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Analysis of factors impacting on the competition of Iran's air transport industry based on Porter's Five Forces Model

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Abstract

Several factors play a role in an industry which may in turn involve threatening or survival of economical firms. Competition is one of the most important factors that its impact and role have been realized in industry management and economic firms. Under today's competitive conditions, to maintain and expand the activities, economic firms are required to pay close attention to planning and strategic readiness.

One of the areas of industry in Iran which needs to be analyzed regarding effective factors on competition is air transport industry. Accordingly, the current research tries to analyze factors impacting on the industry using Porter's five forces model. According to this model, an industry is affected by five competitive forces and these forces determine the state of competitiveness and profitability of an industry: entry of new investors, threat of substitutes, bargaining power of buyers, bargaining power of suppliers, and rivalry among existing competitors. The strongest force or forces play a major role in the firm's strategies.

In the current study, questionnaires, interviews, library studies and documents have been used for data collection. The statistical population of the research consists of managers (Senior, middle, executives), six airlines operating in domestic and international lines (Iran Air, Air Tour, Mahan Aseman, Kish Air and ATA). Analyses were carried out using Friedman test, t-test, exploratory factor analysis, and Kolmogorov-Smirnov test by means of SPSS.

The results show that the most effective force on competition in Ian's air transport industry is the bargaining power of suppliers, and the least effective force is the threat of new entrants. Also, the effectiveness degree of other forces, from the second to the fourth is the competition between existing competitors in the industry, the bargaining power of buyers, and the threat of substitute services, respectively.

Keywords: Strategic Management, Competitive Strategy, Porter's Five Forces model, Air transport industry.

Introduction

Nowadays, transportation is considered as one the manifestations of a civilization, and many have considered it as the heart of economic development and an inseparable part of human life. Economic development and transportation development are closely related to each other, i.e. economic development is important in the creation of an effective transportation and an effective transportation affects the economic development of a country. In fact, the features of air transportation, including less distance, higher speed, separate boundaries, exclusive and complicated technology, tourism attractions, and economic characteristics of consumers distinguish this type of transportation from other types which have created a different economic market.

Studies on different modes of transportation in different distances show that about 30% of air flights over 1000 Kilometers take place through air. Also, more than 50% of flights over 1500 Kilometers take place through air, which has led air transportation to be considered important in international transportation and also domestic transportation of expansive countries with long-distance cities (Ebrahimpoor, 1387). On the other hand, investigation of air transportation shows that, during the last 20 years, a large number of airline companies have been founded which have gone out of business because of bankruptcy and the reason is that many investors look for investments with higher rates of benefits and high social status, so this industry looks less attractive and its foundation and continuation process does not have any prestige. However, if they had higher interest rates, they would be myriad. (Shaw, S, 2007: 80)

In today's competitive markets, which are affected by the process of globalization, rapid growth of technology, new developments in information technology, increase in rapid changes in demand and supply patterns and their cost , different firms, especially transportation in economy, the need for accurate and timely decision-making or competitive strategy in order to succeed and continue their business. Environmental changes which are influenced by globalization and consumption patterns result in the increase in the number of competitors and the competitive domain, in a way that survival in this environment requires understanding the concept of competition, identification and application of effective factors in competitiveness.

The goal of competitive strategy for a business unit in an industry is to find a position where it can defend itself from these competitive factors or to affect them to its own purposes. Since collective power of factors may be relatively troublesome for competitors, the best way to develop a strategy is the in-depth and accurate study of sources of each of these factors. Identifying the main source of competitive pressure determines the weak and strong points of a company, strengthens its position within the industry, determines the areas in which strategic changes can be more efficient and also highlights places in which the industry tendency and change have the most important perspective in existing opportunities and threats. (Mehrpuya, Majidi, 1383: 42).

The airline industry is one of the most profitable industries in the world, and yet costly. One can expect higher income for airlines as long as opportunities available in this industry are employed, and lack of attention to threats will also cause irreparable damage to the company (Belobaba, Peter, 1989). Thus, paving the way for developing effective strategies by managers of air transport industry in Iran is necessary by indentifying the main characteristics of main structure of air transportation which determine competitiveness and profitability in this area.

2. Research Questions:

1-2-1 - The main research questions:

1- Among Porter's five forces of competition, which force is more effective in Iran’s air transport industry?

2 - Among Porter's five forces of competition, which force has is less effective in Iran’s air transport industry?

3 – What is the priority of each of these forces in Iran’s air transport industry?

1-2-2 - Secondary research questions:

1 - In the competition among existing competitors, what are the factors affecting the air transport industry? What is their priority?

2 – In the threat of new entrance, what are the factors affecting the air transport industry? What is their priority?

3 - In the threat of substitute services, what are the factors affecting the air transport industry? What is their priority?

4 - In the bargaining power of customers, what are the factors affecting the air transport industry? What is their priority?

5 - In the bargaining power of suppliers, what are the factors affecting the air transport industry? What is their priority?

3. Methodology

Since this study intends to use the obtained results to solve the organizational problems of the research population, it is applied in nature. A combination of library studies, questionnaires and interviews, with the - experts, will be used in order to collect the data. After library studies and interviews with experts from the airline industry, based on Porter's five forces model, appropriate factors will be defined to assess the their impact on competition in air trasnport industry and a questionnaire will be developed to determine the significance of each fqactor based on the criteria defined which be completed by senior, middle and executive managers.

The research population includes senior, middle and executive managers of Iran Air, Aseman, Mahan Air, Iran Air Tour, Kish Air and ATA Airline. The Sample will be selected using the according to the following procedure:

$$n = \frac{N Z_{\frac{\alpha}{2}}^{2} \sigma^{2}}{\varepsilon^{2} (N-1) + Z_{\frac{\alpha}{2}}^{2} \sigma^{2}}$$

Where N is the population size which is equal to 540.

