Factors enabling competitiveness of science and technology institutions in Iran

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ABSTRACT

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The present study was conducted to investigate the impact of effective factors on competitiveness of science and technology in Iran in provider unites of specialized technological services based on Porter's competitive forces model. The statistical population of this study consisted of all employees of 92 research institutes as provider unites which were classified into four groups, namely universities, ministry of science, research, and technology, private sectors, and other organizations. A questionnaire was used for data collection. The results of this study confirmed Porter's competitive forces model in technical research institutes of the country. Finally, limitations and some suggestions for further research are presented.

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Introduction

Nowadays, industry has entered a new era of information and research organizations in business have a particular industrial position because it is a requirement for success of organizations and human beings. Although these organizations have a long history, but their growth and development and the recognition of their role and importance has gotten serious in recent years and the future of research and technology organization based upon the current predictions show a growing and developing trend. These organizations have an essential role in designing and implementing the required studies in Iran and in this way provides a setting

for success in information and communication era. Qualitative procedure of higher education and increasing number of graduates and specialists in different fields of science are effective in the growth of research and technology institutes. From the perspective of national innovation system, the main role of research and technology is making connection between two domains of universities and industrial agencies. Therefore, one of important activities is changing the research achievements to economic benefits including producing new products, improving the available products, and reducing the price of products. Such kinds of organizations with their enterprises help transfer knowledge among activists in various domains and produce basic knowledge (Barge, Lemus, Nunez, & Modrego, 2007). According to this definition, technology research organizations are non-profit organizations which do research and development (R & D) related activities to improve the competitiveness of organizations through upgrading innovative and technological capabilities. A point that has drawn the researchers' attention is that the organizations are successful in competitive condition for research and innovation which can overtake other ones. Many of research managers believe that research organizations should pay more attention to details and competitiveness parameters. Jain and Triandis (2010) stated that these organizations are different in four aspects from other organizations. In these organizations, employees have a high level of knowledge and talent. They have curious, independent, thoughtful, and analyst mind. The ideas are created through a unique network of communication which is not available in other organizations except research organizations. Their support and financial resources are different from other organizations. The biggest sponsor of their research is government. This kind of financial support caused that the research organizations gain a particular characteristics in this field because it pays attention to the whole community not a particular individual or sponsor organization. Organizational culture is different from other organizations in tangible factors such as research facilities, laboratory equipments, and office buildings and intangible factors like rules, requirements, merits, and norms. The concept of competitiveness in research organizations is a new approach considering its structural differences with industrial structures although the concepts such as competitive advantage and competitiveness factors among different nations and industries have examined in macro and extra-macro level (Huang, Yung, & Yang, 2011). This research was conducted with the aim of identifying and prioritizing the competitiveness of research organizations. The main aim of present research was identifying the effect of the factors in Porter's model about competitiveness of research organizations and analyzing their impacts. Accordingly, this study tried to investigate secondary objectives such as the relationship between various factors and characteristics of organizations and their competitiveness, analyzing and ranking the factors of Porter's model in research organizations, and ranking of sub-factors of Porter's model factors would be considered.

Competitiveness

Theoretical study of various experts and researchers reveals that there is no single definition or interpretation for competitiveness (Lucato, Junior, Vanalle, & Salles, 2012). In general, competitiveness can be considered as abilities and capabilities of a business, industry, region, or nation possess and can maintain to produce higher rates of return to provide good human

