operation coefficients

1. *Passenger per Employee*. The coefficient shows the level of efficiency of the human resources of the enterprise.

2. *Employee per Seat*. The coefficient shows the ratio of the human and technical resources of the airline, is an indicator of the professional qualifications of personnel and the level of technology.

3. *Employee per Airplane*. The coefficient reflects the technical level and structure of the airline fleet.

4. *Revenue per Employee*. The coefficient reflects the qualification and efficiency of the airline's human resources.

5. *Expenses per Employee*. The coefficient also reflects the qualification and efficiency of the airline's human resources.

6. *Revenue per Passenger*. The coefficient reflects the airline's tariffs, the level of demand and the position of the carrier in the airline market.

7. *Revenue per Seat*. The coefficient reflects the level of efficiency in the use of aircraft.

8. *RPKs per Seat*. The coefficient shows the level of demand for an air carrier's offer on the market.

9. *RPKs per Employee*. This is an indicator of the cost of labor resources of the airline on the market.

10. *ASKs per Seat*. This is the efficiency factor for the use of capacity.

11. *ASKs per Employee*. The coefficient shows the airline's operational capabilities for passenger transportation.

12. *Revenue per ASKs*. The coefficient shows the rate of return on the supply in the services market.

13. *Expenses per ASKs*. The coefficient shows the carrier's operational costs.

Table 3.2.

## Operation coefficient calculations for Turkish Airlines

<b>Coefficients</b>	<b>Calculations</b>
<b>Passenger per Employee</b>	$\frac{68,616,740}{24,075}=2,850$
<b>Employee per Seat</b>	$\frac{24,075}{65,688}=0.37$
<b>Employee per Airplane</b>	$\frac{24,075}{329}=73.18$
<b>Revenue per Employee (USD)</b>	$\frac{10,958,000,000}{24,075}=455,161$
<b>Expenses per Employee (USD)</b>	$\frac{8,762,000,000}{24,075}=363,946$
<b>Revenue per Passenger (USD)</b>	$\frac{10,958,000,000}{68,616,740}=159.7$
<b>Revenue per Seat (USD)</b>	$\frac{10,958,000,000}{65,688}=166,819$
<b>RPKs per Seat (mln.)</b>	$\frac{136,946}{65,688}=2.08$
<b>RPKs per Employee (mln.)</b>	$\frac{136,946}{24,075}=5.69$
<b>ASKs per Seat (mln.)</b>	$\frac{173,073}{65,688}=2.63$
<b>ASKs per Employee (mln.)</b>	$\frac{173,073}{24,075}=7.19$
<b>Revenue per ASKs (USD/pkm)</b>	$\frac{10,958}{173,073}=0.063$
<b>Expenses per ASKs (USD/pkm)</b>	$\frac{8,762}{173,073}=0.051$

Analogically calculations for Lufthansa Group operation coefficients were performed.

### 3.2.4. Comparison of Turkish Airlines and Lufthansa Group efficiency ratios

Table 3.3.

Efficiency Ratios	Turkish Airlines		Lufthansa Group	
	Absolute	Relative	Absolute	Relative
Passenger per Employee	2,850	1	2,620	0.92
Employee per Seat	0.37	1	0.4	1.08
Employee per Airplane	73.18	1	81.3	1.11
Revenue per Employee (USD)	455,161	1	869,794	1.91
Expenses per Employee (USD)	363,946	1	797,548	2.19
Revenue per Passenger (USD)	159.7	1	332.2	2.08
Revenue per Seat (USD)	166,819	1	348,713	2.09
RPKs per Seat (mln.)	2.08	1	2.15	1.03
RPKs per Employee (mln.)	5.69	1	5.46	0.96
ASKs per Seat (mln.)	2.63	1	2.65	1.008
ASKs per Employee (mln.)	7.19	1	6.68	0.93
Revenue per ASKs (USD/pkm)	0.063	1	0.132	2.1
Expenses per ASKs (USD/pkm)	0.051	1	0.121	2.37

For building of analytical chart (see Fig.3.2.) relative values were used.

After analyzing the histogram it can be concluded that Lufthansa Group uses its resource potential more efficiently. The chart shows that the qualification and efficiency of the airline's human resources are not significantly differentiate. But when compare coefficients reflected the airline's tariffs, the level of demand and

the position of the carrier in the airline market it can be seen that Turkish Airlines are less efficiently in 2 times then competitor. The coefficient reflects the level of efficiency in the use of aircraft also shows that Lufthansa uses this resource twice more efficiently.

