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Association Analysis Between Airline Destinations

Ali Rıza İNCE [*)]

Abstract: *This study aims to contribute to the strategic decisions of airline companies in determining of their destinations. Using the data of 617 airlines, it was tried to investigate whether there are rules of association between the companies' destinations. Through the analysis made with two different data sets, the rules of association were sought considering both all the destinations and the foreign destinations of the companies. In the analysis of all destinations, 197 rules could be produced with 90% and above confidence level. In the analysis between the companies' foreign destinations, 200 rules with 100% confidence level could be produced. It is presented as a suggestion that airlines can benefit from these rules in their destination planning.*

Key Words: *Strategic management, destination planning, data mining, association rules*
Jel Codes: *M10, L10, L93*

Havayolu Varış Noktaları Arasında Birliktelik Analizi

Öz: *Bu çalışma ile havayolu şirketlerinin varış noktalarını belirleme konusundaki stratejik kararlarına katkı sağlamak amaçlanmıştır. 617 havayolu şirketine ait veriler kullanılarak, şirketlerin varış noktaları arasında birliktelik kurallarının olup olmadığı araştırılmaya çalışılmıştır. İki farklı veri seti ile yapılan analizlerle hem tüm varış noktaları, hem de şirketlerin yurt dışı varış noktaları dikkate alınarak birliktelik kuralları aranmıştır. Tüm varış noktaları ilgili analizde %90 ve üzeri güven seviyesinde 197 kural üretilebilmiştir. Şirketlerin yurt dışı varış noktaları arasındaki analizde ise %100 güven seviyende 200 kural üretilebilmiştir. Havayolu şirketlerinin varış noktaları planlamalarında, bu kurallardan yararlanabilecekleri, bir öneri olarak sunulmuştur.*

Anahtar Kelimeler*: Stratejik yönetim, destinasyon planlama****, v****eri madenciliği, birliktelik kuralları*
Jel Kodları: *M10, L10, L93*

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I. Introduction

One of the important strategic decisions made by airlines is to determine which destinations they will fly to. These decisions significantly affect the success,

[*)] Doç. Dr., Cumhuriyet Üniversitesi İktisadi ve İdari Bilimler Fakültesi Yönetim Bilişim Sistemleri Bölümü (e-posta: arince@cumhuriyet.edu.tr) ORCID ID.https://orcid.org/0000-0003-4653-3091

Bu makale araştırma ve yayın etiğine uygun hazırlanmıştır iThenticate intihal incelemesinden geçirilmiştir.

competitiveness and sustainability of airlines as well as their profits. Decision makers on destination selection receive support from areas such as operations research, spatial planning and economics. Operations researchers use techniques that can be used to minimize the total cost of one or several destinations and maximize total revenues, while economists use regression models to measure the impact of choices. Beyond such analytical studies conducted over a limited number of destinations, the introduction of a synthesist approach that takes into account all destinations of all airlines may play a facilitating role in companies' decision making processes. With this study, it has been tried to assist the airlines' decision making processes on evaluating existing destinations and determining new destinations. Data mining techniques were used to achieve this goal.

With the association rules which is a data mining technique, it is possible to examine the destinations of the airlines currently operating in the market, and as a result, also possible to determine whether there is a rule and pattern among its behaviour of competitors. Association rules mining is a data mining issue that can be defined as revealing interesting rules from big data collections (Margahny and Shakour, 2006).

Data mining is utilized to provide preliminary information required for decision support systems for the area studied by discovering the information in the databases (Fayyad et al., 1996: 38). With data mining, it is possible to reveal the trends and behavior patterns required for decision support systems for businesses to make more effective decisions (Inan, 2003). Data mining where it is possible to discover information based on data analysis from different perspectives, can find application in a wide range of fields including subject titles; advertising, bioinformatics, database marketing, fraud detection, e-commerce, health, security, web, financial forecasting etc.. (Jain et al., 2011: 2793).

In this study, it was tried to investigate whether there are association rules between destinations using data from 617 airlines. The study consists of five parts. In the first part, the techniques and literature summary used in determining the airline destination, in the second part, data mining, Association Rules and Apriori algorithm were discussed, and in the third part, information is given on dataset and method. In the fourth part, the application was conducted with the data of 617 airlines, and in the last part, the result is given.

II. Literature Summary

Choosing a destination for airlines is both a strategic and a tactical decision. It strategically affects very important decisions, from the services that the airline company will offer to its customers, to the factors that significantly affect the company's cost structure, such as the selection of aircraft to be used. The choice of destination involves the evaluation of unexpected route opportunities offered by the market environment, such as bankruptcy, withdrawals or agreements with others, as a tactic. For this reason, destination selection of the airlines is the most important decision they make along with fleet planning and program development (Beloba et al., 2009: 168-169).

Airline companies use two different methods, such as network optimization or network analysis model, when they decide on destinations. These models allow optimization and evaluation on one or more variables (Sha et al., 2015).

The network analysis approach includes models used to estimate network evolution, such as Song et al (2014)'s guess model and Kotegawa (2012)'s machine learning algorithms. Many different approaches are used in the network optimization approach.

The most common optimization approach used in airline route selection is to consider decisions that maximize profit or traffic flow as integer programming problems (SHA et al., 2015). Jaillet et al (1996), Lederer and Nambimadom (1998), Sha et al (2015) have adopted this kind of approach for profit maximization, designing capacitated networks and routing problems.

Unlike traditional operations research optimisation problems which deal with a single objective function to be optimised over a set of feasible solutions, Multiple-Criteria Decision-Making (MCDM) refers to making decisions in the presence of multiple, usually conflicting and non-commensurable criteria (Zanakis et al., 1998; Belton and Stewart, 2002).

MCDM includes specific techniques such as AHP, ANP and TOPSIS are mostly used for the problems in the aviation industry (Dožić, S. 2019). Numerous authors (Hsu and Wen, 2002; Chang and Lee, 2010; Lu and Liu 2014; Lee et al., 2016; Chang et al., 2017; Deveci et al., 2017; Yılmaz et al.,2018) have also used the Multi-Criteria Decision-Making method in airline destination selection.

In these approaches, researchers have used many criteria. Airports, and especially airport infrastructure which has high quality infrastructure (eg. more than 3000 meters of runway, comfortable departure and arrival services, etc.) are an important criterion on determining the destinations of airlines (Bieger & Wittmer, 2006).

Martin and Roman (2004) reported that the factors affecting the network structure of an airline are the number of hubs, potential traffic in hub cities, the location of the hub to minimize flight costs, good airport facilities and the strategy of competitors.

In addition, there are many criteria that LCCs use in destination selection. These are good passenger facilities, low airport charges, simple terminals, quick turnarounds, accessability and rapid check-in facilities (Barrett, 2004); high demand for LCC traffic, a positive economic forecast (Scheers, 2001); accessibility (Humphreys and Francis, 2002); convenient slot times, spare airport capacity (Calder, 2003); number of hubs, potential traffic at the hub cities, location of the hub in order to minimize flying costs, good airport facilities, good weather facilities and strategy of competitors (Martın and Roman, 2004), competition between both airports and airlines (Gillen and Lall, 2004); lower turnaround times and increased punctuality (Lawton, 2002); aeronautical charges (Francis et al., 2003); unit costs, unit revenue or yields, and achieving the load factors (Doganis, 2006); customers, competition, suppliers, and market potential (Lu and Liu, 2014); city population, GDP and trade relations, potential passengers, number of

transit and business passengers, airport unit passenger revenue, competitiveness index, number of competitors flights, distance and cost, touristic and business customer flow, seasonality (Deveci et al., 2017).

Many studies have been carried out on destination selection using the specified approaches and criteria. In these studies;

O'Kelly (1987) proposed a formulation to create several hubs based on passenger interactions between cities from 10 to 25.

Teodorovic et al. (1994) developed a model based on fuzzy set theory where they used fuzzy logic to determine flight options for flight in the first part and used fuzzy linear programming to determine flight frequencies on route options in the second part. In this model, whose purpose is to design an airline network and determine flight frequencies, the estimated number of passengers between city pairs is used as the basic input data.

In their study they conducted in 1998, O'Kelly and Bryan have demonstrated that current hub location models can choose the most appropriate hub locations and allocations, based on the assumption that combining passenger flows on interhub links will result in reduced travel costs. The model they recommended which is more reliable representation of the reality of hub and spoke networks, more explicitly models the scale economies generated on the interhub links.

Lederer and Nambimadom (1998) analyze network and schedule choice affect airline cost wich are important to maximize airline profit using an "idealized" model that permits derivation of analytic. They concluded that in some cases like small distance between cities, high demand rates and small number of cities, direct service is optimal in other cases hub and spoke is optimal.

Janic and Reggiani (2002) used three Multiple-Criteria Decision-Making (MCDM) methods, including TOPSIS (Technique for Order Preference by Similarity to the Ideal Solution), AHP (Analytic Hierarchy Process) and the SAW (Simple Additive Weighting) to the problem of the selection of a new hub airport for an airline. In their study, twelve performance criteria such as population, per capita income, airport size, generalised surface access cost, quality of passenger service in the airport terminal, the airline costs of operating the 'renovated' air route network, the average cost of airport service, airport capacity, the incumbent's market share, utilisation of airport capacity, the airport-induced delay, the environmental constraints are defined as relevant for the location of a new hub.

A survey was carried out by Warnock-Smith ve Potter (2005) to ranke the most important airport choice factors for LCCs. According to this, high demand for LCC services, quick and efficient turnaround facilities, convenient slot times, good aeronautical discounts are the most important choice factors for selecting an airport for LCCs.

A Multi-Objective Programming model which contains airport performance objectives just like cost, revenue, and passengers was used to identify and select a best central airport and its connecting airports providing optimal performance by Chang and Lee (2010).

Sha et al (2015) used integer programming to model for an airline's decision on adding and deleting routes which affect the network topology of air transportation and its future evolution.

Sha et al. (2016) presented an approach based on the discrete choice random-utility theory to select a route. By this approach, it is possible to identificate air transportation networks, determinate of choice sets, and compare and validate developed discrete choice models.

Chang et al. (2017) also applied the multi-objective programming model to build a long-haul route selection model to find the best flight routes between Taiwan and the US. Two objectives, maximizing the total revenue and minimizing the total costs of the selected routes are included in the model.

Deveci et al. (2017) used an interval type-2 fuzzy TOPSIS method to select a new route from five different destinations and used a multi-criteria decision-making (MCDM) method to identify new route's practicality and feasibility. According to them MCDM approach is an useful method for selecting potential airports for route analysis.

Yılmaz et al. (2018) used analytical network process method that specific criteria considered and accomplished as multi-criteria decision-making problem to provide an optimal alternative for flights.

Chang et al. (2019) used a compromise programming method to find potential destinations for airlines. They had tried to select direct flight routes using framework which maximizing total revenue and minimizing total cost.

III. Data Mining, Association Analysis and Apriori Algorithm

Data mining is part of the overall process for discovering information in databases as data search science and technology to discover models and patterns that were previously unknown. In today's world, these databases contain a large amount of information. The availability and abundance of this information make data mining very important and necessary (Rokach and Maimon, 2008). Data mining is the analysis of (usually large) observational datasets to find unexpected relationships and summarize data in new ways that are both understandable and useful. The relationships and summaries obtained from a data mining study are often called models or patterns (Hand et al., 2001: 6). Data mining is the process of identifying and extracting hidden patterns and information from databases and data warehouses. There are various algorithms and tools that can be used for this purpose (Parack et al., 2012).

Data mining techniques such as Association Rules, Clustering, Decision Trees have to overcome a large amount of information, which is a difficult and time consuming

situation (Kantardzic, 2003: 169). The Association Rules technique has been developed in the field of computer science, but has been applied in areas such as market basket analysis (which measures the relationship between the products that a particular customer buys) and web click analysis (which reveals the relationships between the pages frequently clicked by a visitor for a website). In general, the aim is to underline the groups of parts that often occur together in a group of operations (Giudici and Figini, 2009: 90,91). In other words, the Association Rules are the determination of the relationship and associations among the special values of the variables in large data sets. This technique enables analysts and researchers to reveal hidden patterns in large data sets (Nisbet et al., 2009: 126). The goal of association mining is to discover relationships between variables in a dataset containing a large number of variables. This may be to try to find out which variables are strongly related to a particular variable that is most interesting or to try to discover which relationships are strongest between both variables (Baker, 2010).