resources in international competition. In other words, competitiveness is an ability to increase market share, profitability, value-added growth, and existence in fair competition for a long time (Thompson, 2001). Competitiveness can be explored from multiple dimensions. One of important aspects is the sources of competitiveness. These sources can be divided to three groups, namely technology, organization, and human resources. Competitive advantage resulting from human resources has more stability than other competitive advantages and needs much time to be imitated by the competitors (Yolles, 2009). In this model, Porter (1990) considered competitiveness as a result of mutual interaction among internal factors (general factors such as ingredients, energy and manpower and technical factors such as skilled manpower, technical knowledge, and advanced technology), domestic demand condition (size, quality, and quantity of domestic demand), related and supporting industries (distributed systems, research institutions), structural strategy and competition (lower prices or differentiation).
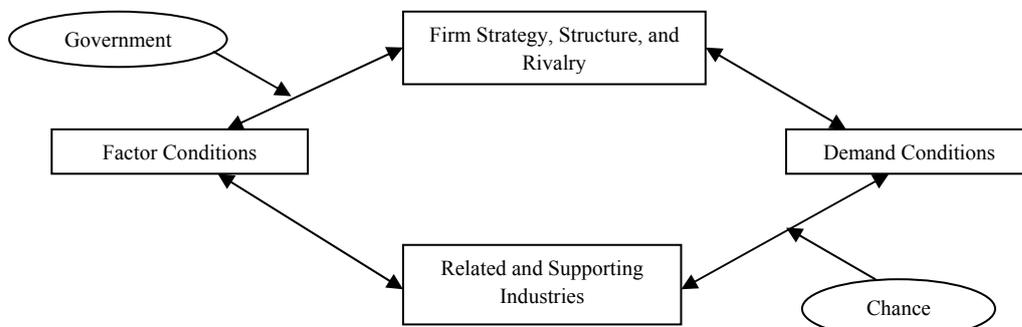

Figure 1. Porter's diamond model for the competitive advantage

Porter (1990) believed that these factors are mutually interacted and changes in each of them can affect other factors. In addition, two external factors including government and unforeseen events influence the factors that can be effective in competitiveness. Porter (1985) suggested his five forces model in which the nature and competitiveness of each industrial environment is related to a set of five different powers. He also believed that the number of competitors and the intense competition among five competitive forces increase competitiveness of industry and country (Baltzan & Phillips, 2010; Grundy, 2001).
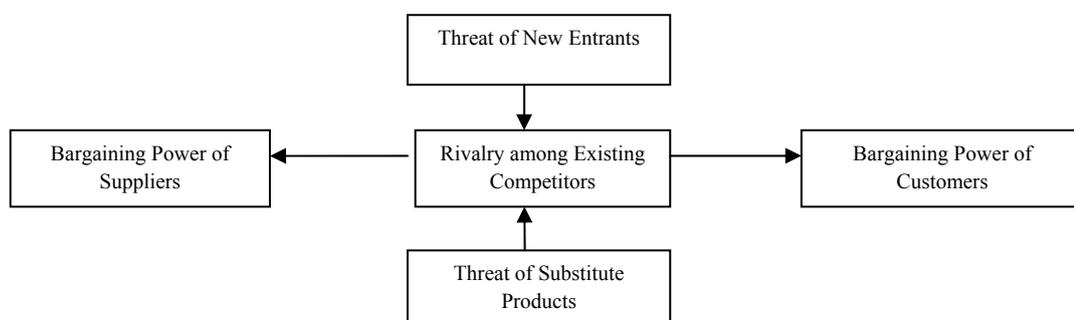

Figure 2. Porter's five forces model

The cause of this issue is the mutual effort of competitors for increasing the quality and reduction of cost of products or services for customers' satisfaction (Cronin & Taylor, 1992;

Eisingerich & Bell, 2008; Yeo & Li, 2014). These factors aimed to contribute to an increase in perceived standards of living and higher customers' satisfaction. Government as a main force always is effective in the competitiveness and can intervene in political, economical, and social issues and enforce laws and regulations and possess positive or even negative effects in the competitiveness. Monetary policies, financial and business policies, tax laws, supporting, official, and organizational policies, governmental costs and other governmental decisions are effective in the competitiveness of agencies, industries, and countries (Yglesias, 2003).