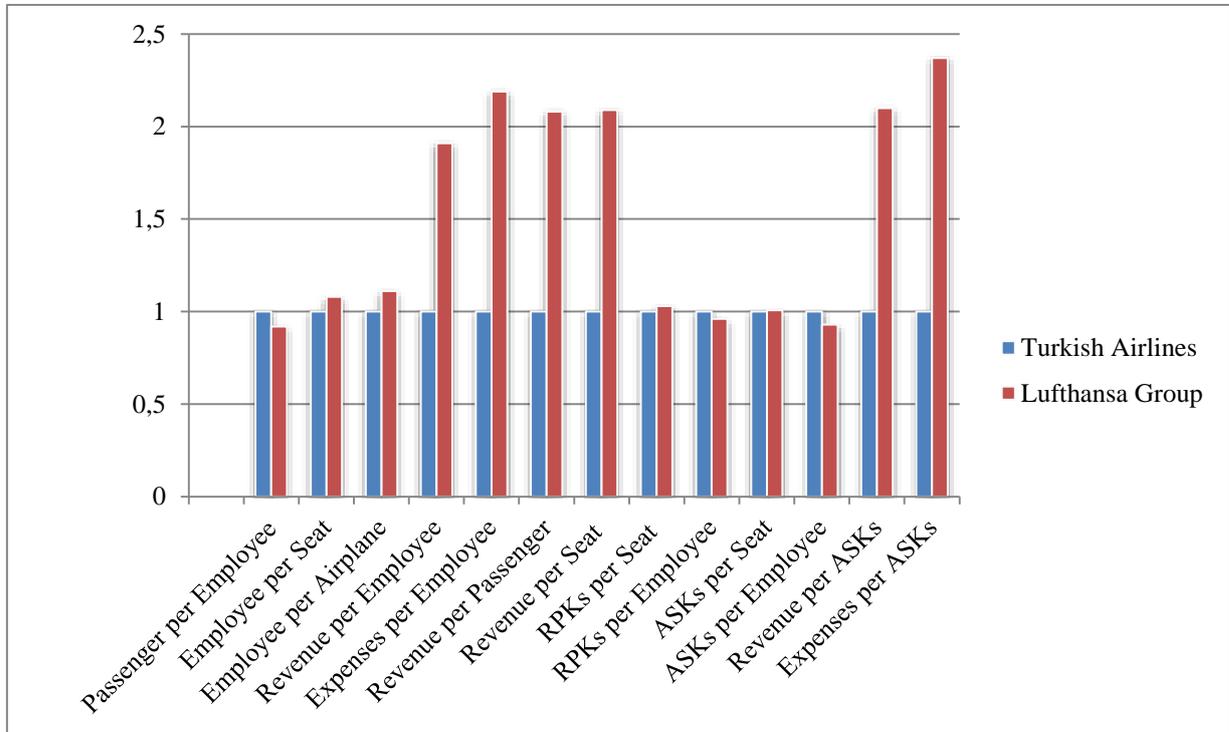


Fig.3.2. Analytical Chart of Turkish Airlines and Lufthansa Group efficiency ratios

So, it was decided to revise business and management strategy of Turkish Airlines and to improve efficiency of aircraft fleet usage.

### 3.3. Future strategy of Turkish Airlines

#### 3.3.1. Industry developments

The global aviation sector, negatively affected by terrorist incidents in 2016, began to recover in 2017 following a decrease in safety concern, with passenger demand increase. These positive developments in 2017 affected the first quarter of 2018 positively. Global passenger demand grew 9.5% year on year terms during the first quarter of 2018 and it is expected to continue on this growth by the end of

2018. Besides this strong demand pick up, global aviation capacity and load factor increased 6,4% 2.3 points respectively. Compared to the global aviation sector, Turkish Airlines performed better; passenger demand increased by 25%, capacity increased by 15% and load factor increased by 6.5 points. In this period, the number of passengers carried by Turkish Airlines increased by 29%, reaching 17 million passengers compared to the first quarter of last year.

Turkish Airlines continues its success on passenger side in cargo transportation. The Incorporation has achieved to maintain its strong growth trend in the cargo market over the last decade and consequently, cargo carried increased by 38% and cargo revenue increased by 52%. Turkish Airlines increases the importance of cargo transportation each passing day and plans to expand the cargo fleet in proportionate to passenger fleet.

Accordingly, Turkish Airlines takes firm steps forward to be one of the largest air cargo carriers in the world by increasing its share of the world air cargo market with the addition of new cargo aircraft to the existing fleet (see Fig.3.3.).

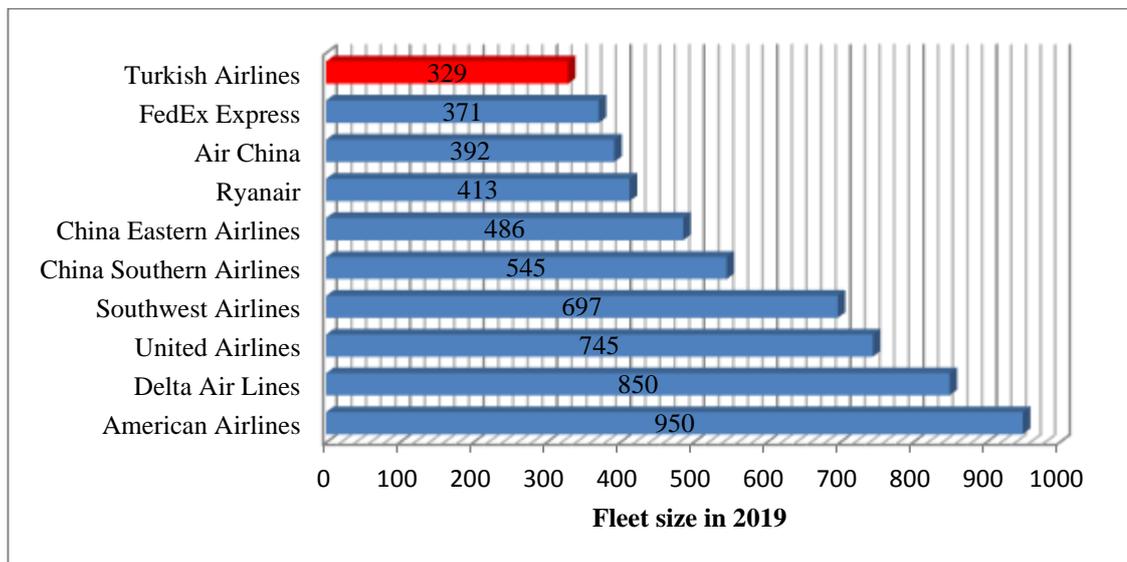


Fig.3.3. Top 10 airlines by fleet size in 2019

Turkish Airlines continued its impressive communication performance in 2018 without slowing down as in 2017.

Sponsorship in the international sports organizations, corporate social responsibility projects and other various sponsorships support Turkish Airlines

brand image as well as make huge contribution to the development of tourism in Turkey by accurate advertisement of Turkey. Turkish Airlines, titled as airline which flies to the most countries in the world, underlines that it will maintain its title in the forthcoming years by open and planned to open new destinations. Turkish Airlines' large flight network and young fleet structure will become stronger and provide significant advantage in intensely competitive aviation sector.

### 3.3.2. Investments, incentives and investment policies

Within the scope of “2009-2023 Fleet Projection” and “2012-2020 Fleet Plans”, confirmed by the Board, number of aircraft and delivery years are stated on the following table.

On March 9, 2018, in order to insure the need for wide body aircraft, the Incorporation has decided to purchase 50 firm and 10 optional aircraft, a total of 60 wide body aircraft to be delivered between 2019 and 2023 (see Fig.3.4.).