With widespread use in various fields such as telecommunication networks, market and risk management, inventory control, (Kotsiantis and Kanellopoulos, 2006), association rules have become a widely researched area and therefore faster algorithms are presented. Some of these are Apriori based algorithms or Apriori modifications (Margahny and Shakour, 2006).

Apriori algorithm has become a standard approach in association rules mining. It was first introduced by Agrawal and Srikant (1994). The algorithm starts with a dataset containing transactions and aims to create product sets that have at least the threshold set by a user. In the algorithmic process of Apriori, an element of the 'k' length 'X' set is common to see if every 'X' subset that has the 'k' length is also frequent. This evaluation causes the search area to be significantly reduced and provides computational rule discovery at a convenient time. Confidence is basically the accuracy of the rule and Apriori is used to list rules (Nahar et al., 2013).

The basic steps of the Apriori algorithm are as follows (Webb, 2003):

Apriori Algoritması

F_l ={Common product sets with 1 element);
For (k= 1; $F_k \neq \phi$; k + +) do begin
C_{k+1}=apriori-gen (F_k); // New candidates
for all transactions t ∈ Database do begin
C'_t= subset (C_{k+1} ,t);// Candidates in t
For all candidates c ∈ C'_t do
c.count + +;
End
F_{k+1}={c ∈ C_{k+1} | c.count ≥ minimum support}
End
End
Answer $U_k F_k$;

There are two important basic measures in association rules: support and confidence. Since the database is large, support and confidence thresholds are often predefined by users to leave rules that are not very interesting or useful (Kotsiantis & Kanellopoulos, 2006). The support value and confidence level are numerical values and some numerical terms must be determined to define them. Let D be the database of transactions, N is the number of transactions in D. Each D_i process is a set of products. Let support (X) be the ratio of transactions involving the X product set:

$$Support(X) = \left|\left\{I \mid I \in D \wedge I \supseteq X\right\}\right| / N$$

I is an element set and |. | also shows the number of elements of the set. The support value of a association rule is the ratio of the transactions where both the previous and the next are present, to the total number of transactions. The value of confidence is the rate of transactions involving the previous, but also the following. Support and trust values for $A \Rightarrow C$ association are as follows (Webb, 2003):

$$\text{Support } (A \Rightarrow C) = \text{Support } (A \cup C)$$

$$\text{Confidence } (A \Rightarrow C) = \text{Support } (A \cup C) / \text{Support}(A)$$

If the support value is high enough (if transactions represent a random sample from the same data distribution as future transactions), the level of confidence is a reasonable estimate of the probability that any future transaction involving the first side of the rule will also include the second side of the rule (Webb, 2003). Another value other than the support and confidence used in the association rules is the "lift" value. Lift value is calculated as follows:

$$Lift(A \Rightarrow C) = \frac{confidence(A \Rightarrow C)}{\sup port(C)}$$

If the result of the transaction is less than 1, the fact that A is seen has a negative correlation on the seeing of C; If it is greater than 1, it means that seeing A has a positive correlation on seeing C, which means that seeing one is related to seeing another. If the lift value is 1, it means that the two sides are independent from each other (Taş, 2018: 37-38).

IV. Data Set and Method

In the study, airline data obtained from web resources was used. Association rules mining were made using these data. In this context, 43,707 lines of data belonging to 617 airlines were transformed using Excel macros and a data warehouse was prepared.

The data warehouse is the sum of the subject-oriented, time variant and non-updatable data used in management decision supports. The data warehouse is a commodity, real, dimensional and clustered data and a process manager that enables people to make decisions and provide appropriate information (Bose et al., 2009: 190). A fully trained set was used in the study.

V. Application

3.7.2 version of Weka program was used in the study. Weka program is an open source software. This program supports the algorithm of many classification, clustering and Association Rules.

In the study, the association rules were sought considering both all the destinations and the destinations outside the airline's own country. Apriori algorithm was used in both analyzes. In the analysis of all destinations, 197 rules could be produced with 90% confidence level. These results are presented in Table 1. In the analysis between the airline companies' destinations outside their own countries, 200 rules with 100% confidence level could be produced. These rules are presented in Table 2.

According to the results presented in Table 1 and Table 2, the left side of the "==>" sign in the rules produced with the Apriori algorithm is the first condition of the rule; the right side shows the second condition. Conf. in the rule gives the level of confidence. At the end of the rule, there is a lift value. In the tables below, the rules produced with both data sets are given.

Table 1. Rules Created for All Destinations

1. JohnF_Kennedy_NewYork_JFK=1 SanFrancisco_SFO=1 146 ==> LosAngeles_LAX=1 146 <conf:(1)> lift:(7.09)
2. Seattle-Tacoma_SEA=1 146 ==> LosAngeles_LAX=1 144 <conf:(0.99)> lift:(6.99)
3. SanFrancisco_SFO=1 162 ==> LosAngeles_LAX=1 158 <conf:(0.98)> lift:(6.91)
4. Melbourne_MEL=1 164 ==> Sydney_SYD=1 158 <conf:(0.96)> lift:(7.84)
5. Amsterdam_AMS=1 Heathrow_London_LHR=1 158 ==> CharlesDeGaulle_Paris_CDG=1 152 <conf:(0.96)> lift:(5.3)
6. Brussels_BRU=1 Madrid_MAD=1 158 ==> CharlesDeGaulle_Paris_CDG=1 152 <conf:(0.96)> lift:(5.3)
7. Barcelona_BCN=1 Brussels_BRU=1 156 ==> CharlesDeGaulle_Paris_CDG=1 150 <conf:(0.96)> lift:(5.3)
8. Barcelona_BCN=1 MarcoPolo_Venice_VCE=1 154 ==> Fiumicino_Rome_FCO=1 148 <conf:(0.96)> lift:(6.14)
9. Amsterdam_AMS=1 Geneva_GVA=1 152 ==> Fiumicino_Rome_FCO=1 146 <conf:(0.96)> lift:(6.14)
10. Amsterdam_AMS=1 Zurich_ZRH=1 152 ==> Munich_MUC=1 146 <conf:(0.96)> lift:(6.09)
11. Barcelona_BCN=1 Heathrow_London_LHR=1 152 ==> Madrid_MAD=1 146 <conf:(0.96)> lift:(5.93)

12. Frankfurt_FRA=1 Zurich_ZRH=1 152 ==> Munich_MUC=1 146 <conf:(0.96)> lift:(6.09)
13. Amsterdam_AMS=1 Fiumicino_Rome_FCO=1 Frankfurt_FRA=1 150 ==> Madrid_MAD=1 144 <conf:(0.96)> lift:(5.93)
14. Brussels_BRU=1 Frankfurt_FRA=1 164 ==> CharlesDeGaulle_Paris_CDG=1 156 <conf:(0.95)> lift:(5.24)
15. Brussels_BRU=1 Munich_MUC=1 160 ==> CharlesDeGaulle_Paris_CDG=1 152 <conf:(0.95)> lift:(5.23)
16. Duesseldorf_DUS=1 Frankfurt_FRA=1 160 ==> Munich_MUC=1 152 <conf:(0.95)> lift:(6.02)
17. Geneva_GVA=1 Malpensa_Milan_MXP=1 160 ==> Fiumicino_Rome_FCO=1 152 <conf:(0.95)> lift:(6.07)
18. Barcelona_BCN=1 Geneva_GVA=1 158 ==> Fiumicino_Rome_FCO=1 150 <conf:(0.95)> lift:(6.07)
19. Amsterdam_AMS=1 Barcelona_BCN=1 Fiumicino_Rome_FCO=1 158 ==> Madrid_MAD=1 150 <conf:(0.95)> lift:(5.86)
20. Fiumicino_Rome_FCO=1 Frankfurt_FRA=1 Madrid_MAD=1 158 ==> Barcelona_BCN=1 150 <conf:(0.95)> lift:(6.12)
21. Amsterdam_AMS=1 Brussels_BRU=1 156 ==> CharlesDeGaulle_Paris_CDG=1 148 <conf:(0.95)> lift:(5.23)
22. Fiumicino_Rome_FCO=1 Kastrup_Copenhagen_CPH=1 156 ==> Barcelona_BCN=1 148 <conf:(0.95)> lift:(6.12)
23. Heathrow_London_LHR=1 Munich_MUC=1 156 ==> Frankfurt_FRA=1 148 <conf:(0.95)> lift:(5.66)
24. Barcelona_BCN=1 Madrid_MAD=1 Malpensa_Milan_MXP=1 156 ==> Fiumicino_Rome_FCO=1 148 <conf:(0.95)> lift:(6.07)
25. Barcelona_BCN=1 Fiumicino_Rome_FCO=1 Malpensa_Milan_MXP=1 156 ==> Madrid_MAD=1 148 <conf:(0.95)> lift:(5.86)
26. Geneva_GVA=1 Zurich_ZRH=1 154 ==> Munich_MUC=1 146 <conf:(0.95)> lift:(6.01) lev:(0.08) [121] conv:(14.41)
27. Amsterdam_AMS=1 CharlesDeGaulle_Paris_CDG=1 Fiumicino_Rome_FCO=1 154 ==> Madrid_MAD=1 146 <conf:(0.95)> lift:(5.85)
28. Amsterdam_AMS=1 Geneva_GVA=1 152 ==> Munich_MUC=1 144 <conf:(0.95)> lift:(6)
29. Amsterdam_AMS=1 Zurich_ZRH=1 152 ==> Madrid_MAD=1 144 <conf:(0.95)> lift:(5.85)
30. Frankfurt_FRA=1 Zurich_ZRH=1 152 ==> CharlesDeGaulle_Paris_CDG=1 144 <conf:(0.95)> lift:(5.22)
31. Malpensa_Milan_MXP=1 Zurich_ZRH=1 152 ==> Madrid_MAD=1 144 <conf:(0.95)> lift:(5.85)
32. Malpensa_Milan_MXP=1 Zurich_ZRH=1 152 ==> Munich_MUC=1 144 <conf:(0.95)> lift:(6)
33. Amsterdam_AMS=1 Madrid_MAD=1 Munich_MUC=1 152 ==> Fiumicino_Rome_FCO=1 144 <conf:(0.95)> lift:(6.06)
34. Amsterdam_AMS=1 Fiumicino_Rome_FCO=1 Munich_MUC=1 152 ==> Madrid_MAD=1 144 <conf:(0.95)> lift:(5.85)
35. Barcelona_BCN=1 Frankfurt_FRA=1 Malpensa_Milan_MXP=1 152 ==> Fiumicino_Rome_FCO=1 144 <conf:(0.95)> lift:(6.06)

