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A CANONICAL ANALYSIS ON THE RELATION BETWEEN INFORMATION TECHNOLOGY AND TOTAL QUALITY MANAGEMENT AND ORGANIZATIONAL EFFICIENCY AND JOB SATISFACTION IN HOSPITALS (CASE STUDY: IMAM REZA HOSPITAL)

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ABSTRACT

The purpose of this research is to investigate the relation between information technology and total quality management and organizational efficiency and job satisfaction. The population of the present study is consisted of the entire employees of Urmiya's Imam Reza Hospital as 260 individuals. By implementing the Cochran formula the size of the sample was determined as 159 individuals. For data collection a questionnaire developed by the author was implemented. Validity of the questionnaires was determined by management professors and respectively the reliability was also determined through Cronbach's alpha. For data analysis, canonical correlation technic and multivariate regression test are used. Results of data's canonical correlation analyses revealed that there is a 99percent assured significant relation among information technology, total quality management and organizational efficiency and job satisfaction (R^2_c=0. 71). On the other hand, regression results indicated that information technology and total quality management are appropriate anticipants for job satisfaction and organizational efficiency. The redundancy coefficient for explanation of variance of the variables of first set (organizational efficiency and job satisfaction) by the second set (information technology and total quality management) is equal to sixty three percent. Also redundancy coefficient of the second set by first set was calculated as fifty three percent.

Keywords: Job Satisfaction, Total Quality Management, Organizational Efficiency, Information Technology

INTRODUCTION

With respect to limitation of resources in every country, increasing organizational efficiency obtains importance as a basic necessity for promoting the standards of lives of a nation. This limitation includes productive materialistic elements such as capital, land and technology as well as efficient, skilled and expert human resources. As a result, need for efficiency is a necessity in every country despite being developed, developing or laggard (Khaki, 1997). Results of researches regarding organizational efficiency and effective elements have shown that elements such as training the employed human resource, improving motivations among employees for more and better working, creating adequate contexts for manager's and employee's innovations, establishing an efficient payment system based on performance and establishment of punishment and rewarding system and ultimately increasing employee's job satisfaction are among the effective elements on organizational efficiency (Nasiripour *et al.*, 2013). Job satisfaction is a factor for evaluation of efficient and appropriate management and possession of sufficient motivation of human resources for better and more working in an organization. Because if the human resource possess sufficient motivation for work; they will employ their talents and skills for the organization. Having spirits and job satisfaction is important for obtaining high organizational efficiency. Therefore, an important element in increasing an organization's employee's psychological energy is the optimization of their job satisfaction (Pour, 2009). Another effective element on organizational efficiency is to be benefiting from information technology and total quality management. Information technology is a bilateral capital. On one hand, not unlike the traditional shapes of capital, it is implemented as

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production technology (Mahmoud and Razaghi, 2011). Increasing the performance and efficiency of human resources and optimized implementation of existing resources and ultimately obtaining success in realization of organizational goals and obtaining customer satisfaction in using the provided services and products by firms, hospitals and etc. are in debt of benefiting from these powerful and effective instruments. Total quality management is a management method which helps the organization to obtain an optimized organizational performance through improving problem solving on the basis of quality. Total quality management is also a human resource based management which tries to help the organization via increasing customer satisfaction and reducing the costs of operations. One of the basic principles of total quality management is uninterrupted improvement in all processes and improvement of the quality of the services of the interest of customers, recyclability of wastes, focusing on improvement of processes instead of criticizing individuals and making decisions based on information and employee's job satisfaction (Flynn, 1995). Therefore, realization of total quality management's goals of interest is in debt of appropriate application of work force, information technologies such as internet and other communicative and information systems and having rich and up to date databases. The outcome of such a performance is increased efficiency and obtaining customer satisfaction. Therefore, there seems to be a tight and significant relation between information technology and total quality management as each other's complement and improvement of efficiency and customer satisfaction. Because information technology provides a suitable context for performance of quality management and as well as implementing the entire capacities of human resources, via this method, organizational efficiency and job satisfaction are also improved and in addition, customer satisfaction is also obtained. In this research we have tried to discuss the relation between these components via canonical correlation technic as well as, investigating the effects of total quality management on changes in efficiency and job satisfaction among the studied population.

