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Understanding Travel Behavior in Aviation Industry

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Abstract: ***The research paper is an attempt to provide ease to the customers of the airline industry in-flight selection process depending upon their respective travel motives. The selection of an airline among alternatives is a Multi-Criteria Decision Making (MCDM) problem. This paper develops an evaluation model based on the Analytical Hierarchy Process (AHP) to determine the magnitude of each criterion numerically and the fuzzy Technique for Order of Preference-based on Similarity to Ideal Solution (TOPSIS) is used to obtain the final ranking. For our study- Brand trust, Prize of tickets, Hospitality, Privileges, Lay-off duration, Time of flight, Overweight luggage charges, we considered as the critical parameters and the elements of the discussion. The study delved into the domestic market of India for the evaluation process. The methodology included a survey questionnaire conducted among the postgraduates and undergraduates of the university, Professionals from the IT industry, and some entrepreneurs. The insights derived from the study are likely to provide a better understanding of the airline industry for consumers. Alternatively, the managers and organizations can help their consumers in selecting optimum alternatives for planning their travel with the airlines. The study lays more emphasis on the degree of ease and associated parameters. The study follows by further subdividing the preferred airline ranking concerning customer purpose, traveling for vacation, business, and job purposes. The data so collected confirms the premise mentioned above.***

Keywords: AHP, Airline Industry, TOPSIS

1. Introduction

India's aviation industry is largely untapped with huge growth opportunities. A proper selection of airlines is, therefore, a very important issue in the present scenario. Understanding the severe competition the airline industry is facing in today's world, it becomes pertinent to recognize the booming market in the industry described above. Past studies have performed research analysis in various airline industriess(Kaynak et al., 1994; Sevkli et al., 2012).

The purpose of this research is to understand why certain categories of individuals prefer traveling from various airlines and what are the important criteria they consider while they travel through these means. Our study, therefore, is an attempt to explore the dimensions which lead to the selection of various airlines by individuals traveling for various purposes.

Therefore, in this regard, their relative preferences are understood based on criteria that are most significant to and support the airline industry. This analysis provides useful information for airline companies about their objectives, policies, and approaches to managing their airlines. Further, they also provide guidelines for managers and aviation industries to take relative precautions while forming their pricing policies for different categories of passengers.

As the past studies have majorly emphasized on the tourism and aviation industries, however, the studies have limited their scope in understanding the effects of several parameters on choosing an airline, particularly the dimensions which have been examined in the present research. For example, the studies have mostly overlooked the role of brands in choosing airlines across the various purposes of the visit of passengers to different locations. Therefore, our study aims to evaluate the role of several parameters in choosing an airline.

In contrast to the various passengers we examined educators, business travelers, and leisure travelers, our study encapsulates them holistically under one umbrella. Such visitors may include travel for educational purposes or into some leisure and fun activities or business purposes. Our study therefore integrates and understands the role of various parameters such as Brand trust, Prize of tickets, hospitality, privileges, Lay-off duration, Time of flight, Overweight luggage charges, etc. This study provides a better understanding of the airline industries and also strategically plans them in the growing market. Our study was based on surveys. The data confirmed the following:

Those passengers who are traveling for business or job purposes prefer it named airlines as their mode of transportation and overweight sis not as important criteria for them.

Passengers traveling for vocational/leisure activities prefer the price of a ticket as an important criterion whereas overweight as least important.

This clearly indicates that certain travelers lay special emphasis on different criteria to plan their travel accordingly. The study provides more insights about how individuals prefer their criteria for planning their travel

Additionally, the study provides insights for airline industries as to what are certain criteria individuals lay emphasis on while planning their travels. The study strongly recommends managers to cater to different customers and plan their ticket management system accordingly. The study also contributes to the existing literature to

Criteria for selecting the airlines

1) Brand Trust – "Brand trust is defined as the willingness of the average consumer to rely on the ability of the brand to perform its stated function"(Holbrook, 2012). Consumers lay a special affinity for brands they trust. Therefore, individuals consider known and familiar brands to travel. These individuals, for example, are more likely to resonate and maintain congruent relations with trusted brands. Therefore in our study, we consider the premise of these individuals that they are likely to maintain and travel with the congruent and more trusted airlines.

