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APPLICATION OF TOTAL QUALITY MANAGEMENT PRACTICES IN TURKISH FOREST PRODUCTS INDUSTRY

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Abstract

Total quality management (TQM) is a method of management in which the human factor is on the foreground, continuous improvement approach is adopted, team work is encouraged, and the responsibility for the quality of products is shared by all employees. The aim of the total quality management is to provide continuous and perfect service to the customers through highly educated and motivated employees.

In the scope of this study, TQM practices in forestry products sector were inspected. For this end, surveys were administered to 377 engineers and foremen who work in 14 large-scale companies that possess ISO 9001:2000 Quality Management System Certificate. Survey data were analyzed using SPSS 16.0 software package and descriptive statistics and exploratory factor analyses were performed.

The study indicated that TQM practices that take place in Turkish forest products industry are classified under six categories (customer focus, people-come-first approach, leadership of the management, continuous improvement, full participation, and team work). Upon inspection the distribution of these activities, it was seen that participant companies employed customer-oriented total quality practices, put people and team work on the foreground, and targeted continuous improvement.

Key words: *total quality management; continuous improvement; exploratory factor analysis; forest products industry; ISO 9001:2000.*

INTRODUCTION

TQM for businesses has recently been accepted as a very significant element in boosting general business performance and gaining an advantage of competitiveness at world standards (Lakhe and Mohanty 1995, Zhang 2000). The term "total" in the concept expresses wholeness in terms of the business or the corporation. Accordingly, TQM entails a holistic understanding which requires asking for quality in all processes and work related to the product, as well as in employees' relations between themselves and with the customers (Saran and Göçerler 1998). Imai (1986) defines quality as a series of regular practices and completely integrated efforts to improve performance at all levels in an institution, including all employees from workers to the managers. TQM is the integration by an organization of all its functions and processes in order to be successful in the continuous improvement of the quality of its products and services. The objective is customer satisfaction. TQM understanding increases quality and the efficiency of the organization. In production and service operations that aim at customer satisfaction, the employees' job satisfaction is also taken into consideration (Swift 1998).

TQM is the art of attaining perfection. It is an effective method to reach what is ideal. TQM is the total of the principles, the philosophy that represents improving organizations. It is the quantitative methods and human resources operations that improve all processes in the organization. It offers more than current and future customer expectations. TQM is a discipline applied by management techniques, available improvement efforts, and technical tools (Besterfield 1999).

Businesses that adopt TQM are required to learn about the basic features of it in which human factor is on the foreground, team work is encouraged, and responsibility for the quality is shared by all employees.

The basic characteristics of TQM are shown to include customer focus, people-come-first approach, leadership of the management, permanent improvement, use of information and analysis, strategic and quality planning, employee training, supplier integration, full participation, and team work (Samson and Terziovski 1999, Sureshchandar *et al.* 2001).

In the previous studies, some shortcomings in TQM practices of businesses that operate in Turkish forest products industry have been reported (Cındık *et al.* 1999). Therefore, the purpose of the present study to determine the current state and shortcomings of TQM practices in businesses that possess ISO 9000 Quality Management System (QMS) certification in certain forest products sectors (furniture, chipboard products, paper and integrated plants) throughout Turkey.

MATERIALS AND METHODS

The participants of the study include companies that operate in forest products industry and possess ISO 9001:2000 QMS certification. Research show that businesses that employ more than 100 employees attach more importance to TQM practices since they need the institutional structure (Serin 2004). The businesses were determined accordingly and 40 companies were found to meet the conditions for the study. All factories were contacted and informed about the study and its procedures. 14 of them accepted the study to be implemented in their premises. Considering the studies in the literature, the return rate was found to vary between 20% and 45% (Bal and Gundry 1999, Hum and Leow 1996). This study has a return rate of 35%. Therefore, the obtained number of data was accepted as statistically sufficient. The survey procedure was completed in a period of six months.

Of the 14 participant companies, 6 operate in particleboard, 2 operate in plywood, 4 operates in paper, 1 operates in furniture and 1 operates in fiberboard production. Surveys were administered to medium level employees who include engineers and chief. Employees and senior administrators were discarded from the participant list because the questions of the survey could be hard to reply for the employees, while managers could provide biased answers.

Surveys were administered to a total of 390 engineers and chiefs in 14 businesses. Upon inspection, 13 surveys were discarded due to unintelligibility and the study is based on remaining 377 surveys. The survey form was a compilation of previous surveys on TQM (Eroğlu 2003, Serin 2004, Yağar 2007, İnce 2007, Aydın 2007). The survey consists of 2 sections, namely demographic information (5 questions) and Likert-type (5 scales) questions to determine TQM factors (50 questions). Completed surveys were entered into SPSS (Statistical Software for Social Sciences) 16.0, and following reliability and validity analyses, descriptive statistic analyses were made.