With the above calculations, sample size is as follows:

$$n = \frac{540 \times 1.96^{2} \times 0.667^{2}}{0.08^{2} (540-1) + 1.96^{2} \times 0.667^{2}} = 178.90 \cong 179$$

After sampling and collection of questionnaires, reliability of questionnaires (internal correlation test) will be calculated using Cronbach's alpha and validity will be checked using content analysis and data will be analyzed using SPSS software. K-S test for goodness of fit, i.e. to infer the distribution of variables (normality of the distribution of variables), t-test to measure the effect of five forces on variables with normal distribution, and nonparametric tests to measure the effect of five forces on variables without normal distribution will be used. Finally, Friedman' test will be used to prioritize each of these forces.

4. Theoretical basis of the research:

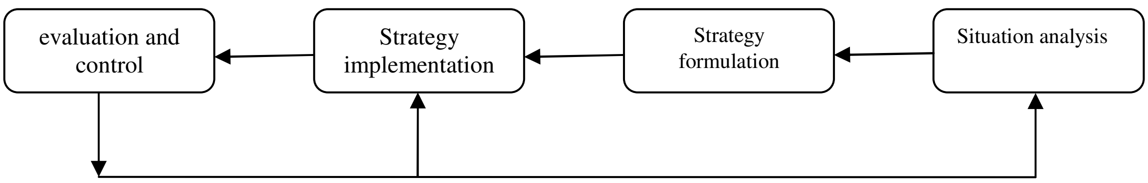
Strategy can be defined as "inclining, dispatching, sending, taking and looking". It is thought that this word has been used to refer to the knowledge and art of an ancient Greek general named "Strategos». The word is the combination of words *stratus* which means army and *ego* which means a leader, which has been entered the military terminology approximately 3,000 years ago. Strategos referred to the duty and the role of the Army commander. Then, the concept of "General art" was used which referred to his psychological and behavioral skills in military duties and his command**.** In the same Latin sources, strategy is derived from the concept of "stratum" which means a way, road or a river bed. Despite disagreements regarding the root of the word, it can be said that in general both definitions contain similar concepts which shows unanimity regarding this term (Khorasani, 1387).

Hafer and Schendel interpret strategy as a basic pattern of effective application of current and future resources of the organization in contrast to the external opportunities and threats which determine how the organization achieves its goals (Karami, 2003: 4 4). On the other hand, Eden and Ackermen (1998) define strategy as: effective strategy is a coherent set of individual attempts made to support a set of goals (Holloway, 2008: 5). In general, strategy is an ongoing process. It is a way of thinking and analysis about a business, including assessment of strengths and weaknesses and visualization of its possibilities. What is known about strategy from the last three decades shows that it is not a thing that we have but it is a thing we do and need it to support and grow a successful business or organization. Thus, strategy is a continuous evolutionary process, not an outcome or an end point (Pugh, J, 2011: 175).

Strategic management is thought of as a set of managerial decisions and actions that will determine the future performance of a company. Strategic management includes situation analysis (both internal and external), strategy formulation (strategic planning), strategy implementation, evaluation and control (L. Villain, 1390: 17). The importance of strategic management is in that it offers a framework to organizations which by offering procedures and guidelines necessary to achieve long-term organizational goals increase their ability in prediction of and confrontation with environmental changes (Baracker, 1980: 223).

The process of strategic management is comprised of four major elements: Situation analysis, strategy formulation, strategy implementation and strategy evaluation. Figure 1 shows the interaction among these four elements:

Figure 1: elements of strategic management process



Source: (Greenly, 1986: 106)

According to Michael Porter, the basis of strategy lies in setting limitation in achieving what you are trying to reach. The nature of strategy formulation is linking an organization with its situation. If you want to do a business which is similar to that of your rival, it is unlikely that you succeed. Business moves rapidly and you should dedicate time to formulate a strategy.

The need for strategy and strategic management in businesses has been realized more after the Second World War, when the stable business environment changed into a constantly changing and competitive environment. Ansef considers the following two factors that cause such changes:

1 - Rapid and noticeable changes made in the activities of business units.

2 – Increasing application of science and technology in the process of management. Environmental changes increase the need for the \ability to predict these changes in order to gain advantages from opportunities and timely measures to avoid threats.