	Type	Total	Owned	Financial Lease	Opr./Wet Lease	Seat Capacity	Average Fleet Age	Year End Fleet*					
								2018	2019	2020	2021	2022	2023
Wide Body	A330-200	16	2	3	11	4.122	10,3	18	16	13	13	8	5
	A330-300	37		29	8	10.807	3,9	37	37	37	37	36	29
	A340-300	4	4			1.332	19,7	4	4	4	4	4	4
	B777-3ER	33		27	6	11.670	4,1	33	32	30	30	30	30
	<b>Total</b>	<b>90</b>	<b>6</b>	<b>59</b>	<b>25</b>	<b>27.931</b>	<b>5,8</b>	<b>92</b>	<b>89</b>	<b>84</b>	<b>84</b>	<b>78</b>	<b>68</b>
Narrow Body	B737-900ER	15		15		2.355	4,6	15	15	15	15	15	15
	B737-9 MAX								5	10	10	10	10
	B737-800	88	25	42	21	14.392	9,5	82	82	80	80	80	78
	B737-700	1			1	124	11,9	1	1				
	B737-8 MAX							7	19	38	53	65	65
	A321 NEO							3	21	39	59	77	92
	A319-100	7		6	1	924	7,2	7	6	6	6	6	6
	A320-200	24	5	7	12	3.822	11,0	19	12	12	12	12	12
	A321-200	68		62	6	12.360	5,5	68	68	66	64	64	64
	A320-200 WL												
	B737-800 WL	20			20	3.780	12,4	17	14	8	6	2	
<b>Total</b>	<b>223</b>	<b>30</b>	<b>132</b>	<b>61</b>	<b>37.757</b>	<b>8,3</b>	<b>219</b>	<b>243</b>	<b>274</b>	<b>305</b>	<b>331</b>	<b>342</b>	
Cargo	A330-200F	9		9			4,0	9	9	9	9	9	9
	B777F	2		2			0,1	5	5	5	5	5	5
	Wet Lease	5			5		24,0						
	<b>Total</b>	<b>16</b>		<b>11</b>	<b>5</b>		<b>9,8</b>	<b>14</b>	<b>14</b>	<b>14</b>	<b>14</b>	<b>14</b>	<b>14</b>
<b>GRAND TOTAL</b>	<b>329</b>	<b>36</b>	<b>202</b>	<b>91</b>	<b>65.688</b>	<b>7,7</b>	<b>325</b>	<b>346</b>	<b>372</b>	<b>403</b>	<b>423</b>	<b>424</b>	
<b>Year End Seat Capacity :</b>								<b>65.545</b>	<b>68.722</b>	<b>72.308</b>	<b>77.631</b>	<b>80.407</b>	<b>79.543</b>

Fig.3.4. Order of deliveries of Turkish Airlines aircraft in 2018-2023

According to this, a total of 30 B787-9 aircraft, of which 25 firm and 5 optional, will be purchased from Boeing and a total of 30 A350-900 aircraft, of which 25 firm and 5 optional will be purchased from Boeing.

By the end of March 2018, the operation has been carried out by 90 double-aisle passenger aircraft, 219 singleaisle passenger aircraft and 18 cargo aircraft. Double-aisle aircraft constitute about 28 % of the total number of aircraft in fleet. Due to the effect of stage length and seat capacity, contribution of wide body aircraft to the production is more than 50% (see Fig.3.5.).

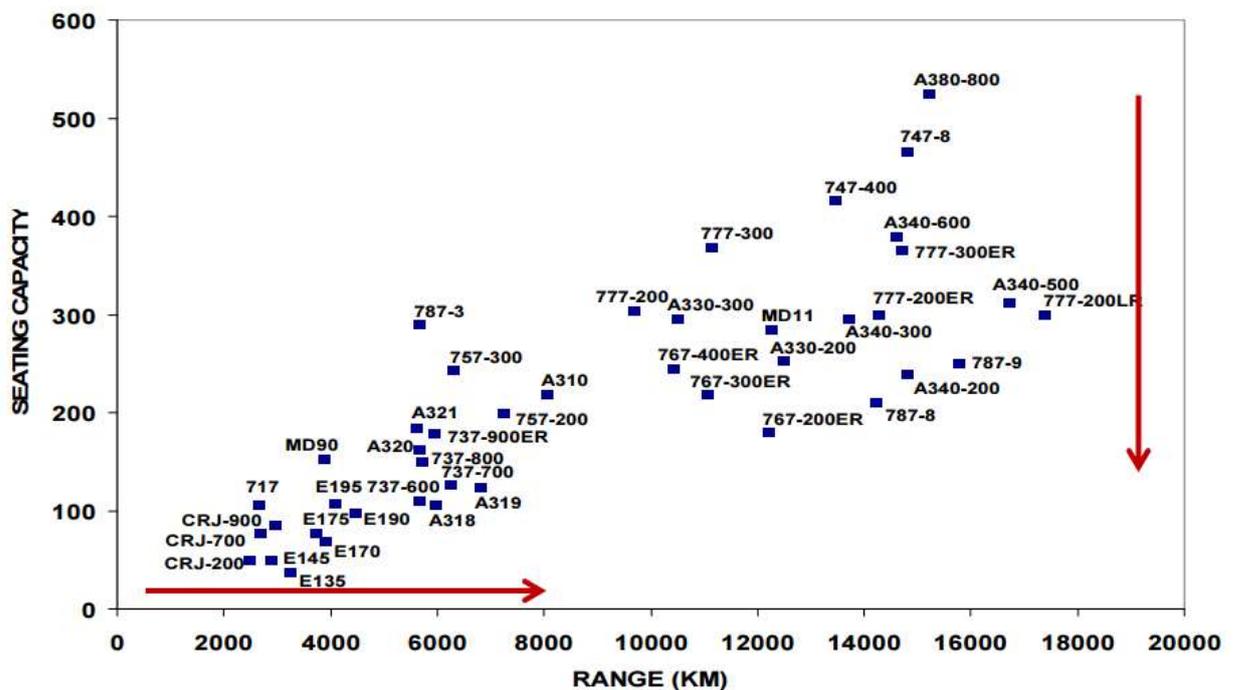


Fig.3.5. Commercial aircraft by size and range

### 3.3.3. Developments within the incorporation

#### *New Route Announcement*

The Incorporation will start operating scheduled flights, based on market conditions, to Banjul, the capital of Gambia, Marrakesh of Morocco, Palermo of Italy and Moroni, the capital of Comoros.

