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A Model for IT Strategic Planning and Competitive Assessment of Quality Function Deployment (QFD) Approach (Case Study: Kharazmi Information Technology Development Co.)

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Abstract: Now a days, the organizations have relative competitive position that their main focus of activities is to supply demand and respond to the customers' expectations. So, active companies in Information Technology (IT) field also require a model to plan strategic information systems to select and use optimalstrategic systems and new IT technologies for their organizations. The aim of this research is to provide a model for IT strategic planning and competitive assessment. In this model of IT needs, IT strategies and its strategic programs are prioritized using Friedman test and paired comparisons and mathematical methodology such as eigenvector. By getting managers' feedback through questionnaires, it is proposed to plan optimal strategic system to promote IT needs using QFD team ideas. The research methodology is QFD technique, analytical tools and house of quality matrix. Finally, competitive distance is assessed between this company and the other active competitor of IT using QFD technique. It means that by using the view points of the company managers, it is provided recommendations to improve the business processes within the IT field of organization. The research findings show that IT needs of "creating profitable income" with 0.299 has the most priority among these needs. The IT strategy of "market development" with coefficient 0.326 and IT strategic plan of "GIS software development" with coefficient 0.166 have the highest priority between IT strategies and IT strategic plans in Kharazmi Co.

Key words: Planning, strategic, IT, competitive assessment, Iran

INTRODUCTION

According to IT increasing development, there is a high competition between active IT companies and IT strategies providers and they look for modern and new methods to get the market share. According to the definition: strategic information systemis a system which is developed to meet the needs of business (Babaei, 2007). So, organizations are going to get the super quality and function through the customers' needs (Voice of customer). In today world, survival means to attract customers to create positive cash flow and profitability and the necessity to attract customers in today world is to recognize customers and perceive to customer voice. With this interpretation, a framework in which companies can achieve to their organizational goals, vision and information systems strategy is necessary and inevitable (Zhian *et al*., 2012). In planning of all parts of the organization, it is always believed that any decision, without using scientific methods, can lead to decrease effectiveness. Quality Function Deployment (QFD) is a systematic method to identify customer needs and convert them in to engineering characteristics (Qanbarpur and Abbaspour, 2006). One of the main objectives of strategic planning is to determine rivals position and create a distinct competitive advantage over others. Given the importance of this, organizations should always gather information on competitors, according to environmental changes, opportunities and threats to develop appropriate strategies. Therefore, in IT strategic planning, it should also be carried out competitive assessment. In developing strategic plan, senior managers generally have to apply quantitative and qualitative terms (Haki and Ali, 2005). Therefore, to implement, the strategies of the organization, it must be used an approach to transform strategic plans in to operational ones and also analyze competitors conditions (Robert and Dorothy, 2003). By using QFD, conceptual needs of

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strategic plans can be transformed into applicable programs, measurable and appropriate to improve. QFD is a multi-stage procedure that in each stage, the data inside the team is integrated using a matrix (Azarmsa, 2012). When QFD is used to transform IT needs into IT strategies and also IT strategies into IT strategic plans, it must be used a procedure to prioritize them and analyze the competitors. So, the aim of this study is to provide a model for IT strategic planning and competitive assessment using Quality Function Deployment (QFD) approach Case Study: Kharazmi Information Technology Development Co.

Empirical history: Khaleghi (2007) had done a study entitledas "providing a framework by combining the techniques of QFD, SWOT and BSC to develop organizational strategies in a service". In this research, it is firstly identified SWOT matrix (strength, weakness, opportunities and threats) using developing strategy models. Then, it has been defined long-term goals and organizational strategies using Balanced Scorecard (BSC). Developing strategies could not guarantee their effectiveness. To do so, strategies have been placed in house of quality model.

Olyaie (1998) had done a study entitled as "application of QFD inquality planningof aheavy machineryplant". QFD approach is anew method to promote quality and using, it in internationally recognized companies is successfully growing and has many benefits for them in terms of customer satisfaction and consumers and increased competitiveness. Due to the noted benefits, it has been decided to implement QFD in a designing and manufacturing heavy machinery company.