36. Amsterdam_AMS=1 Fiumicino_Rome_FCO=1 170 ==> Madrid_MAD=1 160 <conf:(0.94)> lift:(5.81)
37. Amsterdam_AMS=1 Fiumicino_Rome_FCO=1 Madrid_MAD=1 160 ==> Barcelona_BCN=1 150 <conf:(0.94)> lift:(6.05)
38. Amsterdam_AMS=1 Barcelona_BCN=1 Madrid_MAD=1 160 ==> Fiumicino_Rome_FCO=1 150 <conf:(0.94)> lift:(5.99)
39. Barcelona_BCN=1 Frankfurt_FRA=1 Madrid_MAD=1 160 ==> Fiumicino_Rome_FCO=1 150 <conf:(0.94)> lift:(5.99)
40. Barcelona_BCN=1 Fiumicino_Rome_FCO=1 Frankfurt_FRA=1 160 ==> Madrid_MAD=1 150 <conf:(0.94)> lift:(5.79)
41. Barcelona_BCN=1 Geneva_GVA=1 158 ==> Madrid_MAD=1 148 <conf:(0.94)> lift:(5.78)
42. Brussels_BRU=1 Fiumicino_Rome_FCO=1 158 ==> CharlesDeGaulle_Paris_CDG=1 148 <conf:(0.94)> lift:(5.16)
43. Brussels_BRU=1 Fiumicino_Rome_FCO=1 158 ==> Malpensa_Milan_MXP=1 148 <conf:(0.94)> lift:(5.45)
44. Fiumicino_Rome_FCO=1 Heathrow_London_LHR=1 158 ==> Madrid_MAD=1 148 <conf:(0.94)> lift:(5.78)
45. Fiumicino_Rome_FCO=1 Heathrow_London_LHR=1 158 ==> Malpensa_Milan_MXP=1 148 <conf:(0.94)> lift:(5.45)
46. CharlesDeGaulle_Paris_CDG=1 Fiumicino_Rome_FCO=1 Madrid_MAD=1 158 ==> Barcelona_BCN=1 148 <conf:(0.94)> lift:(6.04)
47. Barcelona_BCN=1 CharlesDeGaulle_Paris_CDG=1 Fiumicino_Rome_FCO=1 158 ==> Madrid_MAD=1 148 <conf:(0.94)> lift:(5.78)
48. CharlesDeGaulle_Paris_CDG=1 Zurich_ZRH=1 156 ==> Munich_MUC=1 146 <conf:(0.94)> lift:(5.93)
49. Fiumicino_Rome_FCO=1 Kastrup_Copenhagen_CPH=1 156 ==> Madrid_MAD=1 146 <conf:(0.94)> lift:(5.78)
50. Heathrow_London_LHR=1 Munich_MUC=1 156 ==> Malpensa_Milan_MXP=1 146 <conf:(0.94)> lift:(5.45)
51. Madrid_MAD=1 Zurich_ZRH=1 156 ==> Munich_MUC=1 146 <conf:(0.94)> lift:(5.93) lev:(0.08) [121] conv:(11.94)
52. Arlanda_Stockholm_ARN=1 Munich_MUC=1 154 ==> Kastrup_Copenhagen_CPH=1 144 <conf:(0.94)> lift:(6.7)
53. Madrid_MAD=1 Vienna_VIE=1 154 ==> Barcelona_BCN=1 144 <conf:(0.94)> lift:(6.03)
54. Frankfurt_FRA=1 Vienna_VIE=1 154 ==> CharlesDeGaulle_Paris_CDG=1 144 <conf:(0.94)> lift:(5.15)
55. Geneva_GVA=1 Zurich_ZRH=1 154 ==> Madrid_MAD=1 144 <conf:(0.94)> lift:(5.77)
56. Amsterdam_AMS=1 Frankfurt_FRA=1 Madrid_MAD=1 154 ==> Fiumicino_Rome_FCO=1 144 <conf:(0.94)> lift:(5.98)
57. Fiumicino_Rome_FCO=1 Madrid_MAD=1 Munich_MUC=1 154 ==> Amsterdam_AMS=1 144 <conf:(0.94)> lift:(5.72)
58. Fiumicino_Rome_FCO=1 Madrid_MAD=1 Munich_MUC=1 154 ==> Barcelona_BCN=1 144 <conf:(0.94)> lift:(6.03)
59. Barcelona_BCN=1 Fiumicino_Rome_FCO=1 Munich_MUC=1 154 ==> Madrid_MAD=1 144 <conf:(0.94)> lift:(5.77)

60. Frankfurt_FRA=1 Madrid_MAD=1 Malpensa_Milan_MXP=1 154 ==> Fiumicino_Rome_FCO=1 144 <conf:(0.94)> lift:(5.98)
61. Barcelona_BCN=1 Frankfurt_FRA=1 172 ==> Fiumicino_Rome_FCO=1 160 <conf:(0.93)> lift:(5.95)
62. Barcelona_BCN=1 Frankfurt_FRA=1 172 ==> Madrid_MAD=1 160 <conf:(0.93)> lift:(5.74)
63. Amsterdam_AMS=1 Fiumicino_Rome_FCO=1 170 ==> Barcelona_BCN=1 158 <conf:(0.93)> lift:(6)
64. Frankfurt_FRA=1 Heathrow_London_LHR=1 170 ==> CharlesDeGaulle_Paris_CDG=1 158 <conf:(0.93)> lift:(5.12)
65. Heathrow_London_LHR=1 Malpensa_Milan_MXP=1 168 ==> CharlesDeGaulle_Paris_CDG=1 156 <conf:(0.93)> lift:(5.11)
66. Duesseldorf_DUS=1 Munich_MUC=1 164 ==> Frankfurt_FRA=1 152 <conf:(0.93)> lift:(5.53)
67. Barcelona_BCN=1 Kastrup_Copenhagen_CPH=1 160 ==> Fiumicino_Rome_FCO=1 148 <conf:(0.93)> lift:(5.91)
68. Geneva_GVA=1 Madrid_MAD=1 160 ==> Barcelona_BCN=1 148 <conf:(0.93)> lift:(5.97)
69. Kastrup_Copenhagen_CPH=1 Madrid_MAD=1 160 ==> Barcelona_BCN=1 148 <conf:(0.93)> lift:(5.97)
70. Barcelona_BCN=1 Kastrup_Copenhagen_CPH=1 160 ==> Madrid_MAD=1 148 <conf:(0.93)> lift:(5.71)
71. Brussels_BRU=1 Malpensa_Milan_MXP=1 160 ==> CharlesDeGaulle_Paris_CDG=1 148 <conf:(0.93)> lift:(5.09)
72. Brussels_BRU=1 Malpensa_Milan_MXP=1 160 ==> Fiumicino_Rome_FCO=1 148 <conf:(0.93)> lift:(5.91)
73. Brussels_BRU=1 Munich_MUC=1 160 ==> Frankfurt_FRA=1 148 <conf:(0.93)> lift:(5.52)
74. Geneva_GVA=1 Malpensa_Milan_MXP=1 160 ==> CharlesDeGaulle_Paris_CDG=1 148 <conf:(0.93)> lift:(5.09)
75. Geneva_GVA=1 Madrid_MAD=1 160 ==> Fiumicino_Rome_FCO=1 148 <conf:(0.93)> lift:(5.91)
76. Geneva_GVA=1 Munich_MUC=1 160 ==> Madrid_MAD=1 148 <conf:(0.93)> lift:(5.71)
77. Geneva_GVA=1 Madrid_MAD=1 160 ==> Munich_MUC=1 148 <conf:(0.93)> lift:(5.86)
78. McCarran_LasVegas_LAS=1 158 ==> LosAngeles_LAX=1 146 <conf:(0.92)> lift:(6.55)
79. Munich_MUC=1 Zurich_ZRH=1 158 ==> Amsterdam_AMS=1 146 <conf:(0.92)> lift:(5.65)
80. Fiumicino_Rome_FCO=1 Heathrow_London_LHR=1 158 ==> CharlesDeGaulle_Paris_CDG=1 146 <conf:(0.92)> lift:(5.09)
81. Frankfurt_FRA=1 Geneva_GVA=1 158 ==> CharlesDeGaulle_Paris_CDG=1 146 <conf:(0.92)> lift:(5.09)
82. Munich_MUC=1 Zurich_ZRH=1 158 ==> CharlesDeGaulle_Paris_CDG=1 146 <conf:(0.92)> lift:(5.09)
83. Frankfurt_FRA=1 Geneva_GVA=1 158 ==> Fiumicino_Rome_FCO=1 146 <conf:(0.92)> lift:(5.91)

84. Fiumicino_Rome_FCO=1 Heathrow_London_LHR=1 158 ==> Frankfurt_FRA=1 146 <conf:(0.92)> lift:(5.51)
85. Frankfurt_FRA=1 Geneva_GVA=1 158 ==> Malpensa_Milan_MXP=1 146 <conf:(0.92)> lift:(5.38)
86. Munich_MUC=1 Zurich_ZRH=1 158 ==> Frankfurt_FRA=1 146 <conf:(0.92)> lift:(5.51)
87. Munich_MUC=1 Zurich_ZRH=1 158 ==> Geneva_GVA=1 146 <conf:(0.92)> lift:(7.11)
88. LosAngeles_LAX=1 SanFrancisco_SFO=1 158 ==> JohnF_Kennedy_NewYork_JFK=1 146 <conf:(0.92)> lift:(6.18)
89. Munich_MUC=1 Zurich_ZRH=1 158 ==> Madrid_MAD=1 146 <conf:(0.92)> lift:(5.7) lev:(0.08) [120] conv:(10.18)
90. CharlesDeGaulle_Paris_CDG=1 Fiumicino_Rome_FCO=1 Madrid_MAD=1 158 ==> Amsterdam_AMS=1 146 <conf:(0.92)> lift:(5.65)
91. Fiumicino_Rome_FCO=1 Madrid_MAD=1 184 ==> Barcelona_BCN=1 170 <conf:(0.92)> lift:(5.96)
92. Barcelona_BCN=1 Fiumicino_Rome_FCO=1 184 ==> Madrid_MAD=1 170 <conf:(0.92)> lift:(5.7)
93. Amsterdam_AMS=1 Brussels_BRU=1 156 ==> Frankfurt_FRA=1 144 <conf:(0.92)> lift:(5.51)
94. Amsterdam_AMS=1 Vienna_VIE=1 156 ==> CharlesDeGaulle_Paris_CDG=1 144 <conf:(0.92)> lift:(5.08)
95. Madrid_MAD=1 Zurich_ZRH=1 156 ==> Amsterdam_AMS=1 144 <conf:(0.92)> lift:(5.65)
96. Barcelona_BCN=1 Brussels_BRU=1 156 ==> Madrid_MAD=1 144 <conf:(0.92)> lift:(5.7)
97. CharlesDeGaulle_Paris_CDG=1 Zurich_ZRH=1 156 ==> Frankfurt_FRA=1 144 <conf:(0.92)> lift:(5.51)
98. Heathrow_London_LHR=1 Munich_MUC=1 156 ==> CharlesDeGaulle_Paris_CDG=1 144 <conf:(0.92)> lift:(5.08)
99. Madrid_MAD=1 Zurich_ZRH=1 156 ==> CharlesDeGaulle_Paris_CDG=1 144 <conf:(0.92)> lift:(5.08)
100. CharlesDeGaulle_Paris_CDG=1 Zurich_ZRH=1 156 ==> Madrid_MAD=1 144 <conf:(0.92)> lift:(5.7)
101. Madrid_MAD=1 Zurich_ZRH=1 156 ==> Geneva_GVA=1 144 <conf:(0.92)> lift:(7.11)
102. Heathrow_London_LHR=1 Munich_MUC=1 156 ==> Madrid_MAD=1 144 <conf:(0.92)> lift:(5.7)
103. Madrid_MAD=1 Zurich_ZRH=1 156 ==> Malpensa_Milan_MXP=1 144 <conf:(0.92)> lift:(5.37)
104. Barcelona_BCN=1 Fiumicino_Rome_FCO=1 Malpensa_Milan_MXP=1 156 ==> Frankfurt_FRA=1 144 <conf:(0.92)> lift:(5.51)
105. Barcelona_BCN=1 Madrid_MAD=1 Munich_MUC=1 156 ==> Fiumicino_Rome_FCO=1 144 <conf:(0.92)> lift:(5.9)
106. CharlesDeGaulle_Paris_CDG=1 Fiumicino_Rome_FCO=1 Malpensa_Milan_MXP=1 156 ==> Frankfurt_FRA=1 144 <conf:(0.92)> lift:(5.51)
107. CharlesDeGaulle_Paris_CDG=1 Madrid_MAD=1 Malpensa_Milan_MXP=1 156 ==>Fiumicino_Rome_FCO=1 144 <conf:(0.92)> lift:(5.9)