### *Cargo Aircraft Purchase*

In order to insure the need for cargo aircraft for the year 2020 and afterwards, the Incorporation has decided to purchase 1 A330-200F cargo aircraft from DVB Bank SE.

### *Wide Body Aircraft Purchase*

In order to insure the need for wide body aircraft, the Incorporation has decided to purchase 50 firm and 10 optional aircraft, a total of 60 wide body aircraft, of which 6 to be delivered in 2020, 14 in 2021, 10 in 2022, 12 in 2023, 11 in 2024 and 7 in the year 2025. According to this, total of 30 B787-9 aircraft, of which 25 firm and 5 optional, will be purchased from Boeing and a total of 30 A350-900 aircraft, of which 25 firm and 5 optional will be purchased from Airbus.

### *Traffic Development*

- Total number of passengers carried is targeted to reach 74 million including 33 million on domestic routes, 41 million on international routes.

- While passenger load factor is expected to be in the band of 79% and 80%, total Available Seat Kilometers (ASK) will approximately reach to 183 billion with an increase of between 5% and 6% compared to 2017. Capacity (ASK) increase is expected to be 10% in Turkey, 9% in Middle East, 6% in Europe, 6% in Far East, 4% in America and 3% in Africa regions.

- In 2018, cargo/mail carried is expected to increase by 21% reaching 1.3 million tonnes.

### *Financial Development*

- In 2018, jet fuel consumption is expected to increase by 9% compared to 2017.

- Average jet fuel (including fuel hedge) is expected to be 633\$/ton in 2018.

- The Incorporation is targeting to generate 11.8 billion USD of sales revenue.

- Cost per available seat kilometer (CASK), excluding fuel is expected to increase by between 3%-5%.

•Unconsolidated EBITDAR margin is targeted to be between 21% and 22%, whereas consolidated EBITDAR margin is targeted to be in the band of 23% and 24%.

### **3.4. Practical way to improve efficiency of Turkish Airlines**

The main goal of the airline, like any commercial enterprise, is to maximize profits and ensure the optimal functioning of the organization, while maintaining an effective management system.

To achieve the main goal of the company, focus on a specific development perspective is necessary. Schematically, the implementation of the airline's strategy can be represented in the form of a “goal tree” (see Fig. 3.6).

To choose the development path of the airline, you need to enter evaluation criteria.

While using expert methods to determine the criteria, their weights and assess the effects of alternative actions. It will be considered that individual alternatives at two levels of branching.

Weighted estimates will be calculated using the following formula:

$$Ek = Wk_{ij} \times e_{ij} \quad (1)$$

where  $Ek$  is the effect

$Wk_{ij}$  - weighted values of the criteria,

$e_{ij}$  - assessment of the effects of alternative actions

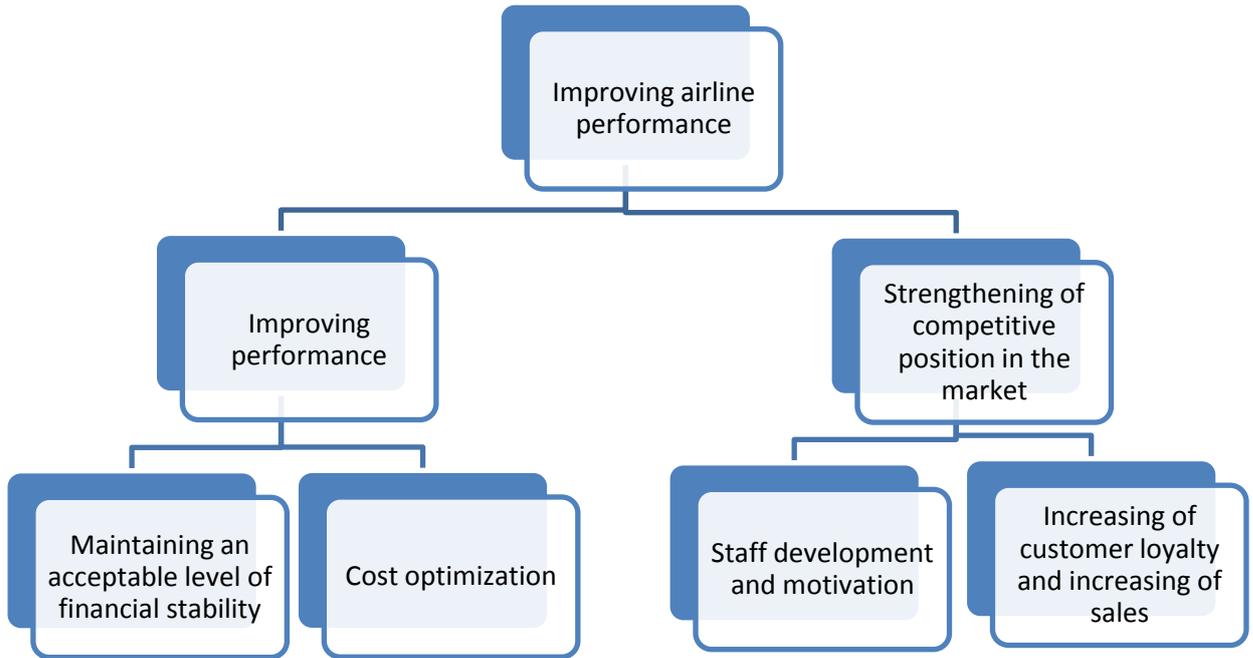


Fig.3.6. Turkish Airlines Goal Tree

Weighted values of the criteria and assessment of the effects of alternative actions is carried out on the basis of the expert method.

The first level of choice for solving the problem can be described as follows (see Table 3.4).

The second level “Increasing the effectiveness of activities” it has been considered based on two criteria (see Table 3.5).

The third level “Strengthening the competitive position in the market” can be considered according to the criteria (see Table 3.6).