Conceptual Model

Previous studies clearly indicate that various factors affected competition. Considering this, several models and structures of this factors and indicators have been studied such as Porter's five forces model of competition. All five competitive forces might be effective in competitiveness in industry (Altuntas, Semercioz, Mert, & Pehlivan, 2014; Dale, 2000; Tallon & Kraemer, 2007; Ucmak & Arslan, 2012; Yunna & Yisheng, 2014). The first force of this model is bargaining power of suppliers which suppliers can apply pressure on a company by charging higher prices, adjusting the quality of the product or controlling availability, and delivery timelines. The second force of Porter's model of competition is bargaining power of buyers. Buyers increase competition within an industry by forcing down prices, bargaining for improved quality or more services, and playing competitors against each other. All of these factors decrease the attractiveness of the industry by lowering its profitability. The power of an industry's important buyer groups depends on characteristics related to its market situation and the relative importance of its purchases from the industry as compared with its overall business (Porter, 2008). In threat of new entrants, new competitors to an industry bring new capacity, the desire to gain market share, and often substantial resources. Prices can bid inflated cost as a result of reducing profitability. Therefore, institutions that are seeking to diversify their business and enter into a new market or industry often make optimal use of the resources at their disposal in order to make a fundamental change (Porter, 1980; Wesseling, Faber, & Hekkert, 2014).

The next factor of Porter's five forces model of competition is intensity of rivalry among competitors. Industry rivalry takes the form of jockeying for reaching a position using various tactics such as price competition, advertising battles, product introductions, and increase or warranty services for customers. In most industries, one company's competitive moves will have a noticeable impact on the competitors. Therefore, it may provoke a fight against the competition that threatens its strategic position before formulating firm strategies. The intensity of rivalry among firms is one of the main forces that shape the competitive structure of an industry (Covin & Slevin, 1990; Ormanidhi & Siringa, 2008; Tavitiyaman, Qu, & Zhang, 2011). One another factor of Porter's five forces model of competition is threat of substitute products. All firms in an industry are competing, in a broad sense, with industries producing substitute products. Substitutes limit the potential returns of an industry by placing a ceiling on the prices firms in the industry can profitably charge. All firms in an industry have a wide competition with industries that produce substitute products. Substitute products by placing a ceiling on the price restrain the potential productivity of the industry. More

suitable the cost of substitute products, more stable will be the limitations of profitability ratio (Niederhut-Bollmann & Theuvsen, 2008).

Government is other effective factor in this model which plays significant role in competitive industry. In many industries, government has a role of buyer or supplier and can influence over industry competition through the policies have been implemented. In most cases, the role of the government as a buyer or supplier was mostly determined due to the political rather than economical conditions which were determined as a buyer or provider. Rules and governmental regulations can be factors for measuring constituting restrictions in the activities of buyer-supplier organizations (Lee, Bae, & Lee, 1991). However, it is better to test the role of government as an independent factor and discuss their impact on competition through the five competitive factors to achieve the purposes of structural analysis. In other words, the results of government decisions in aforementioned factors reflect in the competitiveness of research organizations.

Research Hypotheses

In this study, the following hypotheses were tested based on the Porter's theory.

H_1: Suppliers (statistics/equipments) are effective in the competitiveness of research organization.

H_2: Applicants and customers of research products (services) are effective in competitiveness of research organizations.

H_3: Existing competitors affect the competitiveness of organizations.

H_4: The entrance of potential competitors influences the research organizations.

H_5: Substitute products can be effective in competitiveness of research organizations.

Method

The purpose of this study was to find out the main factors which affected the competitiveness of the sectors. The data were collected in the form of field research. The statistical population of this research consisted of in 92 organizations or institutes in Iran (among technology research institutions approved by the ministry of science, research, and technology). These organizations consisted of universities, science and research ministry, private sector, and other organizations. The obtained sample size presented in Table 1.

Table 1
Statistical Population and Distribution of Samples

Organizational Affiliation	Number of Organizations	Adjusted Sample Number
Universities	48	33
Ministry of Science, Research, and Technology	7	5
Private Sector	17	11
Other Organizations or Unites	20	14

Simple random sampling method was used in order to collect the necessary data and to test the hypotheses of the study. Furthermore, a well structured questionnaire whose reliability and validity were tested in advance was distributed among the participants. This questionnaire consisted of two sections was used to collect on a 5-point Likert scale ranging from strongly disagree (1 point) to strongly agree (5 points). Demographic information of the

statistical sample including gender, education, age, research working experience, type of job, type of organization or institute, affiliated organization, type of research was presented in the first section. The second part of the questionnaire measured the variables of the study including suppliers, buyers, new entrants, existing rivals or competitors, and substitute products and tested the research hypotheses which were presented in Table 2.