108. CharlesDeGaulle_Paris_CDG=1 Fiumicino_Rome_FCO=1 Malpensa_Milan_MXP=1 156==>Madrid_MAD=1 144 <conf:(0.92)> lift:(5.7)
109. Amsterdam_AMS=1 Malpensa_Milan_MXP=1 174 ==> CharlesDeGaulle_Paris_CDG=1 160 <conf:(0.92)> lift:(5.06)
110. Frankfurt_FRA=1 Madrid_MAD=1 174 ==> Barcelona_BCN=1 160 <conf:(0.92)> lift:(5.93)
111. Barcelona_BCN=1 Munich_MUC=1 170 ==> Madrid_MAD=1 156 <conf:(0.92)> lift:(5.66)
112. Fiumicino_Rome_FCO=1 Geneva_GVA=1 166 ==> Malpensa_Milan_MXP=1 152 <conf:(0.92)> lift:(5.33)
113. CharlesDeGaulle_Paris_CDG=1 Geneva_GVA=1 164 ==> Fiumicino_Rome_FCO=1 150 <conf:(0.91)> lift:(5.85)
114. Fiumicino_Rome_FCO=1 MarcoPolo_Venice_VCE=1 162 ==> Barcelona_BCN=1 148 <conf:(0.91)> lift:(5.89)
115. Heathrow_London_LHR=1 Madrid_MAD=1 162 ==> Fiumicino_Rome_FCO=1 148 <conf:(0.91)> lift:(5.84)
116. Heathrow_London_LHR=1 Madrid_MAD=1 162 ==> Frankfurt_FRA=1 148 <conf:(0.91)> lift:(5.45)
117. Heathrow_London_LHR=1 Madrid_MAD=1 162 ==> Malpensa_Milan_MXP=1 148 <conf:(0.91)> lift:(5.32)
118. Barcelona_BCN=1 CharlesDeGaulle_Paris_CDG=1 Madrid_MAD=1 162 ==> Fiumicino_Rome_FCO=1 148 <conf:(0.91)> lift:(5.84)
119. Fiumicino_Rome_FCO=1 Madrid_MAD=1 Malpensa_Milan_MXP=1 162 ==> Barcelona_BCN=1 148 <conf:(0.91)> lift:(5.89)
120. Barcelona_BCN=1 Kastrup_Copenhagen_CPH=1 160 ==> Amsterdam_AMS=1 146 <conf:(0.91)> lift:(5.58)
121. Amsterdam_AMS=1 Kastrup_Copenhagen_CPH=1 160 ==> Barcelona_BCN=1 146 <conf:(0.91)> lift:(5.89)
122. Brussels_BRU=1 Malpensa_Milan_MXP=1 160 ==> Frankfurt_FRA=1 146 <conf:(0.91)> lift:(5.44)
123. Geneva_GVA=1 Madrid_MAD=1 160 ==> CharlesDeGaulle_Paris_CDG=1 146 <conf:(0.91)> lift:(5.03)
124. Geneva_GVA=1 Munich_MUC=1 160 ==> CharlesDeGaulle_Paris_CDG=1 146 <conf:(0.91)> lift:(5.03)
125. Geneva_GVA=1 Munich_MUC=1 160 ==> Fiumicino_Rome_FCO=1 146 <conf:(0.91)> lift:(5.83)
126. Kastrup_Copenhagen_CPH=1 Madrid_MAD=1 160 ==> Fiumicino_Rome_FCO=1 146 <conf:(0.91)> lift:(5.83)
127. Geneva_GVA=1 Malpensa_Milan_MXP=1 160 ==> Frankfurt_FRA=1 146 <conf:(0.91)> lift:(5.44)
128. Geneva_GVA=1 Malpensa_Milan_MXP=1 160 ==> Madrid_MAD=1 146 <conf:(0.91)> lift:(5.63)
129. Geneva_GVA=1 Madrid_MAD=1 160 ==> Malpensa_Milan_MXP=1 146 <conf:(0.91)> lift:(5.31)
130. Geneva_GVA=1 Munich_MUC=1 160 ==> Zurich_ZRH=1 146 <conf:(0.91)> lift:(7.18)
131. Amsterdam_AMS=1 CharlesDeGaulle_Paris_CDG=1 Madrid_MAD=1 160 ==> Barcelona_BCN=1 146 <conf:(0.91)> lift:(5.89)

132. Amsterdam_AMS=1 Barcelona_BCN=1 Madrid_MAD=1 160 ==> CharlesDeGaulle_Paris_CDG=1 146 <conf:(0.91)> lift:(5.03)
133. Amsterdam_AMS=1 Barcelona_BCN=1 CharlesDeGaulle_Paris_CDG=1 160 ==> Madrid_MAD=1 146 <conf:(0.91)> lift:(5.63)
134. Amsterdam_AMS=1 Fiumicino_Rome_FCO=1 Madrid_MAD=1 160==>CharlesDeGaulle_Paris_CDG=1 146 <conf:(0.91) lift:(5.03)
135. Amsterdam_AMS=1 CharlesDeGaulle_Paris_CDG=1 Madrid_MAD=1 160==>Fiumicino_Rome_FCO=1 146 <conf:(0.91)> lift:(5.83)
136. Oslo_OSL=1 158 ==> Kastrup_Copenhagen_CPH=1 144 <conf:(0.91)> lift:(6.53)
137. Amsterdam_AMS=1 Heathrow_London_LHR=1 158 ==> Frankfurt_FRA=1 144 <conf:(0.91)> lift:(5.44)
138. Amsterdam_AMS=1 Heathrow_London_LHR=1 158 ==> Malpensa_Milan_MXP=1 144 <conf:(0.91)> lift:(5.31)
139. Kastrup_Copenhagen_CPH=1 Munich_MUC=1 158 ==> Arlanda_Stockholm_ARN=1 144 <conf:(0.91)> lift:(7.5)
140. Arlanda_Stockholm_ARN=1 Kastrup_Copenhagen_CPH=1 158 ==> Munich_MUC=1 144 <conf:(0.91)> lift:(5.77)
141. Brussels_BRU=1 Madrid_MAD=1 158 ==> Barcelona_BCN=1 144 <conf:(0.91)> lift:(5.88)
142. Fiumicino_Rome_FCO=1 Vienna_VIE=1 158 ==> Barcelona_BCN=1 144 <conf:(0.91)> lift:(5.88)
143. Brussels_BRU=1 Madrid_MAD=1 158 ==> Fiumicino_Rome_FCO=1 144 <conf:(0.91)> lift:(5.83)
144. Brussels_BRU=1 Fiumicino_Rome_FCO=1 158 ==> Madrid_MAD=1 144 <conf:(0.91)> lift:(5.63)
145. Brussels_BRU=1 Madrid_MAD=1 158 ==> Malpensa_Milan_MXP=1 144 <conf:(0.91)> lift:(5.31)
146. Brussels_BRU=1 Madrid_MAD=1 158 ==> Munich_MUC=1 144 <conf:(0.91)> lift:(5.77)
147. Fiumicino_Rome_FCO=1 Vienna_VIE=1 158 ==> CharlesDeGaulle_Paris_CDG=1 144 <conf:(0.91)> lift:(5.02)
148. Munich_MUC=1 Zurich_ZRH=1 158 ==> Malpensa_Milan_MXP=1 144 <conf:(0.91)> lift:(5.31)
149. Fiumicino_Rome_FCO=1 Frankfurt_FRA=1 Madrid_MAD=1 158 ==> Amsterdam_AMS=1 144 <conf:(0.91)> lift:(5.58)
150. CharlesDeGaulle_Paris_CDG=1 Fiumicino_Rome_FCO=1 Frankfurt_FRA=1 158==>Malpensa_Milan_MXP=1 144<conf:(0.91)> lift:(5.31)
151. CharlesDeGaulle_Paris_CDG=1 Fiumicino_Rome_FCO=1 Madrid_MAD=1 158==>Malpensa_Milan_MXP=1 144 <conf:(0.91)> lift:(5.31)
152. Fiumicino_Rome_FCO=1 Frankfurt_FRA=1 Madrid_MAD=1 158 ==> Malpensa_Milan_MXP=1 144 <conf:(0.91)> lift:(5.31)
153. MarcoPolo_Venice_VCE=1 178 ==> Fiumicino_Rome_FCO=1 162 <conf:(0.91)> lift:(5.82)
154. Amsterdam_AMS=1 Madrid_MAD=1 176 ==> Barcelona_BCN=1 160 <conf:(0.91)> lift:(5.86)
155. Amsterdam_AMS=1 Madrid_MAD=1 176 ==> CharlesDeGaulle_Paris_CDG=1 160 <conf:(0.91)> lift:(5.01)
156. Amsterdam_AMS=1 Madrid_MAD=1 176 ==> Fiumicino_Rome_FCO=1 160 <conf:(0.91)> lift:(5.81)

157. Arlanda_Stockholm_ARN=1 174 ==> Kastrup_Copenhagen_CPH=1 158 <conf:(0.91)> lift:(6.5)
158. Amsterdam_AMS=1 Frankfurt_FRA=1 174 ==> CharlesDeGaulle_Paris_CDG=1 158 <conf:(0.91)> lift:(5)
159. Frankfurt_FRA=1 Madrid_MAD=1 174 ==> Fiumicino_Rome_FCO=1 158 <conf:(0.91)> lift:(5.81)
160. Barcelona_BCN=1 Malpensa_Milan_MXP=1 172 ==> Fiumicino_Rome_FCO=1 156 <conf:(0.91)> lift:(5.8)
161. Barcelona_BCN=1 Malpensa_Milan_MXP=1 172 ==> Madrid_MAD=1 156 <conf:(0.91)> lift:(5.6)
162. Amsterdam_AMS=1 Fiumicino_Rome_FCO=1 170 ==> CharlesDeGaulle_Paris_CDG=1 154 <conf:(0.91)> lift:(4.99)
163. Fiumicino_Rome_FCO=1 Munich_MUC=1 170 ==> Barcelona_BCN=1 154 <conf:(0.91)> lift:(5.84)
164. Barcelona_BCN=1 Munich_MUC=1 170 ==> Fiumicino_Rome_FCO=1 154 <conf:(0.91)> lift:(5.79)
165. Fiumicino_Rome_FCO=1 Munich_MUC=1 170 ==> Madrid_MAD=1 154 <conf:(0.91)> lift:(5.59)
166. Malpensa_Milan_MXP=1 Munich_MUC=1 170 ==> Frankfurt_FRA=1 154 <conf:(0.91)> lift:(5.41)
167. Amsterdam_AMS=1 Munich_MUC=1 168 ==> CharlesDeGaulle_Paris_CDG=1 152 <conf:(0.9)> lift:(4.98)
168. Amsterdam_AMS=1 Munich_MUC=1 168 ==> Fiumicino_Rome_FCO=1 152 <conf:(0.9)> lift:(5.78)
169. Amsterdam_AMS=1 Munich_MUC=1 168 ==> Madrid_MAD=1 152 <conf:(0.9)> lift:(5.58)
170. Heathrow_London_LHR=1 Malpensa_Milan_MXP=1 168 ==> Frankfurt_FRA=1 152 <conf:(0.9)> lift:(5.4)
171. Fiumicino_Rome_FCO=1 Geneva_GVA=1 166 ==> Barcelona_BCN=1 150 <conf:(0.9)> lift:(5.83)
172. Fiumicino_Rome_FCO=1 Geneva_GVA=1 166 ==> CharlesDeGaulle_Paris_CDG=1 150 <conf:(0.9)> lift:(4.98)
173. Brussels_BRU=1 Frankfurt_FRA=1 164 ==> Munich_MUC=1 148 <conf:(0.9)> lift:(5.72)
174. CharlesDeGaulle_Paris_CDG=1 Geneva_GVA=1 164 ==> Malpensa_Milan_MXP=1 148 <conf:(0.9)> lift:(5.25)
175. SanFrancisco_SFO=1 162 ==> JohnF_Kennedy_NewYork_JFK=1 146 <conf:(0.9)> lift:(6.03)
176. Heathrow_London_LHR=1 Madrid_MAD=1 162 ==> Barcelona_BCN=1 146 <conf:(0.9)> lift:(5.81)
177. Heathrow_London_LHR=1 Madrid_MAD=1 162 ==> CharlesDeGaulle_Paris_CDG=1 146 <conf:(0.9)> lift:(4.96)
178. SanFrancisco_SFO=1 162 ==> JohnF_Kennedy_NewYork_JFK=1 LosAngeles_LAX=1 146 <conf:(0.9)> lift:(7.68)
179. Barcelona_BCN=1 CharlesDeGaulle_Paris_CDG=1 Madrid_MAD=1 162 ==> Amsterdam_AMS=1 146 <conf:(0.9)> lift:(5.52)
180. CharlesDeGaulle_Paris_CDG=1 Madrid_MAD=1 180 ==> Barcelona_BCN=1 162 <conf:(0.9)> lift:(5.81)