Now, to evaluate the effectiveness of each of the four possible paths, the product of successive effects was calculated:

$$E(l) = ek_2 * ek_1, \quad (2)$$

where  $l = 1.4$ ;  $k = 1.6$

The following weighted estimates of the effectiveness of possible strategies for solving the problem was obtained:

$$E (1) = 0.5 * 0.5 = 0.25 \text{ units of efficiency (ue),}$$

$$E (2) = 0.5 * 0.5 = 0.25 \text{ ue,}$$

$$E (3) = 0.5 * 0.5 = 0.25 \text{ ue,}$$

$$E (4) = 0.5 * 0.5 = 0.25 \text{ ue.}$$

*Table 3.4.*

**Choosing a way to solve the problem of “Increasing the efficiency of the airline”**

Criteria	E	Subgoals	
		Improving performance	Strengthening competitive position at the market
Sales growth	0.5	0.6	0.4
Cost reduction	0.5	0.5	0.5
		Effect (value)	
		0.5	0.5

*Table 3.5.*

**Choice of a way to solve the problem “Increasing the efficiency of activities”**

Criteria	E	Actions	
		Maintaining an acceptable level of financial stability	Cost optimization
Profitability	0.5	0.4	0.6
Capital	0.5	0.7	0.3
		Effect (value)	
		0.5	0.5

**Choosing a way to solve the problem “Strengthening a competitive position in the market”**

Criteria	E	Actions	
		Staff development and motivation	Increased customer loyalty and, as a result, increased sales
Profitability	0.5	0.6	0.4
Income	0.5	0.4	0.6
		Effect (value)	
		0.5	0.5

Calculations showed that all selected airline goals have the same efficiency. That is, it is necessary to develop a program of measures to increase the efficiency of the airline, which can satisfy all of the stated goals:

- cost optimization due to energy efficiency programs, including by updating the aircraft fleet;
- lower prices in order to attract various consumer groups;
- gaining a greater market share through the creation of loyalty programs;
- increasing the company's capitalization and achieving an acceptable level of financial stability;
- improving staff motivation and qualifications.

One of the reserves for reducing costs is the use of energy efficiency programs, primarily programs to reduce the amount of fuel used. At the same time, one of the options is to constantly update the aircraft fleet.

Thus, it is necessary to market the oldest fleet of aircraft on the balance sheet of the airline and justify the acquisition of new ones. It is necessary to determine which aircraft and how much to sell.

For this, the characteristics of the airline's aircraft as of 01/01/2020 are presented (see Table 3.7.).

Table 3.7.

**Characteristics of airline planes as of 01/01/2020**

Aircraft type	Quantity	Age		Average age
		The newest	The oldest	
Airbus A310-300		Cargo		
Airbus A319-100	14	4.6	11	7.9
Airbus A320-200	29	6.7	12.1	8.9
Airbus A321-200	9	0.0	9.3	6.9
Airbus A330-200	20	4.8	13.3	8.53
Airbus A330-300	30	N/A	5.5	2.6
Airbus A340-300	4	15.9	20	17.8
Boeing 737-700	2	10.1	10.3	10.2
Boeing 737-800	74	N/A	17.6	9.6
Boeing 737-900	11	1	4.7	3.5
Boeing 777-300	33	1.9	8.3	4.9
<b>Total</b>	<b>228</b>			<b>7.0</b>

From the presented data it can be seen that among aircraft owned by the airline, Airbus 340-300–4 units at the age of 17 years old and Boing 737-800–8 units at the age of 15 years are of the greatest age.

Therefore, they must be replaced.

The market value of the aircraft sold is calculated.

The market value will be assessed based on a comparative approach, using the multiplier method. This assessment method is most preferred by the experts.

Examples of different multipliers are: Price / Age, Price / Maximum Take-Off Weight, Price / Hours, Price / Life.

In the current Turkish conditions, the most applicable are the multipliers Price/Age, Price / Flight hours. They are the key ones for the investor who decides on the sale of aircraft.

The parameters of the raid and take-off mass can lead to inadequate costs in Turkish practice, since often the non-intensive use of aircraft by a number of carriers does not directly affect the cost, all other things being equal.

To evaluate the market value of Boeing 737-800 aircraft, three analogues were sold on the market in 2018:

Analog 1 - an airplane of American Airlines,

Analog 2 - Aeroflot airline

Analog 3 - IAG Alliance aircraft.

The calculation of the multipliers Price / Age, Price / Plaque of hours according to the above counterparts is presented in Table 3.8.

The following is a calculation of the market value of the Boeing 737-800 aircraft for the airline (Table 3.9).

The calculations showed that the market value of Boeing 737 aircraft owned by the airline is \$ 45,31 million per unit.

To evaluate the market value of Airbus A340-300 aircraft, three analogues were sold on the market in 2018:

Analog 1 — Air France – KLM airplane,

Analog 2 - Lufthansa airline

Analog 3 is an Aeroflot airline.

The calculation of the multipliers Price / Age, Price / Flight hours according to the above counterparts is presented below (Table. 3.10.).

Table 3.11. presents the calculation of market value of Airbus A340 aircraft for the airline.

The calculations showed that the market value of Airbus A340 aircraft owned by the airline amounts to \$ 201,35 million per unit (Table 3.11.).

Based on the calculations, the total market value of all airplanes sold by the airline is \$ 1167,88 (Table 3.12.).

Table 3.8.

**The calculation of the multipliers**

Indicator	Analog 1	Analog 2	Analog 3	Average value
Estimated selling price, million dollars	49	34	43	-
Age, years	16	14	12	-
Flight hours, hours	54250	63750	45620	-
Price/Age	3.1	2.42	3.56	2.99
Price/Flight hours	0.00057	0.00045	0.00070	0.00058

Table 3.9.

**Calculation of the market value of Boeing 737 aircraft for Turkish airlines**

Indicator	Value
Multiplier Price/Age	2.99
Multiplier Price/Flight hours	0.00058
Age, years	15
Flight hours, hours	68620
The market value of the object of the valuation by the Price/Age multiplier, mln dollars	50.83
The market value of the object of the valuation by the Price/Flight hours multiplier, mln dollars	39.8
Weighted Market Value, mln dollars	45.31

Table 3.10.

