

## Relationship between Information Technology and Total Quality Management in Sport Federations

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### ABSTRACT

The purpose of this study is the relationship between information technology and elements of total quality management in the sports federations of Islamic Republic of Iran and specifically which of the components of Information Technology can increase Total quality Management in the Sports federations. Questionnaire has been used for this purpose. The study population was considered the country's sports federation directors, including chairman, vice chairman and secretary of the sports federations and their number were estimated at 150 people. Of the 150 questionnaires distributed among the managers of sports federations, many of them were received but due to some incomplete questionnaires collected, 93 questionnaires were analyzed. For data analysis, Pearson correlation and regression analysis were used. The results showed an average rate of acceptance of the principles of total quality management and information technology in the sports federations. Correlation coefficient showed a significant relationship with information technology and component of total quality management. The results of Regression analysis with simultaneous showed that in Aspects of information technology, systems automating administrative activities at the highest coefficient is expected to total quality management (Beta=0.298). Increase in Quality without access to fast and accurate information is impossible. And the need to equip these organizations to bring information technology to enhance the service quality and this note confirms this study result.

**KEYWORD:** Information Technology, Total Quality management, TQM, excellence models of organization

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### INTRODUCTION

New information and communications technologies have changed the world in which we live and the ways of learning how to live. In the near future, more than 80% of human beings life affairs will have a direct or indirect dependence on information technology and the development of information technology in education and global collaboration will have significant role too (1). We live in the information age where the opportunities are born from creative ideas and intelligent application of information (2). Nowadays, information technology (IT) and communications have grown significantly among different countries and have presented many advantages to the organizations (3). In order to absorb the established benefits by information technology, the technology should be implemented and used efficiently (4); because the organizations face the threat that if they don't identify the growing digital gap inside the country or between their country and other countries, they will lag behind (4).

On the other hand, the quality category is a global movement; if someone neglects this, he will be obliterated. No matter in which country he lives, or in which industry he works. So, the managers should equip themselves to prevent the failure (5).

The organizations should compete in a challenging market in the age of information technology; the market which is very variable, complicated, multi-competent and customer-based (2). Many of the organizations, in response to the commercial pressures, have a frequent attempt to enhance their quality and productivity. The organizations can increase their productivity by increasing the output, reducing the costs, increasing the output faster than the costs and a combination of these ways. Information technology is widely used in improving both the quality and productivity (2). Usually it is said that information technology is the most important factor in increasing the productivity and decreasing the costs (6).

The organizations use different tools for the purpose of quality improvement, cost reduction and productivity increase including total quality management (TQM), total productive maintenance (TPM) and business process re-engineering, etc.

TQM is a way of doing job and managing an organization which uses all the potential capabilities of managers and employees which are based on their active cooperation, to improve the quality and productivity of the

organization constantly and frequently (7). Deming defines the quality as “the sameness and equability of goods or related services”. Improvement in service quality, cost saving and paying attention to the customer which are presented by TQM, makes it an effective method in saving the financial method of the organization, especially in the cases of resource constraints (7); and in the world where it is the most important weapon for competition and the most important tool in maintaining the services quality, TQM is the true way of future management (8).

The main components of TQM are top management support, customer relationship, supplier relationship, workforce management, employee attitudes & behavior, product design process, process flow management, quality data and reporting (9). Most of the referred researches have studied the outcomes of information technology and confirmed its positive role in total quality management, but, few researches have studied the circumstances and factors developing it. Most of the researches done are in the industry area and few of them are in the area of sports organizations. Gallardo *et. al.* (2008) has studied the effect of new computer software and programs on the qualitative development of sport organizations and places management. The results of the present research showed that computer software can strengthen the sport organizations in order to improve their problems rapidly. This research stated that computer programs and software can help the sport organizations in different aspects including management of timetables, exercises, definition of job description, work satisfaction, personnel distribution, disaster management and so on (10); but, the first researches done specifically on the effects of information technology on quality management are related to Hughes (1994). He noted that using IT in TQM environment requires certain changes in the organization culture and this will be fulfilled via high commitment of senior management (11). Choi (2000), in his researches, has attempted to make a structure and tool for measuring the effects of IT on management quality. Because of the aim of his research and also, interest in discovering how to support the management quality by IT, he has focused more on the processes of quality than performance of the quality (12). Choi's (2001) other research is about revealing the role of IT, especially in nonmanufacturing section which can show the importance or unimportance of IT for TQM. He has attempted to research quantitatively about the extent of IT application in order to protect different dimensions of TQM (13). Dewhurst (2003) examined the ways in which TQM is influenced by IT and studied the role of IT in TQM activities in order to identify the key issues required to be taken into account by experts (14). He has noted that IT effects on TQM can be revealed by two ways:

1. The emergence of the negative effect of introducing IT in the organization on the motive of the personnel,
2. Employing IT as an enabler mechanism for daily activities of TQM

But Lioyld-walker (1998) have obtained different results. The result of his research on Australian banking industry showed that the quality of service and product is mostly affected by It planning and programming, rather than IT applications related to innovation (15). Mahony & Howard (2001) in a research entitled as “sport business in the next decade” stated that sport organizations like other organizations need to use new technologies in order to survive, improve the performance and increase the efficiency. And the organizations which don't adjust themselves to the conditions and requirements of new technologies will stay behind (16). Lee *et. al.* (2010) in a newer research, have examined the relationship between the quality management and customers` satisfaction and intention in golf clubs. The sample of the research was 528 persons of golf clubs members. The results showed that quality management is one of the important factors for customer satisfaction. But the customers` expectancy of the quality factors is different based on gender. For example, women mostly pay attention to the physical aspects of quality such as the cleanness of environment (17).

Martinez-Lorente *et. al.* (2003) examined the effect of IT on TQM components of industrial companies in Spain. They showed that there is meaningful relation between information technology and all components of TQM. Meanwhile, the variables such as size and extent of the organization or the production system type of the organization affect TQM application (9). Bharadwaj *et. al.* (2009) showed in a study that the shortcoming of IT in companies cause a reduction in value-added of the company (18). Fueki & Kawamoto (2009) in a research on the information of Japanese companies being active since 1975 till 2005, concluded that the increase in production has occurred in companies where use IT more (19). Arvanitis & Loukis (2008) showed in a study that there is a meaningful relationship between the capacity of information technology and the capacity of human resources and productivity in Swiss and Greece companies which the relationship is stronger in Swiss companies (20). Sadikoglu & Zehir (2010) studied the relationship between TQM and performance in 500 Turkish companies with iso9001:2000 standard and showed that there is a positive and high relationship between the two components (21).

Generally, it can be said that all the researches state that the essence of reaching quality in the organizations, either sport organizations or other ones, is the use of new technologies and increasing the organization flexibility against the sudden changes, unless some old researches. And undoubtedly, information technology plays the most important role in reaching this case. Regarding the wide studies in the area, some questions arise, such as: How

much information technology is used in sport organizations? Is there any meaningful relationship between the use of information technology and accepting the components of quality management?

### RESEARCH METHODOLOGY

Based on the nature of this research and regarding the aims and hypotheses, the method of current research is descriptive correlative which is done in field and via questionnaire. The statistical society of the research was the managers of sport federations including the president, vice-president, and secretary of the federation who are estimated to be 150 persons. Most of the 150 questionnaire distributed among the managers of the sport federations were received but only 93 of them were reviewed since the respondent managers were not related to the interest society or the questionnaires were incomplete. This number corresponds to the sample volume determined by Krejcie and Morgan table (22). Personal information questionnaire includes age, sex, marital status, education, major, management background and organizational position. Martinz-Lorentea questionnaire was used in assessing the rate of accepting the principles of total quality management (9). This questionnaire includes 42 items. Different parts of the questionnaire include the components of senior management support (items 1-6), contact with customer (items 7-11), contact with suppliers (items 12-16), human resources management (items 17-24), personnel behaviors (items 25-28), production and service process (items 29-33), the management of production and service process (items 34-37) and quality assurance unit (items 38-42). Since Martins questionnaire was designed for other service companies, it was assessed by 10 significant professors of management science and sport management after composition and then its admissibility was ensured. To measure the extent of IT usage in the federations, the researcher-made questionnaire was used. This questionnaire includes 36 items which measured the IT usage extent in the organizations in 6 dimensions, senior management support system, management information systems, decision-making support systems, official activities automation systems, work process systems and network system. Admissibility of the questionnaire was proved by related experts.

For the stability of questionnaires after considering the comments, re-examination method was used and their re-examination coefficient for information technology questionnaire was 0.733 and for total management questionnaire was 0.715. Also, in order to calculate the inner stability, Krunbach alfa method was used and the inner stability coefficient for information technology questionnaire was 0.918 and for total quality management questionnaire was 0.931.