RESULTS AND DISCUSSIONS

As demographic information of participants were examined, it was shown that 22.5% of them were between 30 and 34 years of age, while 20.4% were between 25 and 29, and 0.8% were over 50. A significant amount of participants (79.8%) were male, while 53.1% were married. Furthermore, it was seen that 48.5% were engineers and 40.3% were chief. While 40.9% have been employed in their position for less than 5 years, 3.4% have worked in the same position for more than 21 years.

Analyses of reliability and validity

Although there are many models employed in reliability analyses, for this study Cronbach alpha coefficient was used. Upon analysis, the scale was seen to have a general Cronbach alpha coefficient of 0.959. This number varies between 0 and 1, and values over 0.90 show excellent agreement.

Factor analyses were made in order to measure structural validity of the study. However, before moving on to factor analysis, it is essential to test conformity of the data set with Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy. KMO is an index that compares the magnitudes of observed correlations and partial correlations, and for validity, this rate should be over 0.5 (Sharma 1995). In this study, KMO value was found as 0.942 (Bartlett's Test of Sphericity Sig.:0.001), and the study was found appropriate for factor analysis. Basic components analysis and varimax rotation technique were used in factor analysis procedure. In this context, variables that load on more than one factor and factors that include less than three variables were discarded. Eigenvalues statistics was employed in determining the number of factors. According to Dunteman (1989), factors with a bigger eigenvalue than 1 are accepted as significant. Table 1 shows the results of exploratory factor analysis related to the scale.

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Table 1

Scale's exploratory factor analysis results

Variable		Fact. load	Ann. Var. (%)
	Costumer Focus		17.216
CF 1	On designing a new products, customer requirements are considered	0.752	
CF 2	Customer desires is the priorities of our company	0.726	
CF 3	Gathering and evaluation of the customers' complains and opinion on our product	0.723	
CF 4	Development of product based on Customer expectation and service quality	0.706	
CF 5	Our company work with priority of customer-oriented	0.695	
CF 6	Our company regularly research for customer satisfaction	0.646	
CF 7	On designing a new products and serving, customer desires are considered	0.632	
CF 8	The quality targets are determined based on customer desires	0.615	
CF 9	The degree of satisfaction of our customer related with the quality of a product is higher	0.601	
CF 10	Customer satisfaction are properly and systematically measured in our company	0.515	
CF 11	A committee is formed to solve customer complains	0.512	
	Approach of First People		13.912
PCF 1	An opportunity to increase the motivation of employees is provided to employees in companies	0.749	
PCF 2	There are good enough career planning, education and process development for all employees.	0.740	
PCF 3	My benefits are considered in company	0.727	
PCF 4	My ideas are respected in company	0.716	
PCF 5	Employees are trained to increase their knowledge and talents in company	0.681	
PCF 6	Employee flexibility, versatility and trainings are used to support the development of performance	0.673	
PCF 7	The attitude of administrators is fair in company	0,669	
	Administrative Leadership		10.390
LM 1	Top management discusses the subjects related with quality in strategically important meetings	0.787	
LM 2	Top management takes long period success into the account	0.745	
LM 3	Top management updates the information about quality concepts and technics	0.732	
LM 4	Top management actively attends the activity of quality management	0.672	
LM 5	Top management is foresighted and consistent about quality and company mission	0.622	
	Permanent Amendment		9.406
PI 1	Quality increasing activities are continuously carried out in company	0.736	
PI 2	Cautions are taken for determining , analyzing, and preventing to occur the problem in manufacturing and service	0.711	
PI 3	Before production, new products are completely observed and tried	0.616	
PI 4	Our company use PACC (Planning-Applying-Checking and taking Caution) for procedure control and development	0.579	
PI 5	Quality system is permanently developed in our company	0,573	
	Full Participation		6.328
FP 1	I feel responsible to the company	0.779	
FP 2	Employees know that quality is their own responsibilities	0.653	
FP 3	Employees make an effort as much as they can for the company success	0.629	
	Team Work		5.476
TW 1	To increase the participation of employees to the quality management, bonus system is applied	0.705	
TW 2	To solve the problem, team work is performed	0.640	
TW 3	All parts of our company collaborate and they are in contact with one another	0.604	
	Announced Total Variances (%)	**-**	**62.728**
	Kaiser-Meyer-Olkin (KMO) value	**-**	**0.939**
	Bartlett's Test of Sphericity (Sig.)		**0.001**

Upon application of factor analysis, out of a 50 item-scale, 16 items which are nonconforming or which load on more than one factor were discarded. The remaining 34 items formed 6 sub-factors with eigenvalues bigger than 1. Total expressiveness of this six- factored structure was 62.728%.