Dastoryan (2010) had done a study entitled as "developing a framework for strategic information system planning (strategic information system planning) to conduct software solutions provider companies". The main goal of this research is to develop a framework for strategic information system planning to conduct software solutions provider companies in using latest technologies.

Molaei (2010) had done a study entitled as "developing human resource strategies of governmental organizations to improve satisfaction using QFD (Tehran Municipality of Culture and art Organization)". The main goal of this research is to assess the opinions and demands of citizens and suitable human resource strategies related to the demands of citizens and prioritizing them using QFD technique. Since, this method makes communication with audiences during service design stages, it will provide customer satisfaction.

Research questions:

- What is IT needs in Kharazmi IT development Co.?
- And what is its priority?
- According to the dimensions of customer satisfaction which IT need in Kharazmi IT development Co. has higher priority?
- What are effective IT strategies to meet the IT needs in Kharazmi IT development Co.? And what is its priority?
- What are effective IT Strategies consistent with IT (SISP) strategy in Kharazmi IT development Co.? And what is its priority?
- How is the assessment of competitive distance of IT strategies in Kharazmi IT development Co. with the other competitors?

Research executive model: Introduction and implementation of the model in this study is performed to identify and prioritize the elements of IT strategic planning and assess the competitive development Kharazmi IT Co. In this model, by using the company's IT needs, it is dealt with the company's IT strategy. Similarly, by using IT strategies, IT strategic plans are determined and selected. Accordingly, based on needs and strategies of IT and also IT strategic plans, a house of quality model is formed. Components that should be priorities in this model are firstly IT needs and then IT strategies and IT strategic plans. In following, competitive assessment would be done using assessment the current situation and the state of competition.

MATERIALS AND METHODS

The present research is applicable and in terms research methodology is a description of case study and in terms of research is descriptive and survey based. To do case study, it was used mix method which combines quantitative and qualitative methods. It has been used semi-structured interviews and meetings to do qualitative method. Similarly, it has been used Friedman test and questionnaire to identify IT needs, strategies and plans to do quantitative parts, paired comparisons and specific vector technique to determine significance degree of IT needs, strategies and plans and house of quality matrix to determine dependency rate of IT needs, strategies and plans as well. For competitive assessment, it is used current state and competitors state questionnaires and house of quality matrix tool. The statistical population of this research includes senior managers and directors of IT development team of Kharazmi Co. that whether, they responsible for strategic decisions on the business field of the company or operationally responsible for the company's strategic projects and finally, they have been known as elites. In this research, the sample selected for

interview is 10 persons of senior managers and directors of IT Kharazmi Co. in which interviewees have at least 1 year job experience and are responsible for strategic and operational decisions of projects. In selecting these samples, items including time, availability of interviewees and their cooperation have been considered. In questionnaire of identifying IT needs, strategies and plans and in terms of small number ofmanagers and expertsin the field ofstrategic, the sample is same as society and it has been used to talcensus method and then 30 questionnaires have been distributed. To gather elites' view points in the steps of determining the priorities of IT needs, strategies and plans and also their dependency, it has been used judgement sampling method of 3 superior managers of Kharazmi Co. to fill out the questionnaires. To determine current and competitors states of IT strategies, the related questionnaire was distributed among 30 persons. It is done two by two comparisons in questionnaire usinga scale which has been proposed from 1 (preferably equal) to 9 (extremely preferred). The decision maker also can use the adverse of 1-9 if the answer is negative. The answer to the other questions in questionnaires were also provided as Likert Scale in five items from 1 (very low) to 5 (very much). In the present study, to promote validity in qualitative research (determining IT needs, strategies and plans), it was considered to strategies such as minimum intervention in the description (using descriptive phrases such as quote (reporting an event according to the narrative notification)), data pluralism (using various sources to better understand a phenomenon), participant feedback (providing interpretation and results to the participants by the researcher and determine and modify the ill-conceived items) and get colleagues views (providing interpretations and results of researcher by other researchers and their colleagues). In there liability of the quality to the reliability of inter subject, the performed copies during text types by two persons must be considered. During interviews' classification as well as questionnaires distribution, it must be determined reliability analysis. In research quantitative part, the face and content validity of the questionnaires must be verified by reviewing elites and experts. To assess the reliability in research quantitative part, 30 questionnaires must be distributed. By using SPSS software, the reliability in questionnaire of (identifying IT needs, IT strategies and IT strategic plans) for its 3 parts were 0.831, 0.801 and 0.721 and in questionnaire of (determining IT strategies) was 0.81 which indicated their high reliability. In terms of questionnaire of (determining priorities of IT needs, strategies and plans), it was done paired comparison by distributing questionnaire among 3 elites and using expert choice software and obtained compatibility scale of values as 0.04, 0.06 and 0.04 which are <0.1 and indicates there liability of questionnaire matrices. The questionnaire of quality home matrix (determining the scale of communication in communication matrix) is also a credible standard matrix. To analyze data, it was used Freidman test, t test and paired comparison.