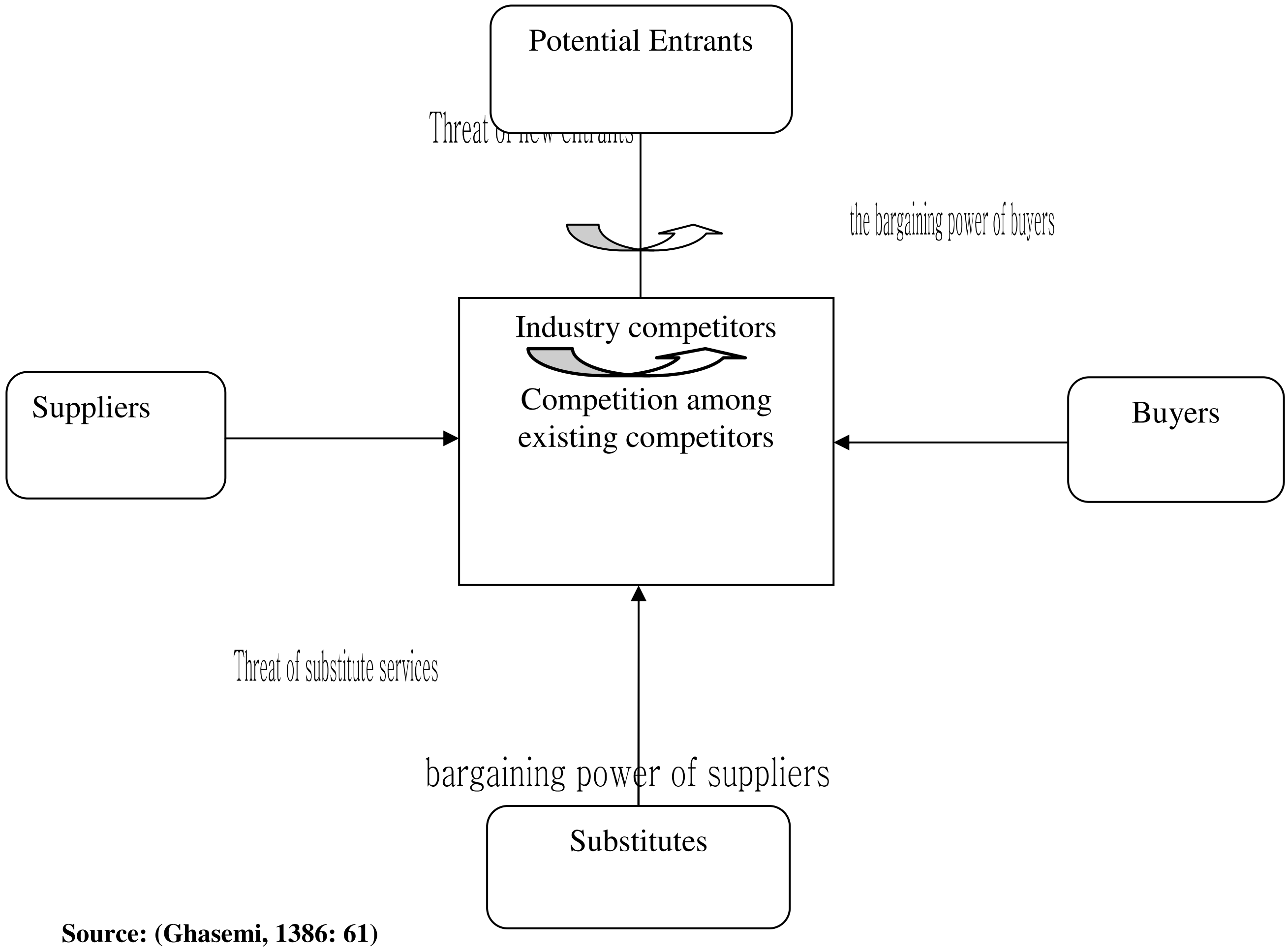
Non-competitive organizations in world's economy have to change their internal structure or go out of business. Thus, competitive analysis not only impacts on business strategy formulation but also impacts on supporting companies financially, marketing, security analysis, and many other business related areas. Such an analysis provides a comprehensive framework of analytic techniques in order to enable the company to analyze its industry, predict its progress in the future, know its rivals, and understand its situation so that it could turn such analyses into a competitive strategy in specific businesses (Binesh, 1384**).**

The common objective of any business is to succeed by gaining substantial profits and improving its operation. Competitive strategies are one of the factors in achieving such objectives (Tavitiyaman,P, 2011: 649). Markides defines competitive strategy as " the art of creating a higher position for a company" (Kiani, 1390: 18). Competitive strategy refers to the behavior of an organization to gain competitive advantages. Every business, whether it is a single activity or a portfolio of activities, should have a competitive strategy.

In management, competitiveness means the ability to increase market share, profitability, growth of added value and remain in the international competitive scene for a long time. Scientist and researchers have proposed numerous theories and model to expound and interpret the concept of competitiveness and factors that affect it and one of the most comprehensive models is Michael Porter's five forces model. These competitive forces include the entry of new investors or entrants, the threat of substitutes, the bargaining power of buyers, the bargaining power of suppliers, and rivalry among existing competitors. Porter noted that these five forces determine the intensity of competition in an industry and profitability, and the strongest force or forces are important and effective in the formulation of strategies. Michael Porter considers the nature of strategy formulation as linking a company with its surrounding. According to Porter, the structure of and industry plays a key role in determining competition rules and strategies that are potentially available for the company. The importance of forces out of the industry is essentially relative. Since external forces usually affect all active firms in an industry, the major factor in the ability of different companies is in dealing with such forces**.** (Mehrpuya, Majidi, 1383: 41)

Thus, according to the most important elements of competitiveness, the starting point for analyzing an industry is usually identifying the factors and forces affecting the industry and the aim of identifying these forces is to gain the ability to increase the competitive advantages of companies against potential competitors in their industry and the main objective of the analysis of external factors affecting competition is to determine how an organization can formulate its competitive strategies in order to make use of available environment and how it can reduce the effects of results emanated from threats to survive (Kettel, 2002).

Figure 3. Competitive framework of Michael Porter



Source: (Ghasemi, 1386: 61)

4.1. Analysis of Porter's Five Forces Model in air transport industry:

4.1. 1. The bargaining power of suppliers:

Suppliers comprise an important ring of the system of providing value to the customer. They are the providers of resources that a company needs to produce goods and provide services. Suppliers' problems can seriously affect marketing. The increase in supply costs may lead to higher prices and ultimately cause damage to the company's sale rates (Cutler, 2008: 80). Thus, in their strategic planning, companies should pay particular attention to the role of their raw material suppliers. In the case of several suppliers, the company can gain access to the cheapest raw materials by constantly varying suppliers, but such situation is not always the case because external suppliers, i.e. suppliers outside the countries' borders, may impose higher costs on the company and the limits on the number of suppliers increase the need for more strategic thinking about the ways to deal with suppliers (Kopplemann, 1998: 19). A powerful supplier can gain large profits by imposing its power on production industry. However, if the supplier industry is competitive, i.e. there is a large number of suppliers for a product, their power will decrease (Hakyeonlee, 2012: 1784).