In the structure, the first factor is customer focus with an expressiveness of 17.216%, the second factor is people-come-first approach with an expressiveness of 13.912%; the third factor is leadership of management with an expressiveness of 10.390%; the fourth factor is continuous improvement with an expressiveness of 9.406%; the fifth factor is full participation with an expressiveness of 6.328%; the sixth factor is team work with an expressiveness of 5.426%.

Findings on customer-focus

Upon factor analysis on survey items, the sub-factor with the highest amount of expressiveness on total variance was found to be customer-focus (17.216%). The percentage distribution of items in this group is given in Table 2.

Table 2

Percentage distribution of customer-focus factor

Questions	1		2		3		4		5	
	N	%	N	%	N	%	N	%	N	%
CF 1	6	1.6	11	2.9	60	15.9	**177**	**46.9**	123	32.6
CF 2	1	0.3	10	2.7	51	13.5	**174**	**46.1**	141	37.4
CF 3	4	1.1	17	4.5	52	13.8	151	40.1	**153**	**40.6**
CF 4	3	0.8	15	4.0	53	14.1	**177**	**46.9**	129	34.2
CF 5	3	0.8	16	4.2	71	18.8	**166**	**44.1**	121	32.1
CF 6	5	1.3	28	7.4	75	19.9	**162**	**45.6**	97	25.7
CF 7	7	1.9	18	4.8	75	19.9	**188**	**49.8**	89	23.6
CF 8	3	0.8	26	6.9	72	19.1	**160**	**42.5**	116	30.8
CF 9	3	0.8	9	2.4	79	21.0	**178**	**47.2**	108	28.6
CF 10	11	2.9	26	6.9	78	20.7	**167**	**44.3**	95	25.2
CF 11	18	4.8	37	9.8	100	26.6	**141**	**37.4**	81	21.5

1: Strongly disagree 2: Disagree 3: Undecided 4: Agree 5: Strongly Agree

As shown in Table 2, it is obvious that the questions related with customer focus had highly attention. Forest products industry shows a customer-oriented approach. With customer-oriented management system, customer needs and desires are frankly determined.

Omar et al. (2006) stated in a study of Malaysian Production Companies that there is an increase for the production performance of the companies which works with customer-oriented. To provide this increase, production system and management organization arranged based on customers' desires has an important effect. Adebanjo and Kehoe (2001) stated that companies which consider customer's recommendation can solve the problems which come from companies' organizational structure and causes costumer's dissatisfaction, otherwise an ineffective TQM application shows up and performance loss is observed.

In a study conducted in Chinese Companies, the effects of customer orientations on financial performance were investigated. Consequently, organizational customer's orientations lead to customer's satisfaction and this increase helps to raise financial performance (Cai 2009).

Sousa (2003) pointed in a study carried out in an electronic industry that customer's oriented production should be used for production strategy and designing procedure,

Findings belong to people-come-first-approach sub factor

As a result of factor analysis, the other sub factor with 13.912 % clarity on total variance was determined as people-come-first-approach. The perceptional distribution belong to questions located in this group is given in Table 3.

According to Table 3, there is a medium level agreement to the questions belong to people-come-first-approach factor. People factor, focus spot of TQM, has been a subject to many researches. Improving work conditions made employees feel valuable themselves and this provides work satisfaction (Renaud 2002).

Table 3

The perceptional distribution belongs to people-come-first-approach factor

Question	1		2		3		4		5	
	N	%	N	%	N	%	N	%	N	%
PCF 1	32	8.5	65	17.2	115	30.5	**122**	**32.4**	43	11.4
PCF 2	27	7.2	56	14.9	112	29.8	**128**	**34.0**	54	14.3
PCF 3	20	5.3	57	15.1	103	27.3	**139**	**36.9**	58	15.4
PCF 4	17	4.5	35	9.3	78	20.7	**176**	**46.7**	71	18.8
PCF 5	20	5.3	58	15.4	65	17.2	**157**	**41.6**	77	20.4
PCF 6	18	4.8	46	12.2	**135**	**35.9**	129	34.2	49	13.0
PCF 7	18	4.8	34	9.0	106	28.1	**156**	**41.4**	63	16.7

1: Never Agree 2: Agree 3: No comment 4: Agree 5: Totally Agree

Physical dissatisfaction of person decreases his/her performance, increases the possibility of resignation and absenteeism, and increase total level of dissatisfaction (Saal and Knight 1988).