2) Price of tickets- "Individuals and specifically price-sensitive travelers prefer traveling based on the pricing of the tickets they are likely to pay." However, based on our study, we tried including travelers based on their purpose of travel. As a result, a few travelers may be less sensitive to the prices they are paying for the travels. Also, in certain cases, the dynamic pricing affects to a greater extent while choosing airlines. Therefore, it becomes very important to analyze and understand the notion of "price of tickets" behind choosing an airline for fellow travelers. Hence it was obvious for us to include this in our study.
3) Timing Of Flight- "It refers to the availability of several different departure timings provided by the airline in a single day." Individuals prefer traveling to their destination based on the variants of time slots available for reaching these destinations. Therefore, it becomes very important to analyze and understand the notion of "Time of flight" behind choosing an airline for fellow travelers. Hence it was obvious for us to include this in our study and provide better insights for airline industries to make use of this dimension and provide a better understanding of the traveler and the industries.
4) Services Provided- "It refers to the quality of services provided by the airline." To the growing clusters of various airlines emerging in the service industry, it is essential to advance the growing literature in terms of how various categories of individuals can actually be influenced by the service provided by several airlines. Past studies have clearly acknowledged the demand for airline services and clearly suggests that service quality is central to the choice of airlines for both business and leisure travelers. Not only can this but evaluation of more robust services provide a competitive advantage over the rival and competing airlines. In addition to the previous dimensions, this dimension provides a more comprehensive understanding of the airline industry in contrast to the previous studies.
5) Connectivity- "It refers to the number of destinations covered by the airline." Travelers combine variants of different possibilities to understand and minimize ways to reach their preferred destination. Hence it was obvious for us to include "connectivity" in our study and provide better insights for airline industries to make use of this dimension and provide a better understanding of the traveler and the industries.
6) Offers Provided- "It refers to the "on-ground discounts and offers" provided by the airline" There is a fundamental concern about anti-competitive promotion practices, in the context of social media and other online portals because of the competitive deals provided by these vendors. Such deals and offers make it even more difficult for airlines to struggle efficiently in each other's markets. We anticipate that this is likely to provide and have a strong influence on individuals choosing airlines over the other
7) Over Weight Luggage Charges – It refers to the charges of carrying luggage more than base weight allowed by the airline. Such restrictions also carry a huge carryover effect for individuals to choose a particular airline. Therefore, the study provides a more comprehensive understanding of the said dimension.
8) Lay-Off Duration – Passengers avoid taking an airline if they have huge lay-over resulting in incurring huge losses by the parent airline. Therefore, there is a need to understand what kind of traveler pays major emphasis on this parameter. Hence let us understand the use of lay-off duration and provide a better understanding of the traveler and the industries.

Categories/customer purposes –'

Following are the categories of travelers which was included in our study:

1) **Educational purposes-** Educational tourism is increasingly becoming popular, particularly in India. Students traveling for attending courses, exchange programs typically fall under this category. Education tourism also involves scholars to travel from their place to another place for different educational and training purposes like exams, conferences, lectures, diploma courses, etc.
2) **Vacation purposes** – It can be defined as the period to relax and travel for pleasure apart from doing your usual work or regular activities. It may include family trips, vacations, honeymoon, and other leisure activities.
3) **Job/business purposes - I**t can be defined as the travel for professional purposes by the self-employed or employees. It includes purchasing or selling goods or services, trade fairs, and exhibitions. It can also be formal on-job training and courses. There are many activities done for entertainment, like plays, concerts, etc.

2. Methodology

The paper employs TOPSIS (Chen, 2000; Olson, 2004) as a tool to estimate the performance indices P_i of the criteria determined as important factors in-flight selection process. Firstly, the data is collected from university graduates concerning various airlines from all the sources available openly accessible for public use as well as from the surveys conducted over various platforms. TOPSIS follows a certain predefined step to find the performance index P_i.

Step 1. The initial step is the configuration of the Normalization Matrix using all the values for the characteristic, which are illustrated in Table4.

Step2. We followed calculating the Weighted Normalization Matrix, as shown in Table5.