RESULTS AND DISCUSSION

Here by using QFD Model as step by step, it was made model.

Step 1; identifying IT needs with Friedman test: According to Table 1, as significance level 0.000 is less than error scale of 0.05 so, in 95% of confidence level, it can be rejected zero statistical hypothesis (H_o) based on equality of significance of IT needs while, it can be accepted the opposite statistical hypothesis (H_1) based on inequality of significance of IT needs.

In Table 2, the identified IT needs have been provided using Friedman analysis: the result of this research has been defined as rows of first house of quality matrix of QFD approach.

Step 2; identifying IT strategies with Friedman test: According to Table 3, as significance level 0.000 is less than error scale of 0.05 so, in 95% of confidence level, it can be rejected zero statistical hypothesis (H_o) based on equality of significance of IT strategies while, it can be accepted the opposite statistical hypothesis (H_1) based on inequality of significance of IT strategies. In Table 4, the identified IT strategies have been provided using Friedman analysis: the identified IT strategies were placed as first house of quality matrix columns and second house of quality matrix rows.

Table 1: Freedman test significance

Test statistics[a]	Values
N	30.000
χ^2	102.042
df	6.000
Asymp. Sig.	0.000

[a] Freedman test

Table 2: Identified IT needs

Ranks	Mean rank
Differentiating-significance	3.96
Generating incomeandsustainable profitability-significance	2.69
Risk management-significance	4.47
IT business quality-significance	2.50
Customers' satisfaction-significance	5.70
Agility support operation-significance	4.47
Improving processes-significance	4.21