Davis (1988), in his study, stated that the abundant opportunities of promotion and premium have positive effects on employees. Being fair and relied on base of promotions are important for employees. In addition, employees would like to be appreciated in terms of their work performance.

Opportunity of making control and effect on work, being sure on safety, developing social network in work, having good physical work conditions without stress for employees positively affect work deduction (Edvardsson and Gustavsson 2003). Being known and appreciation of the good performance by Chiefs, workmates, and having a premium system related with an increase in administrator salaries provide a work satisfaction for employees (Chin *et al.* 2002).

Findings belong to leadership of management sub-factor

As a result of factor analysis, one of the sub-factors with 10.390 % clarity on total variance was determined as leadership of management. The perceptional distribution belong to questions located in this group is given in Table 4.

Table 4

The perceptional distribution belongs to leadership of management factor

Question	1		2		3		4		5	
	N	%	N	%	N	%	N	%	N	%
LM 1	5	1.3	33	8.8	88	23.3	**177**	**47.0**	74	19.6
LM 2	8	2.1	20	5.3	64	17.0	**175**	**46.4**	110	29.2
LM 3	7	1.9	28	7.4	78	20.7	**192**	**50.9**	72	19.1
LM 4	8	2.1	35	9.3	73	19.4	**190**	**50.4**	71	18.8
LM 5	8	2.1	19	5.0	95	25.2	**172**	**45.9**	82	21.8

1: Never Agree 2: Agree 3: No comment 4: Agree 5: Totally Agree

As seen in Table 4, there is a high level agreement to the questions belong to leadership of management factor. The obtained results are consistent with previous studies.

Webb (2007) studied the effects of leadership behaviors on employee performance and stated that the administrators who adopt the type of transformist leader made an effective increase on employee performance. Park and Rainey (2008) stated that initiating system with starting a transformation period which is appropriate to the variable environmental conditions, affecting audiences' belief, manner, and merit by characteristic properties such as respect, reliance, and courage, and applying transformist leadership values by adopting mission and targets of organizations have positive effect on employees.

Chaove Cheng (2009), in a study on nurses, investigated that leadership properties of administrators have negative and meaningful effect on work stress. Daenzer (2009), in the study carried out in American automotive sector, stated that transformist leadership type decreases work stress of employees, and with this, passive leadership increases work stress.

Findings belong to permanent improvement sub-factor

As a result of factor analysis, the other-sub factor with 9.406 % clarity on total variance was determined as continuous improvement. The perceptional distribution belong to questions located in this group is given in Table 5.

Table 5

The perceptional distribution belongs to continuous improvement factor

Questions	1		2		3		4		5	
	N	%	N	%	N	%	N	%	N	%
PI 1	3	0.8	25	6.6	70	18.6	**190**	**50.4**	89	23.6
PI 2	6	1.6	16	4.2	63	16.7	**187**	**49.6**	105	27.9
PI 3	8	2.1	24	6.4	86	22.8	**174**	**46.1**	85	22.5
PI 4	8	2.1	22	5.8	82	21.8	**178**	**47.2**	87	23.1
PI 5	7	1.9	20	5.3	88	23.3	**169**	**44.8**	93	24.7

1: Never Agree 2: Agree 3: No comment 4: Agree 5: Totally Agree

As seen in Table 5, there is a high level agreement about the questions belong to continuous improvement factor. To properly govern the company with its strategy, while performance measurements provide accurate, clear, trustworthy, and on time data, permanent improvement draws a proper direction to be successful of the company (Kabadayı 2002).

Deming (1982) defined the continuous improvement as non-stop improvement in procedure, product, and quality. To remove any type condition and dissatisfaction from environment, the need of corrective, innovative, and creative procedure was mandatory for improvement (Spiker *et al*. 1992).

Improvements in the procedure includes various topics such as using input, determining potential customers, specification for product and service, procedure actions and evaluating and making control of all actions. Improving of actions helps decreasing of process time and increasing product quality (Morgan 1997).

Findings belong to full participation sub-factor

As a result of factor analysis, the other sub factor with % 6,328 clarity on total variance was determined as full participation. The perceptional distribution belong to questions located in this group is given in Table 6.

