

SEM Analysis of the Impact of Knowledge Management, Total Quality Management and Innovation on Organizational Performance

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ABSTRACT

Knowledge is a concept higher than data and information. Knowledge is a set of data, the practical work associated with it, the results of its application in various decisions, training associated with it and the attitude of people in different jobs and responsibilities associated with it. In today's world the organizations' competitiveness depends on sound management of intellectual property. The organizations implement knowledge management based on their structure and conditions and as a result every organization is faced with various challenges in implementing knowledge management. In this study, the data is collected through a questionnaire about company information. The questionnaire included questions on 6 main areas of total quality management and three areas of knowledge management, innovation and financial performance.

KEYWORDS: Knowledge management, Total Quality Management, structural equations, innovation

INTRODUCTION

Knowledge management is achieving organizational goals with efficient use of an organization's ability or knowledge to use intellectual capital (individual experience and knowledge of any individual) and collective knowledge in order to achieve its goal through a process of knowledge production, knowledge sharing and its use with the help of technology. Knowledge management is the secret organizational success in the 21st century. Knowledge is a concept higher than data and information. Knowledge is a set of data, the practical work associated with it, the results of its application in various decisions, training associated with it and the attitude of people in different jobs and responsibilities associated with it. The knowledge of each person even in the specific cases may be different than others. Knowledge is the basis for each individual's skills, expertise and experience. Every organization to achieve its objectives uses a set of knowledge that has occupied the minds of individuals. In the absence of this knowledge, the failure of the organization or the high cost of repeating some decision-making processes and the lack of the optimal use of the experimental records and decisions are expected. That's why leading organizations attempt to collect hidden knowledge with staff and working groups known as "knowledge capital". The research problem is that organizations today are looking for the establishment and implementation of knowledge management for the development of their organizations. In fact, knowledge management is now considered as one of the main competitive advantages with great importance. In today's world the organizations' competitiveness depends on sound management of intellectual property. The organizations implement knowledge management based on their structure and conditions and as a result every organization is faced with various challenges in implementing knowledge management. It should be noted that the deployment of knowledge management requires understanding its basic concepts (data, information, knowledge management and wisdom), the creation of appropriate infrastructure (new ways of personnel management, change of communication patterns, organizational culture, etc.) and paying attention to factors that may cause the failure of this process (lack of sufficient study, neglecting the continuity of management process and ...). This study attempts to examine the total quality management as a management system and knowledge and innovation management and their impact on the performance of an organization. Enterprises, organizations and administrative units with any mission, goal and vision ultimately act within a national or international scope and they are required to respond to customers, clients and stakeholders to respond the company the aim of which is profitability and customer satisfaction and help to realize purposes in line with the development and excellence of a country. So, analyzing the results of a performance is considered as strategically important process. The quality and effectiveness of management and its performance is a critical factor in the realization of development programs and social welfare. Providing services and multiple products and meeting costs by the resources have created adequate sensitivity to review goals, continuous quality improvement, improved customer and citizens' satisfaction, organizational performance and staff management. If the performance evaluation process is performed accurately and continuously by process approach, it will promote accountability of executive and organizational systems in the public sector and increase public confidence in organizational performance and effectiveness of government. In the NGO it will promote

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resource management, customer satisfaction, contribution to national development, creation of new functionalities, stability and promoting world-class companies and institutions [1]. Most organizations seek customer satisfaction and convert them into loyal customers. Providing these appropriate services depends on various issues. Using the comprehensive quality management system according to various aspects of quality of services it is possible to all to the quality of services and also using knowledge management it is possible to use the knowledge in the organization to improve service delivery. According to what has been discussed above it is possible to understand the importance of considering KMa and TQMb, organizational innovation and their impact on the organizational performance to provide all of these services and their impact on customer satisfaction. So in this research the effect of this issue is addressed.

METHODOLOGY

This descriptive survey type study is conducted using structural equations method. In this study, the data is collected through a questionnaire about company information. The questionnaire included questions on 6 main areas of total quality management and three areas of knowledge management, innovation and financial performance. Then using the statistical analysis the proposed hypotheses will be analyzed. Scientific studies are classified into three classes based on objectives: fundamental, applied and developmental. The present study is an applied research and tries to identify the effect of factors. Data Collection in this study is conducted by reviewing the past studies. For this purpose the library study and data extraction from scientific database of articles is used. The method of data collection is the survey type. The population of this research is companies that have implemented knowledge management and quality management systems in their organization. To calculate the sample size the Cochran equation in equation (1) was used:

$$n = \frac{\frac{z^2 pq}{d^2}}{1 + \frac{1}{N} \left(\frac{z^2 pq}{d^2} - 1 \right)} \tag{1}$$

In equation 1 the maximum permissible error (d) equals 0.05, confidence coefficient is 0.95, t=1.96 and p and q values equal 0.5 and population size is N. The P value is considered 0.5 because if p=0.5, n will have its maximum value and this makes the sample large enough [4]. The sample size for this study is 260.