Table 3: Friedman test significance of variables

Test statistics[a]	Values
N	30.000
χ^2	111.005
df	5.000
Asymp. Sig.	0.000

[a] Freedman test

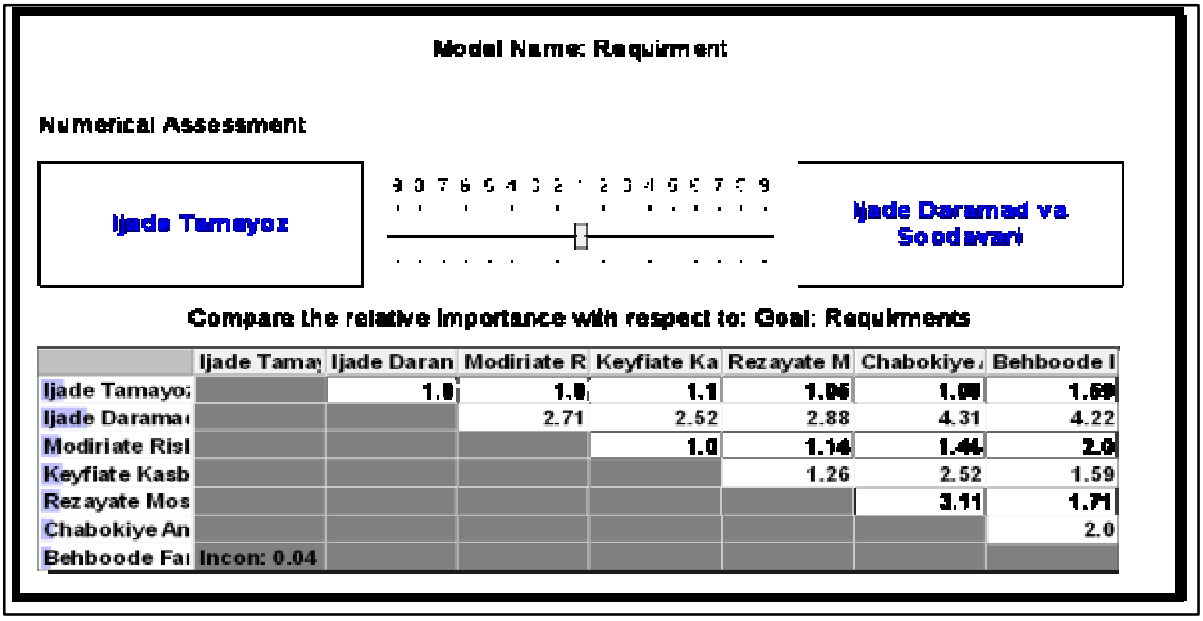

Fig. 1: Compatibility rate of IT needs in EC software

Table 4: Identified IT strategies

Ranks	Mean rank
Market development-significance	3.57
Creatingstrategic links-significance	5.44
Variety ofproduct andservices portfolio-significance	3.85
Increasingcapacityin countrymajorauctions-significance	2.71
Developing efficientandtalentedhuman resource-significance	2.02
Developing knowledgeand informationinfrastructure-significance	3.41
Developing market-significance	3.57

Table 5: Step 4 house of quality matrix

	IT strategies						
IT needs	Market development	Creating strategic links	Increasing variety of products and services portfolio	Developing capacity in country major auctions	Developing efficient and talented human resource	Knowledge information and infrastructure	Significance (A)
Differentiating	0.15	0.16	0.22	0.26	0.04	0.10	0.299
Generating income and sustainable profitability	0.23	0.10	0.20	0.06	0.07	0.08	0.146
Risk management	0.23	0.21	0.15	0.12	0.06	0.11	0.138
IT business quality	0.17	0.18	0.14	0.26	0.25	0.18	0.134
Customer's satisfaction	0.07	0.13	0.20	0.08	0.23	0.18	0.128
Agility support operation	0.09	0.11	0.02	0.05	0.19	0.19	0.084
Improving processes	0.05	0.11	0.06	0.16	0.12	0.15	0.069
Total weight	0.15	0.15	0.17	0.16	0.12	0.13	0.058
Relative weight	0.17	0.17	0.19	0.19	0.13	0.15	0.042

Step 3; identifying the priority of IT needs with paired comparison: According to Fig. 1, the need of "generating income and sustainable profitability" with 0.299 of significance degree has the highest score and the needs of "creating differentiating", "IT business quality", customers' satisfaction", risk management", "agility support operation" and "improving processes" are from 2-7 grades, respectively. The results of prioritization of IT needs are placed in significance coefficient column (A) of first house of quality matrix.

Step 4; determining the relationship between IT needs and strategies with communication matrix: The total weight of each IT strategy was obtained from the total multiplying of significance degree of each need in corresponding dependence in which the calculations were done in MS Excel and place in row of matrix total weight (Table 5). The total weights of IT strategies was equal to 0.87 in which the total weight of each one was divided to 0.87 to calculate the relative weight of

Table 6: Significance of Friedman test

Test statistics[a]	Values
N	30.00000
χ^2	122.42100
df	7.00000
Asymp. Sig.	0.00000

[a] Friedman test

Table 7: The identified IT strategies

Ranks	Mean rank
Producing and improving products and comprehensive banking strategies (switch core) significance	4.280
Developing cloud computing solution (Cloud computing) significance	4.030
Developstrategies tocombat money laundering(fraud management)-significance	4.070
establishingintegrated standards and frames needed for Prince II, ITIL, ISO 27000-significance	4.092
Developing GIS software-significance	5.560
Developing mobile solutions such as OSS Mobile-significance	5.300
Identifying and owning enterprises with technical knowledge in IT-significance	5.940

