

Crew Planning Management in Aviation Industry: A Turkish Airline Case

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Extensive Summary

Introduction

In the course of globalization, the volume of trade has rapidly increased all over the world and the world has become a small village. It is an undeniable fact that aviation industry is one of the greatest actors in the realization of this fact. Aviation has advanced as the commercial borders removed; in turn, advances in aviation has further removed the borders, and rapid transportation and travel from one end of the world to another have become possible. The rapid development in the aviation industry has also reflected in Turkey and has contributed significantly to the national economy, despite a delay. Turkey is one of the countries with the fastest growth in terms of passenger and cargo air traffic in the world and in Europe, particularly. Turkish airline operators continuously increase especially their international destinations every passing day, and operate successfully in international markets, which are under intense competition. Sustainable success in this ever-developing industry is of great importance, considering the geographical characteristics of Turkey.

Today, the largest support to both the service and manufacturing industries is provided by the aviation sector. Considering both civil aviation and cargo transportation, it enables transportation of goods and people from one place to another quickly and safely. Flight operations within the service and operation processes of aviation operators are characterized by the combination of complex and challenging activities, which have the greatest impact on the profitability of the business. These activities are divided into two groups as flight planning and crew planning. Among them, crew planning include preparation of task lists, assignment of flight crews to the prepared task lists, and the scheduling of these activities. In line with this, crew planning management aims to increase productivity with optimization techniques on one hand, while taking human factor into consideration on the other.

Considering all this, it becomes clear how important the crew planning in the developing and changing aviation industry is in terms of both human resources and production function. In this study, crew planning function in aviation was investigated in both contexts to emphasize the importance of human constraints as well as the mathematical constraints that are taken into account when crew planning is carried out. In line with this, crew planning activities of an airline operating in Turkey was examined to put forth the factors to be considered during crew planning activities. In the first part of the study, the aviation industry in Turkey and in the world was examined, and the framework for the crew planning activities was set accordingly. The second part, however, discusses the focus group study carried out at the above-mentioned airline company operating in Turkey.

1. Conceptual Framework

The aviation industry is one of the industries where international relations are most intense because of the abundance and diversity of the activities, and the global factors are quite important due to the mentioned structure of this industry. This significance has resulted in the formation of national and international authorities on civil aviation. Civil aviation authorities are basically institutions that set the standards of all civil aviation activities and ensure and supervise their implementation to provide flight and ground safety (Oktal and Gerece, 2002, Saldıraner, 1992). The Civil Aviation General Directorate, Turkey, which is a subsidiary of the Ministry of Transport and responsible for coordinating the activities of civil aviation, is the authority responsible for the regulation and supervision of such activities.

Since the aviation industry is a safety-oriented sector with national and international dimensions, the international rules are in the forefront in the industry and it is necessary to recruit and direct the workforce in accordance with these rules. Turkey has made great strides in the aviation industry since the early 2000s in particular. The planning of human resources is a very sensitive issue for the industries where safety is the top priority like the aviation industry. Due to the structure of the industry, the people to be employed in this industry should have certain qualifications (Demir, 2016, Gerece, 2010).

The airline companies in Turkey should take into account the "Flight Crew Duty and Rest Periods Code of Conduct Guide", which has been prepared by the Directorate General of Civil Aviation, when performing crew planning activities. This guide was designed to determine the mandatory rules, procedures and limitations regarding the duty and rest times to be met by aviation operators in order to ensure flight safety and to regulate the activities in this regard. The rules set by the General Directorate of Civil Aviation are extremely important for crew planning activities and play a major role in the smooth execution of crew planning activities. Apart from these rules, airlines have their own rules for flight crew activities. In addition, Turkish Civil Aviation Union (Hava-İs), which is active since the beginning of civil aviation in Turkey, continue its union activities since 1962. Hava-İs has an attentive attitude to provide job security and protect the rights of flight crew and ground personnel working in airline companies, which offer particularly intense services.

1.3. Crew Planning Activities

In aviation industry, many processes must be planned prior to transportation function. Line plans are made according to demand forecasts, new routes are

determined, flight departure times and airports are decided by taking into account the hubs. In addition, as an assignment problem, planes are assigned to lines and tariffs are planned taking into account the most effective airtime duration of the planes. The plans made up to this point are made by using different computer based algorithms on the machines (planes) and human factor is not considered yet. Crew planning makes team assignments according to type to planes assigned to lines by considering the human factor. To do this, the individual flight legs are paired with each other to form duties. Afterwards, the teams are assigned to these duties. Each type of aircraft can fly with differently trained teams and can have different cabin service, in addition, different number of flight personnel are used for different types of aircraft. In addition, matching the people who can fly together is one of the problems. Since human factor is involved, this is the point where the most divergence is seen in the plans. In line with this, crew planning becomes a complex optimization problem that is constrained by international rules and the company's own rules and regulations, as well as constantly changing human needs and problems. There are many studies about scheduling and assignment dimension of crew planning in the literature. These studies generally develop solution proposals using various optimization models such as intuitive and meta-intuitive models, 0-1 integer programming, and cluster partitioning problems (Arabeyre et al., 1969, Hoffman and Padberg, 1993, Salazar-González, 2014, AhmadBeygi et al., 2009, Aydemir et al., 2013, Abdelghany et al., 2017, Zhang et al., 2015).

