

Analytical Hierarchy Process (AHP) for Analysis: Selection of Passenger Airlines for Gulf Country

Amit Yadav, Maira Anis, Mohsin Ali & Sadhana Tuladhar

Abstract— Nepal is underdeveloped country with political instability and due to lack of job opportunity every year many people travel gulf country for job. In advance world, airway is the fastest medium for passenger to reach the destination. As day by day advancement of the aviation technologies, increased in speed and a lot of companies that entering to the airways sector. This leads to the conclusion that rising competition, price, services, airlines profile, comfort and other factors effect on decision making by the passengers. So we use AHP as a decision making approach to investigate if it is applicable in dealing the multiple criteria decision making problem. The criteria that care taken into consideration in this study include that food quality, risk management, airlines profile, cost, service and comfort of the four gulf country airlines. AHP helps in decision making by constructing hierarchies and each criterion can be assigned with the preference scale that is determined by the decision makers. It is further believed that the results of this work will be directly benefit to passengers travel gulf country, manpower company of Nepal and airlines in putting forward efficiency boosting suggestion by way of improvement in airlines and causes behind passengers choice.

Index Terms— Gulf Country Airlines (GCA), Passenger (P), Analytical Hierarchy Process (AHP)

1 INTRODUCTION

RAPID growth of technology world, there is rapid growth in passenger traffic in the airlines market worldwide. Airlines are the fastest medium to reach the destination and due which it becomes the people choice. As airlines try to acquire and retain customers, competition is ever increasing. Airlines Company the primary competitive weapon initially used is price but soon they realize that competition on price alone cannot make them win situation in the long term. This is the one of the main reason behind the fact that airlines are relatively efficient in responding to competitors price changes (Jones 1995). This means that in a high competitive market, airlines competitive advantages belongs in the service quality comprehended by customers. Airlines have long been observed as a key element of a modern functioning economy based on world trade and interconnectivity.

Nepal is agro based country, where most of people depend on agriculture. Agriculture is the slow process of earning money, because of certain time for cultivation. Foreign employment becomes strong demand among young Nepalese looking for income and job opportunities as well as skill and technological enhancement. The Ministry of Labor is the apex part in labor administration and it's mainly operations as policy level. According to them, until 1980's mainly people travel to India where work permits and passports are not required. But in mid-1980's, Nepali citizens began to seek work in gulf countries as gulf country are the largest place for job opportunity due to lot of resources. According to official records provided by the DLEP, at recent more than 280 recruiting agencies hold license to operate a foreign employment business. For the development of the country, the Nepali state has not been able to mobilize human resources for the development of the country.

When the Nepal Institute of development Studies published it's first Migration Year Book 2005, number of migrant workers was 135,992 for the fiscal year 2004-2005 and at recent the number had increased dramatically. According to Department of Foreign Employment, 240,269 Nepalese left overseas for foreign employment in the first 9 months of fiscal year 2010-2011 (MoLTM, 2011). Therefor for convenient of passenger in decision making to travel gulf country via airlines, we conduct this research study.

Airlines provide services to customers including ticket reservation, purchase, risk management, food quality, comfort and service at the destination as well as on-board etc. It not only consists of tangible attributes, but also intangible attributes such as airlines profile, food quality, comfort, service, risk management, which are difficult to measure accurately. Different experts usually have wide range of perceptions towards intangible attributes, depending on their preference structures and roles in process. Most of the criticism about scale based on measurement is that scores do not represent user preference, so respondents have to internally convert preference to scores and the conversion may introduce distortion of the preference being captured. Most studies assessing air companies portray mainly use tools as Data Envelopment Analysis (DEA) (Soares 2002, Angulo 2002). For analysis of data, selection criteria and human judgment perform a major role (Arslan 2004). They have also developed a behavioral model to explain route choice, where decision perceptions were modeled as fuzzy numbers. The fuzzy technique to assess the quality of airline services in Taiwan (Tsaur 2002).

This study is aim for selection of gulf country airlines travel from Nepal and helps in decision making for passenger through presentation of methodology to assess relevant criteria for purchasing flight ticket using the Hierarchical Analysis (HA) method. Considering as food quality, cost, airlines profile, risk management, service and comfort according to opinion based of experts as based on the studied done by Lima et al. (2006). Rest of this study is structured as follows: the first part is literature review which explains important aspects for

- Amit Yadav, PhD Scholar, School of Management & Economics (SME), University of Electronic Science and Technology of China (UESTC), China. Mobile-0086-18782240306. E-mail: amityan2u@yahoo.com
- Maira Anis, PhD Scholar, SME, UESTC, China.
- Mohsin Ali, PhD Scholar, SME, UESTC, China.
- Sadhana Tuladhar, Visa, package & tour coordinator, Air Arabia

the assessment of variables of airlines take in consideration for analysis and presents the evaluation framework and methodology. Next part explains the process and results of empirical study. The final results of the empirical study are presented in discussion and conclusion part.