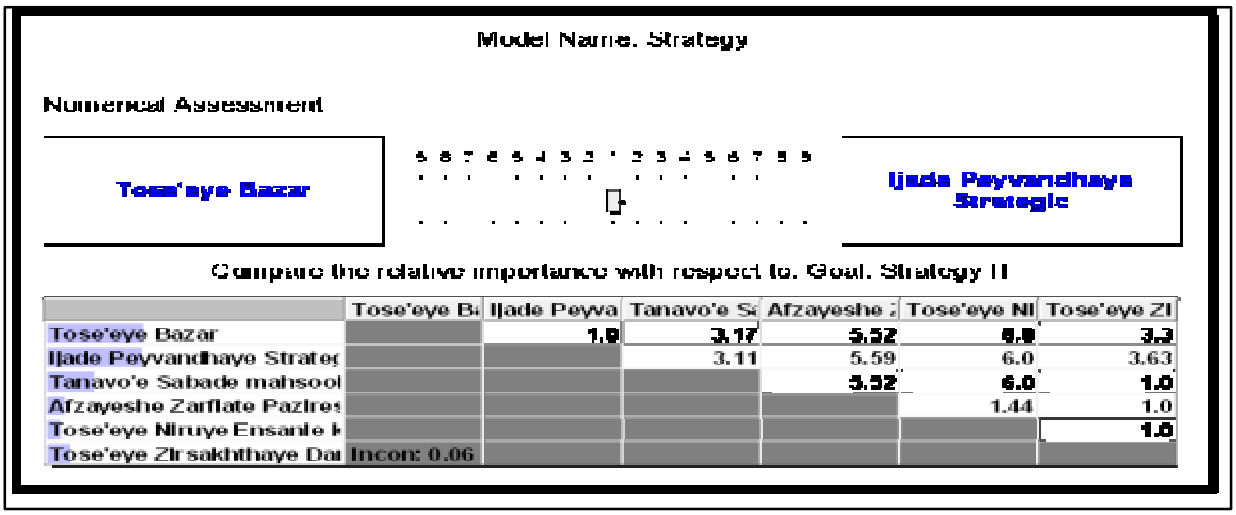

Fig. 2: Compatibility rate of IT strategies in EC software

each IT strategy and finally, the results have been placed in related row of matrix relative weight.

Step 5; identifying IT strategic plans with Friedman test: According to Table 6, as significance level 0.000 is less than error scale of 0.05 so, in 95% of confidence level, it can be rejected zero statistical hypothesis (H_0) based on equality of significance of IT strategic plans while, it can be accepted the opposite statistical hypothesis (H_1) based on inequality of significance of IT strategic plans. In Table 7, the identified IT strategies have been provided using Friedman analysis.

Step 6; identifying IT strategies priority with paired comparison: In this step, the identified IT strategies must be prioritized with paired comparison and special vector methodology in expert choice software.

According to Fig. 2, the need of "market development" with 0.326 of significance degree has the highest score and the needs of "creating strategic links" with 0.323 of significance degree is in the second grade and "developing efficient and talented human resource" is in the sixth grade as well.

The results of prioritization of IT needs are placed in significance coefficient column (A) of second quality home matrix. The significance coefficient of this matrix will be indicated with A.

Step 7; determining the relationship between IT strategies and IT strategic plans in communication matrix: The total weight of each IT strategy was obtained from the total multiplying of significance degree of each need in corresponding dependence in which the calculations were done in MS Excel and place in row of matrix total weight (Table 8). The total weights of IT strategies was equal to 1.26 in which the total weight of each one was divided to 1.8726 to calculate the relative weight of each IT strategy and finally, the results have been placed in related row of matrix relative weight.