MATERIALS AND METHODS
Methods
In terms of purpose, the present research is an applicable study and in terms of methods, it's a descriptive-survey research. The population is consisted of the entire employees of Urmiya's Imam Reza Hospital as 260 individuals.

The sample size is determined via the Cochran formula as 159 individuals. For collecting data, the questionnaires of information technology with 12 items, total quality management with 32 items, job satisfaction with 19 items and organizational efficiency with 25 items were used which all use a 5 degrees Likert scale.

Validity of questionnaires was validated by some of management professors and respectively the reliability of questionnaire was determined via the Cronbach's alpha. Reliability coefficients of each questionnaire are shown in table1 which indicates a desirable reliability for questionnaires. For data analysis, the canonical correlation technic and multivariate regression test are used.

Table 1: Coefficients of questionnaire's reliability

Variable	Reliability coefficient (a)	Number of questions
Information technology	0.90	12
Total quality management	0.89	32
Organizational efficiency	0.87	25
Job satisfaction	0.90	19

RESULTS AND DISCUSSION
Results
In this section, the hypotheses and their related outputs are scrutinized through sound statistical tests.
Main hypothesis: there is a relation between information technology and total quality management and job satisfaction and organizational efficiency.

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Table 2: Descriptive statistics of canonical variables

Variables	Average	Standard deviation	Changes coefficient
Organizational efficiency	3.76	0.70	19
Job satisfaction	3.80	0.70	18
Total quality management	3.89	0.76	20
Information technology	4.05	0.80	20

The results of descriptive statistics related to canonical variables of the research are shown in table 4-5. The highest average and standard deviation values are related to information technology (4.05 and 0.80) and the lowest values of average and standard deviation are related to organizational efficiency (3.76 and 0.70). According to calculated change coefficients, the variability of all evaluated variables is in one range which is a sign of variability within the evaluated variables among the scaled parameters in the aforementioned table.

For testing the direct relation between dependent and independent canonical variables including the components of job satisfaction and organizational efficiency, the Pearson's correlation test is used. Table 3 shows the existence of a linear (direct) relationship between effective elements on efficiency and job satisfaction at the significance level of 0.01. On the other hand, considering the fact that calculated correlation values are less than 0.8, the issue of multicollinearity is out of commission.

Table 3: Pearson correlation among canonical variables

		Information technology	Job satisfaction	Quality management	Organizational efficiency
IT	Pearson correlation	1	. 779[**]	. 652[**]	. 735[**]
	significance		. 000	. 000	. 000
	number	159	159	159	159
Job satisfaction	Pearson correlation	. 779[**]	1	. 635[**]	. 772[**]
	significance	. 000		. 000	. 000
	number	159	159	159	159
Quality management	Pearson correlation	. 652[**]	. 635[**]	1	. 728[**]
	significance	. 000	. 000		. 000
	number	159	159	159	159
Organizational Efficiency	Pearson correlation	. 735[**]	. 772[**]	. 728[**]	1
	significance	. 000	. 000	. 000	
	number	159	159	159	159

Significance of the Full Model of Canonical Correlation Analysis
Table 4 shows the results of significance tests for the full model of canonical correlation analysis.

Table 4: Significance tests for the full model of canonical correlation analysis

Test name	Value	Hypothesis DF	Error DF	F	Significance
Pillar test	0.777	4	312	49.598	0.000
Hoteling test	2.590	4	308	99.722	0.000
Wilkes Lambda	0.266	4	310	72.667	0.000
Largest root	0.716	-	-	-	-

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As you can see in table 4, the significance of Wilkes Lambda shows that there is a 99 percent assured canonical correlation between the two variables. Therefore, the amount of effects of two functions of this analysis is equal to 1-0.27= 0.73. The value of variance between two sets of variables is the same and the full model is able to explain it. As a result, the obtained model shows that there is a joint variance source which explains the diffraction of two sets of variables. The value of this variance is 0.73. In this research, 73 percent determines the variance between information technology and total quality management and job satisfaction and organizational efficiency. Therefore, with respect to significance level of Wilkes test, it may be concluded that there is a significant relation among the two variables sets of information technology and total quality management and job satisfaction and organizational efficiency. As a result, the main hypothesis is accepted.