2 LITERATURE REVIEW

There are many study conducted on airlines but very few study revels on decision making by passenger for selection of airlines. The explosion of client services, time comprehension, globalization of the industry and organizational integration are the challenges faced by logistics (Christopher 1997). Similarly, those challenges are face by the passenger's airlines. How these challenges are handled to serve the client in right time, in right quantity, with appropriate quality and costs for products and services are determines by the competency of each organization. The aspect of main competitive performance to define secondary aspects from the perspective of the clients are explained by Slack et al (1997), Ballou et al (2001), Correa et al (2001). These secondary aspects are taken into consideration while experts give values for each variable in our data collection process. Quality criterion will not be considered in this study as it only describes product specifications but food quality is taken into consideration because this plays vital role as passenger point of view. Due to religious point of view and its quality, mainly passenger suffer while travel in airlines.

In the life of individuals or group of people and it could be trivial or important, repetitive or novel, expected or unforeseen, decision making is a daily occurrence (Cooke 1991). Most of the people would like to see decision making as a means of optimizing choice but actually truth is those individuals often fail to do so in their daily life due to complex matters that require optimality choice (Janis 1979). Decision makers satisfied by making best of the satisfactory options to be the best solution to the problems (Simon 1993). However, if there is failure to make effective decision that leads to poor and wrong decision (Drucker 2001). So, using AHP for decision making process in order to overcome many of the shortcomings of the previous procedure is first suggested by Narasimhan (1983). So, the purpose of this research is to explore the use of this concept and suggested to easy apply methodology for many organizations in dealing with airlines selection decisions.

Professor Thomas Saaty of the Wharthon Business School in 1977 developed AHP. AHP was based primarily on the pair wise comparison matrices that with the help of decision maker use to establish preferences between alternatives for different criteria and the rating methods (Saaty 1980, Saaty 1994). Since it is introduce, the AHP has been widely applied in various field for decision making process. It has been utilized in a lot of specific application and areas such as sociology and environment, education, politics, budget allocation, marketing, project and portfolio selection, economic and planning, energy, health, conflict resolution and arms control, material handling and purchasing, manufacturing system, manpower selection and performance measurements (Saaty 1980, Saaty & Vargas 1982, Zahedi 1986).

Selection of aircraft to purchase for the biggest Turkish airlines company, Turkish Airlines using one of the multi criteria-

decision making techniques, Analytical Network Process (ANP) was undertaken by Yavuz (2011). Evaluation criteria often conflict and it is frequently impossible to find a supplier that excels in all areas, so selection problem is perhaps the most important component of the purchasing function (Robert 1992). In the field of academia, using of the AHP a more transparent process of awarding faculty's members for their excellence of performance in term of service to university and community, research and teaching was introduced (Badri & Abdulla 2004). Similar study an earlier research in the selection of high ranked personnel in the academia using was conducted using AHP (Taylor, Ketcham & Hottman 1989). The application of the AHP in relations to job selection for the fresh economic graduates in one of the local university was conducted by Soon (2004). Similarly in the field of academic the AHP is also widely used in the manufacturing and production field. The environmental performance of manufacturing process mainly in the pulp and manufacturing industry, AHP was used to asses (Pineda 2002). Using AHP investigated the suitability of various flexible manufacturing systems and cellular manufacturing configuration system (Chan 1996).

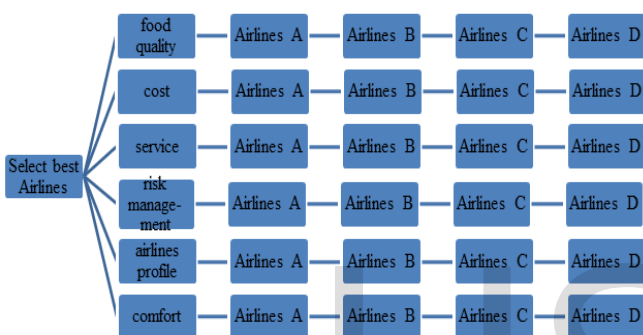
Therefore it is evident since it is introduced, the AHP had been widely used and its skillfulness is applicable in different areas. Education and manufacturing related fields mentioned above the AHP method is also applicable in other diverse areas of study, among other studies in benchmarking (Gilleard & Wong 2004, Portovi 2001), supplier selection (Bhutta & Huq 2002, Handfield 2002), outsourcing (Udo 2000), banking (Huu & Kar 2000), product development (Muller & Fairlie 2001), marketing (Davies 2001) and project evaluation (Liang 2003). Influencing from those studied and seeing the problem faced by passengers in Nepal to travel gulf country, this study had been conducted. From this research finding both passengers and Travel Company will be benefited.