Table 6

The perceptional distribution belongs to full participation factor

Questions	1		2		3		4		5	
	N	%	N	%	N	%	N	%	N	%
FP 1	0	0	6	1.6	37	9.8	132	35.0	**202**	**53.6**
FP 2	4	1.1	12	3.2	66	17.5	**166**	**44.1**	129	34.2
FP 3	2	0.5	17	4.5	52	13.8	**192**	**50.9**	114	30.2

1: Never Agree 2: Agree 3: No comment 4: Agree 5: Totally Agree

As seen in Table 6, there is a high level agreement about the questions belong to full participation factor. Performing TQM can be possible with adopting this idea by employees and implementing full participation of them. TQM approach is a procedure which covers full participation of employees, determining employees' target, making decision and solving problems (Anfuso 1994).

All employees in TQM should have desire and actively attend work activities. Individuals who contribute to decisions think that they are part of organization and feel responsibility to run the decision. In addition, employees make much more effort with having more satisfaction. This decreases mistakes, increase trust and so quality and productivity increase (Yeniçeri 2009).

Organizations should encourage, make things available, and reward employees to make them contribute to decisions. A substructure should be constructed for full participation. On the other hand, full participation function, plays an important role for adopting TQM approach, becomes gradually weaker and leads dissatisfaction of labor (Kitapçı 2006). It is determined that approaches of the management, which provide full participation by considering employees' opinions, reduce the stress of employees (Aydın *et al*. 2010).

Findings belong to team work sub-factor

As a result of factor analysis, the other sub factor with % 5,476 clarity on total variance was determined as team work. The perceptional distribution belong to questions located in this group is given in Table 7.

Table 7

The perceptional distribution belongs to team work factor

Questions	1		2		3		4		5	
	N	%	N	%	N	%	N	%	N	%
TW 1	88	23.3	58	15.4	81	21.5	**89**	**23.6**	61	16.2
TW 2	16	4.2	26	6.9	67	17.6	**199**	**52.8**	69	18.3
TW 3	12	3.2	18	4.8	76	20.2	**183**	**48.6**	88	23.3

1: Never Agree 2: Agree 3: No comment 4: Agree 5: Totally Agree

As seen in Table 7, there is a medium level agreement about the questions belong to team work factor. One of the principal goals of TQM is providing participation of all employees in companies to the continuous development activities. Employees' participation for continuous development is effective when teams became organized (Şirvancı 2004).

Team work is not an alternative way to reach success in TQM, it is a basic requirement. Decentralization, making employees powerful, participation the procedure of making decision and determining companies' targets are the essential requirements in TQM (Pakdil 2004).

In companies who adopt TQM approach as a complete structure, technical knowledge and development, productivity, communication, team work capability, approach for working in different conditions, attendance and stability in company, quality approach, making decision and application ability, motivation, adaption and devotion to company of employees show higher performance (Özgör 2008).

CONCLUSION

Today's global world with rapidly changing environmental conditions, the constituents, technologies, production, and management procedure of socio-cultural and economic structure which are different with the ones in the past, show changes. Companies in competitive conditions and getting harder day by day need to build and have effective quality and management system to stay standing. Today, all these are carried out by TQM.

The word "total" states integrity in a company. Accordingly, TQM reflects a complete idea which is looking for quality in every procedure and work related with products, in relations with customers and relations among employees.

Today for all industrial companies, TQM is essential. Customer's increasing expectations, picking up "being global beyond being flawless" as the target, quick development of technology, increasing cost of inferiority, increasing international competition, and increase in the value of human being make "total quality management" essential. Following results related to the opinions of medium and low level administrators about TQM applications in Turkey forest products industry are obtained:

- Customers' expectations are considered in designing a new product or improving current products.
- Customers' expectations are regularly investigated.
- A management team is formed to handle with customers' complains.
- Employees' opinions are considered.
- Motivation increasing activities are applied for employees.
- Employees are educated.
- Top management shows innovative, foreseeing, and participative leadership about quality.
- Quality increasing activities are regularly applied in companies.
- Mistake proofing activities are applied in manufacturing.
- Procedure improving activities are performed.
- Participation for administrators and employees are supported.
- Employees work in sense of belonging to companies.
- Problems are solved with team work.

Consequently, creating an ambiance to increase employees' performance and having a target to develop employees' performance should take part among the administrator's main tasks. Therefore, employees should be satisfied and happy with the factors such as full participation, permanent

education, and development, communication, team work, quality chambers, reality, and sense of trust. TQM approach which service these factors should be adopted by companies.

TQM should take part among companies' principal applications for both improving work conditions of employees and providing qualified products to customers. In addition, TQM is important due to its sustainability.

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