Table 2
Relationship between Hypotheses, Relevant Questionnaire Questions, and Research Variables

Question Number	Variable	Related Hypothesis
1-5 (First Section)	Suppliers	1
1-7 (Second Section)	Buyers	2
1-8 (Second Section)	New Entrants	3
8-16 (Second Section)	Existing Rivals or Competitors	4
17-19 (Second Section)	Substitute Products	5

Based on the data gathered, the reliability coefficient alpha was calculated to be 0.79. The analysis methods used in this research was non-parametric tests including Binominal test and Spearman's rank correlation coefficient.

Results

The descriptive statistics of the respondents are presented in Table 3. These statistics are categorized based on the occupation and working experience.

Table 3
Descriptive Statistics

	Items	Frequency	Percentage
	Research Director	70	43%
Occupation	Non-research Director	6	4%
	Researcher	80	49%
	Others	6	4%
	Below 5 years	38	23%
Working Experience	5-15 years	96	60%
	15-25 years	25	15%
	More than 25 years	3	2%

Data Analysis for Testing Hypotheses

Table 4 displays the results of Binomial test for main hypotheses. This research tried to identify the factors affecting the competitiveness of research organizations. As it shown in Table 4, the effect of first main hypothesis (the effect of suppliers) at the 0.00 significance level was smaller than error level. Therefore, based upon the respondents' comments test statistics fell into the region of first hypothesis. This means that the suppliers (statistics/equipments) were effective in competitiveness of research organizations at 95 per cent confidence level. Regarding the second hypothesis (buyer/customer effect), significant level (0.00) was smaller than the error level (0.05). According to the respondents' opinions,

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test statistics fell into the region of second hypothesis. It means that the customers were effective in the competitiveness of research organizations. With respect to the data, the third and the fourth main hypotheses (the effect of existing rivals and new entrants) were confirmed. Their significance levels were (0.00) which were less than the error level (0.05). It means that existing rivals and new entrants fell into the region of first hypothesis and therefore were effective in competitiveness of research organizations at 95 per cent confidence level. The significance level for fourth hypothesis (0.00) was lower than the error level (0.05), so this hypothesis also was confirmed at 95 per cent confidence level. Therefore, respondents' ideas fell into the region of first hypothesis. Based upon these results, Porter's model was applicable for research organizations or institutes of the country at 95 per cent confidence level.

Table 4
Results of Binomial Test for Main Hypotheses

Main Hypotheses	Assumptions	Category	Frequency	Relative Frequency	Significance Level
Suppliers	H_0	<=3	17	0.10	
	H_1	>3	145	0.90	0.00
	Total		162	1.00	
Customer/ Buyer	H_0	<=3	30	0.19	
	H_1	>3	132	0.81	0.00
	Total		162	1.00	
Existing Rivals or Competitors	H_0	<=3	16	0.10	
	H_1	>3	146	0.90	0.00
	Total		162	1.00	
New Entrants	H_0	<=3	17	0.10	
	H_1	>3	145	0.90	0.00
	Total		162	1.00	
Substitute Products	H_0	<=3	32	0.20	
	H_1	>3	130	0.80	0.00
	Total		162	1.00	

In the second step, the relationship between the types of research institutions, institutional affiliation, and types of research activities with impact of each five factors of competitiveness and some of its main subsets was examined. Therefore, Spearman's rank correlation coefficient as a non-parametric measure was used to test the significance of association between the two variables. This method uses a coefficient of rank correlation after ranking the variables. Table 5 showed the result of Spearman's rank correlation coefficient.

As shown in Table 5, the obtained correlation coefficient for the relationship between investigated elements, in most cases, was higher than error level (0.05) and the test statistic lied in the null hypothesis region and therefore there was not sufficient reason to accept the first hypothesis. This meant that the test statistic was located in the first hypothesis region and therefore there was no reason to accept the null hypothesis. The positive correlation coefficient meant that there was a statistically significant positive correlation between the variables while negative coefficient indicated a significant inverse relationship between the variables. With respect to Table 5, all hypotheses of the study were confirmed. Friedman's nonparametric test for rank position and significance was performed to determine

respondent's preferences and see if the differences were significant. Thus, factors affecting the competitiveness of research institutes were prioritized, i.e., threat of existing competitors, threat of new entrants, threat of substitute products, bargaining power of suppliers, and bargaining power of customers (applicants). Table 6 presented the mean ranks of Friedman's test results.