181. Madrid_MAD=1 Malpensa_Milan_MXP=1 180 ==> Fiumicino_Rome_FCO=1 162 <conf:(0.9)> lift:(5.75)
182. Geneva_GVA=1 Munich_MUC=1 160 ==> Amsterdam_AMS=1 144 <conf:(0.9)> lift:(5.51)
183. Kastrup_Copenhagen_CPH=1 Madrid_MAD=1 160 ==> Amsterdam_AMS=1 144 <conf:(0.9)> lift:(5.51)
184. Amsterdam_AMS=1 Kastrup_Copenhagen_CPH=1 160 ==> Madrid_MAD=1 144 <conf:(0.9)> lift:(5.56)
185. Barcelona_BCN=1 Vienna_VIE=1 160 ==> CharlesDeGaulle_Paris_CDG=1 144 <conf:(0.9)> lift:(4.96)
186. Barcelona_BCN=1 Vienna_VIE=1 160 ==> Fiumicino_Rome_FCO=1 144 <conf:(0.9)> lift:(5.75)
187. Barcelona_BCN=1 Vienna_VIE=1 160 ==> Madrid_MAD=1 144 <conf:(0.9)> lift:(5.56)
188. Brussels_BRU=1 Malpensa_Milan_MXP=1 160 ==> Madrid_MAD=1 144 <conf:(0.9)> lift:(5.56)
189. Brussels_BRU=1 Munich_MUC=1 160 ==> Madrid_MAD=1 144 <conf:(0.9)> lift:(5.56)
190. Geneva_GVA=1 Madrid_MAD=1 160 ==> Zurich_ZRH=1 144 <conf:(0.9)> lift:(7.08)
191. Amsterdam_AMS=1 Fiumicino_Rome_FCO=1 Madrid_MAD=1 160 ==> Frankfurt_FRA=1 144 <conf:(0.9)> lift:(5.37)
192. Amsterdam_AMS=1 Fiumicino_Rome_FCO=1 Madrid_MAD=1 160 ==> Munich_MUC=1 144 <conf:(0.9)> lift:(5.7)
193. Fiumicino_Rome_FCO=1 Frankfurt_FRA=1 Malpensa_Milan_MXP=1 160 ==> Barcelona_BCN=1 144 <conf:(0.9)> lift:(5.81)
194. Barcelona_BCN=1 Fiumicino_Rome_FCO=1 Frankfurt_FRA=1 160 ==> Malpensa_Milan_MXP=1 144 <conf:(0.9)> lift:(5.24)
195. Fiumicino_Rome_FCO=1 Frankfurt_FRA=1 Malpensa_Milan_MXP=1 160==>CharlesDeGaulle_Paris_CDG=1 144 <conf:(0.9)> lift:(4.96)
196. CharlesDeGaulle_Paris_CDG=1 Frankfurt_FRA=1 Malpensa_Milan_MXP=1 160 ==> Fiumicino_Rome_FCO=1 144 <conf:(0.9)> lift:(5.75)
197. Fiumicino_Rome_FCO=1 Frankfurt_FRA=1 Malpensa_Milan_MXP=1 160 ==> Madrid_MAD=1 144 <conf:(0.9)> lift:(5.56)

As can be seen from the table above, according to the first rule produced, 146 airlines flying to JohnF_Kennedy_NewYork_JFK and SanFrancisco_SFO also fly to LosAngeles_LAX destinations. The confidence level of this rule is 1 and the lift value is 7.9.

According to the second rule, 144 of 146 airlines that fly to Seattle-Tacoma_SEA destination also fly to LosAngeles_LAX destination. The confidence level of this rule is 0.99 and the lift value is 6.99.

According to the third rule, 158 of 162 airline companies flying to SanFrancisco_SFO destination also fly to LosAngeles_LAX destination. The confidence level of this rule is 0.98 and the lift value is 6.91. For the remaining 194 rules, comments similar to the comments above can be made.

Table 2. Rules for Out-of-Country Destinations

1. JohnF_Kennedy_NewYork_JFK=1 SanFrancisco_SFO=1 66 ==> LosAngeles_LAX=1 66 <conf:(1)> lift:(6.38)
2. OHare_Chicago_ORD=1 SanFrancisco_SFO=1 61 ==> LosAngeles_LAX=1 61 <conf:(1)> lift:(6.38)
3. Amsterdam_AMS=1 Arlanda_Stockholm_ARN=1 Duesseldorf_DUS=1 61 ==> Kastrup_Copenhagen_CPH=1 61 <conf:(1)> lift:(5.53)
4. Duesseldorf_DUS=1 Frankfurt_FRA=1 Zurich_ZRH=1 61 ==> Munich_MUC=1 61 <conf:(1)> lift:(5.07)
5. Amsterdam_AMS=1 Frankfurt_FRA=1 Geneva_GVA=1 Munich_MUC=1 61 ==> Zurich_ZRH=1 61 <conf:(1)> lift:(6.16)
6. McCarran_LasVegas_LAS=1 SanFrancisco_SFO=1 59 ==> LosAngeles_LAX=1 59 <conf:(1)> lift:(6.38)
7. SanFrancisco_SFO=1 Seattle-Tacoma_SEA=1 59 ==> LosAngeles_LAX=1 59 <conf:(1)> lift:(6.38)
8. Amsterdam_AMS=1 Arlanda_Stockholm_ARN=1 Zurich_ZRH=1 59 ==> Kastrup_Copenhagen_CPH=1 59 <conf:(1)> lift:(5.53)
9. Amsterdam_AMS=1 Duesseldorf_DUS=1 Geneva_GVA=1 59 ==> Munich_MUC=1 59 <conf:(1)> lift:(5.07)
10. Brussels_BRU=1 Geneva_GVA=1 Munich_MUC=1 59 ==> Zurich_ZRH=1 59 <conf:(1)> lift:(6.16)
11. Duesseldorf_DUS=1 Frankfurt_FRA=1 Geneva_GVA=1 59 ==> Munich_MUC=1 59 <conf:(1)> lift:(5.07)
12. Duesseldorf_DUS=1 Oslo_OSL=1 58 ==> Munich_MUC=1 58 <conf:(1)> lift:(5.07)
13. Orlando_MCO=1 SanFrancisco_SFO=1 58 ==> LosAngeles_LAX=1 58 <conf:(1)> lift:(6.38)
14. Arlanda_Stockholm_ARN=1 Brussels_BRU=1 Duesseldorf_DUS=1 58 ==> Kastrup_Copenhagen_CPH=1 58 <conf:(1)> lift:(5.53)
15. Amsterdam_AMS=1 Arlanda_Stockholm_ARN=1 Duesseldorf_DUS=1 Frankfurt_FRA=1 58 ==> Kastrup_Copenhagen_CPH=1 58 <conf:(1)> lift:(5.53)
16. Amsterdam_AMS=1 Duesseldorf_DUS=1 Frankfurt_FRA=1 Zurich_ZRH=1 58 ==> Munich_MUC=1 58 <conf:(1)> lift:(5.07)
17. Amsterdam_AMS=1 Duesseldorf_DUS=1 Geneva_GVA=1 Zurich_ZRH=1 58 ==> Munich_MUC=1 58 <conf:(1)> lift:(5.07)
18. Duesseldorf_DUS=1 Frankfurt_FRA=1 Geneva_GVA=1 Zurich_ZRH=1 58 ==> Munich_MUC=1 58 <conf:(1)> lift:(5.07)
19. CharlesDeGaulle_Paris_CDG=1 Melbourne_MEL=1 57 ==> Sydney_SYD=1 57 <conf:(1)> lift:(6.86) lev:(0.09) [48] conv:(48.69)
20. Fiumicino_Rome_FCO=1 Oslo_OSL=1 57 ==> Kastrup_Copenhagen_CPH=1 57 <conf:(1)> lift:(5.53)
21. Munich_MUC=1 Singapore_SIN=1 57 ==> Frankfurt_FRA=1 57 <conf:(1)> lift:(4.71)
22. Heathrow_London_LHR=1 SanFrancisco_SFO=1 57 ==> LosAngeles_LAX=1 57 <conf:(1)> lift:(6.38)
23. LesterB_PearsonIntl_Toronto_YYZ=1 SanFrancisco_SFO=1 57 ==> LosAngeles_LAX=1 57 <conf:(1)> lift:(6.38)
24. Arlanda_Stockholm_ARN=1 Frankfurt_FRA=1 Zurich_ZRH=1 57 ==> Munich_MUC=1 57 <conf:(1)> lift:(5.07)
25. Athens_ATH=1 Madrid_MAD=1 MarcoPolo_Venice_VCE=1 57 ==> Barcelona_BCN=1 57 <conf:(1)> lift:(5.11)

26. Barcelona_BCN=1 Fiumicino_Rome_FCO=1 Manchester_MAN=1 57 ==> Madrid_MAD=1 57 <conf:(1)> lift:(5.11)
27. Frankfurt_FRA=1 Madrid_MAD=1 MarcoPolo_Venice_VCE=1 57 ==> Barcelona_BCN=1 57 <conf:(1)> lift:(5.11)
28. Kastrup_Copenhagen_CPH=1 Madrid_MAD=1 MarcoPolo_Venice_VCE=1 57 ==> Barcelona_BCN=1 57 <conf:(1)> lift:(5.11)
29. Duesseldorf_DUS=1 Frankfurt_FRA=1 Oslo_OSL=1 57 ==> Munich_MUC=1 57 <conf:(1)> lift:(5.07)
30. JohnF_Kennedy_NewYork_JFK=1 McCarran_LasVegas_LAS=1 SanFrancisco_SFO=1 57 ==> LosAngeles_LAX=1 57 <conf:(1)> lift:(6.38)
31. JohnF_Kennedy_NewYork_JFK=1 OHare_Chicago_ORD=1 SanFrancisco_SFO=1 57 ==> LosAngeles_LAX=1 57 <conf:(1)> lift:(6.38)
32. JohnF_Kennedy_NewYork_JFK=1 SanFrancisco_SFO=1 Seattle-Tacoma_SEA=1 57 ==> LosAngeles_LAX=1 57 <conf:(1)> lift:(6.38)
33. McCarran_LasVegas_LAS=1 Orlando_MCO=1 SanFrancisco_SFO=1 57 ==> LosAngeles_LAX=1 57 <conf:(1)> lift:(6.38)
34. Amsterdam_AMS=1 Arlanda_Stockholm_ARN=1 Duesseldorf_DUS=1 Munich_MUC=1 57 ==> Kastrup_Copenhagen_CPH=1 57 <conf:(1)> lift:(5.53)
35. Amsterdam_AMS=1 Brussels_BRU=1 Geneva_GVA=1 Munich_MUC=1 57 ==> Zurich_ZRH=1 57 <conf:(1)> lift:(6.16)
36. Arlanda_Stockholm_ARN=1 Brussels_BRU=1 Duesseldorf_DUS=1 Frankfurt_FRA=1 57 ==> Kastrup_Copenhagen_CPH=1 57 <conf:(1)> lift:(5.53)
37. Brussels_BRU=1 Geneva_GVA=1 Malpensa_Milan_MXP=1 Munich_MUC=1 57 ==> Zurich_ZRH=1 57 <conf:(1)> lift:(6.16)
38. Amsterdam_AMS=1 Fiumicino_Rome_FCO=1 Frankfurt_FRA=1 Geneva_GVA=1 Munich_MUC=1 57 ==> Zurich_ZRH=1 57 <conf:(1)> lift:(6.16)
39. Amsterdam_AMS=1 Frankfurt_FRA=1 Geneva_GVA=1 Madrid_MAD=1 Munich_MUC=1 57 ==> Zurich_ZRH=1 57 <conf:(1)> lift:(6.16)
40. Amsterdam_AMS=1 Frankfurt_FRA=1 Geneva_GVA=1 Malpensa_Milan_MXP=1 Munich_MUC=1 57 ==> Zurich_ZRH=1 57 <conf:(1)> lift:(6.16)
41. CharlesDeGaulle_Paris_CDG=1 SanFrancisco_SFO=1 56 ==> LosAngeles_LAX=1 56 <conf:(1)> lift:(6.38)
42. Miami_MIA=1 SanFrancisco_SFO=1 56 ==> LosAngeles_LAX=1 56 <conf:(1)> lift:(6.38)
43. Brussels_BRU=1 Madrid_MAD=1 MarcoPolo_Venice_VCE=1 56 ==> Barcelona_BCN=1 56 <conf:(1)> lift:(5.11)
44. Duesseldorf_DUS=1 Frankfurt_FRA=1 Vienna_VIE=1 56 ==> Munich_MUC=1 56 <conf:(1)> lift:(5.07)
45. Duesseldorf_DUS=1 Kastrup_Copenhagen_CPH=1 Oslo_OSL=1 56 ==> Munich_MUC=1 56 <conf:(1)> lift:(5.07)
46. Frankfurt_FRA=1 Malpensa_Milan_MXP=1 Manchester_MAN=1 56 ==> Munich_MUC=1 56 <conf:(1)> lift:(5.07)
47. JohnF_Kennedy_NewYork_JFK=1 McCarran_LasVegas_LAS=1 Orlando_MCO=1 56 ==> LosAngeles_LAX=1 56 <conf:(1)> lift:(6.38)
48. McCarran_LasVegas_LAS=1 OHare_Chicago_ORD=1 SanFrancisco_SFO=1 56 ==> LosAngeles_LAX=1 56 <conf:(1)> lift:(6.38)
49. Amsterdam_AMS=1 Arlanda_Stockholm_ARN=1 Munich_MUC=1 Zurich_ZRH=1 56 ==> Kastrup_Copenhagen_CPH=1 56 <conf:(1)> lift:(5.53)