First subsidiary hypothesis: variables of information technology and total quality management are able to anticipate changes in job satisfaction.

Table 5: Job satisfaction

Anticipation variables	beta	t	Significance	Standard deviation
Information technology	0.63	9.95	0.000	0.055
Total quality management	0.22	3.45	0.001	0.058

As you can see in table 5, information technology and total quality management can significantly anticipate job satisfaction. Therefore, the first subsidiary hypothesis is accepted.

Second subsidiary hypothesis: variables of information technology and total quality management are able to anticipate changes in organizational efficiency

Table 6: Results of multiple regression tests of information technology, quality management and organizational efficiency

Anticipation variables	beta	t	Significance	Standard deviation
Information technology	0.45	7.22	0.000	0.055
Total quality management	0.43	6.91	0.000	0.058

As you can see in table 6, information technology and total quality management can significantly anticipate organizational efficiency. Therefore, the second subsidiary hypothesis is accepted.

Third subsidiary hypothesis: there is a relation between information technology and job satisfaction

Table 7: Pearson's correlation coefficient between information technology and job satisfaction

		Information technology	Job satisfaction
Information technology	Correlation coefficient	1	. 779[**]
	significance		. 000
	number	159	159
Job satisfaction	Correlation coefficient	. 779[**]	1
	significance	. 000	
	number	159	159

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The outcome of table 7 indicates that there is a 99 percent assured relation between information technology and job satisfaction. Therefore, the third subsidiary hypothesis is accepted.

Fourth subsidiary hypothesis: there is a relation between information technology and organizational efficiency

Table 8: Pearson's correlation coefficient between information technology and organizational efficiency

		Information technology	Organizational efficiency
Information technology	Correlation coefficient	1	. 735[**]
	significance		. 000
	number	159	159
Organizational efficiency	Correlation coefficient	. 735[**]	1
	significance	. 000	
	number	159	159

The outcome of table 8 indicates that there is a 99 percent assured relation between information technology and organizational efficiency. Therefore, the fourth subsidiary hypothesis is accepted.

Fifth subsidiary hypothesis: there is a relation between quality management and organizational efficiency

Table 9: Pearson's correlation coefficient between total quality management and organizational efficiency

		Information technology	Organizational efficiency
Organizational efficiency	Correlation coefficient	1	. 728[**]
	significance		. 000
	number	159	159
Total quality management	Correlation coefficient	. 728[**]	1
	significance	. 000	
	number	159	159

The outcome of table 9 indicates that there is a 99 percent assured relation between total quality management and organizational efficiency. Therefore, the fifth subsidiary hypothesis is accepted.

Sixth subsidiary hypothesis: there is a relation between quality management and job satisfaction

Table 10: Pearson's correlation coefficient between total quality management and job satisfaction

		Information technology	Organizational efficiency
Total quality management	Correlation coefficient	1	. 635[**]
	significance		. 000
	number	159	159
Job satisfaction	Correlation coefficient	. 635[**]	1
	significance	. 000	
	number	159	159

The outcome of table 10 indicates that there is a 99 percent assured relation between total quality management and job satisfaction. Therefore, the sixth subsidiary hypothesis is accepted.

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Seventh subsidiary hypothesis: there is a relation between job satisfaction and organizational efficiency.

Table 11: Pearson's correlation coefficient between organizational efficiency and job satisfaction

		Information technology	Organizational efficiency
Job satisfaction	Correlation coefficient	1	. 772[**]
	significance		. 000
	number	159	159
Organizational efficiency	Correlation coefficient	. 772[**]	1
	significance	. 000	
	number	159	159

The outcome of table 11 indicates that there is a 99 percent assured relation between organizational efficiency and job satisfaction. Therefore, the seventh subsidiary hypothesis is accepted.