Table 5
Results of Spearman's Rank Correlation Coefficient between the Various Elements and the Subset of the Main Assumptions

Effect on Competitiveness	Parameter	Types of Research	Institution Type	*Organization Affiliation*
Difficult to replace research institute	Correlation Coefficient	-0.18	0.02	-0.13
	Significance Level	0.82	0.78	0.90
Provide negotiators' personal benefit	Correlation Coefficient	-0.01	0.38	-0.11
	Significance Level	0.85	0.62	0.14
Bear the customer cost , if you replace the current products with other ones	Correlation Coefficient	0.05	0.11	-0.07
	Significance Level	0.48	0.15	0.36
The ability of suppliers to compete	Correlation Coefficient	-0.07	-0.08	-0.00
	Significance Level	0.32	0.26	0.95
The ability of customers to compete	Correlation Coefficient	0.05	0.05	0.12
	Significance Level	0.48	0.46	0.12
Grow the research subject up	Correlation Coefficient	-0.12	0.06	0.04
	Significance Level	0.11	0.40	0.58
Having unique equipments of institute	Correlation Coefficient	0.12	0.11	0.06
	Significance Level	0.11	0.15	0.39
Exclusive and unique live performance	Correlation Coefficient	0.08	0.11	0.06
	Significance Level	0.27	0.14	0.44
Limited access to raw materials or information for newcomers	Correlation Coefficient	0.08	-0.26	-0.27
	Significance Level	0.28	0.74	0.00
Small number of existing competitors	Correlation Coefficient	0.00	0.13	-0.05
	Significance Level	0.91	0.08	0.50
Small number of suppliers	Correlation Coefficient	-0.01	-0.08	0.13
	Significance Level	0.89	0.27	0.08
Large number of customers (clients)	Correlation Coefficient	-0.01	0.01	-0.08
	Significance Level	0.82	0.88	0.30
Loyalty to the institution	Correlation Coefficient	0.03	-0.01	0.05
	Significant Level	0.67	0.85	0.46
Previous relationship to the applicants	Correlation Coefficient	0.03	-0.12	-0.19*
	Significance Level	0.63	0.07	0.00
High startup costs for newcomers	Correlation Coefficient	-0.00	0.07	0.00
	Significance Level	-0.92	0.33	0.99
Low information cost and research procedures	Correlation Coefficient	0.03	0.04	0.02
	Significance Level	0.70	0.61	0.74
Having knowledge of the market and the cost of providing	Correlation Coefficient	0.03	-0.05	-0.03
	Significance Level	0.64	0.44	0.68
Organization's size	Correlation Coefficient	-0.13	-0.11	-0.00
	Significance Level	0.09	0.13	0.91
Better customer service or product quality of institute	Correlation Coefficient	-0.16*	-0.06	-0.23*
	Significance Level	0.03	0.44	0.00

** Correlation is significant at the 0.01 level (2-tailed)
*Correlation is significant at the 0.05 level (2-tailed)

Table 6
Friedman's Test for Prioritizing Hypotheses

Main Hypotheses	Mean Rank
Threat of Existing Competitors	3.27
Threat of New Entrants	3.18
Threat of Substitute Products	3.00
Bargaining Power of Suppliers	2.89
Bargaining Power of Customers (Applicants)	2.66

By using Spearman's nonparametric test, the relationship between the types of institutions, organization affiliation, and types of research activities with main hypothesis was examined and the results finally presented at Table 7.