Step3. Followed this, we calculated the weighted Normalization Matrix. Additionally, we calculated the topmost and the lowermost values, which indicate the minimum and the maximum of the two values which are chosen as the most positive and most negative values. It is calculated using, as shown by equation 1:

$A = [a_{ij}]_{m \times n,}$ where, a_{ij} is

$A_{ij} = X'_{ij} / \sqrt{\sum_{i=0}^{n} X^{'}ij}$

i = 1, 2…n ; j = 1, 2,…….n

Step4. The next step is the separation measures calculations, which are the deviations of the values from the weighted Normalization Matrix. The values are calculated for each

dimension that is seven diverse values are obtained for eight diverse criteria. It is calculated using, as shown by equation 2:

$$S_i^+ = \sqrt{\sum_{j=1}^{m} W_j (a_{ij}^+ - a_{ij})^2}$$

$$S_i^- = \sqrt{\sum_{j=1}^{m} W_j (a_{ij}^- - a_{ij})^2}$$

Step 5. The final step is to calculate the performance index of all the criteria; it is achieved by the implementation of equation 3.

$$P_i = \frac{S_i^+ + S_i^-}{S_i^-}$$

The paper utilizes the Analytic Hierarchy Process like previous studies(AHP)(Kurttila et al., 2000) to determine the near-perfect weight to the criteria mention in the table. AHP "is a structured process to determine the relative importance of a set of activities in a multi-criteria decision-making problems." The data used in this process is collected using surveys. The quantitative procedure makes it an obvious choice to choose it over qualitative ones. The AHP method is based on three predicates:

- Configuration and analysis of the data collected
- The relative judgment of the alternatives and the criteria.
- Separation of the priorities.

The performance index depicts the overall performance of the various criteria following one another based on the customer's priorities. The following tables are mentioned to provide step by step interaction of the cumulated data with TOPSIS and AHP. The performances of all the airlines are judged by the customers based on seven criteria: - Brand trust, Prices of tickets, Time of flight, Services provided, Connectivity of the airline, Offers provided, Overweight Luggage Charges. These criteria are briefly illuminated in table1, and the data source for all the Airlines is depicted in table2. The importance of each criterion is then achieved by conducting the survey and with the use of AHP, the importance is numerically obtained in table3. The performance index is calculated for each Airline which is a superior indicator for performance judgment. The steps are precisely followed as mentioned before and are manifested in the following tables. The study aims at getting a near-perfect ranking for all Airlines to provide consumers the best available airline for their traveling purpose. Due to decision making based on analysis of mathematical calculations and raw facts and figures, it provides results that are less prone to errors and hence are satisfactory.

Table 1: Criteria of customers for airline selection

Criteria	*Meaning*	*Definition*
BT	Brand Trust	Brand trust is defined as the willingness of the average consumer to rely on the ability of the brand to perform its stated function."
POT	Price of Tickets	Individuals and specifically price-sensitive travelers prefer traveling based on the pricing of the tickets they are likely to pay.
TOF	Time of Flight	It refers to the availability of the number of different departure timings provided by the airline in a single day.
SP	Services Provided	It refers to the quality of services provided by the airline
CON	Connectivity	It refers to the number of destinations covered by the airline. Travelers combine variants of different possibilities to understand and minimize ways to reach their preferred destination
OP	Offers Provided	It refers to the "on-ground discounts and offers" provided by the airline
OWLC	Overweight Luggage Charges	It refers to the charges of carrying luggage more than the base weight allowed by the airline.
LOD	Lay-of-Duration	It refers to the duration between the two connecting flights.

Table 2: Showing values for criteria for different Airlines operating in India.

Flight	BT	POT	TOF	SP	CON	OP	OWLC	LOD
AIR INDIA	1	9800	5	5	69	3	325	125
AIR ASIA	6	8300	2	6	21	4	600	251
INDIGO	4	8900	5	4	66	5	1200	218
JETAIRWAYS	3	14000	4	2	52	2	750	115
GOAIR	5	8850	5	7	28	7	1140	53
SPICEJET	2	10250	4	3	51	6	240	78
VISTARA	7	10500	3	1	24	1	900	22

Table 3: Weights for different criteria calculated using AHP.

Criteria	Weight	Weight %
BT	0.083592	8.3591712
POT	0.22224	22.223954
TOF	0.138884	13.888396
SP	0.055334	5.533359
CON	0.111015	11.101508
OP	0.194468	19.446806
OWLC	0.027562	2.7562105
LOD	0.166906	16.690595

Table 4: Conversion into Normalization matrix for data from table 2.