50. Amsterdam_AMS=1 Duesseldorf_DUS=1 Frankfurt_FRA=1 Geneva_GVA=1 56 ==> Munich_MUC=1 56 <conf:(1)> lift:(5.07)
51. Amsterdam_AMS=1 Duesseldorf_DUS=1 Frankfurt_FRA=1 Geneva_GVA=1 56 ==> Zurich_ZRH=1 56 <conf:(1)> lift:(6.16)
52. Amsterdam_AMS=1 Geneva_GVA=1 Heathrow_London_LHR=1 Munich_MUC=1 56 ==> Zurich_ZRH=1 56 <conf:(1)> lift:(6.16)
53. Arlanda_Stockholm_ARN=1 Frankfurt_FRA=1 Kastrup_Copenhagen_CPH=1 Vienna_VIE=1 56 ==> Munich_MUC=1 56 <conf:(1)> lift:(5.07)
54. Arlanda_Stockholm_ARN=1 Frankfurt_FRA=1 Kastrup_Copenhagen_CPH=1 Zurich_ZRH=1 56 ==> Munich_MUC=1 56 <conf:(1)> lift:(5.07)
55. Brussels_BRU=1 CharlesDeGaulle_Paris_CDG=1 Geneva_GVA=1 Munich_MUC=1 56 ==> Zurich_ZRH=1 56 <conf:(1)> lift:(6.16)
56. Brussels_BRU=1 Frankfurt_FRA=1 Geneva_GVA=1 Munich_MUC=1 56 ==> Zurich_ZRH=1 56 <conf:(1)> lift:(6.16)
57. CharlesDeGaulle_Paris_CDG=1 Duesseldorf_DUS=1 Frankfurt_FRA=1 Zurich_ZRH=1 56 ==> Munich_MUC=1 56 <conf:(1)> lift:(5.07)
58. Duesseldorf_DUS=1 Frankfurt_FRA=1 Kastrup_Copenhagen_CPH=1 Zurich_ZRH=1 56 ==> Munich_MUC=1 56 <conf:(1)> lift:(5.07)
59. Amsterdam_AMS=1 CharlesDeGaulle_Paris_CDG=1 Frankfurt_FRA=1 Geneva_GVA=1 Munich_MUC=1 56 ==> Zurich_ZRH=1 56 <conf:(1)> lift:(6.16)
60. Amsterdam_AMS=1 Duesseldorf_DUS=1 Frankfurt_FRA=1 Geneva_GVA=1 Zurich_ZRH=1 56 ==> Munich_MUC=1 56 <conf:(1)> lift:(5.07)
61. Amsterdam_AMS=1 Duesseldorf_DUS=1 Frankfurt_FRA=1 Geneva_GVA=1 Munich_MUC=1 56 ==> Zurich_ZRH=1 56 <conf:(1)> lift:(6.16)
62. Amsterdam_AMS=1 Duesseldorf_DUS=1 Frankfurt_FRA=1 Geneva_GVA=1 56 ==> Munich_MUC=1 Zurich_ZRH=1 56 <conf:(1)> lift:(7.23)
63. Dallas_Ft_Worth_DFW=1 SanFrancisco_SFO=1 55 ==> LosAngeles_LAX=1 55 <conf:(1)> lift:(6.38)
64. Frankfurt_FRA=1 Melbourne_MEL=1 55 ==> Sydney_SYD=1 55 <conf:(1)> lift:(6.86)
65. Hartsfield-Jackson_Atlanta_ATL=1 SanFrancisco_SFO=1 55 ==> LosAngeles_LAX=1 55 <conf:(1)> lift:(6.38)
66. Heathrow_London_LHR=1 OHare_Chicago_ORD=1 55 ==> LosAngeles_LAX=1 55 <conf:(1)> lift:(6.38)
67. Amsterdam_AMS=1 Arlanda_Stockholm_ARN=1 Oslo_OSL=1 55 ==> Kastrup_Copenhagen_CPH=1 55 <conf:(1)> lift:(5.53)
68. Arlanda_Stockholm_ARN=1 Duesseldorf_DUS=1 Geneva_GVA=1 55 ==> Munich_MUC=1 55 <conf:(1)> lift:(5.07)
69. Arlanda_Stockholm_ARN=1 Duesseldorf_DUS=1 Malpensa_Milan_MXP=1 55 ==> Kastrup_Copenhagen_CPH=1 55 <conf:(1)> lift:(5.53)
70. Arlanda_Stockholm_ARN=1 Duesseldorf_DUS=1 Vienna_VIE=1 55 ==> Kastrup_Copenhagen_CPH=1 55 <conf:(1)> lift:(5.53)
71. Arlanda_Stockholm_ARN=1 Duesseldorf_DUS=1 Oslo_OSL=1 55 ==> Munich_MUC=1 55 <conf:(1)> lift:(5.07)
72. Arlanda_Stockholm_ARN=1 Fiumicino_Rome_FCO=1 Zurich_ZRH=1 55 ==> Kastrup_Copenhagen_CPH=1 55 <conf:(1)> lift:(5.53)
73. Arlanda_Stockholm_ARN=1 Malpensa_Milan_MXP=1 Zurich_ZRH=1 55 ==> Kastrup_Copenhagen_CPH=1 55 <conf:(1)> lift:(5.53)

74. Athens_ATH=1 Madrid_MAD=1 Prague_PRG=1 55 ==> Barcelona_BCN=1 55 <conf:(1)> lift:(5.11)
75. Bologna_BLQ=1 Fiumicino_Rome_FCO=1 Madrid_MAD=1 55 ==> Barcelona_BCN=1 55 <conf:(1)> lift:(5.11)
76. Barcelona_BCN=1 Frankfurt_FRA=1 Manchester_MAN=1 55 ==> Madrid_MAD=1 55 <conf:(1)> lift:(5.11)
77. Barcelona_BCN=1 Manchester_MAN=1 Munich_MUC=1 55 ==> Madrid_MAD=1 55 <conf:(1)> lift:(5.11)
78. Brussels_BRU=1 Frankfurt_FRA=1 Manchester_MAN=1 55 ==> Munich_MUC=1 55 <conf:(1)> lift:(5.07)
79. Duesseldorf_DUS=1 Frankfurt_FRA=1 Heathrow_London_LHR=1 55 ==> Munich_MUC=1 55 <conf:(1)> lift:(5.07)
80. Frankfurt_FRA=1 Madrid_MAD=1 Oslo_OSL=1 55 ==> Kastrup_Copenhagen_CPH=1 55 <conf:(1)> lift:(5.53)
81. Frankfurt_FRA=1 Oslo_OSL=1 Vienna_VIE=1 55 ==> Kastrup_Copenhagen_CPH=1 55 <conf:(1)> lift:(5.53)
82. Frankfurt_FRA=1 Manchester_MAN=1 Zurich_ZRH=1 55 ==> Munich_MUC=1 55 <conf:(1)> lift:(5.07)
83. Geneva_GVA=1 Heathrow_London_LHR=1 Manchester_MAN=1 55 ==> Zurich_ZRH=1 55 <conf:(1)> lift:(6.16)
84. JohnF_Kennedy_NewYork_JFK=1 Orlando_MCO=1 SanFrancisco_SFO=1 55 ==> LosAngeles_LAX=1 55 <conf:(1)> lift:(6.38)
85. JohnF_Kennedy_NewYork_JFK=1 Orlando_MCO=1 SanFrancisco_SFO=1 55 ==> McCarran_LasVegas_LAS=1 55 <conf:(1)> lift:(8.34)
86. McCarran_LasVegas_LAS=1 OHare_Chicago_ORD=1 Orlando_MCO=1 55 ==> LosAngeles_LAX=1 55 <conf:(1)> lift:(6.38)
87. McCarran_LasVegas_LAS=1 SanFrancisco_SFO=1 Seattle-Tacoma_SEA=1 55 ==> LosAngeles_LAX=1 55 <conf:(1)> lift:(6.38)
88. OHare_Chicago_ORD=1 Orlando_MCO=1 SanFrancisco_SFO=1 55 ==> LosAngeles_LAX=1 55 <conf:(1)> lift:(6.38)
89. Amsterdam_AMS=1 Arlanda_Stockholm_ARN=1 Brussels_BRU=1 Duesseldorf_DUS=1 55 ==> Kastrup_Copenhagen_CPH=1 55 <conf:(1)> lift:(5.53)
90. Amsterdam_AMS=1 Arlanda_Stockholm_ARN=1 CharlesDeGaulle_Paris_CDG=1 Duesseldorf_DUS=1 55 ==> Kastrup_Copenhagen_CPH=1 55 <conf:(1)> lift:(5.53)
91. Amsterdam_AMS=1 Arlanda_Stockholm_ARN=1 Frankfurt_FRA=1 Zurich_ZRH=1 55 ==> Kastrup_Copenhagen_CPH=1 55 <conf:(1)> lift:(5.53)
92. Amsterdam_AMS=1 Arlanda_Stockholm_ARN=1 Frankfurt_FRA=1 Zurich_ZRH=1 55 ==> Munich_MUC=1 55 <conf:(1)> lift:(5.07)
93. Amsterdam_AMS=1 Arlanda_Stockholm_ARN=1 Geneva_GVA=1 Munich_MUC=1 55 ==> Kastrup_Copenhagen_CPH=1 55 <conf:(1)> lift:(5.53)
94. Amsterdam_AMS=1 Arlanda_Stockholm_ARN=1 Geneva_GVA=1 Zurich_ZRH=1 55 ==> Kastrup_Copenhagen_CPH=1 55 <conf:(1)> lift:(5.53)
95. Amsterdam_AMS=1 Duesseldorf_DUS=1 Fiumicino_Rome_FCO=1 Geneva_GVA=1 55 ==> Munich_MUC=1 55 <conf:(1)> lift:(5.07)
96. Amsterdam_AMS=1 Duesseldorf_DUS=1 Fiumicino_Rome_FCO=1 Zurich_ZRH=1 55 ==> Munich_MUC=1 55 <conf:(1)> lift:(5.07)
97. Amsterdam_AMS=1 Duesseldorf_DUS=1 Geneva_GVA=1 Kastrup_Copenhagen_CPH=1 55 ==> Munich_MUC=1 55 <conf:(1)> lift:(5.07)