Table 7
Spearman's Nonparametric Test Results

Hypothesis	Parameter	Type of Research	Organization's Size	Organization Affiliation
Bargaining Power of Suppliers	Correlation Coefficient	-0.05	-0.05	0.02
	Significance Level	0.48	0.50	0.77
Bargaining Power of Buyers	Correlation Coefficient	0.00	0.08	-0.03
	Significance Level	0.99	0.27	0.64
Threat of New Entrants	Correlation Coefficient	0.03	0.02	-0.13
	Significance Level	0.63	0.73	0.09
Threat of Potential Competitors	Correlation Coefficient	-0.00	-0.01	0.05
	Significance Level	0.96	0.86	0.50
Threat of Substitute Products	Correlation Coefficient	0.00	0.04	-0.18*
	Significance Level	0.98	0.57	0.01

** Correlation is significant at the 0.01 level (2-tailed)
* Correlation is significant at the 0.05 level (2-tailed)

As it is clear from Table 7, the obtained correlation coefficient between the variables in most cases was greater than the acceptable error level. It meant that test statistics lied in the null hypothesis region. Consequently we can claim with 95 per cent certainty that there so we can say that there was no reason to accept the first hypothesis. In some cases, significant level of error was smaller than the acceptable level (0.05). This means that the test statistic was located in the first hypothesis region and therefore there was not sufficient reason to accept the null hypothesis at 95 per cent confidence level.

Discussion
Organizational competitiveness is considered as an emerging issue in the country. The waves of privatization in Iran and some scientific issues related to it came back to twenty years ago in this field. The privatization of higher education and public universities has been a worldwide phenomenon in recent years. Technology importation and large number of engineering graduates provide opportunity for greater mobility to meet the needs of technology. For this purpose, competitiveness in technology research institutes was considered in this study. The hypotheses were tested by non-parametric tests and as a result all five hypotheses of the study were confirmed. It meant that raw material suppliers, equipment or providers of data and information, applicants and customers of research

products (services), existing competitors or rivals, entry of potential competitors or new entrants, and possibility of substituting new products, services or technology should be considered as factors that can affect the competitiveness of technology research organizations.

One of the obtained results from the hypotheses test was that ministry of science, research, and technology or university affiliated research institutions compared with private institutions considered the threat of substituted products as a competitive factor. There were no significant differences indicating the impact of institutions on their attitudes toward competitive factors. In addition, the researchers and research managers who have high education degrees felt better the effect of the threat of competitive rivalry among existing firms and substituting products than those who having a lower university degree (BA). Therefore, their knowledge of technology and their opinion about the threat of substitute products was noticeable. Researchers and research managers who having a work experience more than a few of their less experienced colleagues believed that having unique facilities and processes of implementing research could be effective in increasing competitiveness in research institutions. They also considered less effective the role of small number of suppliers as a competitiveness factor than other their research colleagues. Research institutions affiliated with universities and ministry of science, research, and technology were less aware than private research institutions of the effect of superior products as preventing agents against substitute products. Building work relationship with individuals or institutions who possibly applied for research products or services, and limited access to information or raw materials as an entry barrier to new entrants were considered less essential for increasing the competitiveness of research institutions by affiliated institutions on comparison with other organizations or institutions. Another result was that there was no significant difference in effects of type and size of research institutions on their attitudes towards available competitive factors.

Conclusion

Future researchers and research institutions in this field of inquiry should analyze competitive factors in the field before selecting the area of interests or abilities, considering technical and economical issues, identifying clients, suppliers, and potential competitors or rivals. Furthermore, they should attempt to predict or detect the substitute products in terms of technology. It is controversial to select the rivalry among existing competitors as the first priority among the five competitive forces. Two factors lead to this view are as follow: First, existing rivals or foreign firms may consider main threat for the research organizations of country. Second, research and technology organizations in a country are important elements because they are considered as rivals.

Foreign firms not only would be caused to improve the quality of available technologies, but also would be prevented a monopoly in the country. If domestic research institutions want to compete with them, they should increase the quality of their products and decrease their prices. If the existence of a competitive environment in domestic markets is considered by respondents, then it seems that the number of research in research and technology organizations decreased or from scientific policymakers' perspective, there is not any suitable

thematic separation for them in majority institutions. Therefore, the activities in which they are engaged are repetitive and parallel to one another. The duties assigned to ministry of science, research, and technology are appropriate policy formulation, review, performance evaluation of these organizations in order to stop wasting material and spiritual capitals. These institutions' policy makers should be aware that they will have a strong competitive environment if they do not have a growing technology or unique and distinctive process.