Model

In this part of the research the model and analysis of the data is provided. The conceptual model is based on Figure 1:

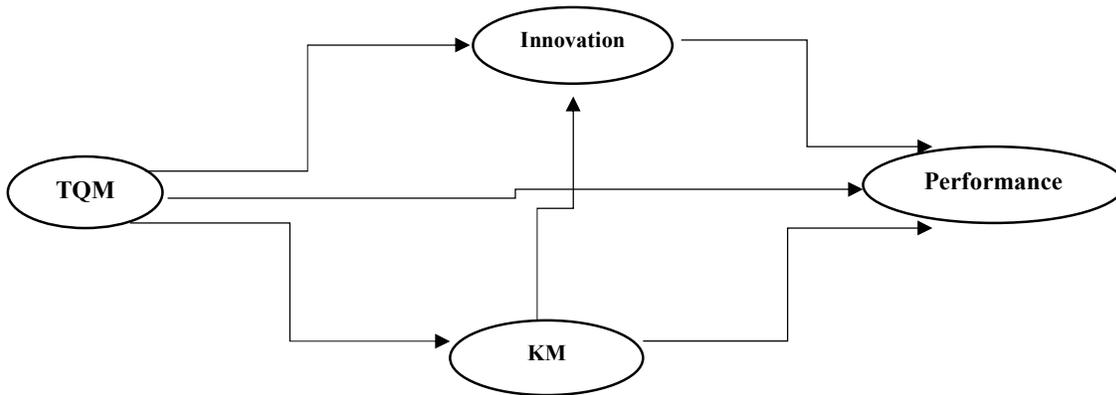


Figure 1: Conceptual model

The method used in this study to analyze the data is using structural equations. Structural equation modeling technique is very general and powerful multivariate analysis from the multivariate regression family or extended "general linear model". This model enables the researchers to examine a set of regression equations simultaneously. Structural equation modeling is a holistic approach to test hypotheses about the relationship between observed and latent variables known as covariance structure analysis, causative modeling or LISREL, but the dominant term is structural equation modeling or SEM [2]. According to [3] multivariate analysis is one

^a knowledge management
^b total quality management

of the most powerful and most useful analysis methods of behavioral and social sciences research because these issues are multivariate and cannot be solve by two variable method (where each time an independent and dependent variables are considered). The analysis of covariance structures or SEM is one of the main methods of analysis of complex data structures and a new method to evaluate causal relationships which means the analysis of several variables that presents the simultaneous effects of variables in a theory-based structure. Through this method it is possible to test the acceptability of theoretical models in particular populations using correlation data, non-pilot and pilot.

Obvious variables (questionnaire items)

As stated before, in this study in order to measure latent variable the observable variables are devised. In order to do this a questionnaire is used. This questionnaire included the following questions. Any question is used to measure a latent variable.

All questions except for the control variables are presented as 5 point Likert scale. The scale is shown in the following table:

Table 1: Scale table

1	2	3	4	5
Disagree	Partially disagree	No idea	Partially agree	Agree

Questions related to the performance of the organization are classified as follows:

Table 2: Scale of performance questions

1	2	3	4	5
Below 5%	5%-10%	10%-15%	15%-20%	Above 20%

Reliability

In order to analyze test reliability Cronbach's alpha coefficient was used. Cronbach's alpha coefficient was invented by Cronbach and it is one of the most common methods to measure reliability of the questionnaire. Credibility or reliability of the questionnaire means that if similar attributes are measured in the same way and under the same conditions at different times, the results will be the same. Cronbach's alpha coefficient is used to measure the one-dimensionality of the attitudes, beliefs and... In fact, we want to see to what extent the perceptions of the respondents of the questions were of the same. This coefficient is based on the scales. Scales are a class of numbers on a continuum of people, objects or behaviors in order to quantify the qualities. The most common scale used in social research is Likert scale. Likert scale is based on the items having the same weight. Thus, each item is given scores (example, from 1 to 5 for 5 Likert scale) the total score an individual obtains from the items represent his attitude. In general, Cronbach's alpha is calculated using one of the following equations:

$$\alpha = \frac{k\bar{C}}{\bar{V} + (k-1)\bar{C}} \tag{2}$$

$$\alpha = \frac{k}{k-1} \left(1 - \frac{\sum_{i=1}^k S_i^2}{\sigma^2} \right) \tag{3}$$

Cronbach's alpha coefficient of all questionnaire items is as follows:

Table 3: Cronbach's alpha

Number of questions	Cronbach's alpha coefficient
24	0.81

Cronbach's alpha for the questionnaire is 81% which indicates high reliability of statistical data.