3 METHODOLOGY

This research had taken the airlines data, adopting a qualitative approached by using focus group method for the data collection. Four major airlines taken for result findings mainly fly to gulf country and this research is focusing on convenient for passenger to travel via airlines to gulf country. As data for analysis taken is primary and sampling procedure was judgment sampling. The groups had been made up of different travel agencies expert staffs, who mainly work for those airlines (airline taken for study) in Nepal and whose inputs and judgment formed the basis of this study. The focus group adequately knows about the airlines quality, character and factors affecting the airlines which include director of travel agency, administration staff who handle matter of those airlines, ticket seller, and customers. Most of the group members have 5 to 10 years of working experience and well known with the aviation major problems. To alleviate the process of managing the focus group one of the senior administrators (well versed with major problem in aviation) was chosen to lead the discussions. This process helps the group to discuss more freely and enables to elicit maximum information. According to their opinion major factor which passenger's cares are food quality, cost, service, risk management, airlines profile and comfort. Those factors are taken for analysis and findings for this paper.

In overall, the discussion group agrees with those factors (variables) which mainly affect in decision making by passengers for travelling by airlines. They also believe that this study will helps in decision making for both customer as well as travel agency to give maximum benefit to passenger. These decision criteria are summarized in a questionnaire based on Enyinda (2010), and administered to the group so that their order of preference can be ranked and to enable the construction of the pairwise comparisons matrices. The construction of the hierarchies of goal, criteria and alternatives as required in the AHP helped by identifying the variables. Where airlines A is Qatar Airways, airlines B is Etihad Airways, airlines C is Air Arabia and airlines D is Fly Dubai. For the final analysis, using methodology followed by Robert (1992) for selection procedure we found the final result by finding best airline and ranking them respectively.

Fig 1: Airlines Selection Hierarchy



Food Quality

Food varies widely in quality and quantity across different airline companies and classes of travel. Meals must generally be frozen and heated on the ground before takeoff, rather than prepared fresh. Sometimes passengers complain about taste and quality, religious aspect (Hindu cannot eat beef, Muslim only eat halal meat). So due to those reason also passenger change mind in selection of airlines.

Cost:

In the purchasing ticket, cost has traditionally been considered as one of the most important aspects of airline’s selection criteria.

Service:

Airline’s services are imperative for any airlines firm. Airlines are expected to provide high-quality services. Essentially, services include consist of on-time departure & arrival, premium & VIP services, value added services, maintain aircraft, cargo & freight services.

Risk Management (RM):

Airlines must be able to proactively mitigate and manage accidental risks. The ability of airlines to help passenger reduce risk on purchasing ticket, fraud (charging more than real value), operational efficiency, safety, experienced pilot and consistency.

Airlines Profile (AP):

This criterion encompasses airline’s reputation, flexibility, capacity, financial condition.

Comfort:

As people travel long and short distance sitting on seat. But if passenger doesn’t feel comfort then might cause body pain, headache, muscle stretching and more impact on health. Com-

fort also play role in selection of airlines by passenger.

4 CITATIONS

By the groups had been made up of different travel agencies expert, findings had shown the results from the pair wise comparisons matrices that were constructed based on the criteria selected. The data is presented in the following manner:

(A) Pairwise Comparison Matrix and Computations: (Evaluation Criteria), (B) Airlines Pairwise Comparison Matrices and Priorities & (C) Computation of weights airlines alternatives.