Sometimes, the selection of research subjects and fields would be done correctly and efficiently, for some reason faced with a lack of consumer demand or the other competitor's tactics (including foreign firms) reduced its actual value. Facing such conditions, it is better for research institutions to have enough power or capacity to hold their research product both in terms of time consumption (before replacement of new products), and the financial support to be maintained until the appropriate time. Research institutions should be in terms of facilities, equipments, and fixed costs in such a way that when the considered field of research is encountered with crisis they can easily change the direction of the field to another one in order to use facilities and appliances in the new subject or field. Continuous identification and communication with potential future applicants are important points that should be considered by research organizations. This point should be taken important especially for unaffiliated institutions. Although the risk in research is perilous for research institutions, it has the entrance advantage of new competitors or barriers. Research institutions with personal and institutional experience can reduce the risk and increase the barriers of entry towards new competitors. Although locating business in certain areas requires heavy costs, it reduces the possibility of entering of new competitors. It is better that the suppliers of materials, equipments, and statistics are identified in specified field. The limited numbers of suppliers lead to increase their bargaining power. In addition, the challenges of conducting research decrease the competitive power of research institutions. It is necessary to collect information or data about markets and products when working with suppliers. This information would be helpful tips to prevent artificially increase bargaining power of the firms' suppliers against research institutions.

Ongoing research in areas that require special equipment and materials can reduce the competitiveness of organization through increasing the firm's bargaining power of suppliers of materials and equipments. The institutes possibly must choose the research topics that are of interest to numerous applicants. Research topics should be chosen in such a way that neither the applicant nor the supplier (the client) do not have any ability and possibility to enter in that field of study. Otherwise, these two groups do not compete with research institutions; they can reduce competition in research institutions through threatening their capabilities and increasing the bargaining power.

Despite the fact that the findings of this study claimed the effectiveness of competitions in organizations; there were some limitations in the implementation of the present study. Due to time limitation, there was not enough time and budget to distribute the questionnaire in different organizations and this study just focused on research institutions and university affiliated organizations. The time span in this study was not enough, so a long-term study may help obtain comprehensive findings. The present study used only a questionnaire to elicit

information from participants and it could use multiple method approaches like observation and interview to increase the validity of its data.

This study approved that Porter's five competitive factors model was applicable to the research and technology institutions. However, it is still unclear whether the proposed strategies for the industry can be implemented in these organizations or not. For analyzing such strategies, it is better to analyze and evaluate the above-mentioned institutions in several classes of the same. Implementing the same kinds of strategies for different categories or sets is not recommended. We can replicate these factors and assumptions in other sciences and humanities majors through confirming competitive factors for research and technology institutes.

Nowadays, the issue of competitiveness is claimed to be one of the convenient topics in the field of management and marketing. In the present study, the impact of competitive factors in research and technology institutions was investigated; however, a chain of other studies in this field is required to verify and investigate the claim of this study, along with many other key issues in this regard. First, the study could be conducted in other non-technical fields of study to evaluate competitiveness factors. Second, the study could be investigated the competitiveness factors based on resource-based theory, introducing the advantages and disadvantages, and providing competitive factors. Third, this study can be replicated to investigate the research and technology institutions in other fully specialized areas in order to provide competitive strategies. Furthermore, the study can be applied in industry-related research institutions, R & D, and institutions in science and technology parks.

References

Altuntas, G., Semercioz, F., Mert, A., & Pehlivan, C. (2014). Industry forces, competitive and functional strategies, and organizational performance: Evidence from restaurants in Istanbul, Turkey. *Procedia - Social & Behavioral Sciences, 150*, 300–309.

Baltzan, P., & Phillips, A. (2010). *Business driven technology* (4th ed.). Boston, MA: McGraw-Hill/Irwin.

Barge, A., Lemus, A., Núñez, R., & Modrego, A. (2007). Research and technology organizations: How do they manage their knowledge? *International Journal of Entrepreneurship & Innovation Management, 7*(6), 556–۵۷۵.