2. Research on crew Planning Activities in Airline Operators

2.1. Objective, Method and Results

In this study, considering the developments in Turkey's civil aviation industry, it is aimed to identify the factors affecting the flight crew planning, which is an important cost factor in the aviation industry. For this purpose, a qualitative research was conducted in one of the leading enterprises in the aviation industry in Turkey. The open-ended questions asked to the participants were used to explain the subject and to create a discussion environment; and, in the focus group study, it was attempted to reveal the factors taken into account by an airline operator when performing crew planning activities.

Many findings were obtained from the focus group interviews on crew planning activities. The first of these findings, as previously discussed, is the fact that Turkey's aviation industry is one of the fast developing industries. The other is that the implementation of crew pairing and crew rostering activities made for crew planning is consistent with those described in the literature.

During the research, participants were asked about their opinions and experiences as well as the activities they were carrying out on the job, and the information obtained showed that 5 factors were important for the crew planning activities of an airline operator. These factors include:

- *Compliance to rules and the level of wellness:* Airline flight crews need to comply with international rules as well as the airline's own rules when planning the flight crews. It is also important to take into account the levels of fatigue of flight crews, even if they comply to the rules. The flight crew must be well rested and be energetic on duty.
- *Not exploiting the human resources:* Human resources in crew planning

activities are handled in two different ways as flight crews and employees who perform crew planning activities. It is foreseen that the reasons such as excessive change in duties of flight crew, poorly organized order, uncertainty in flight schedule may lead to low job satisfaction and motivation. However, these changes in the flight crew's duties will cause the employees who perform the crew planning activity to work overtime, which is the use of human resources unnecessarily. In order not to encounter such problems, it is important not to change the schedules resulting from the pairing and rostering activities for a long time and to implement them in this regard.

- *Ensuring Employee Satisfaction:* It is believed that complying with the rules and wellness levels as well as use of the human resources thoughtfully will increase employee satisfaction. In addition to this, one should avoid dissatisfying activities such as unbalanced assignments to designated duties, not allowing flight crew to select a matched duty, assigning the same person repeatedly to the same flight destination, and assigning overnight duties to a certain part of the crew constantly. For this reason, maximization of satisfaction of the employees in all respects indicate that the crew planning activities are managed properly.
- *Reducing unit team costs:* It is also important to pay attention to costs when carrying out assignments in the crew planning activities. When performing this activity, it is aimed to decrease the cost of crew per seat per kilometers (CRAST) over time or to keep it constant. However, joining the crew members' duties to make them longer or shorter and keeping crew preparation time too high is the among the reasons that increase costs. An assignment activity carried out by taking into consideration such constraints will ensure that the airline operator does not exceed the budget for crew planning.
- *Keeping up a high service quality:* The success of the service level depends on the departure of the designated crew members and the aircraft at the specified time. In measuring the level of the service, it is important to identify whether the crew members are in charge at the time of their duties, whether the crew members are on duty completely, whether the flights are executed in time and whether the operational service is provided thoroughly. In order to maintain the same level of service quality, it is necessary to minimize the problems that may arise in the case of sudden changes such as changing of the aircraft type and technical failures.

The fulfillment of all these factors affects the success of crew planning activities in airline operators. As is known, the primary goal of crew planning is to match one-legged flights to each other. In addition, in the rostering of crew to matching flights, the human resource must be managed by taking into consideration the five factors mentioned above. In line with these factors, it is believed that the crew planning activity will be carried out in an efficient and efficient manner.

Conclusion and Evaluation

In this study, it was aimed to reveal the factors that should be considered in crew planning activities in the aviation industry, and the way of carrying out such activities was examined based on the results of the research conducted at a sample airline

operator. These research findings are believed to give an idea about the current state of the industry. Through the evaluation of the findings obtained, it was tried to determine the factors affecting the process in terms of the crew planning activities. In this direction, it was observed that the crew planning activities in the aviation industry are carried out on the basis of two main processes (crew pairing and rostering activities), in accordance with the rules set by both the civil aviation authority and the airline operator. However, although the rules are largely decisive, it is clear that such practices may vary in different operators, as long as each airline operator has its own rules. In this respect, it is believed that the study has a guiding role for similar studies to be conducted in the future. The qualitative research methodology used in the study, conducted with participants who are working in an operator and who are actually performing those activities, is one of the strengths of this study. Another strength of the study is that in the literature there was no other study conducted with qualitative research method in this context. In this regard, the study is of importance since it reveals the factors important in crew planning activities. In addition, the focus group interview, which is one of the qualitative methods in the study, is of importance in terms of gathering rich information. No doubt, however, the lack of information on how all activities are planned and how optimization problems are solved, and the fact that they are not supported by quantitative methods, is the limitation of the study.