Table 1: Pairwise Comparison Matrix and Computations for the six criteria

	FQ	Cost	Service	RM	AP	Com.fort
FQ	1	9	3	7	5	4
Cost	1/9	1	9	1	8	1
Service	1/3	1/9	1	7	8	1
RM	1/7	1	1/7	1	7	1
AP	1/5	1/8	1/8	1/7	1	3
Com.fort	1/4	1	1	1	1/3	1
Column Total	2.037	12.236	14.268	17.143	29.333	11

Table 2: Normalized Matrix for the six criteria

	FQ	Cost	Service	RM	AP	Com.fort	Weights (Row Avg)
FQ	0.491	0.736	0.210	0.408	0.170	0.364	0.397
Cost	0.055	0.082	0.631	0.058	0.273	0.091	0.198
Service	0.164	0.009	0.070	0.408	0.273	0.091	0.169
RM	0.070	0.082	0.010	0.058	0.239	0.091	0.092
AP	0.098	0.010	0.009	0.008	0.034	0.273	0.072
Com.fort	0.123	0.082	0.070	0.058	0.011	0.091	0.073
Total							1.00

Table 3-8 shows four airlines with respect to each criterion implemented the pairwise comparison matrices and priorities. The step followed to create the criteria comparison matrix is similar to this process.

Table 3: Pairwise Comparison Weights with respect to FQ (Food Quality)

	Airlines A	Airlines B	Airlines C	Airlines D
Airlines A	1	1	3	3
Airlines B	1	1	3	3
Airlines C	1/3	1/3	1	1
Airlines D	1/3	1/3	1	1
Weight	0.375	0.375	0.125	0.125

Table 4: Pairwise Comparison Weights with respect to Cost

	Airlines A	Airlines B	Airlines C	Airlines D
Airlines A	1	1	6	7
Airlines B	1	1	6	7
Airlines C	1/6	1/6	1	1
Airlines D	1/7	1/7	1	1
Weight	0.433	0.433	0.070	0.064

Table 5: Pairwise Comparison Weights with respect to Service

	Airlines A	Airlines B	Airlines C	Airlines D
Airlines A	1	1	7	7
Airlines B	1	1	8	8
Airlines C	1/7	1/8	1	2
Airlines D	1/7	1/8	1/2	1
Weight	0.424	0.453	0.072	0.051

Table 6: Pairwise Comparison Weights with respect to RM (Risk Management)

	Airlines A	Airlines B	Airlines C	Airlines D
Airlines A	1	1	7	7
Airlines B	1	1	7	7
Airlines C	1/7	1/7	1	1
Airlines D	1/7	1/7	1	1
Weight	0.438	0.438	0.063	0.063

Table 7: Pairwise Comparison Weights with respect to AP (Airlines Profile)

	Airlines A	Airlines B	Airlines C	Airlines D
Airlines A	1	1	8	8
Airlines B	1	1	8	8
Airlines C	1/8	1/8	1	1
Airlines D	1/8	1/8	1	1
Weight	0.444	0.444	0.056	0.056

Table 8: Pairwise Comparison Weights with respect to Comfort

	Airlines A	Airlines B	Airlines C	Airlines D
Airlines A	1	3	7	7
Airlines B	1/3	1	7	7
Airlines C	1/7	1/7	1	1
Airlines D	1/7	1/7	1	1
Weight	0.548	0.329	0.062	0.062

This means, travel agency experts on airlines compare each pair of airlines with respect to each criterion (food quality, cost, service, risk management, airlines profile and comfort). The three steps (sum of the elements in each column, divide each value of matrix by its column sum and find out the priority vector by computing row averages) is used to determine the weights of the airlines for each criterion.

Table 9: Computation of weights Airlines Alternatives

	FQ	Cost	Service	RM	AP	Comfort	Weights
Airlines A	0.397	0.198	0.169	0.092	0.072	0.073	0.419
Airlines B	0.375	0.433	0.424	0.438	0.444	0.329	0.407
Airlines C	0.125	0.070	0.072	0.063	0.056	0.062	0.090
Airlines D	0.125	0.064	0.051	0.063	0.056	0.062	0.085
Total							1.00

The final solution using AHP method and its analysis result is shown in table 9. Simple weighted average technique is followed to compute overall weights of the airlines data. Six weights are computed for given airlines, one for each rating criteria (from table 3-8) and the appropriate criteria weights in meeting the goals of the hierarchy are multiplied by these four weights (table 2). To find out the airlines score, the results of six criteria multiplications are added together. From selecting these airlines represents each airlines score by computing total benefits to be obtained from. According to result of the overall

weights of alternative airlines, airline A (0.419) is most favored airline with all aspect, as followed by airlines B (0.407) as ranked 2nd, similarly airlines C (0.090) ranked 3rd and airlines D (0.085) ranked as 4th. So, as from analysis result, our finding refers that airline A (0.419) is the best airlines for passengers to travel gulf country.