**The calculation of the multipliers**

Indicator	Analog 1	Analog 2	Analog 3	Average value
Estimated selling price, million dollars	200	210	180	-
Age, years	18	16	21	-
Flight hours, hours	51620	43650	68470	-
Price/Age	11,1	13,12	8,57	10,93
Price/Flight hours	0,0038	0,0048	0,0026	0,0037

Table 3.11.

**Calculation of the market value of Airbus 340-300 aircraft for Turkish airlines**

Indicator	Value
Multiplier Price/Age	10,93
Multiplier Price/Flight hours	0,0037
Age, years	17
Flight hours, hours	58620
The market value of the object of the valuation by the Price/Age multiplier, mln dollars	185,81
The market value of the object of the valuation by the Price/Flight hours multiplier, mln dollars	216,89
Weighted Market Value, mln dollars	201,35

Table 3.12.

**Market value of all airline aircraft sold**

Aircraft	Quantity	Market value of a unit, million dollars	The total market value, mln. dollars
Boeing 737	8	45,31	362,48
Airbus 340-300	4	201,35	805,4
Total			1167,88

However, it should be noted that aircraft are a very specific and expensive asset. Accordingly, selling one aircraft on the market and twelve at the same time are completely different things. Thus, the cost of each individual aircraft put up for sale will be reduced. It is defined that a discount on the market value of aircraft in the amount of 20%. Table 3.13. presents the calculation of the market cost of aircraft sold.

Table 3.13.

**The calculation of the market value of the sold aircraft of the airline, taking into account the discount**

Indicator	Value
The total market value of the aircraft sold, million dollars	1167,88
Market value discount	20,00%
The total market value of the aircraft sold, taking into account the discount, million dollars	934,304

Thus, the calculations showed that the total market value of the airline's sold aircraft, taking into account the discount, is 934,304 million dollars.

Further, to compensate for the missing aircraft in order to maintain the appropriate seating capacity of the airline fleet, it is necessary to purchase the same number of aircraft.

It should be noted that a significant part of the aircraft is purchased on a financial lease basis.

A very small part of the aircraft fleet was purchased by the airline on an operating lease basis, although this type of lease has clear advantages. The comparative characteristics of financial and operating leasing is presented (see Table 3.14.).

The essence of operating leasing is that aircraft are transferred to the lessee for a period substantially shorter than the depreciation period of the aircraft. Operating leasing generally ranges from 3 to 7 years and has advantages for the lessee associated with a limited tenure.

*Table 3.14.*

**Comparative characteristics of financial and operational leasing**

Financial leasing	Operating leasing
long term (up to 15 years of operation);	the term of the contract (3–7 years) is significantly less than the useful life of the aircraft (20–30 years);
at the end of the contract, the aircraft becomes the property of the lessee;	at the end of the contract, the aircraft is returned to the lessor / the contract is renewed;
upon conclusion of the contract, the aircraft is immediately put on the balance of the recipient and amortized, the lessee bears financial expenses;	leasing expenses are charged to the prime cost;
liabilities are recorded at a discounted value;	obligations under the contract are off-balance sheet and are presented in the notes to the statements at an undiscounted cost.
increases the debt load of the airline.	

Due to the fact that the life time of aircraft can be in some cases 20-30 years, this fact allows the operator to respond to changes in market conditions.

In practice, in Turkey, operating leasing transactions are currently carried out according to the following scheme. The aircraft is transferred to the lessee under a lease agreement (using tax benefits). After returning the aircraft to the lessor, it is transferred to another lessee, but on a regular lease.

According to lessors, the most attractive for airlines in operating leasing is the ability to regularly update their fleet without worrying on the sale of obsolete aircraft in the secondary market.

In addition, the aircraft under operating leases are off balance, which does not affect the capital structure of the airline. In this case, leasing payments from the lessee are operating expenses. The main advantages of operating leasing for the airline are presented in Table 3.15.

Thus, the main advantages of the use of operating leasing in the airline's activities are the absence of an initial payment under a leasing agreement, and the absence of costs for servicing and maintaining aircraft.

Based on the foregoing, it can be concluded that operating leasing is a fundamentally different business model compared to financial leasing transactions. If the role of the lessor in financial leasing transactions is to provide financing, assess the risks and potential of the borrower, as well as organize the supply of aircraft, then during operational leasing the lessor accompanies the leased asset throughout the entire life cycle of the latter.

The lessor provides inspections, repairs and maintenance of the aircraft of which it is the owner. The lessee also gets rid of the need to organize the sale of aircraft, if there is no need for its further use.

Another reason for using operating leasing for the airline may be that this mechanism, unlike financial leasing, is not considered by banks as debt obligations of the borrower.

Consequently, operating leasing allows you to attract additional financing, necessary, for example, airlines for the development of other activities.

**The main advantages of operating leasing for Turkish Airlines**

Benefits	Comments
No advance payment under a lease agreement	The airline, as a lessee, does not divert funds for a one-time down payment for the leased asset
Short rental period	The airline can lease aircraft for 3-5 years, depending on production needs
Access to new aircraft	The airline may periodically update its fleet vessels by renegotiating an operating lease agreement with a new one with the receipt of new aircraft
Lack of maintenance costs	The lessor takes the burden of maintaining and maintaining aircraft
Leasing payments are fully attributed to the cost	Allows saving on income tax

Thus, the renewal of the aircraft fleet must be made through the use of operating leasing mechanisms.

To compensate for the missing aircraft in order to maintain the appropriate seating capacity of the airline fleet, the following aircraft must be purchased:

1. Boeing 777-200ER-3 units.
2. Boeing 737-800-8 units.

The renewal of the aircraft fleet will lead to a decrease in the amount of fuel used, which will have a significant impact on the cost of air transportation, as fuel costs occupy a significant part of it.

Thus, the airline will be able to reduce the cost of air tickets in order to attract various groups of consumers, primarily in domestic destinations.

The predictive assessment of the expected result of the proposed activities was carried out.

For the beginning a comparative analysis of aircraft acquisition mechanisms will be conducted: for credit and financial account leasing.

