Determinants of the Total Quality Management Implementation in SMEs in Iran (Case of Metal Industry)

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Abstract

Total Quality Management (TQM) is able to recognize the necessary techniques and tools in production process to reduce or eliminate the redundancy and increase the quality and efficiency. TQM in Iran started from 1993, when the automobile industry made an agreement with France (Peugeot Company) and Korea (KIA Company) based on ISO 9000 standard. As a result, the growth in automobile industry was impressive. According to this point, other industries and companies also realized the need of quality to achieve competitive advantage for entering into global market. Total quality management is one of the most vital strategies for achieving customer satisfaction and higher profit. Although total quality management is the important strategy in recent years, there has not been much consideration of applying TQM in Iran's metal industry. In order to find the determinants of TQM implementation in metal industry, fifty companies are selected as a sample and three managers of each were asked to fill up the questionnaires. From total of 150questionnaires, only 115 questionnaires were responded. According to the final results, Management Commitment, Role of Quality Department, Training and Education, Employee Involvement, Quality Policy, Adequate Relationship with Suppliers, and Quality Culture found to be the determinants and they have a positive and significant relationship with TQM implementation in SMEs in Iran.

Key Words: Total Quality Management, SME, Metal Industry

1. Introduction

In general, TQM is an advanced process that can be used for employees, firms and organizations and also in regards to customer' intentions, customer satisfaction, current tasks in organization, and group works quality which made by individuals. Total quality management in Iran started form 1993, when the automobile industry made an agreement with France (Peugeot) and Korea (Kia) based on ISO 9000 standard. The growth of automobile industry was impressive; according to this point other industries and companies also realized the need of quality for achieving competitive advantage and entering into global market.

Small and Medium Enterprises (SMEs) have grown in recent years. As market being competitive, SMEs are forced to adopt TQM to increase their overall quality. The aim of this research is to identify the factors which influence on decision making for implementation of TQM in metal industry as a SMEs sector in Iran. The rise of intense competition in the global market forced the companies to enhance quality of their products. Total quality management known as a strong tool to achieve this vital goal. But unfortunately this strategy has not considered powerfully in Iran industries. One of the industries that have significantly affects Iran's GDP, is metal industry. Before the implementation of total quality management in Iran especially in this industry, it is important to find the important factors that affect the decision making for implementing this strategy.

Total quality management is a vital practice in companies to increases their products and services quality towards achieving customer satisfaction. Nwabueze (2001) notes that TQM needs research investigation in internal process for continues enhancement of quality to gain customer satisfaction. Three main theoreticians such as

Deming (1986), Juran and Gryna (1993) and Crosby (1979) argued that total quality management needs special attention to the customer, employees, and leadership style. However there is a different idea on the importance of each item. Oberle (1990) believed that successful implementation of TQM needs specific culture within the organization.

Small and medium enterprises have grown in recent years. Increase in market competitiveness forced SMEs to adopt TQM in order to increase their overall quality. Up to now SMEs are very slow on adoption TQM (Carlos, 2008).Total quality management can increase the performance of SMEs that highly effects on global competition for countries.

2. Literature Review

TQM is power of manager that depends on the commitment of organization to make more advance techniques in problem solving processes and it is based on team work and employee groups.TQM helps companies to decrease the costs, increase the teamwork, achieve high degree of differentiation, increase customer satisfaction and reduce the time for launching new products in market (Duane, Hokisson, Hitt, 2009). TQM improves the quality and service that passed among all organization's members (Zelealem and Solomon, 2002).

One of the best ways to increase and expand the trade activities in each country is to enhance the level of quality (Djerdjour, 2000).In developing countries quality is one of the most important factors for companies to survive in competitive market and it is a vital key to enter into global market (Garvin, 1988). TQM could recognize the necessary techniques and tools in production process and eliminate or reduce the redundancy as well as increase the quality and efficiency (Steingard and Fitzgibbons, 1993).According to Flynn, Schroeder and Sakakibara (1994) definition; TQM is a set of programs and plans to obtain high quality of product and services, furthermore it can investigate on customer support with continues expansion of process through meet the customer needs and expectation. According to Ho and Fung (1994) definition; TQM is a best method to raise the efficiency, flexibility and the power of competition for firms. In addition TQM could eliminate dissipation, this target will be achieved when employees involve with improvement process.

Literature in implementation of TQM in small and medium enterprises is too limited. The reason could be due the fact that attention has been given to the large organizations than small business. But some researchers pay more consideration to applying TQM in SMEs, because most of them believed that implementation of TQM is more effective to small and medium enterprises as compared to large business. One of the primary surveys in 1993 by Moreno-Luzon found that small firms have high potential to apply innovation process and also they can manage and motivate the employee better than large firms, but he argued that training is the key success factor for TQM implementation in SMEs. Two major advantages were considered as a beneficial point for SMEs using TQM within their organization; enhancing customer satisfaction as well as employee satisfaction. It means that employing TQM by SMES can achieve both internal and external satisfaction at the same time (Shea and Gobeli, 1995).