All organizations and companies have raw material suppliers and service providers to produce their own product or provide services and the bargaining power of suppliers refers to the ability of suppliers to increase prices or reduce the quality of inputs (www.mindtools.com, 2005). Therefore, powerful suppliers are considered a threat to an industry. According to Porter, suppliers are considered powerful when they have the following features:

1 - Limited number of suppliers
2 – Lack of substitutes for the manufacturer to choose another type of raw material for the production.
3 – In case the amount paid to the supplier comprises the cost of an organization.
4 – Ability of the supplier to be responsible for complete product cycle and make forward integration
5 - If the Industry is not a specific customer to the supplier.

6 - If the supplier products lack differentiation and diversity and changes in their application charge extra switching costs (Porter, 1985).

As noted above, Porter believes that if the company is solely dependent on an exclusive manufacturer for raw materials, such a supplier will be able to put prices up.

For airline companies there are so many raw material suppliers that can produce such exclusive products and goods. Obviously, companies that carry passengers and handle cargoes and/or control traffic which are normally done by airline companies in different countries are examples of monopolies without competitors, which airline companies have to pay the price they want for getting required services. Yet, in spite of the fact that airline company profits have been decreased because of economic recession, most of them use their exclusive service supply ability to gain more resources. It seems that the only way to control the costs of landing and other services provided by such monopolies is a strict and specific law.

4.1.2. The bargaining power of customers:

Customers have direct effects on the present and future operation of a company. Prior studies have shown that customer satisfaction is the major source of competition advantage which often leads to customer loyalty and repeated purchases. Profits of customer satisfaction include increased income, reduction of transaction costs, reduction of costs in loyal buyers(Ghazani, 90: 62). Powerful customers can be reducers of economic firms' profit and finally the industry. Customers are considered as a threat only when their bargaining ability could decrease prices or increase total production costs because of demand for quality products to create tendency for buying. Also, they create competition among themselves and rival companies which reduce the industry profit (Mehrpuya, 1383: 68).

In Porter's model, the term "*buyers*" is used instead of the term "*customers*". Buyers will have more bargaining power under the following conditions:

1 - When buyers are concentrated and limited in number.
2 – When company products lack differentiation and diversity.
3 – When there is a possibility of backward integration.
4 – When selling prices of products or services comprise an insignificant part of the cost price of buyers
5 – When the buyer does not have sufficient information.
6 – When industrial products have an insignificant role in the quality of buyer services and products.
7 – When buyers make lower profits.
8 – When buyers face lower switching costs (Cattell, 2002).

In recent years, revolution in the distribution and sale systems, by creating virtual networks and providing internet, have caused decrease in commission prices of airline companies and changed the balance of market power to the benefit of customers by increasing customers' knowledge. [1] Electronic market provides customers faster access to useful information without limit about services, setting time, the prices of an airline company, and the ability for faster and easier reservation, and payment.

4.1.3. Threat of new entrants

New entrants enter an industry only when profit limits are high enough and seem suitable and there are fewer obstacles. The more the obstacles to entry, the less the impact of this force on competition intensity. Porter provides the following factors as entry barriers to the industry.

1 - Distinctive products
2 - The need for large capital investment
3 – High switching costs
4 - Access to channels of distribution
5 - Scale-independent costs
6 - Government standards

Another disruptive factor in the balance of competition by old airlines is the entry of new competitors into air transport market. In some industries, entry of new competitors is sometimes difficult and sometimes impossible, and in others it is very easy, and in new air transport industry the latter is the case, particularly in short routes and point to point markets because many barriers to new entrants (in Europe and the United States of America) have been decreased or have been completely removed in some cases. The main barriers to entry to the air transport are as follows:

1 - The first barrier to entry to the airline industry can be the governing surveillance limitations.
2 - Primary sources and the capital required to enter is second barrier to new entrants.
3 - In the air transport industry, airline slots are a significant barrier to entry for new entrants.
4 - The need for airplanes for the establishment of an airline is a limitation to new entrants.

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[1] Market power is the ability of a company to increase prices higher than the prices of general market and maintaining prices for a relatively long period of time.

5 - The need for human investment: since airline companies are suppliers of services in which customers need individual attention, human investment plays a permanent role in the function of every company (www.airlines.com website, 2009).
6 – The need for airline service providers and land handling and engineering services and repair in order to check and maintain airplanes is another factor required to establish a airline company.
7 – Weakness in economies of scale

4.1.4. **The threat of substitute products and services**
The existence of a product which can be a substitute for another product in an industry poses a threat to the existing product and even if it could not replace it, because of creating competitive conditions, by decreasing its price, lowers the industry profits. The most important and notable substitute products are those that:
A – Are the functions of tendencies which improve the balance of price performance with manufacturing products.
B – Are produced by industries that make higher profits.
In the second case, if the development leads to increase in competition among industries which produce substitute products and decrease in prices or improvement in price performance, these substitute products will be put into action. Interpreting such tendencies can be useful in deciding whether it is necessary for an industry to prevent substitute products using strategy or formulate a strategy for it as a key factor (Kettel, 2002).

Porter believes that competition balance in old companies which were active in the air transport industry may be undermined by several factors. Substitutes are one the factors which can be used instead of air transport. Currently, there are a few substitutes for air transport which impact on the air transport market. The most important substitutes for air transport are as follows:
1. Advancement in information technology and communications and creation of electronic methods for carrying out business transactions and even training which reduces the need for travel.
2. Road transport, especially railroads.
3. Using internet and email as communication tools instead of sending postal cargoes which are decreasing cargo income and post offices as a part of airline companies' income.