The total cost of aircraft will be \$ 1,539 million:

1. Boeing 777-200ER – 3 units at a price of 265 million dollars.
2. Boeing 737-800-8 units at a price of 93 million dollars.

Below are the initial data for calculating the costs of an airline when purchasing aircraft on credit and under a financial leasing scheme (see Table 3.16.).

*Table 3.16.*

**Initial data for calculating the cost of buying aircraft on credit and according to the scheme of financial leasing**

Indicator	Credit	Financial leasing
The total cost of aircraft, dollars	1 539 000 000	1 539 000 000
Depreciation rate	10%	10%
Duration of contract	3 years	3 years
Contract rate	16%	12%
Frequency of payments	1 time per month	1 time per month
Down payment	20%	20%
Accelerated Depreciation Ratio	1	1,5
Leasing premium	-	5%
The cost of additional services of a leasing company	-	10%
VAT rate	18%	18%

The calculation of lease payments under a financial leasing agreement is carried out according to the following formula:

$$LP = DL + RC + LP_r + AS + VAT \quad (3)$$

where LP is the amount of lease payments;

DL - depreciation of the lessor;

RC - the cost of credit resources used;  
 AS - the cost of additional lessor services;  
 LPr - leasing premium;  
 VAT - VAT paid by the lessee.

The calculation of depreciation when applying the linear method, the amount of depreciation is determined by the formula:

$$DL = \frac{k \times m \times (IC \times N_d)}{100} \quad (4)$$

where IC is the initial cost of the leased asset, rub .;  
 $N_d$  – Normal depreciation rate, % per year.

Calculation of fees for used credit resources is carried out according to the following formula:

$$RC = \sum_{t=1}^n CR_t \times \frac{L_t}{365} \times \frac{AR}{100\%} \quad (5)$$

where  $CR_t$  - credit resources used for the buying of aircraft;  
 AR - annual rate for the use of credit, %;  
 L - is the duration of the period (days);  
 n - is the number of periods; t - is the period number.

The formula for calculating the leasing premium, expressed as a percentage of the value of the leasing agreement, has the following form:

$$LPr = CV \times p_i \quad (6)$$

where LPr is the leasing premium;  
 CV - contractual value (initial cost of aircraft);  
 $p_i$  - lessor's interest rate (percentage per annum).

The calculation of the amount of VAT is carried out according to the following formula:

$$VAT = \frac{P \times R_{VAT}}{100} \quad (7)$$

where P is the profit from a transaction under a leasing agreement;

$R_{VAT}$  - VAT rate, %

Let us calculate the size of the lease payments for the airline when they are paid in equal installments within each year with the frequency specified in the financial leasing agreement (see Table 3.17.).

The total cost of leasing payments will amount to 2 280 430 898 dollars.

*Table 3.17.*

#### **Calculation of lease payments under a financial leasing agreement**

No	Indicator	Value, dollars
1	Depreciation charge	692 550 000
2	Fee for using credit resources	429 381 000
	1 <sup>st</sup> year	170 829 000
	2 <sup>nd</sup> year	143 127 000
	3 <sup>rd</sup> year	115 425 000
3	Aircraft transport tax	103 022 918,4
4	The size of the leasing premium	61 560 000
5	The size of the fee for additional services	123 120 000
6	Value added tax	332 146 980
7	Total cost of lease payments	2 280 430 898

Table 3.18 presents a comparative calculation of the costs of credit and financial leasing.

According to the below calculations, it is clear that the difference in real expenses of the enterprise under the financial leasing scheme provides savings of

the airline in the amount of 165 709 649,1 dollars (9.68% compared with the loan), which is 10.8% of the cost of purchased aircraft.

Thus, the scheme for the acquisition of aircraft for carrying out activities of the airline on the basis of financial leasing is quite more effective in comparison with bank lending.

*Table 3.18.*

**Comparative calculation of costs for credit and financial leasing**

№	Parameters	Credit, dollars	Financial leasing, dollars
1	The cost of aircraft with VAT	1 539 000 000	1 539 000 000
2	Down payment (own funds)	307 800 000	307 800 000
3	Loan amount	1 231 200 000	1 231 200 000
4	Accrued interest (annuity payment)	590 976 000	1 049 230 898
5	Amount of payments	1 822 176 000	2 280 430 898
6	VAT set off when purchasing aircraft	234 762 714	347 862 339,6
7	Property tax (2.2%)	33 858 000	0
8	Accrued depreciation for the study period	461 700 000	692 550 000
9	Amount of reduction of the tax base for income tax	1 086 534 000	1 932 568 559
10	Savings on income tax	217 306 800	386 513 721,9
11	The amount that reduces the company's tax expenses	452 069 514	734 376 061,5
12	Total: expenses of the airline	1 711 764 486	1 546 054 837
13	Savings under the leasing scheme, dollars	165 709 649,1	
	Savings on leasing scheme in%	9,68%	

However, as was said earlier, the use of operating leasing schemes is more advantageous (see Table 3.19.).

Having analyzed the data from Table 3.19, it can be concluded that during operating leasing, the airline has savings in the operation of aircraft in the amount of 982 620 720 dollars, including due to a 20% advance —307 800 000 dollars, provided for financial leasing, as well as work for maintenance and repair - 307 800 000 dollars that is, 15.78% less, which can be significant in financial planning in the airline and effectively distribute the financial resources remaining at the airline's disposal. According to the calculations, it is clear that the acquisition of aircraft under the operating leasing scheme will lead to savings in financial resources of the airline.

*Table 3.19.*

**Comparative calculation of costs for financial and operating leasing**

Indicator	Financial leasing, dollars	Operating leasing, dollars
Cost of vehicles	1 539 000 000	1 539 000 000
Advance payment	307 800 000	0
Loan amount under the lease agreement	1 231 200 000	1 539 000 000
Depreciation charge	615 600 000	0
Lease rate	12%	16%
Fee for used credit resources	1 120 545 900	1 231 200 000
Leasing premium	5%	5%
The cost of additional services of a leasing company	10%	10%
Leasing premium	61 560 000	76 950 000
Payment of additional services	123 120 000	153 900 000
Value Added Tax	456 556 669,6	540 189 000
Total lease payments	2 377 382 570	2 002 239 000

Continue of Table 3.19.