Cronin, J. J., & Taylor, S. A. (1992). Measuring service quality: Reexamination and extension. *Journal of Marketing, 56*, 55–68.

Covin, J. G., & Slevin, D. P. (1990). New venture strategic posture, structure, and performance: An industry life cycle analysis. *Journal of Business Venturing, 5*(2), 123–135.

Dale, C. (2000). The UK tour-operating industry: A competitive analysis. *Journal of vacation Marketing, 6*(4), 357–367.

Eisingerich, A. B., & Bell, S. J. (2008). Perceived service quality and customer trust: Does enhancing customers' service knowledge matter. *Journal of Service Research, 10*, 256–268.

Grundy, T. (2001). Competitive strategy and strategic agendas. *Strategic Change, 10*, 247–258.

Huang, L., Yung, C. Y., & Yang, E. (2011). How do travel agencies obtain a competitive advantage? Through a travel blog marketing channel. *Journal of Vacation Marketing, 17*(2) 139–149.

Jain, R. K., & Triandis, H. C. (2010). *Management of research and development organization: Managing the unmanageable* (3rd ed.). Hoboken, NJ: John Wiley & Sons.

Lee, D. H., Bae, Z., & Lee, J. (1991). Performance and adaptive role of the government – supported research institute in Korea. *World Development, 19*(10), 1421–1440.

Lucato, W. C., Junior, M. V., Vanalle, R. M., & Salles, J. A. A. (2012). Model to measure the degree of competitiveness for auto parts manufacturing companies. *International Journal of Production Research, 50*(19), 5508–5522.

Niederhut-Bollmann, C., & Theuvsen, L. (2008). Strategic management in turbulent markets: The case of the German and Croatian brewing industries. *JEEMS, 1*, 63–88.

Ormanidhi, O., & Siringa, O. (2008). Porter's model of generic competitive strategies: An insightful and convenient approach to firms' analysis. *Business Economics, 43*(3), 55–64.

Porter, M. E. (1980). *Competitive strategy: Techniques for analyzing industries and competitors.* New York: Free Press.

Porter, M. E. (1990). *The competitive advantage of nations*. New York: Free Press.

Porter, M. E. (1985). *The competitive advantage: Creating and sustaining superior performance*. NY: Free Press.

Porter, M. (2006). Competitive strategy. *Strategic Management Journal, 2*(1), 93–95.

Porter, M. E. (2008). The five competitive forces that shape strategy. *Harvard Business Review*, *4*(1), 23–41.

Tavitiyaman, P., Qu, H., & Zhang, H. (2011). The impact of industry force factors on resource competitive strategies and hotel performance. *International Journal of Hospitality Management, 30*, 648–657.

Tallon, P. P., & Kraemer, K. L. (2007). Fact or fiction? A sense making perspective on the reality behind executives' perception of IT business value. *Journal of Management Information Systems, 24*, 13–54.

Thompson, J. (2001). *Strategic management* (4th ed.). London: Thomas Learning.

Ucmak, F., & Arslan, C. (2012). The impact of competition conditions on new market entrants in Istanbul hotel industry: An analyse by using five forces of competitive position model of M. Porter. *Procedia – Social & Behavioral Sciences, 58*, 1037– 1046.

Wesseling, J. H., Faber, J., & Hekkert, M. P. (2014). How competitive forces sustain electric vehicle development. *Technological Forecasting & Social Change, 81*, 154–164.

Yeo, R. K., & Li, J. (2014). Beyond SERVQUAL: The competitive forces of higher education in Singapore. *Total Quality Management, 25*(2), 95–123.

Yglesias, E. (2003). Porter vs. porter: Modeling the technological competitiveness of nations. *Scientometrics, 57*(2), 281– 293.

Yolles, M. (2009). Competitive advantage and its conceptual development. *Business Information Review, 26*(2), 93–111.

Yunna, W., & Yisheng, Y. (2014).The competition situation analysis of shale gas industry in

China: Applying Porter's five forces and scenario model. *Renewable & Sustainable Energy Reviews, 40*, 798–805.