4.1. 5. **Competition among existing competitors:**
Competition and competitive rates are not the same in producing different products or providing different services. Entry to new different markets brings a different level of competition for players. Companies try to win their rival by using various methods.
Creation of competition in industries, specifically when there is a possibility of weakening the entire industry in terms of profitability, is the result of several structural reasons which are as follows:
1 – Numerous competitors of equal power
2 - Slow growth of the industry
3 - The high cost of fixed prices
4 - The lack of differentiation in the industry products
5 - The high cost of exit from an industry
6 - Increase in capacity in higher scales
7 - Various competitors
8 – High strategic share in the industry

Porter noted that in many industries, often real competition or move towards a change results from old and existing companies in the industry. Old and active companies are similar to each other in terms of points of strengths, weaknesses, and problems. Thus, such companies can make profits in the periphery of their activities through aggressive and intense competitions (Shaw, 2007: 76).

Currently, there is no specific barrier to competition among airlines. From April 1997, the airlines in Europe have competed in a market where there were few control over freight rates, capacity and transport fare, and this shows that there has been a major change in the air transport of Europe where there were intense regulations which is not the case for airline companies in Iran whose market is the control of old and governmental companies.

5. Research findings

5.1. Statistical data of air transport industry in Iran

According to the latest official data provided by the Aviation industry in 2009 , Iran Air, Aseman, Iran Air Tour, Mahan Air, Kish Air, Taban, Zagros, Caspian, Naft Iran, Saha, Fars Air, Arya Air, Ata, and Sahand Hesa airline companies have attempted to carry passengers and cargo domestically.

According to the comparisons made, competition with the highest intensity in passenger transportation on internal routes in 89 and 88 belongs to Iran Air (% 5/24 , % 8/30) , Aseman (% 5/20 , % 5/18) , Mahan (% 5/17 , % 9/11) , Iran Air Tour (% 8/13 , % 3/15), and Kish Air (% 4/6 , % 04/8), respectively. On the other hand, Ata as a newly established company has increased its share from %1/0 to 4% in 89 compared to 88 and its market share in 89 which ranked sixth. These six companies have dedicated (% 8/86, % 4/84) of total domestic passenger market. In the transportation section, Mahan (% 5/43 , % 8/33) , Iran Air (% 3/16 , % 7/22) Iran Air Tour (% 2/7 , % 4/8) have transported the total of (% 9/80 , % 3/71) cargoes on domestic routes. In terms of posts, in the past two years, 89 and 88 , the following three companies with the mentioned percents have carried posts on domestic routes: Iran Air (% 1/61 , % 6 / 62) , Iran Air Tour (% 4/28 , % 4/27) and Mahan (% 6/10 , 10%). Also, In terms of the number of flights, these six companies own the total (% 8/82, % 3/81) of market share.

According to the analyses, competition with the highest intensity in international passenger transportation in 89 and 88 belongs to Iran Air with (% 8/39 , % 6/42) passengers, Mahan with (% 3/24 , 5% / 25) passengers, Aseman with (% 3/9 , %, 1/8) , and Kish Air with (% 9/7 , % 2/5) passengers with the total of (%81 , 3% / 81) passengers.

Also, in terms of the amount of freight transported internationally, two companies of Iran Air with (% 4/50 , % 9/45) and Mahan with (% 7/32 , % 3/39) have been able to carry (% 2 / 83 , % 3/85) of the international load. Moreover, in international post transportation, Mahan Air and Iran Air, with the proportion of (97 to 3) and 89 (98 to 2) in 88, have provided services (Table 1).

Table 1: Comparative statistics (percentage) of foreign and domestic airlines in providing services on international routes

Airlines	Number of passengers transported		Freight tonnage transported		Post tonnage transported		Number of flights	
	88	89	88	89	88	89	88	89
Domestic Airlines	% 4/61	% 8/60	% 8/62	% 2/62	% 3/80	% 8/81	% 7/64	% 1/65
Foreign Airlines	% 6/38	% 2/39	% 2/37	% 8/37	% 7/19	% 2/18	% 3/35	% 9/34
Total	100%	100%	100%	100%	100%	100%	100%	100%

Source: Aviation Organization Website

2.5. Data obtained from the questionnaire

Questions were designed by converting them into scales (1 = very low, 2 = low, 3 = moderate, 4 = high and 5 = very high). The questionnaire is comprised of 37 questions. The questions include "The threat of new competitors into" containing 12 items, "existing competitive industry" containing 8 items, "bargaining power of women shoppers" containing 7 items, "power of the chin woman Suppliers " containing 7 items, and "threat of substitute products or services " containing 3 items. Cronbach's Alpha was used to determine the reliability using SPSS 15. Reliability coefficient ranges from zero (no correlation) to +1 (perfect correlation). When α is greater than 7/0, reliability of the questionnaire is confirmed. For this purpose, 33 questionnaires were piloted and Cronbach's alpha was calculated for the entire questionnaire and individual items using SPSS. The reliability of the questionnaire was calculated using Cronbach's Alpha which is 826/0 and alpha values for different dimensions of the questionnaires are also given in the above table which are greater than 70% (Table 2).

Table 2: Alpha value for each dimension of Porter's model

Dimensions	**The number of questions in each dimension**	**The alpha value for each dimension**
The threat of new entrants	12	773/0
Competition among existing competitors	8	779/0
Threat of substitute services	3	718/0
Bargaining power of customers	7	797/0
Bargaining power of suppliers	7	765/0
Total	37	826/0

The calculated sample size in this study was N=179. In order to collect questionnaires, 214 questionnaires were distributed among senior, middle, and executive managers, 179 of which were returned. The percentage of questionnaires returned was 84% (Table 3).

Table 3: Number of questionnaires distributed to airlines

Airlines	Population size	The number of questionnaires distributed
Iran Air	193	76
Mahan	107	41
Aseman	70	31
Iran Air Tours	60	23
Kish Air	58	22
ATA	52	21
Total	540	214

Table 4: ………………………………….