The results of Structural Equations

In this part we will check the results in the form of structural equations. These results help to draw conclusions in relation to the provided hypotheses. LISREL software is used to perform calculations in this section and the results will be reported based on the format of the same software. Calculations have been prepared based on the covariance matrix.

Model structure that is designed based on a conceptual model is as follows:

Latent Variables KM, Innovation, Performance, TQM

Relationships	q12 = KM	q24 = Performance
q1 = TQM	q13 = KM	Innovation = KM
q2 = TQM	q14 = KM	Performance = KM Innovation
q3 = TQM	q15 = KM	KM = TQM
q4 = TQM	q16 = KM	Innovation = TQM
q5 = TQM	q17 = KM	Performance = TQM
q6 = TQM	q18 = Innovation	Path Diagram
q7 = TQM	q19 = Innovation	End of Problem
q8 = TQM	q20 = Innovation	-----
q9 = KM	q21 = Performance	Sample Size = 260
q10 = KM	q22 = Performance	
q11 = KM	q23 = Performance	

Model fit index

Over the past decade various fit indices are presented for structural equations. Although numerous different types of these indices are constantly evolving, there is no optimal index that everyone agrees on. These indices have been classified in various ways, one of the major classifications is the one presented by Marsh et al. (1967). They classified fit indices to three groups absolute, relative and modified.

Table 4: Model fit index

Allowance	The value obtained	Index
less than 3	2.251	Kai two degrees of freedom
More than 0.7	0.720	Goodness of fit (GFI)
Less than 0.1	0.080	RMSEA
More than 0.9	0.910	Fitness modified (CFI)
More than 0.9	0.650	Adjusted goodness of fit (AGFI)
More than 0.9	0.840	NFI

The results of testing hypotheses

All calculations and above results are presented to analyze the following hypotheses. In this section the results of testing hypothesis are presented based on t test. The results are derived from LISREL application. The hypotheses of this study are as follows the t test results of which are presented based on the following table:

- TQM has a direct and positive impact on organizational innovation
 - TQM has a direct and positive impact on organizational performance
 - TQM has a direct and positive impact on Knowledge Management
 - Knowledge Management has a direct and positive impact on organizational innovation
 - Knowledge Management has a direct and positive impact on organizational performance
 - Organizational innovation has a direct and positive impact on organizational performance
- The values higher than 1.96 at 0.95 level of significance cause the acceptance of hypothesis and the lower values cause the Hypotheses rejection.

Table 5: Hypothesis test results

Hypotheses	Test statistics	Result
1	6.39	Accepted
2	2.31	Accepted
3	2.41-	Accepted
4	1.08-	Rejected
5	0.45	Rejected
6	5.14	Accepted

Conclusion

In analyzing the findings we can express that total quality management has a direct positive impact on knowledge management, the impact of total quality management on organizational innovation is accepted too. Perhaps the most important reason is too much focus on total quality management as a tool. In fact, based on the results of this study the organizations that have established quality management in their organization have no developed innovation. Organizational Innovation is subject to competitive market. In fact, many organizations in Iran do not feel competitive pressure from imports. Many imported goods are faced with tariffs and leading manufacturers also do not see any reason to change their products. Thus, innovation in general is not well developed among Iranian manufacturers. Another hypothesis rejected in this research is the impact of

knowledge management on organizational performance. Iranian producers' performance is affected by their innovation and their performance is mostly affected by the management of special processes. We obviously see that the total quality management affects performance of the manufacturers. TQM is comprehensive management thinking but innovation is in the categories of research and development. Rejection of this hypothesis is a reason for the low effectiveness of innovation in Iranian organizations which could be resolved by increasing the competitive space in the market. So we can offer the following suggestions for future research:

- Analyzing the effect of factors such as strategic planning on organizational performance
- Study and analysis of economic factors on organizational performance
- Analyzing the reasons of low effectiveness of KM on the performance of Iranian organizations

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