Flight	BT	P	TOF	SP	CON	OP	OWLC	LOD
AIR INDIA	0.084515425	0.361780055	0.456435465	0.422577127	0.541730773	0.253546276	0.150953528	0.324099683
AIR ASIA	0.507092553	0.306405557	0.182574186	0.507092553	0.164874583	0.338061702	0.278683435	0.650792163
INDIGO	0.338061702	0.328555356	0.456435465	0.338061702	0.518177261	0.422577127	0.557366871	0.565229847
JETAIRWAYS	0.253546276	0.51682865	0.365148372	0.169030851	0.408260873	0.169030851	0.348354294	0.298171708
GoAir	0.422577127	0.326709539	0.456435465	0.591607978	0.219832778	0.591607978	0.529498527	0.137418266
Spicejet	0.169030851	0.378392404	0.365148372	0.253546276	0.400409702	0.507092553	0.111473374	0.202238202
VISTARA	0.591607978	0.387621487	0.273861279	0.084515425	0.188428095	0.084515425	0.418025153	0.057041544

Table 5: Conversion into the Weighted Normalization matrix

Flight	BT	P	TOF	SP	CON	OP	OWLC	LOD
AIR INDIA	0.007064789	0.080401834	0.063391563	0.023382709	0.060140286	0.049306652	0.004160597	0.054094167
AIR ASIA	0.042388734	0.068095431	0.025356625	0.028059251	0.018303565	0.065742203	0.007681102	0.108621087
INDIGO	0.028259156	0.073017992	0.063391563	0.018706167	0.057525491	0.082177754	0.015362204	0.094340227
JETAIRWAYS	0.021194367	0.114859763	0.050713251	0.009353084	0.045323114	0.032871101	0.009601378	0.049766633
GOAIR	0.035323945	0.072607779	0.063391563	0.032735793	0.024404754	0.115048855	0.014594094	0.022935927
SPICEJET	0.014129578	0.084093755	0.050713251	0.014029626	0.044451516	0.098613304	0.003072441	0.03375476
VISTARA	0.049453524	0.086144822	0.038034938	0.004676542	0.02091836	0.016435551	0.011521653	0.009520573

Table 6: Ideal best and ideal worst values from the weighted normalization matrix

Flight	BT	P	TOF	SP	CON	OP	OWLC	LOD
Ideal Best	0.007064789	0.068095431	0.063391563	0.004676542	0.060140286	0.016435551	0.003072441	0.108621087
Ideal Worst	0.049453524	0.114859763	0.025356625	0.032735793	0.018303565	0.115048855	0.015362204	0.009520573

Table 7: Calculated Euclidian distance from the ideal best and ideal worst

FLIGHT	Si+	Si-
AIR INDIA	0.067499975	0.112707231
AIR ASIA	0.086277956	0.120705183
INDIGO	0.073171845	0.116861731
JETAIRWAYS	0.081026582	0.105472561
GOAIR	0.141712985	0.060409584
SPICEJET	0.114709917	0.069852589
VISTARA	0.119147825	0.107325578

Table 8.1: Resultant performance index of the attributes(Education)

Ranking	*Flight*
1	Airline-1
3	Airline-2
4	Airline-3
6	Airline-4
2	Airline-5
7	Airline-6
5	Airline-7

Table 8.2: Resultant performance index of the attributes(Vacation)

Ranking	*Flight*
1	Airline-1
4	Airline-3
3	Airline-2
2	Airline-5
6	Airline-4
7	Airline-6
5	Airline-7

Table 8.3: Resultant performance index of the attributes(Business)

Ranking	*Flight*
1	Airline-1
2	Airline-5
3	Airline-2
4	Airline-3
5	Airline-7
6	Airline-4
7	Airline-6

3. Conclusions

In this study, data is collected using cross-sectional surveys AHP(Sevkli et al., 2012), TOPSIS is used as the analysis tool. Thus, we conclude that different categories of individuals prefer different criteria for selecting and traveling through different airlines. Their selection criteria are well demonstrated with the results so obtained. Thus, this provides insights for the managers and aviation industries to confirm and understand the profiles of individuals and then design and formulate their pricing policies accordingly. This research is likely to contribute to the aviation industries by ranking the different airlines and thus strategically understand their competitive procedures. We strongly recommend future studies to identify and explore more dimensions that may influence the selection of airlines by diverse travelers.

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