Company	Frequency	Percent	Valid Percent	Cumulative percentage
Iran Air	74	4/41	5/42	5/42
Mahan	32	8/17	1/18	6/60
Aseman	23	9/12	1/13	8/73
Iran Air Tour	19	3/10	6/10	4/84
Kish Air	15	5/8	8/8	1/93
Ata	12	7/6	9/6	100
Without respone	4	4/2		
Total	179	100	100	

4-4 - Answer to the research questions

To answer the research questions, at first, the factors affecting the competition among existing competitors, including the threat of new entrants, the threat of substitutes, the bargaining power customers, and the bargaining power of supplier were determined and they were ranked using Friedman test. Then, the importance and overall impact of Porter's five competitive forces can be obtained in air transport industry. In other words, the priority of each force and the force with the most impact, the least impact and the priority of other competitive forces can be calculated using the analysis.

To identify effective factors, t-test was used for all of the research questions. Research hypotheses are as follows:

$$H_0 : \mu \le 3$$

$$H_1 : \mu > 3$$

The factor is not effective.
The factor is effective.

4.4.2 Secondary research questions

4.2.1 The first research question

What are effective factors in Iran's air transport industry, in competition among existing competitors? What is their priority?

Table 5: t-test for factors of competitive factors among existing competitors

	Factors	Sample mean	Test statistic	Significance	Lower Bound	Upper Bound
1	Number of Competitors	59/3	57/8	00/0	45/3	72/3
2	strategy diversity and facilities of existing airlines	89/3	98/14	00/0	76/3	99/3
3	Slow rate of growth of this industry (and conversion of competition into increasing market share)	28/3	42/4	00/0	16/3	41/3
4	Differentiation of airline services from each other	91/3	06/15	00/0	79/3	03/4
5	The difficulty of withdrawing airlines' assets after deciding to stop their activity (as a serious barrier to exit)	11/3	61/1	11/0	97/2	25/3
6	Government as a potential barrier to poor airlines' exit from the industry	26/3	03/3	00/0	09/3	43/3
7	Existence of airlines which take risks	45/3	60/6	00/0	31/3	58/3
8	Existence of airlines which are the major shareholders of the market	04/3	65/17	00/0	93/3	16/4

According to the above table, all of five factors are effective except the fifth factor because test statistic is greater than 645/1 (the critical value of the table at the confidence level of 95%) and thus the significance level is less than 05/0. Therefore, we can reject H_0 and accept H_1, showing the effectiveness of factors. However, the effectiveness of " The difficulty of withdrawing airline assets, after deciding to stop their activity (as a serious barrier to exit)" is not confirmed.

4.4.2.2. The second research question

What are effective factors in Iran's air transport industry, in the threat of new entrants? What is their priority?

Table 6: t-test for factors of the threat of new entrant factors

	Factors	Sample mean	Test statistic	Significance	Lower Bound	Upper Bound
1	Customer reluctance to use services of new airlines with unfamiliar brands	96/2	59/0-	55/0	83/2	09/3
2	Alliance of airlines against the new entrant	10/3	16/1	25/0	93/2	26/3
3	The industry need for huge investment	93/3	65/15	00/0	82/3	05/4
4	Noticeable fluctuation in the performance of airlines (increase and decrease in profits and losses of previous years)	73/3	92/10	00/0	60/3	86/3
5	Low levels of profitability in the early years of activity	29/3	61/3	00/0	13/3	45/3
6	dependence of success of airlines on specialized and continuous experience of their staff	05/3	63/0	53/0	89/2	21/3
7	The negative feelings of society towards the industry (for example, lack of security due to dilapidated airplanes)	05/3	66/0	51/0.	90/2	20/3
8	Domestic and international legal structures (in terms of the difficulty of obtaining permits)	55/3	97/6	00/0	39/3	70/3
9	Lack of entrants access to the channels of distribution	99/2	08/0-	94/0	86/2	13/3
10	Inability of new entrants to provide services at large scale - to gain benefits from cost savings resulted from economies of scale	22/3	17/3	00/0	08/3	35/3
11	Encouraging designs of existing airlines for passengers who travel a lot and the loss of these privileges by changing airlines into newly established airlines	56/2	65/5-	00/0	40/2	71/2
12	Limited access to basic required services	86/2	70/1-	09/0	70/2	02/3

According to Table 6, factors 3, 4, 5, 8 and 10 are effective, and others are not effective because the test statistic is less than 645/1 (the critical value in the table at the confidence level of 95%) and the significance level is greater than 5/0. It can be concluded than we can accept H_0 and reject H_1, showing the ineffectiveness of mentioned factors.

4.4.2.3. The third research question

What are effective factors in Iran's air transport industry, in the threat of substitute services? What is their priority?

Table 7: t-test for factors of the threat of substitute services

	Factors	Sample mean	Test statistic	Significance	Lower Bound	Upper Bound
1	Low cost and high availability of substitute services (for example, rail and road travel services)	08/3	097/0	34/0	92/2	24/3
2	The impact of price proportion of industry services with passenger satisfaction on the unwillingness of passengers for substitute services	62/3	99/7	00/0	47/3	77/3
3	The advent and advancement of information technology (for example, expansion of the use of video conferencing) as an alternative to air travel which lowers its necessity	70/2	04/4-	00/0	56/2	85/2

T-test for "the threat of substitute services" factors shows that "The impact of price proportion of industry services with passenger satisfaction on the unwillingness of passengers for substitute services" is effective. "Low cost and high availability of substitute services (for example, rail and road travel services)" is a threat which is not completely effective . "The advent and advancement of information technology (for example, expanding the use of video conferencing) as an alternative to air travel which lowers its necessity" is not considered as an effective threat to air transport industry.