98. Amsterdam_AMS=1 Duesseldorf_DUS=1 Malpensa_Milan_MXP=1 Zurich_ZRH=1 55 ==> Munich_MUC=1 55 <conf:(1)> lift:(5.07)
99. Arlanda_Stockholm_ARN=1 Brussels_BRU=1 CharlesDeGaulle_Paris_CDG=1 Duesseldorf_DUS=1 55 ==> Kastrup_Copenhagen_CPH=1 55 <conf:(1)> lift:(5.53)
100. Arlanda_Stockholm_ARN=1 Brussels_BRU=1 Duesseldorf_DUS=1 Munich_MUC=1 55 ==> Kastrup_Copenhagen_CPH=1 55 <conf:(1)> lift:(5.53)
101. Arlanda_Stockholm_ARN=1 Duesseldorf_DUS=1 Frankfurt_FRA=1 Tegel_Berlin_TXL=1 55 ==> Munich_MUC=1 55 <conf:(1)> lift:(5.07)
102. Arlanda_Stockholm_ARN=1 Frankfurt_FRA=1 Kastrup_Copenhagen_CPH=1 Oslo_OSL=1 55 ==> Munich_MUC=1 55 <conf:(1)> lift:(5.07)
103. Arlanda_Stockholm_ARN=1 Frankfurt_FRA=1 Kastrup_Copenhagen_CPH=1 Tegel_Berlin_TXL=1 55 ==> Munich_MUC=1 55 <conf:(1)> lift:(5.07)
104. Brussels_BRU=1 Fiumicino_Rome_FCO=1 Madrid_MAD=1 MarcoPolo_Venice_VCE=1 55 ==> Barcelona_BCN=1 55 <conf:(1)> lift:(5.11)
105. Fiumicino_Rome_FCO=1 Frankfurt_FRA=1 Madrid_MAD=1 MarcoPolo_Venice_VCE=1 55 ==> Barcelona_BCN=1 55 <conf:(1)> lift:(5.11)
106. Fiumicino_Rome_FCO=1 Kastrup_Copenhagen_CPH=1 Madrid_MAD=1 MarcoPolo_Venice_VCE=1 55 ==> Barcelona_BCN=1 55 <conf:(1)> lift:(5.11)
107. Brussels_BRU=1 Duesseldorf_DUS=1 Frankfurt_FRA=1 Zurich_ZRH=1 55 ==> Munich_MUC=1 55 <conf:(1)> lift:(5.07)
108. Brussels_BRU=1 Fiumicino_Rome_FCO=1 Geneva_GVA=1 Munich_MUC=1 55 ==> Zurich_ZRH=1 55 <conf:(1)> lift:(6.16)
109. Duesseldorf_DUS=1 Frankfurt_FRA=1 Geneva_GVA=1 Kastrup_Copenhagen_CPH=1 55 ==> Munich_MUC=1 55 <conf:(1)> lift:(5.07)
110. Duesseldorf_DUS=1 Frankfurt_FRA=1 Kastrup_Copenhagen_CPH=1 Oslo_OSL=1 55 ==> Munich_MUC=1 55 <conf:(1)> lift:(5.07)
111. Duesseldorf_DUS=1 Frankfurt_FRA=1 Madrid_MAD=1 Zurich_ZRH=1 55 ==> Munich_MUC=1 55 <conf:(1)> lift:(5.07)
112. Duesseldorf_DUS=1 Frankfurt_FRA=1 Malpensa_Milan_MXP=1 Zurich_ZRH=1 55 ==> Munich_MUC=1 55 <conf:(1)> lift:(5.07)
113. Heathrow_London_LHR=1 Madrid_MAD=1 Manchester_MAN=1 Munich_MUC=1 55 ==> Frankfurt_FRA=1 55 <conf:(1)> lift:(4.71)
114. Frankfurt_FRA=1 Kastrup_Copenhagen_CPH=1 Malpensa_Milan_MXP=1 Zurich_ZRH=1 55 ==> Munich_MUC=1 55 <conf:(1)> lift:(5.07)
115. JohnF_Kennedy_NewYork_JFK=1 McCarran_LasVegas_LAS=1 Orlando_MCO=1 SanFrancisco_SFO=1 55 ==> LosAngeles_LAX=1 55 <conf:(1)> lift:(6.38)
116. JohnF_Kennedy_NewYork_JFK=1 LosAngeles_LAX=1 Orlando_MCO=1 SanFrancisco_SFO=1 55 ==> McCarran_LasVegas_LAS=1 55 <conf:(1)> lift:(8.34)
117. JohnF_Kennedy_NewYork_JFK=1 Orlando_MCO=1 SanFrancisco_SFO=1 55 ==> LosAngeles_LAX=1 McCarran_LasVegas_LAS=1 55 <conf:(1)> lift:(8.74)
118. Amsterdam_AMS=1 Arlanda_Stockholm_ARN=1 Duesseldorf_DUS=1 Frankfurt_FRA=1 Munich_MUC=1 55 ==> Kastrup_Copenhagen_CPH=1 55 <conf:(1)> lift:(5.53)
119. Amsterdam_AMS=1 Arlanda_Stockholm_ARN=1 Frankfurt_FRA=1 Munich_MUC=1 Zurich_ZRH=1 55 ==> Kastrup_Copenhagen_CPH=1 55 <conf:(1)> lift:(5.53)
120. Amsterdam_AMS=1 Arlanda_Stockholm_ARN=1 Frankfurt_FRA=1 Kastrup_Copenhagen_CPH=1 Zurich_ZRH=1 55 ==> Munich_MUC=1 55 <conf:(1)> lift:(5.07)

121. Amsterdam_AMS=1 Arlanda_Stockholm_ARN=1 Frankfurt_FRA=1 Zurich_ZRH=1 55 ==> Kastrup_Copenhagen_CPH=1 Munich_MUC=1 55 <conf:(1)> lift:(7.04)
122. Amsterdam_AMS=1 Brussels_BRU=1 CharlesDeGaulle_Paris_CDG=1 Geneva_GVA=1 Munich_MUC=1 55 ==> Zurich_ZRH=1 55 <conf:(1)> lift:(6.16)
123. Amsterdam_AMS=1 Brussels_BRU=1 Frankfurt_FRA=1 Geneva_GVA=1 Munich_MUC=1 55 ==> Zurich_ZRH=1 55 <conf:(1)> lift:(6.16)
124. Amsterdam_AMS=1 Brussels_BRU=1 Geneva_GVA=1 Malpensa_Milan_MXP=1 Munich_MUC=1 55 ==> Zurich_ZRH=1 55 <conf:(1)> lift:(6.16)
125. Amsterdam_AMS=1 Duesseldorf_DUS=1 Frankfurt_FRA=1 Kastrup_Copenhagen_CPH=1 Zurich_ZRH=1 55 ==> Munich_MUC=1 55 <conf:(1)> lift:(5.07)
126. Amsterdam_AMS=1 Frankfurt_FRA=1 Geneva_GVA=1 Kastrup_Copenhagen_CPH=1 Munich_MUC=1 55 ==> Zurich_ZRH=1 55 <conf:(1)> lift:(6.16)
127. Amsterdam_AMS=1 Fiumicino_Rome_FCO=1 Frankfurt_FRA=1 Geneva_GVA=1 Malpensa_Milan_MXP=1 Munich_MUC=1 55 ==> Zurich_ZRH=1 55 <conf:(1)> lift:(6.16)
128. Amsterdam_AMS=1 Melbourne_MEL=1 54 ==> Sydney_SYD=1 54 <conf:(1)> lift:(6.86)
129. CharlesDeGaulle_Paris_CDG=1 OHare_Chicago_ORD=1 54 ==> LosAngeles_LAX=1 54 <conf:(1)> lift:(6.38)
130. Dallas_Ft_Worth_DFW=1 Seattle-Tacoma_SEA=1 54 ==> LosAngeles_LAX=1 54 <conf:(1)> lift:(6.38)
131. Dulles_Washington_IAD=1 OHare_Chicago_ORD=1 54 ==> LosAngeles_LAX=1 54 <conf:(1)> lift:(6.38)
132. EdwardL_Logan_Boston_BOS=1 SanFrancisco_SFO=1 54 ==> LosAngeles_LAX=1 54 <conf:(1)> lift:(6.38)
133. Frankfurt_FRA=1 SanFrancisco_SFO=1 54 ==> LosAngeles_LAX=1 54 <conf:(1)> lift:(6.38)
134. Orlando_MCO=1 Seattle-Tacoma_SEA=1 54 ==> LosAngeles_LAX=1 54 <conf:(1)> lift:(6.38)
135. Orlando_MCO=1 Seattle-Tacoma_SEA=1 54 ==> McCarran_LasVegas_LAS=1 54 <conf:(1)> lift:(8.34)
136. Amsterdam_AMS=1 Duesseldorf_DUS=1 Oslo_OSL=1 54 ==> Kastrup_Copenhagen_CPH=1 54 <conf:(1)> lift:(5.53)
137. Amsterdam_AMS=1 Duesseldorf_DUS=1 Oslo_OSL=1 54 ==> Munich_MUC=1 54 <conf:(1)> lift:(5.07)
138. Amsterdam_AMS=1 MarcoPolo_Venice_VCE=1 Zurich_ZRH=1 54 ==> Geneva_GVA=1 54 <conf:(1)> lift:(5.89)
139. Amsterdam_AMS=1 Oslo_OSL=1 Zurich_ZRH=1 54 ==> Kastrup_Copenhagen_CPH=1 54 <conf:(1)> lift:(5.53)
140. Arlanda_Stockholm_ARN=1 Helsinki_HEL=1 Munich_MUC=1 54 ==> Kastrup_Copenhagen_CPH=1 54 <conf:(1)> lift:(5.53)
141. Barcelona_BCN=1 Brussels_BRU=1 Nice_NCE=1 54 ==> Madrid_MAD=1 54 <conf:(1)> lift:(5.11)
142. Frankfurt_FRA=1 Madrid_MAD=1 Nice_NCE=1 54 ==> Barcelona_BCN=1 54 <conf:(1)> lift:(5.11)
143. Barcelona_BCN=1 Frankfurt_FRA=1 Nice_NCE=1 54 ==> Madrid_MAD=1 54 <conf:(1)> lift:(5.11)

144. Barcelona_BCN=1 Malpensa_Milan_MXP=1 Nice_NCE=1 54 ==> Madrid_MAD=1 54 <conf:(1)> lift:(5.11)
145. Brussels_BRU=1 Duesseldorf_DUS=1 Geneva_GVA=1 54 ==> Zurich_ZRH=1 54 <conf:(1)> lift:(6.16)
146. CharlesDeGaulle_Paris_CDG=1 Fiumicino_Rome_FCO=1 Tegel_Berlin_TXL=1 54 ==> Malpensa_Milan_MXP=1 54 <conf:(1)> lift:(4.71)
147. CharlesDeGaulle_Paris_CDG=1 MarcoPolo_Venice_VCE=1 Zurich_ZRH=1 54 ==> Malpensa_Milan_MXP=1 54 <conf:(1)> lift:(4.71)
148. Fiumicino_Rome_FCO=1 Frankfurt_FRA=1 Oslo_OSL=1 54 ==> Kastrup_Copenhagen_CPH=1 54 <conf:(1)> lift:(5.53)
149. Fiumicino_Rome_FCO=1 Manchester_MAN=1 Zurich_ZRH=1 54 ==> Geneva_GVA=1 54 <conf:(1)> lift:(5.89)
150. Fiumicino_Rome_FCO=1 Munich_MUC=1 Oslo_OSL=1 54 ==> Kastrup_Copenhagen_CPH=1 54 <conf:(1)> lift:(5.53)
151. Heathrow_London_LHR=1 Munich_MUC=1 Singapore_SIN=1 54 ==> Frankfurt_FRA=1 54 <conf:(1)> lift:(4.71)
152. Malpensa_Milan_MXP=1 Munich_MUC=1 Singapore_SIN=1 54 ==> Frankfurt_FRA=1 54 <conf:(1)> lift:(4.71)
153. Heathrow_London_LHR=1 JohnF_Kennedy_NewYork_JFK=1 SanFrancisco_SFO=1 54 ==> LosAngeles_LAX=1 54 <conf:(1)> lift:(6.38)
154. JohnF_Kennedy_NewYork_JFK=1 Miami_MIA=1 SanFrancisco_SFO=1 54 ==> LosAngeles_LAX=1 54 <conf:(1)> lift:(6.38)
155. McCarran_LasVegas_LAS=1 Orlando_MCO=1 Seattle-Tacoma_SEA=1 54 ==> LosAngeles_LAX=1 54 <conf:(1)> lift:(6.38)
156. LosAngeles_LAX=1 Orlando_MCO=1 Seattle-Tacoma_SEA=1 54 ==> McCarran_LasVegas_LAS=1 54 <conf:(1)> lift:(8.34)
157. Orlando_MCO=1 Seattle-Tacoma_SEA=1 54 ==> LosAngeles_LAX=1 McCarran_LasVegas_LAS=1 54 <conf:(1)> lift:(8.74)
158. OHare_Chicago_ORD=1 SanFrancisco_SFO=1 Seattle-Tacoma_SEA=1 54 ==> LosAngeles_LAX=1 54 <conf:(1)> lift:(6.38)
159. Amsterdam_AMS=1 Arlanda_Stockholm_ARN=1 CharlesDeGaulle_Paris_CDG=1 Zurich_ZRH=1 54 ==> Kastrup_Copenhagen_CPH=1 54 <conf:(1)> lift:(5.53)
160. Amsterdam_AMS=1 Arlanda_Stockholm_ARN=1 Duesseldorf_DUS=1 Zurich_ZRH=1 54 ==> Kastrup_Copenhagen_CPH=1 54 <conf:(1)> lift:(5.53)
161. Amsterdam_AMS=1 Arlanda_Stockholm_ARN=1 Munich_MUC=1 Oslo_OSL=1 54 ==> Kastrup_Copenhagen_CPH=1 54 <conf:(1)> lift:(5.53)
162. Amsterdam_AMS=1 Frankfurt_FRA=1 Madrid_MAD=1 MarcoPolo_Venice_VCE=1 54 ==> Barcelona_BCN=1 54 <conf:(1)> lift:(5.11)
163. Amsterdam_AMS=1 Brussels_BRU=1 Duesseldorf_DUS=1 Zurich_ZRH=1 54 ==> Munich_MUC=1 54 <conf:(1)> lift:(5.07)
164. Amsterdam_AMS=1 Duesseldorf_DUS=1 Geneva_GVA=1 Madrid_MAD=1 54 ==> Munich_MUC=1 54 <conf:(1)> lift:(5.07)
165. Amsterdam_AMS=1 Duesseldorf_DUS=1 Geneva_GVA=1 Malpensa_Milan_MXP=1 54 ==> Munich_MUC=1 54 <conf:(1)> lift:(5.07)
166. Amsterdam_AMS=1 Duesseldorf_DUS=1 Geneva_GVA=1 Malpensa_Milan_MXP=1 54 ==> Zurich_ZRH=1 54 <conf:(1)> lift:(6.16)
167. Amsterdam_AMS=1 Duesseldorf_DUS=1 Munich_MUC=1 Oslo_OSL=1 54 ==> Kastrup_Copenhagen_CPH=1 54 <conf:(1)> lift:(5.53)