Table 8: Step 7 quality home matrix

IT strategies	IT strategic plans: Production and development of products and comprehensive solutions for banking (core, switch)	Developing cloud computing	Develop strategies tocombat money laundering (fraud management)	Stablishing integrated standards and frames needed for Prince II, ITIL, ISO 27000	Developing GIS software	Developing mobile solutions such as OSS mobile	Identifying and owning enterprises with technical knowledge in IT	Increasing professional human resources in organization's different departments	Significance (A)
Market development	0.22	0.20	0.26	0.04	0.21	0.14	0.21	0.04	0.326
Creating strategic links	0.15	0.17	0.18	0.04	0.13	0.05	0.20	0.04	0.323
Variety ofproduct and services portfolio	0.20	0.22	0.24	0.12	0.25	0.2	0.20	0.18	0.164
Increasingcapacityin country major auctions	0.14	0.14	0.08	0.34	0.1	0.16	0.18	0.25	0.056
Developing efficient and talented human resource	0.17	0.17	0.15	0.14	0.14	0.19	0.04	0.21	0.047
Developing knowledgeand informationinfrastructure	0.10	0.10	0.07	0.32	0.16	0.24	0.17	0.25	0.085
Total weight	0.18	0.18	0.20	0.1	0.18	0.13	0.19	0.10	0.087
Relative weight	0.14	0.14	0.16	0.08	0.14	0.11	0.15	0.08	0.096

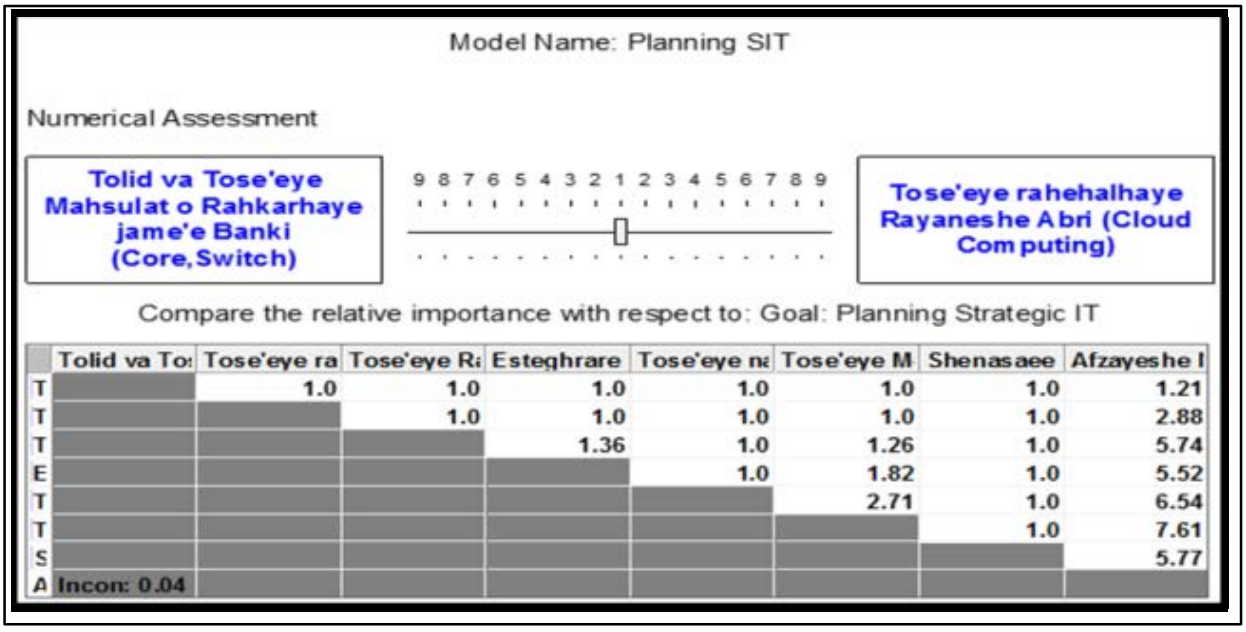

Fig. 3: Compatibility rate of IT strategic plans in EC software

Step 8; identifying the priority of IT strategic plans with paired comparison: In this step, the identified IT strategies of Step 5 must be prioritized with paired comparison and special vector methodology in expert choice software.

According to Fig. 3, the need of "developing GIS software" with 0.166 of significance degree has the highest score and "increasing professional andexpert human resource in the organization sectors" is in the last grade as well.