### Results and findings of the research

Table (1) indicates the demographical information of the research which classifies the respondents of the questionnaire according to their sex, marital status, education, and organizational position. 65 of the managers were men and 28 of them were women. 80 persons had bachelor's degree and higher and 13 persons had under bachelor's degree. Kolmogorov–Smirnov test was used for natural distribution of data which the data distribution in all scales was natural. And for this reason, parametric tests were used in assessing the relationship.

**Table 1: Demographic information of the managers**

Variable	Classification	Frequency	Percent
Sex	Male	65	69.9
	Female	28	30.1
Marital status	Single	75	80
	Married	18	20
Education	Diploma	4	4
	Associate	9	9
	Bachelor	37	39
	Master	29	31
	Doctoral	14	15
Organizational position	President	20	21
	Vice-president	29	31
	Secretary	31	33
	Organization manager	13	13

The scores of IT usage extent and also total quality management in the studied sample is calculated as mean and standard deviation (tables 2 & 3). The mean score of information technology in the studied federations was

3.109 with standard deviation of 0.62, the mean score of total quality management was 3.57 with standard deviation of 0.56. Mean and standard deviation of information technology components and also total quality management are presented in tables (2) and (3), respectively. For total quality management components, the mean 1 to 2.33 is weak, 2.34 to 3.66 is average, and 3.67 to 5 is good (9).

**Table 2: Mean and standard deviation of total quality management components**

TQM component	Mean	Standard deviation
Senior management support system	2.95	0.848
Management information systems	2.48	0.743
Decision-making support systems	3.12	0.849
Official activities automation systems	3.58	0.519
Work process systems	2.92	0.735
Network system	3.00	0.600
Information technology	3.10	0.622

**Table 3: Mean and standard deviation of information technology components**

TQM component	Mean	Standard deviation
Senior management support	3.51	0.795
Contact with customer	3.12	0.890
Contact with supplier	4.30	0.543
Talent-finding process and training athlete	4.07	0.635
Human resources management	3.51	0.508
Personnel behaviors	3.20	0.562
Quality assurance unit	3.14	0.490
Total quality management	3.571	0.560

In order to determine the relationship between information technology and the components of total quality management, Pierson correlative test was used in sport federations based on which there is a meaningful relationship between information technology and senior management support components ( $r=0.705$ ,  $p<0.01$ ), information technology and components of contact with customer ( $r=0.764$ ,  $p<0.01$ ), information technology and components of contact with supplier ( $r=0.515$ ,  $p<0.05$ ), information technology and the components of personnel behaviors ( $r=0.566$ ,  $p<0.05$ ), information technology and the components of Talent-finding process and training athlete ( $r=0.582$ ,  $p<0.05$ ), information technology and the components of Talent-finding process and training athlete management ( $r=0.801$ ,  $p<0.01$ ), information technology and components of quality assurance ( $r=0.707$ ,  $p<0.01$ ). there was no meaningful relationship between information technology and components of human resources management. Table 4 shows the Pierson correlation coefficient between information technology and components of total quality management.

**Table 4: Pierson correlation coefficient for determining the relationship between information technology and components of total quality management**

TQM components	Senior management support	Contact with customer	Contact with supplier	Human resources management	Personnel behavior	Talent-finding and athlete-training process	Management of Talent-finding and athlete-training process	Quality assurance unit
Information technology	**0.705	**0.764	*0.515	0.432	*0.566	*0.582	**0.801	**0.707

\*\*  $p<0.01$ ,  $p<0.05$

Table 5 shows the results of regression analysis with simultaneous method (repeated entering) where all the 6 dimensions of information technology are entered. The results of regression analysis by repeated entering method in table 5 show that multiple correlation coefficient (6 variables) for linear combination of the variables of information technology dimensions with total quality management variable equals 0.65 which explains 38% of the variance of total quality management.