Discussion and Conclusion

The main goal of this research is to analyze the canonical relation between information technology and total quality management and organizational efficiency and job satisfaction in hospitals (case study: Imam Reza Hospital). Results of analysis of the main hypothesis indicated that there is a significant relation among information technology and total quality management and job satisfaction and organizational efficiency. In fact organization which benefit from it and TQM also feature higher employee's job satisfaction and higher performance optimization. Results of research conducted by Moghimi and Hussein zadeh showed that information technology can influence organizational efficiency through tracking, communication, improvability, automation, flexibility, analyzability, coordination and monitoring processes. Lai *et al.,* (2011) conducted a research titled as effects of information technology on aspects of quality management and concluded that information technology is effective on quality management. Corredor and Gooney (2010) also reported that total quality management system in organizations leads to improved performance and organizational efficiency. Khalatbari *et al.,* (2011) conducted a series of researches and concluded that implication of information technology is effective on efficiency, effectiveness and employee's team decisions in technical and professional organizations. Zgardi and Esmaeili (2009) conducted a research titled as the effect of information technology on efficiency of Iranian organizations and concluded that firm size is effective on the depth of deployment of information technology and organizational eminence model.

Also Iranian organizations which benefited from a more deployed type of information technologies were more successful in better implementation of organizational eminence model and access to higher ranks and efficiency. Alizade *et al.,* (2012) conducted a research titled as implementation of information technology and its role in improving organizational efficiency and concluded that employees and managers of Fars province's insurance department should cause development and optimization of organizational operations through implementing information technology because there is a significant relation among information technology and organizational efficiency. Samimi *et al.,* (2010) reported that internal investments of information technology and the external capitals of information technology or surplus of information technology both impose a significant and meaningful effect on total efficiency of production entities among all the selected countries and developed countries as well as developing countries.

Baharestan *et al.,* (2013) conducted a research on the effects of information technology and total quality management on organization's performance and reported that there is a relation between information technology and variables of total quality management and organizational performance. On the other hand, total quality management plays a mediatory role in influence of information technology on organizational efficiency. Madadi *et al.,* (2010) conducted a research titled as the role of information technology on the efficiency of knowledge oriented firms and reported that implementing information technology in cases such as resolving scientific requirements, optimization in career performance, improvement of job

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satisfaction, supporting managers and influencing their decision making processes is important and also there is a significant meaningful relation among dependent and independent variables.

Results of analyses of first subsidiary hypothesis showed that variables of information technology and total quality management are capable of anticipating changes in job satisfaction.

Results of analyses of the second subsidiary hypothesis showed that variables of information technology and total quality management are capable of anticipating changes in organizational efficiency.

Results of analyses of the third subsidiary hypothesis showed that there is a significant relation between information technology and job satisfaction. In other words, if information technology is implemented in an organization, it causes a positive change towards improvement of job satisfaction. With respect to the level and intensity of relation between these two components, it can be claimed that information technology highly influences job satisfaction.

Results of analyses of the fourth subsidiary hypothesis showed that there is a significant relation among information technology and organizational efficiency. Results of analyses of the fifth subsidiary hypothesis showed that there is a relation between quality management and organizational efficiency. Organizational efficiency means high levels of performance and effectiveness. It means that not only the affairs are done in the right way, but also there have been continuous works. As a result, the total quality management which is aimed at continuous optimization of quality of provided services and produced goods can ensure us that in terms of implementing this approach; it will influence the organization's efficiency. In this research, the calculated correlation among these components is high and shows the effectiveness of quality management on organizational efficiency. Results of analyses of the sixth subsidiary hypothesis indicated that there is a significant relation between quality management and job satisfaction. Advanced firms can improve their employee's level of job satisfaction through performance of total quality management which in fact is a culture. They can also create motivations and organizational commitment among their employees through this approach. Results of analyses of the seventh subsidiary hypothesis showed that there is a relation among job satisfaction and organizational efficiency. Any organization which is able to provide its employees with job satisfaction has in fact provided a context for improvement of organizational efficiency. In addition, organizations which were able to improve their efficiency levels via total quality management and implementing information technology, has also created job satisfaction because organizational affairs are undertaken by human resources.

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