Offset VAT	456 556 669,6	540 189 000
Amount of reduction of the tax base for income tax	1 920 825 900	1 462 050 000
Income tax savings	39 063 778,52	292 410 000
Amount reducing enterprise tax expenses	84 543 778,71	832 599 000
Vehicle maintenance	31 211 376,75	0
Costs of the enterprise under the leasing scheme total	2 152 260 720	1 169 640 000
The economy of the company when using operating leasing	-	982 620 720
Savings in %	-	63,85%

In addition, the renewal of the aircraft fleet will increase energy efficiency by reducing fuel costs, which occupy a significant part of the cost of sales (18.4%).

It should be noted that a new aircraft consumes, as a rule, 25-3 0% less fuel than older aircraft. Consequently, updating the aircraft fleet by 12 units will lead to a cumulative reduction in fuel costs by 5%.

Reducing fuel costs will reduce airfare for some destinations, which will lead to an increase in passenger traffic by an average of 10%.

Thus, sales revenue for Turkish airlines will grow by 10% or by 833 231 804,3 dollars. Savings in the operation of aircraft under the operational leasing scheme for the first year will be:  $(982\ 620\ 720 + 165\ 709\ 649,1) / 5 = 229\ 666\ 074$  dollars. The reduction in fuel costs will be: 7 665 dollars.

That is, total income will increase by 1 070 563 621 dollars. The total costs of the program of activities will amount to 400 447 800 dollars. (expenses on operating leasing for 1 year).

The economic effect will be: 670 115 821 dollars. Economic efficiency will be: 62.59%. Therefore, It can be concluded that the proposed measures are appropriate.

# ***SUMMARY***

<i>Air Transportation Management Department</i>				<i>NAU.20.04.02 004EN</i>				
<i>Done by:</i>	<i>Karyna I. Dierbunova</i>			<i>SUMMARY</i>	<i>Letter</i>	<i>Sheet</i>	<i>Sheets</i>	
<i>Supervisor:</i>	<i>Valentyna S.Konovaliuk</i>					<i>D</i>	<i>107</i>	<i>4</i>
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During the completion of the master thesis it was established that efficiency usage of resources influences greatly on the revenue management of the airline and its success on air transportation market overall. Demand for air transportation is determined by gross national product as an external factor, expressed in the form of traffic potential and is reflected in the form of internal and controlled parameters: tariffs, flight frequencies.

Actual passenger turnover and operating revenue depend on these factors. The carrying capacity depends on both internal factors and the prevailing market conditions. These are the capital, composition and structure of the fleet, an airline network formed by an air carrier, pricing and service standards in the market and accepted by the airlines. These factors were investigated in analytical part of bachelor thesis.

Management of the airline's resources has been synthesized: from the most abstract — developing a common strategy, to the main components — personnel, fleet, sales network, airline network, and management.

The conducted analysis of production and financial parameters and graphics introduced of the chosen airline show how the efficiency of resource potential usage influences on airline's activity. Also number of external factors influencing activity of Turkish Airlines such as geopolitical environment in country and in the world, fuel prices etc. were analyzed. Maintaining the accounts of a company is important for calculating the annual turnover of a company or the yearly profit and loss details of a company. It helps in deciding whether a company is running in loss or making profits from its business activities. Therefore, maintaining the details in a perfect way is important to decide the future of the company.

Comparative analysis of efficiency of resource potential usage of Turkish Airlines and Lufthansa Group explains which of the airlines uses its resources more efficiently. After analysis it can be concluded that Lufthansa Group uses its resource potential more efficiently. The chart shows that the qualification and efficiency of the airline's human resources are not significantly differentiate. But when compare coefficients reflected the airline's tariffs, the level of demand and

the position of the carrier in the airline market it can be seen that Turkish Airlines are less efficiently in 2 times than competitor. The coefficient reflects the level of efficiency in the use of aircraft also shows that Lufthansa uses this resource twice more efficiently. So, it can be concluded that Turkish Airlines need to improve efficiency of resource potential usage.

The development and practical application of modern technologies in the field of air transportation are closely interrelated with the solution of important economic problems, one of which is the task of reducing costs and increasing the efficiency of the airline. A single recipe for reducing costs does not exist. But there are a number of ways that airlines can use to increase efficiency and reduce costs. There are three ways to reduce the costs of the airline. One of the significant items of expenditure in the structure of the cost of transport in air transport is fuel cost. The change in the cost of aviation fuel primarily depends on world oil prices, which is very difficult to predict.

A method of saving costs associated with a change in the price of fuel is hedging risks. Another known method of saving is focused on the use of the same type of aircraft in airlines, which allows you to reduce part of the cost of purchasing spare parts and the training and retraining of flight crews. In the conditions of instability of the air transport market, the tasks of reducing costs due to the effective use of aircraft are becoming topical. According to these facts the decision is to improve efficiency of aircraft usage.

Proposed way to improve efficiency of Turkish Airlines aircraft fleet usage is to replace old aircraft. It can be done by replacing of 2 types of Turkish Airlines aircraft which will be done during 2020-2023 years.

Thus, sales revenue for Turkish airlines will grow by 10% or by 833 231 804,3 dollars. Savings in the operation of aircraft under the operational leasing scheme for the first year will be 229 666 074 dollars. The reduction in fuel costs will be: 7 665 dollars.

That is, total income will increase by 1 070 563 621 dollars. The total costs of the program of activities will be in the amount of 400 447 800 dollars. (expenses on operating leasing for 1 year).

The economic effect will be: 670 115 821 dollars. Economic efficiency will be: 62.59%. Therefore, it can be concluded that the proposed measures are appropriate.

The shown strategic directions of quality can serve as the basis for the development of specific programs. It is likely that with such comparative surveys of companies with the highest level of management, it is possible to assign a threshold value to the stability profile. It may be slightly worse than the indicators for the most stable airline. The results can serve as the basis for major management decisions. In addition, knowledge itself is essentially the most powerful resource and enables both airline managers and an individual pilot to adequately respond to stress factors and use preventive and recreational programs.

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