The scope of this study is Iran and the target industry is metal industry. The main reason for choosing metal industry is the crucial role of metal industry in economy and also the importance of quality in final products. Another reason is the role of SMEs in this industry; they play a very important role in this area. Decision making on implementing TQM in this industry can effect widely on the Iran's economy.

3. Data and Methodology

Respondents for this study are managers of SMEs. Fifty companies are selected as a population of study and three managers of each company were asked to fill up the questionnaires. From total of 150 questionnaires, only 115 questionnaires were responded. 25 questionnaires sent through e-mail to managers and 125 distributed in paper based. The data analyzed using SPSS tools, and primary data that gathered from managers through questionnaires is the source of data collection. The questionnaire has two parts, part A is about the demographic of respondents companies and part B is about the variables that mentioned earlier. Cross-sectional approach is used since data were collected at a point of time.

3.1 Independent variables

There are many variables for implementation of TQM, but because of time limitation, in this research we would like to investigate the most important variables in this regard.

Thus the following independent variables are there to influence on decision making of TQM: management commitment, role of quality department, training and education, employee involvement, quality policy, adequate relationship with suppliers and quality culture.

3.2 Dependent variable

As this research is going to focus on what factors can influence on decision making of TQM, so this variable (decision making of TQM) is known as dependent variable in this framework. According to this framework, hypotheses statements are as follow:

H1: management commitment has a significant relationship with TQM implementation in metal industry in Iran.
H2: Quality department has a significant relationship with TQM implementation in metal industry in Iran.
H3: Training and education has a significant relationship with TQM implementation in metal industry in Iran.
H4: Employee involvement has a significant relationship with TQM implementation in metal industry in Iran.
H5: Quality policy has a significant relationship with TQM implementation in metal industry in Iran.
H6: Adequate supplier partnership has a significant relationship with TQM implementation in metal industry in Iran.
H7: Quality culture has a significant relationship with TQM implementation in metal industry in Iran.

4. Empirical Findings

4.1 Reliability

The reliability test is a consistent measurement to examine the reliability when we have same respondents, so this test provides the standard level of accuracy for variables. To achieve reliability, questions in questionnaire have to be related with each other. The popular test for reliability is "Cronbach alpha" test in SPSS, and the standard rate for this test is 0.70; it means that if the value of reliability of data is more than0.70, the variables and data are reliable. Empirical finding on this test are presented in following table:

Table 1: Cornbach alpha test

Variable	Value
Management commitment	0.802
Role of quality department	0.871
Employee involvement	0.759
Training and education	0.873
Adequate supplier partnership	0.860
Quality policy	0.889
Quality culture	0.860
Decision of implementation of TQM	0.776
All variables	0.974

According to the table, all variables and data are reliable.

4.2 Normality Test

Normality test for dependent variable showed in table 2. The most important notice in this table is the value of Skewness and Kurtosis. The standard level for Skewness is ranging from +1 and -1. And the standard level for kurtosis is ranging from+3 and -3. As you can see in table 2, the value of Skewness is 0.226, and the kurtosis value is 0.447, it means that we have a normal distribution.

Table 2: normality test of dependent variable

Implementation of TQM	Statistics	Std. error
Mean	2.7165	0.06846
Median	2.8000	
Variance	0.5390	
Interquartile Range	1.00	
Skewness	0.014	0.226
Kurtosis	-0.558	0.447
Std. deviation	0.7341	

Table 3 shows the Kolmogorov-Shapiro (K-S) and Shapiro-Wilk (S-W) normality tests. According to K-S test, the P-value is 0.2 which is greater than 0.05 and it is acceptable because in K-S test, the P-value has to be greater than 0.05, as a result the data are normally distributed. The p-value of S-W test is 0.079, which is also greater than 0.05, and we have a normal distribution for data.

Table 3, Kolmogorov and Shapiro test of normality

	Kolmogorov-Smirnov			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Implementation of TQM	0.063	115	0.200	0.980	115	0.079

4.3 Factor Analysis

Factor analysis is used to ensure that the questions asked are how much related to the construct that you intent to measure. For this reason, Kaiser-Mayer-Olkin (KMO) measure of sampling adequacy and Bartlett's test of Sphericity are employed and results are presented in table 4.

Table 4: Factor analysis test

Kaiser-Mayer-Olkin measure of sampling adequacy		0.953
Bartlett's test of Sphericity	Approx. Chi-square	1115.12
	d.f	28
	Sig.	0.000

According to the above table, if the value of KMO ranges between 0.5 and0.7, the result is mediocre, and between 0.7 and 0.8 is good, between 0.8 and 0.9 is great and if value is above 0.9 is superb. As you can see these data has the value of 0.953 which indicate that, variables are in the range of superb and we can conclude that factor analysis is suitable for these data. Bartlett's test P-value should be lower than 0.05, as you can see in above table the P-value of these data in Bartlett test is 0.000, that is lower than 0.05 means the factors are appropriate for evaluation in this survey.