The results of prioritization of IT strategic plans are placed in significance coefficient column (A) of second quality home matrix.

Step 9; assessing competitors based on IT strategies with t-test: According Table 9 as significance level 0.000 is less than error scale of 0.05 so, in 95% of confidence level, it can be rejected zero statistical hypothesis (H_0) based on equality of current state and competitor state while, it can be accepted the opposite statistical Hypothesis (H_1) based on inequality of current state and competitor state and the difference of current state and competitor state of IT strategies is significant for all of them.

Based on results, it has been indicated current state and competitor. In this chart, to assess the Kharazmi Co. competitors, the difference ofthese two states has also

Table 9: Comparing current and competitor sates of IT strategies

IT strategies	States	Average	Gap	df	Sig.
Market development	Current	1.41	1.1	129	0.000
	Desirable	2.51			
Creating strategic links	Current	1.34	0.32	129	0.000
	Desirable	1.66			
Diversification ofproduct andservices portfolio	Current	2.08	0.91	129	0.000
ncreasing thecapacity to acceptinlargeauctions	Desirable	1.17			
Developing efficientandeffective forces	Current	1.33	1.19	129	0.000
	Desirable	2.52			
Diversification ofproduct andservices portfolio	Current	1.48	1.02	129	0.000
Increasing thecapacity to acceptinlargeauctions	Desirable	2.5			
Developing efficientandeffective forces	Current	1.08	1.42	129	0.000
	Desirable	2.5			

been added which indicates that the most difference (gap) of Kharazmi Co. and its close competitors is on the strategy of "developing data and knowledge infrastructure" and the least difference (gap) is related to the strategy of "creating strategic links".

CONCLUSION

Here, a summary of the findings were presented by implementing this research, 7 IT needs and 6 IT strategies and 8 IT strategic plans have been identified and prioritized for Kharazmi IT Co. This prioritization indicates the significance of each IT need, strategy and plan in the organization.

In IT needs of house of quality matrix, the need of "providing income and profitability" has the highest rank while, the needs of differentiating, business quality, customer satisfaction, agility of support operation and improving processes are placed in the later ranks, respectively.

Among IT strategies, the strategy of "market development" has the highest priority. The priority of other IT strategies includes creating strategic links, the diversity of products and services, developing data and knowledge infrastructures, increasing the capacity of participating in the country big auctions and improving efficient and capable human resource.

In terms of IT strategic plans in second house of quality matrix, the strategic plan of "developing GIS software" has the highest rank. After that, the strategic plans of "developing strategies tocombat money laundering (fraud management), establishing integrated standards and frames needed for Prince II, ITIL, ISO 27000, identifying and owning companies of technical knowledge in IT, developing cloud computing, developing mobile solution such as Oss mobile, producing and developing products and comprehensive banking strategies (Core, Switch) and increasing professional and expert forces in the organization sector for Kharazmi IT Co. were determined. In assessing competitors, it was concluded that in terms of IT strategies, the most competitive distance of Kharazmi Co. and competitors is the strategy of "developing data and knowledge infrastructures" while the least competitive distance is the strategy of "creating strategic links".

SUGGESTIONS

For each obtained hypothesis and results, the following suggestions for Kharazmi IT Co. are discussed:

- In terms of identifying and prioritizing of IT needs, it was determined that the need of "creating income and profitability" has the highest rank. At the other hand, among IT needs, the need of "creating income and profitability" has the most competitive distance in this company. So, the superior management must reduce this distance with competitors considering the significance of this need
- It was determined, the results that the strategy "market development" has the highest priority among IT strategy. Superior and administrative managers must do their best to define, implement and achieve the plans and goals according to this strategy. In following, this IT strategic plans were determined and prioritized for Kharazmi IT Co.
- By identifying and prioritizing about IT strategic plans in second house of quality matrix, it was determined strategic plan of "developing GIS software" has the highest grade. As, it seems that by developing this software considering technical and business features, the strategy of "market development" and the need of "creating income and profitability" were achieved that elites approves this logic

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