**Table 5: The results of multiple regression analysis of information technology and total quality management by simultaneous method**

Variables	N	R	Rs	Sig (2-tailed)
Dimensions of information technology	10	0.657**	0.38	0.01
Total quality management				

Table 6 shows the coefficients of information technology dimensions for predicting total quality management. Standard coefficient (beta) defines the extent of effect each variable has on standard variable. According to table 6, linear formula of regression analysis is as follows:

$$TQM = 0/359 + (0/286)IT1 + (0/145)IT2 - (0/039)IT3 + (0/298)IT4 - (0/004)IT5 - (0/019)IT6$$

**Table 6: The results obtained from regression test**

Model	Nonstandard coefficients		Standard coefficient	t	Sig
	B	Sted.Er	Beta		
y-intercept	0.359	0.614		0.585	0.01
Management support system (IT1)	0.211	0.270	0.286	0.876	0.001
Management information systems (IT2)	0.078	0.036	0.145	0.158	0.05
Decision-making support systems (IT3)	-0.050	0.232	-0.039	-0.167	0.23
Official activities automation systems (IT4)	0.350	0.367	0.298	1.118	0.007
Work process systems (IT5)	-0.011	0.236	-0.004	-0.134	0.113
Network systems (IT6)	-0.024	0.172	-0.019	-0.145	0.159

### DISCUSSION AND CONCLUSION

In this study, the extent of information technology usage and its relationship with components of total quality management in sport federations of country is examined. The results of present research showed that the extent of IT application in the federations of country is in average level. Also, a meaningful relationship was observed between information technology and its components. The dimensions of information technology are capable of explaining 38% of total quality management variance.

The results obtained here are consistent with the results of the researches done by Esmaili (2001), Qolipour (2005), Choi (2001), Duhurst (2000), haugs (1994), Choi (2000), Martins (2003), Galardo (2008). Regarding the meaningful relationship of information technology and components of quality management, it can be stated that an organization will act effectively when all of its activities are perceived and systematically managed and the decisions related to the current operations of the organization and planned improvements taken based on the reliable information containing the concepts of beneficiaries.

Information technology helps the management to record, process, retrieve, and transfer the information via fax, micrographs, and other tools of telecommunication. With an investment in computer hardware, automatic complementary investments on software, human asset, new business procedures and communicational equipment is established (7). Also, about the relationship between information technology and components of human resources management and personnel behaviors, it can be said that, while in some cases, using the tools of information technology cause some problems among the personnel, but in these cases, the senior manager's consciousness is essential to prevent the paradox and duality between the requests of information technology and the philosophy of total quality management. In most cases, information technology leads to a decrease in the personnel number and their exclusion which can be prevented by developing the company or determining rules such as early retirement.

IT as a center accepts a set of driven activities of management control, productivity, production, education and enhancing a system (23). The extent of information in the organization makes the manager confused. Information technology can help the manager by showing the total conditions of the organization via simple and understandable graphical diagrams. Using IT, the manager's contact with inside and outside of the organization. Information technology can change decision-making process and even decision-making styles. For example, information gathering will be done for rapid decision-making. Smart web-oriented agents or representatives can examine the environment and interpret the information. Information technology procedures reduce the required time for completing each step in decision-making process. Another probable effect on managers' job can be a change in leadership requirements. What is generally the good characteristics of leadership, may be changed significantly by information technology. For example, when face-to-face communication by e.mail and computer conference is replaced, leadership characteristics attributed to the appearance and clothing, are minimized. According to Martinz (2003), information technology helps the management by altering the data that need to be analyzed more (9).

Information technology helps TQM by controlling, gathering, analyzing and reporting data. Also, IT can increase the rate of supervision, enhance the quality of experiments and reduce the costs of quality check activities. Finally, it can solve the qualitative problems before occurrence (2).

One of the biggest advantages of using information technology in the organization is to ease the establishment of easy, fast and wide communication with customers. The federation website can play an important role in this communication. The organizations attempt to offer better services can be effective in attraction and maintenance of customers. Information technology has provided many tools and work processes to maintain satisfaction in customers. One-off production is one of the production strategies and offering desirable services to the customers and the main concern of service and manufacturing industries is how to customize goods with a reasonable and cheap price. A part of solution of customizing production and service is to change industries process from mass production to customized mass production. In mass production and customized mass production a high volume of identical products are manufactured and the difference is that in customized mass production, some of the product options are customized according to the customer's request. Quality is obtained by satisfying the customer's requirements. The organization should know the customers and be aware of their demands to achieve the customer satisfaction. Quality-oriented organizations use a wide range of resources to gather the information about customers and employ various quantitative techniques to go beyond the customers' expectations and predict their needs (13).

As it is shown by the results of the research, the increase in the use of information technology makes the organization more effective and efficient in reaching the better quality.

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