5 DISCUSSION AND CONCLUSION

The applicability of the AHP as an approach to aid decision making for multi criteria problem had indicated that the decision achieved in this study is not similar to the decision that has made by the travel agencies and passengers in selection of airlines for travelling to gulf country. According to them, travel agencies and passengers mainly focus on the cost of fair rather than other facilities. Even passengers who travels to gulf country are mainly workers or low level occupation holder, very few are the high level people. High level people mainly concern about safety, food quality, services, airlines profile and many more rather than cost. But lower level people have financial crisis, they mainly prefer for low cost fair rather than other safety or facility. While discussing about the airlines within the group, group have agreed the with the help of the AHP model had contributed towards a decision making process that is more precise such as decision arranged in agreed structure, permits decision makers to use judgment and observations to surmise relations to make prediction of most likely outcome, allow values and influences to be great accuracy and include the judgment that result from intuition.

The results had indicated that for passenger benefits the airlines A is highly preferred because with overall aspect this is the best to travel. As for our analysis, two airlines (airlines A, airlines B) fair is higher than other two (airlines C, airlines D). But overall analysis findings, airlines A score highest 0.419, 2nd ranked is airlines B (0.407), 3rd ranked is airlines C (0.090) and at last is airlines D (0.085). So we suggest passenger that cost is not only the important factor for travelling in airlines, other factor are also important as well.

Result also showed that decision maker were more able to analyze complex problem in making multi criteria decision by using the analytical hierarchy process. It shows that path to determine which criteria preponderate other both in the near and long terms. It is concerned with real life problem as it allows for consensus making and compromise when logic and intuition failed to help in decision making process. This also helps in saving of time because by representing the strengths and judgments numerically and agreeing on a value decision makers don't need to participate in prolonged argument. There are different tools that help in decision making, although it is widely used particularly in project development evaluation. It has its limitation in that not all decision criteria can be assigned to monetary value. Even so, such criteria which are intangible are also having same importance in that people have equity to that development (Weimer 1989). Decision maker can utilized it as an alternative to compliment complex decision making with the help of the AHP. The combined usage of AHP and other methods for decision making will be more systematic and logical, it will also help decision makers to make more efficacious decision (Drucker 2001).