4.4 Communalities Test

The standard value of initials is 1.000.In this survey Communalities for all variables is 1 (table 5).Extraction means the common variance of data and the portion of variance associated with each variable as indicated in table below. The portion of management commitment variance is 0.842, and for quality department is 0.798, for training and education is 0.878, for employee involvement is 0.831, for quality policy is 0.901, for adequate supplier is 0.881, quality culture is 0.863, and implementation of TQM is 0.499.

Table 5: Communalities test

	Initial	Extraction
Management commitment	1.000	0.842
Role of quality department	1.000	0.798
Training and education	1.000	0.878
Employee involvement	1.000	0.831
Quality policy	1.000	0.901
Adequate supplier	1.000	0.881
Quality culture	1.000	0.863
Implementing TQM	1.000	0.499
Extraction method: Principal Component Analysis		

4.5 Correlation Test

For hypothesis testing we used the Pearson correlation method to discover which hypothesis we should accept or reject. Seven hypotheses exist in this survey and all of them are accepted based on the Pearson correlation analysis; the summary of hypothesis testing is available in table 6 below.

Table 6: hypothesis testing and Pearson correlation

Hypotheses	p-value	Pearson correlation	Result
H1: management commitment has a significant relationship with TQM implementation in metal industry in Iran.	0.000	0.594	Accepted
H2: Role of quality department has a significant relationship with TQM implementation in metal industry in Iran.	0.000	0.487	Accepted
H3: Training and has a significant relationship with TQM implementation in metal industry in Iran.	0.000	0.640	Accepted
H4: Employee involvement has a significant relationship with TQM implementation in metal industry in Iran.	0.000	0.586	Accepted
H5: Quality policy has a significant relationship with TQM implementation in metal industry in Iran.	0.000	0.611	Accepted
H6: Adequate supplier partnership has a significant relationship with TQM implementation in metal industry in Iran.	0.000	0.627	Accepted
H7: quality culture has a significant relationship with TQM implementation in metal industry in Iran.	0.000	0.642	Accepted

As you can see in table 6, all hypotheses are accepted because the P-value of all them is0.000 and it's lower than 0.05. Also the Pearson value of all variables is positive, therefore each variable has a positive and significant relationship with decision making of implementation of TQM.

4.6 Multiple Regression Analysis

In this part we applied the ANOVA analysis. According to table 7, it is indicated that at least one of the predictor variables is suitable to the research model, since the P-value is 0.000 and it is less than 0.05.

Table 7: ANOVA analysis

ANOVA[a]	Sum of Squares	df	Mean Square	F	Sig.
Regression	29.888	7	4.270	14.481	0.000[b]
Residuals	31.550	107	0.295	-	-
Total	61.439	114	-	-	-
a. dependent Variable: implementation of TQM					
b. predictors: (constant), MC, QD, EI, TE, AS, QP, QC					

In the second part the coefficient result of multiple regressions represented. Dependent variable in this table is Implementation of TQM.

Table 8: Coefficients

Model		Unstandardized coefficients		standardized coefficients	t	Sig.	Collinearity statistics	
		Beta	Std. error	Beta			Tolerance	VIF
1	Constant	1.127	0.174	-	6.468	0.000	-	-
	MC	0.009	0.157	0.009	0.054	0.957	0.192	5.210
	QD	-0.331	0.127	-0.379	-2.605	0.011	0.226	4.417
	TE	0.391	0.174	0.388	2.242	0.027	0.160	6.242
	EI	0.070	0.131	0.081	0.538	0.592	0.212	4.715
	QP	0.034	0.194	0.035	0.173	0.863	0.120	8.331
	AS	0.184	0.163	0.196	1.127	0.262	0.158	6.320
	QC	0.325	0.153	0.352	2.127	0.036	0.176	5.693

According to the table 8, the role of quality department (QD), training and education (TE), and quality culture (QC) are the variables that are significant in the area of implementation while other variables are not significant in the area of implementation. Although all hypotheses were accepted according to correlation and multiple regression test, but all variables do not have the same power for decision making of TQM implementation.

5. Conclusion

This survey was concern about the implementation of total quality management in SMEs in metal industry in Iran. According to competitive market in Iran and the pressure of competitors in industries, companies have to increase their quality of products and services to survive and also obtaining customer satisfaction. Moreover for entering into global market, companies and industries have to represent the high quality products in same level as other products that made by developed countries, this is the key success of winning in global market. According to literature, many factors affect the decision making for implementation of TQM, but in this survey we have selected seven major factors. These factors include, Management commitment, Role of quality department, Training and education, employee involvement, quality policy, adequate relationship with suppliers and quality culture. Correlation analysis showed that all factors have a significant and positive relationship with decision making for implementing TQM. Reliability and normality tests showed that our data are reliable and normal. Regression analysis revealed that, the role of quality department, training and education, and quality culture are the variables that are most vital in the area of TQM implementation.

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