4.4.2.4. The fourth research question

What are effective factors in Iran's air transport industry, in the bargaining power of customers? What is their priority?

Table 8: t-test for factors of the threat of substitute services

	Factors	Sample mean	Test statistic	Significance	Lower Bound	Upper Bound
1	Diversity of buyers (that is, in the case of the withdrawal of one of the buyers, airlines can offer their services easily to other buyers)	15/3	62/1	11/0	97/2	32/3
2	The relative importance of ticket cost at cost baskets of passengers	22/3	77/2	00/0	06/3	38/3
3	Differentiation of services(high quality of services) provided by airlines	45/3	24/7	00/0	33/3	58/3
4	Switching costs of airline for buyers	87/2	85/1-	07/0	73/2	00/3
5	Passengers' Income (and price sensitivity)	37/3	17/4	00/0	20/3	54/3
6	Major purchases of services by major buyers (for example, charterers)	78/3	59/11	00/0	64/3	91/3
7	The ability of buyers (for example, charterers) to enter the industry and establish independent airlines	91/2	19/1-	24/0	76/2	06/3

As shown in Table 8, except factors 1, 4, and 7 , other factors 2,3, 5, and 6 are not effective in the bargaining power of customers because the test statistic is less than 645/1 (the critical value in the table at the confidence level of 95%) in 1, 4, and 7 and the significance level is greater than 5/0. It can be concluded than we can accept H_0 and reject H_1 , showing ineffectiveness of mentioned factors.

4.4.2.5 The fifth research question

What are effective factors in Iran's air transport industry, in the bargaining power of suppliers? What is their priority?

Table 9. T-test for factors in the bargaining power of suppliers

	Factors	sample mean	Test statistic	Significance	Lower Bound	Upper Bound
1	Scarcity of suppliers	97/3	49/14	00/0	83/3	10/4
2	Specialized supplier services(i.e. airlines are the only users of these services(For example, handling airplane repair)	77/3	18/11	00/0	63/3	91/3
3	Importance of supplier services in the final quality of provided services to passengers by airlines	68/3	78/10	00/0	55/3	80/3
4	Lack of switching possibility of suppliers by airlines	81/3	24/11	00/0	67/3	95/3
5	The ability of suppliers in entering the industry (establishment of a new airline)	80/2	60/1-	01/0	65/2	95/2
6	Limited capacity of suppliers in responding to the likely increase in demand	22/3	12/3	00/0	08/3	36/3
7	Legal space in creating a monopoly for suppliers (for example, issues license to a limited number of suppliers)	77/3	33/10	00/0	63/3	92/3

All of the factors impact on the bargaining power of suppliers except factor 6, which is the limited capacity of suppliers in responding to the likely increase in demand because test statistic is greater than 645/1 (the critical value of the table at the confidence level of 95%), so the significance level is less than 05/0. Thus, we can reject H_0 and accept H_1 , showing the effectiveness of factors (Table 9).

4.4.3. Answer to the main research questions

The three main research questions are as follows:

1. Among Porter's five competitive forces, which force is the most effective in the competition in Iran's air transport industry?
2. Among Porter's five competitive forces, which force is the least effective in the competition in Iran's air transport industry?
3. What are the priorities of these factors in air transport industry?

Table 10. T-test for Michael Porter's five forces

	Factors	Sample mean	Test statistic	Significance	Lower Bound	Upper Bound
1	Competition among existing competitors	57/3	31/17	00/0	50/3	63/3
2	Threat of new entrants	19/3	85/4	00/0	11/3	27/3
3	Threat of substitute services	13/3	49/2	01/0	03/3	24/3
4	The bargaining power of suppliers	57/3	29/12	00/0	48/3	75/3
5	The bargaining power of buyers	26/3	18/6	00/0	18/3	35/3

The results show that all of Porter's five forces impact on Iran's air transport industry. Also, According to Table 28.4, "the bargaining power of suppliers" is the most effective and "threat of new entrants" is the least effective (Table 10).

5. Analysis and conclusion

Based on the research findings, research questions posed about Porter's five forces will be analyzed. The competition among existing competitors ranked the second among the five forces in the industry (with an average rank of 53/3). Analyses of questionnaire results show the order of factors related to the competition among existing competitors:

Table 11: Average rank and final rank of the competition among existing competitors

Row	Competitive force	Average Rank	final rank
1	Airlines owing the major market share	77/5	1
2	Lack of service differentiation	30/5	2
3	Diversity of strategies and facilities of existing airlines	27/5	3
4	Number of competitors	52/4	4
5	Airline at stake	05/4	5
6	Government as a potential barrier to weak airlines	94/3	6
7	Slow rate of growth	69/3	7
8	The difficulty of withdrawing assets after the decision to cease operations	46/3	8

The threat of new entrants ranked the last (with an average rating of 43/2) among Porter's five forces in Iran's air transport industry. than the index of the proposal by Porter as significant barriers to entry From among the factors proposed by Porter as barriers to the entry to the industry from potential investors' viewpoint, the first five factors in Table 12 are considered as barriers to the new entrants to Iran's air transport industry and factor 7 is not of high importance.

Table 12: Average rank and final rank of the threat of new entrant

Row	Competitive force	Average Rating	The final ranking
1	The industry need for huge investment	92/8	1
2	Noticeable fluctuation in the performance of airlines	28/8	2
3	Domestic and international legal structures (in terms of the difficulty of obtaining permits)	61/7	3
4	Low levels of profitability in its first year of activity	75/6	4
5	Inability of new entrants to provide services at large scale - to gain benefits from cost savings resulted from scale	58/6	5
6	Alliance of airlines against the new entrant	30/6	6
7	The negative feelings of society towards the industry (for example, lack of security due to dilapidated planes)	08/6	7
8	dependence of airlines' success on specialized and continuous experience of their staff	05/6	8
9	Customer reluctance to use new airlines services with unfamiliar brands	86/5	9
10	Lack of entrants access to the channels of distribution	82/5	10
11	Limited access to basic required services	33/5	11
12	Encouraging designs of existing airlines for passengers who travel a lot and the loss of these privileges by changing airline into newly established airlines	42/4	12

As shown in Table 13, the threat of substitute services ranked fourth (with an average of 46/2) among Porter's five competitive forces.