168. Amsterdam_AMS=1 Duesseldorf_DUS=1 Kastrup_Copenhagen_CPH=1 Oslo_OSL=1 54 ==> Munich_MUC=1 54 <conf:(1)> lift:(5.07)
169. Amsterdam_AMS=1 Duesseldorf_DUS=1 Oslo_OSL=1 54 ==> Kastrup_Copenhagen_CPH=1 Munich_MUC=1 54 <conf:(1)> lift:(7.04)
170. Amsterdam_AMS=1 Frankfurt_FRA=1 Kastrup_Copenhagen_CPH=1 Vienna_VIE=1 54 ==> Munich_MUC=1 54 <conf:(1)> lift:(5.07)
171. Arlanda_Stockholm_ARN=1 Duesseldorf_DUS=1 Frankfurt_FRA=1 Malpensa_Milan_MXP=1 54 ==> Kastrup_Copenhagen_CPH=1 54 <conf:(1)> lift:(5.53)
172. Arlanda_Stockholm_ARN=1 Duesseldorf_DUS=1 Frankfurt_FRA=1 Oslo_OSL=1 54 ==> Munich_MUC=1 54 <conf:(1)> lift:(5.07)
173. Arlanda_Stockholm_ARN=1 Duesseldorf_DUS=1 Frankfurt_FRA=1 Zurich_ZRH=1 54 ==> Munich_MUC=1 54 <conf:(1)> lift:(5.07)
174. Arlanda_Stockholm_ARN=1 Duesseldorf_DUS=1 Geneva_GVA=1 Kastrup_Copenhagen_CPH=1 54 ==> Munich_MUC=1 54 <conf:(1)> lift:(5.07)
175. Arlanda_Stockholm_ARN=1 Duesseldorf_DUS=1 Kastrup_Copenhagen_CPH=1 Oslo_OSL=1 54 ==> Munich_MUC=1 54 <conf:(1)> lift:(5.07)
176. Arlanda_Stockholm_ARN=1 Duesseldorf_DUS=1 Munich_MUC=1 Vienna_VIE=1 54 ==> Kastrup_Copenhagen_CPH=1 54 <conf:(1)> lift:(5.53)
177. Arlanda_Stockholm_ARN=1 Fiumicino_Rome_FCO=1 Geneva_GVA=1 Munich_MUC=1 54 ==> Kastrup_Copenhagen_CPH=1 54 <conf:(1)> lift:(5.53)
178. Arlanda_Stockholm_ARN=1 Frankfurt_FRA=1 Geneva_GVA=1 Kastrup_Copenhagen_CPH=1 54 ==> Munich_MUC=1 54 <conf:(1)> lift:(5.07)
179. Arlanda_Stockholm_ARN=1 Frankfurt_FRA=1 Geneva_GVA=1 Zurich_ZRH=1 54 ==> Munich_MUC=1 54 <conf:(1)> lift:(5.07)
180. Arlanda_Stockholm_ARN=1 Munich_MUC=1 Oslo_OSL=1 Vienna_VIE=1 54 ==> Kastrup_Copenhagen_CPH=1 54 <conf:(1)> lift:(5.53)
181. Athens_ATH=1 Fiumicino_Rome_FCO=1 Madrid_MAD=1 MarcoPolo_Venice_VCE=1 54 ==> Barcelona_BCN=1 54 <conf:(1)> lift:(5.11)
182. Barcelona_BCN=1 Frankfurt_FRA=1 Manchester_MAN=1 Munich_MUC=1 54 ==> Madrid_MAD=1 54 <conf:(1)> lift:(5.11)
183. Brussels_BRU=1 Geneva_GVA=1 Madrid_MAD=1 Munich_MUC=1 54 ==> Zurich_ZRH=1 54 <conf:(1)> lift:(6.16)
184. CharlesDeGaulle_Paris_CDG=1 Duesseldorf_DUS=1 Frankfurt_FRA=1 Geneva_GVA=1 54 ==> Munich_MUC=1 54 <conf:(1)> lift:(5.07)
185. Duesseldorf_DUS=1 Fiumicino_Rome_FCO=1 Frankfurt_FRA=1 Geneva_GVA=1 54 ==> Munich_MUC=1 54 <conf:(1)> lift:(5.07)
186. Duesseldorf_DUS=1 Fiumicino_Rome_FCO=1 Frankfurt_FRA=1 Zurich_ZRH=1 54 ==> Munich_MUC=1 54 <conf:(1)> lift:(5.07)
187. Duesseldorf_DUS=1 Frankfurt_FRA=1 Geneva_GVA=1 Madrid_MAD=1 54 ==> Munich_MUC=1 54 <conf:(1)> lift:(5.07)
188. Duesseldorf_DUS=1 Frankfurt_FRA=1 Geneva_GVA=1 Malpensa_Milan_MXP=1 54 ==> Munich_MUC=1 54 <conf:(1)> lift:(5.07)
189. Duesseldorf_DUS=1 Frankfurt_FRA=1 Kastrup_Copenhagen_CPH=1 Vienna_VIE=1 54 ==> Munich_MUC=1 54 <conf:(1)> lift:(5.07)
190. Frankfurt_FRA=1 Munich_MUC=1 Oslo_OSL=1 Vienna_VIE=1 54 ==> Kastrup_Copenhagen_CPH=1 54 <conf:(1)> lift:(5.53)
191. Frankfurt_FRA=1 Madrid_MAD=1 Malpensa_Milan_MXP=1 Manchester_MAN=1 54 ==> Munich_MUC=1 54 <conf:(1)> lift:(5.07)

192. JohnF_Kennedy_NewYork_JFK=1 McCarran_LasVegas_LAS=1 OHare_Chicago_ORD=1 SanFrancisco_SFO=1 54 ==> LosAngeles_LAX=1 54 <conf:(1)> lift:(6.38)
193. McCarran_LasVegas_LAS=1 OHare_Chicago_ORD=1 Orlando_MCO=1 SanFrancisco_SFO=1 54 ==> LosAngeles_LAX=1 54 <conf:(1)> lift:(6.38)
194. Amsterdam_AMS=1 Arlanda_Stockholm_ARN=1 Brussels_BRU=1 Duesseldorf_DUS=1 Frankfurt_FRA=1 54 ==> Kastrup_Copenhagen_CPH=1 54 <conf:(1)> lift:(5.53)
195. Amsterdam_AMS=1 Barcelona_BCN=1 Frankfurt_FRA=1 Geneva_GVA=1 Munich_MUC=1 54 ==> Zurich_ZRH=1 54 <conf:(1)> lift:(6.16)
196. Amsterdam_AMS=1 Brussels_BRU=1 Fiumicino_Rome_FCO=1 Geneva_GVA=1 Munich_MUC=1 54 ==> Zurich_ZRH=1 54 <conf:(1)> lift:(6.16)
197. Amsterdam_AMS=1 Duesseldorf_DUS=1 Fiumicino_Rome_FCO=1 Geneva_GVA=1 Zurich_ZRH=1 54 ==> Munich_MUC=1 54 <conf:(1)> lift:(5.07)
198. Amsterdam_AMS=1 Duesseldorf_DUS=1 Geneva_GVA=1 Kastrup_Copenhagen_CPH=1 Zurich_ZRH=1 54 ==> Munich_MUC=1 54 <conf:(1)> lift:(5.07)
199. Amsterdam_AMS=1 Duesseldorf_DUS=1 Geneva_GVA=1 Malpensa_Milan_MXP=1 Zurich_ZRH=1 54 ==> Munich_MUC=1 54 <conf:(1)> lift:(5.07)
200. Amsterdam_AMS=1 Duesseldorf_DUS=1 Geneva_GVA=1 Malpensa_Milan_MXP=1 Munich_MUC=1 54 ==> Zurich_ZRH=1 54 <conf:(1)> lift:(6.16)

As can be seen from Table 2, according to the first rule produced, 66 airlines flying to JohnF_Kennedy_NewYork_JFK and SanFrancisco_SFO destinations also fly to LosAngeles_LAX destinations. The confidence level of this rule is 1 and the lift value is 6.38.

According to the second rule, 61 airlines flying to OHare_Chicago_ORD and SanFrancisco_SFO destinations also fly to Duesseldorf_DUS destinations. The confidence level of this rule is 1 and the lift value is 6.38.

According to the third rule, 61 airlines flying to Amsterdam_AMS, Arlanda_Stockholm_ARN and Duesseldorf_DUS destinations also fly to Kastrup_Copenhagen_CPH destinations. The confidence level of this rule is 1 and the lift value is 5.53. For the remaining 197 rules, comments similar to the comments above can be made.

VI. Conclusion

One of the important decisions made by airlines is to determine which destinations they will fly to. Destination selection is one of the strategic decisions affecting airline companies' profitability, competitiveness, sustainability and success.

With this study, it was aimed to contribute to the decision making processes of the managers of the airlines with a strategic approach to the stage of defining and establishing the destinations of the business, based on the destination selections of the competitors.

Although there are many techniques developed in the fields of operations research, spatial planning and economics in terms of destination selection, these techniques conclude within an analytical approach over a limited number of destinations. A synthesist approach that takes into account all the destinations and competitor behaviors of all airlines will be important in terms of both providing a new perspective and complementary to existing techniques. Within the framework of such an approach, it may be possible to assist decision making processes for airlines to evaluate existing destinations and determine new destinations by using data mining techniques.

In today's world, an enormous amount of data is collected in a database, text file or web environment in every field. In the analysis and evaluation of the data, different analysis techniques are used according to the way the data is obtained and the size. In this study, the data was obtained from web sources and data mining was used to analyze the data. Using the association analysis / association rule technique, which is one of the most widely used techniques of data mining, associations were sought between airline destinations.

3.7.2 version of Weka program was used in the study. Weka program is an open source software. This program supports the algorithm of many classification, clustering and association rules.

In the study, the rules of association were sought, considering both the destinations and the airline's destinations outside its home country. Apriori algorithm was used in both analyzes. In the analysis of all destinations, 197 rules could be produced with 90% confidence level. In the analysis between the companies' destinations other than their own countries, 200 rules could be produced at 100% confidence level.

Thus, the rules and patterns between competitor behaviors were determined by evaluating the destinations that are currently flying. These rules and patterns, which are based on hidden or open, general and indispensable reasons determined by considering all flights of all airlines, can contribute to the determination, evaluation and selection of destinations by considering the behavior of competitors. Based on the results obtained, it can be said that data mining is an important method in revealing the associations in the airline data. It is considered that the results of this associations will be beneficial for airline companies.

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