REFERENCES

- [1] Angulo Meza, L., Gomes, E.G. and Soares de Mello, J.C.C.B. (2002), Enfoque multiobjetivo para determinação de benchmarks de companhias aéreas brasileiras DEA ineficientes. *Anais do XVI ANPET*, Natal, October, 27-34.
- [2] Arslan, T. and Jotin Khisty C. (2006), A rational approach to handling fuzzy perceptions in route choice. *European Journal of Operational Research* 168, 571-583.
- [3] Badri, M.A., and Abdulla, M.H. (2004). Awards of excellence in institutions of higher education: an AHP approach. *International Journal of Educational Management*. 18 (4), pp. 224-242.
- [4] Ballou, R. H.(2001), Gerenciamento da cadeia de suprimento planejamento, organização e logística empresarial 4 ed. Porto Alegre Bookman.
- [5] Bhutta, K.S., and Huq, F. (2002). Supplier selection problem: A comparison of the total cost of ownership and analytic hierarchy process approaches. *Supply Chain Management: An International Journal*, 7(3), pp. 126-135.
- [6] Chan, F.T.S., and Abhary, K. (1996). Design and evaluation of automated cellular manufacturing systems with simulation modeling and AHP approach: a case study. *Integrated Manufacturing Systems*. 7(6), pp. 39-52.
- [7] Cooke, S., and Slack, N. (1991). *Making management decision* (2nd edition). United Kingdom: Prentice Hall.
- [8] Corrêa, H.L. Gianesi, I.G.N.Caon (2001), Planejamento, Programação e Controle da Produção MRP II/ERP. São Paulo: Atlas, 452p.
- [9] Davies, M. (2001). Adaptive AHP: A review of marketing application with extension. *European Journal of Marketing*. 35(7/8), pp.872-894
- [10] Drucker, P. F., (2001). *The effective decision*. The Harvard Business Review. Boston, MA: Harvard Business School Publishing Corporation.
- [11] Enyinda, Chris I, E. Dunu, & Janel B.H (2010). A model for quantifying strategic supplier selection: evidence from a generic pharmaceutical firm supply chain. *International Journal of Business, Marketing and Decision Science*. Volume 3, Number 2, Fall 2010.
- [12] Gilleard, J. D.and Wong, P.Y.(2004). Benchmarking facility management: applying analytic hierarchy process. *Facilities*, 22(1/2), pp. 19-25.
- [13] Handfield, R., Walton, S. V., Sroufe, R., and Melynk, S.A. (2002). Applying environmental criteria to supplier assessment: A study in the application of the analytic hierarchy process. *European Journal of Operational Research*, Vol. 141, pp.70-87.
- [14] Huu, P. T., and Kar, Y.H. (2000). A Study of bank selection decision in Singapore using the analytical Hierarchy process. *The International Journal of Bank Marketing*, 18(4), p.p. 170-180.
- [15] Janis, I. L. and Mann, L. (1979). *Decision making*. London: Mcmillan Free Press Publishing Company.
- [16] Jones, T.O., Sasser, W.E., 1995. Why satisfied customers defect. *Harvard Business Review* 73 (6), 88-99.
- [17] Liang, W. (2003). The analytic hierarchy process in project evaluation. *Benchmarking: An International Journal*, 10(5), pp. 445-456.
- [18] MoLTM and IoM. 2011. *Contribution of Foreign Labour Migration and Remittance to the Economy of Nepal*. Kathmandu: Ministry of Labour and Transport Management and International Organization for Migration.
- [19] Muller, M. H., and Fairlie-Clarke, A. C. (2001). Using the AHP to determine the correlation of product issues to profit. *European Journal of Marketing*. 35 (7/8), pp. 843-858.
- [20] Pineda-Henson, R., Culaba, A. B., and Mendoza, G.A. (2002). Evaluating environmental performance of pulp and paper manufacturing using the analytic hierarchy process and life cycle assessment. *Journal of Industrial Ecology*, 6(1) pp. 15-28.
- [21] Robert L, Nydick, Hill & Ronald Paul (1992). Using the Analytic Hierarchy Process to Structure the Supplier Selection Procedure. *International Journal of Purchasing and Materials Management*; Spring 1992; 28, 2; ABI/INFORM Global pg. 31.
- [22] Saaty, T. L. (1980). *The analytical hierarchy process: Planning priority setting resource allocation*. United States: McGraw -Hill Incorporated.
- [23] Saaty, T. L. and Vargas, L.G. (1982). *The logic of priorities: Applications in business, energy, health, and transportation*. United States: Kluwer-Nijhof Publishing.
- [24] Saaty, T. L. (1994). How to make a decision: The analytic hierarchy process *Interfaces*, 24(6), pp. 19-43.
- [25] Simon, H. A. (2003). *Decision making: rational, non-rational, and irrational* Educational, Administration Quarterly, Vol. 29, pp. 392-411.
- [26] Slack, N., Chambers, S., Harland, C., Harrison, A. and Johnston, R. (1997), *Administração da produção*. São Paulo: Editora Atlas.
- [27] Soares de Mello et al (2002), Análise de Envolvência de Dados no estudo da eficiência e dos benchmarks para companhias aéreas brasileiras In: XVI ANPET - Congresso de Ensino e Pesquisa em Transportes.
- [28] Soon, J. J. (2004). Job sector and job selection criteria among economic graduates: An analytic hierarchy process study. Unpublished Master's Thesis. University Utara Malaysia.
- [29] Sree Ram Narasimhan, "An Analytical Approach to supplier Selection," *Journal of Purchasing and Materials Management*, Vol. 19, no. 4 (Winter 1983), pp. 27-32.
- [30] Taylor, F.A., Ketcham, A.F., and Hottman, D. (1998). Personnel evaluation with AHP. *Management Decision*, 36(10), pp.679-685.
- [31] Tsauro, S., Chang T. and Yen C. (2002), The evaluation of airline service quality by fuzzy MCDM. *Tourism Management* 23 107-115.
- [32] Udo, G.G. (2000). Using analytic hierarchy process to analyze the information technology outsourcing decision. *Industrial Management and Data Systems*, 100(9), pp. 421-429.
- [33] Weimer, D.L., and Vining, A.R. (1989). *Policy analysis; Concepts and practice* (3rd edition). Engelwood Cliffs, N.J Prentice Hall.
- [34] Yavuz Ozdemir, H. Basligil, M. Karaca (2011). "Aircraft Selection Using Analytical Network Process: A Case for Turkish Airlines". *Proceedings of the World Congress on Engineering*, Vol II, WCE 2011, July 6-8, 2011, London, U.K.
- [35] Zahedi, F. (1986). The Analytic Hierarchy Process - A survey of the method and its applications. *Interfaces*, 16(4), pp. 96-108.