Table 13: Average rank and final rank of substitute services

Row	Competitive force	Average Rating	The final ranking
1	The impact of price proportion of industry services with passenger satisfaction on the unwillingness of passengers for substitute services	43/2	1
2	Low cost and high availability of substitute services (for example, rail and road travel services)	92/1	2
3	The advent and advancement of information technology (for example, expanding the use of video conferencing) as an alternative to air travel which lowers its necessity	66/1	3

As show in Table 14, the bargaining power of customers ranked third (with an average of 85/2) among Porter's five forces in the industry. The bargaining power of travelers / buyers refers to the fact that to what extend the airline submit to the wants of passengers/buyers to keep them. On the other hands, the bargaining power of travelers / buyers also impacts on their sensitivity toward ticket prices.

Table 14: Average rank and final rank of the bargaining power of customers

	Factors	**Average Rating**	**The final ranking**
1	Mass purchases of services by major buyers (for example, charterers)	05/5	1
2	Differentiation of services (high quality of services) provided by airlines	37/4	2
3	Travelers' income (price sensitivity)	22/4	3
4	The relative importance of ticket cost at cost baskets of passengers	90/3	4
5	Diversity of buyers	72/3	5
6	The ability of buyers (for example, charterers) to enter the industry and establish independent airlines	42/3	6
7	Switching costs of airline for buyers	32/3	7

As shown in Table 15 below, the bargaining power of suppliers ranked first (with an average of 72/3) among Porter's five forces in the industry. Based on the findings, the impact rates of factors relating to the bargaining power of the suppliers are as follows:

Table 15. Average rank and final rank of the bargaining power of suppliers

	Factors	**Average Rating**	**The final ranking**
1	Scarcity of suppliers	84/4	1
2	Specialized supplier services(i.e. airlines are the only users of these services(For example, handling airplane repair)	47/4	2
3	Lack of switching possibility of suppliers by airlines	43/4	3
4	Importance of supplier services in the final quality of provided services to passengers by airlines	37/4	4
5	Legal space in creating a monopoly for suppliers (for example, issues license to a limited number of suppliers)	16/4	5
6	Limited capacity of suppliers in responding to the likely increase in demand	22/3	6
7	The ability of suppliers in entering the industry (establishment of a new airline)	52/2	7

Finally, based on data collected and analysis of research findings, rankings of Porter's five forces are given Table 16.

Table 16: Rating classified factors affecting competition in the aviation industry of Iran

	Competitive force	Average rating	final ranking
1	Bargaining power of suppliers	72/3	1
2	The competition among existing competitors	53/3	2
3	Bargaining power of customers	85/2	3
4	Threat of substitute services	46/2	4
5	Threat of new entrants	43/2	5

1. The main part of basic services required in the air transport industry is provided specialized suppliers and because of the small number of these suppliers (as a result of the need for huge investment and specialized form of services), they have higher bargaining power. Also, as a result of specialized from of services, airlines cannot change suppliers which bolsters the bargaining power of suppliers. On the other hand, for their flight, airlines have to resort to suppliers regardless of the quality of services provided. Such heavy reliance on suppliers (i.e. no flight will be achieved without their presence) increases the bargaining power of suppliers in the industry.
2. A few airlines in Iran's air transport industry own the large part of industry, whether in terms of fleet or activity volume which has led to the instability of the market, since the companies, in some cases, sacrifice profitability to increase their market share and achieve their goals. In other words, major players of air transport industry are scarce which has impacted on the market atmosphere and vulnerable to the decisions made by these companies. On the other hand, the effect of presence of other airlines in the competition market is not negligible because these companies (which are small in number) affect the profitability of the industry because of their different and diverse strategies in spite of their low level of activity. Such companies carry out business by renting a small number of airplanes through outsourcing and lower ray costs and they manage their sales by chartering. Thus, because of low ray costs compared to other airlines on the one hand and the incentive for gaining a secure place among customers sensitive to the price, and accepting the risk of lower profit on the other hand faces the completion conditions with complications and disruptions. Sometimes, these factories, by paying travelling agencies, encourage them to sell more in their own routes which in some cases destabilizes the market.
3. In Iran's air transport industry, domestic sales are carried out according to approved rates and schedules which means the lack of the bargaining power of customers in this sector. At international level, sales in different classes allows for using different rates for airlines which depends on customers' demand of different combination of rates. However, some parts of sales at the domestic and international level are chartered which provide suppliers the possibility to change prices according to market conditions.
4. Findings show that the distinction between air transport and other types of travel has created a different market. Specific features of this type of travel including high speed, reduction in costs as result of time particularly long distances, separate boundary, tourism, and consumers' economic characteristics have made them immune to the threat to substitute products / services. In general, air travelers, those who are customer of the industry because of business reasons with the aim of reducing travel time, safer and more comfortable travel or tourists who are not economically sensitive to the travelling costs and seek comfortable and calm travel will not try to replace other types of travel. This is more the case in Iran for rail or road transport because of lower services.
5. Massive costs of buying or renting airplanes, purchase of exclusive flight services, losses of airlines as a result of sanctions in recent years, legal structures both in international and domestic level strict regulations both in terms of flight safety and security issues, and inability of newly established airlines in economies of scale are considered significant factors which makes new rivals in the industry not to be considered as a threat to old airlines.

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