

*Full Length Research Paper*

# Cross-Industry Perspectives on Total Quality Management: Evidence from the Turkish Market

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The objective of this study is to examine the perception differences of TQM in Southeastern Anatolia Project (GAP) region and find the relationship between education, experience, gender and TQM perceptions. GAP is a project aimed at removing the development differences between west and east regions of Turkey. In a developing region such as Southeastern Anatolia, it is important to determine how TQM, perceived by businesses, help to conduct and better implement the TQM philosophy. With an understanding of the perception differences between businesses, it is of the study's view that TQM efforts will be more useful and practical. In this study, we used factor analysis and regression analysis to determine the differences between industries. Then regression analysis was used with dummy variables to compare the business groups. Results indicate that in GAP region, different industries perceive TQM efforts differently and as such, textile business is the most pessimistic sector about TQM efforts, while iron-steel industry is the most optimistic one. Moreover, education and experience have an effect on TQM perception in a positive manner. TQM practitioners who try to implement TQM efforts in GAP region must consider these findings and should behave accordingly.

**Key words:** TQM perception, Southeastern Anatolia Project (GAP), industry comparison, factor analysis.

## INTRODUCTION

This study is a situation analysis aimed to reveal TQM perception in Southern Anatolia with several aspects. This research provides the view point of managements/employers to TQM philosophy in a region called GAP. With the results of this study, businesses would be able know where they are and can take the needed steps to go further. Also, this study contributes to the literature in determining the underlying factors of TQM perception with adequate reliability and validity.

In the globalization process, businesses and industries are faced with fierce competition and had to struggle with environmental changes, therefore, their survival depend on adaptation to changes. TQM philosophy is one of the dynamics that lie behind this process of change.

Sectors have different inner structures, while some businesses need more capital and the others work fine with labor. Some of them have bigger size than others

and all of these create differences in the world's viewpoint (Kaplan and Pathania, 2010). In addition to this industry structure, personal traits can have effects on perception of TQM. We will investigate in this paper, whether or not education created any perception differences between businesses that are closer to gender work experience.

Some sectors probably perceive TQM differently than other sectors. A few of them are more optimistic and boost TQM activities, while some others do not feel good with TQM efforts. We will investigate the observation made in this article and assume that it is valuable for TQM practitioners and businesses to better implement TQM activities and develop strategies for different sectors.

TQM philosophy has grasped an important place in today's management understanding and this philosophy can be seen as an important criterion to increase business profit and provide continuity. Moreover, TQM understanding can present important insight into social responsibility of businesses. In this context, this research has been performed to determine the realization power of those aims of GAP region businesses.

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## GAP and Turkey

Turkey has 7 geographic regions namely Mediterranean, Aegean, Marmara, Central Anatolia Region, Black Sea, Eastern Anatolia and lastly Southeastern Anatolia region and all of these regions have different level of industry and development. As regard these regions, Aegean and Marmara regions are in a better state than the others. Therefore, in these regions, unemployment rates are relatively low, but the Eastern and Southeastern regions are the most underdeveloped regions of Turkey. This is so, because of the low GDP of these regions and the relatively low industrialization rate relative to western regions. In this framework, it becomes important to research the ongoing business industrialization process and one of the most important factors on this process of TQM perception.

GAP project is a very important project for the development of Southeastern Anatolia region of Turkey. It aims at eliminating the development difference between the western and eastern part of Turkey by raising income level and creating job opportunities in rural areas. Total cost of the project is 36 billion TL, of which 81% of this investment was realized by the end of 2009.

The relationship between such a big project and its relationship with performance enhancing TQM applications has to be investigated. Do employers/managers and those performing in GAP region really appreciate the importance of TQM or have not recognized the importance of quality? In their viewpoint, how do they see the quality efforts? Do diverse sectors perceive TQM efforts differently? These are the questions that we want to answer.

## The concept and development of TQM

Industrial revolution, which has emerged in the second half of the 18th century, has a great effect on the development of production in the whole world. With industrial revolution, human force was replaced by machine and this changed the production management and production system philosophies, and as a result, personnel expectation has become a social struggle. This process is expressed as the first turning point in industry in the world of science. Industrial revolution influenced the world with its emergence in Europe, thereby developing the American continent and was implemented by other continents. After 150 years from industrial revolution, the second turning point in industry (TQM philosophy) was initiated in Japan who was in a bad situation after World War II. TQM is still regarded as an important philosophy and researches about this subject on the countries which just started its implementation or are still implementing it can contribute to the literature.

The concept of „total quality management“ (TQM) has been developed as a result of intense global competition.

Organizations with international trade and global competition have paid considerable attention to TQM philosophies, procedures, tools and techniques (Zakuan et al., 2010, p. 187). TQM programs were adopted by US firms to compete with the competition of Japanese firms, especially in the automobile and electronics industries in the 1980s.

The establishers of TQM are quality management specialists like Deming and Juran (Yong and Wilkinson, 2001, p. 248). The early implementation tools of TQM were statistical and mathematical models for mass production such as Ishikawa diagrams, Pareto analysis, control charts, histogram and probability distributions. All of these were useful tools in increasing the quality of production. For example with control charts, the elimination of non-acceptable products process became easier, in that it was possible to make more consistent products.

Total quality management (TQM) is an important management tool and when we look at the history of management, we can see that there is no other major development as TQM. It has gained much interest from scholars as well as from practitioners. A lot of things have been said and are been continually said about the subject. Therefore, there are a lot of definitions of TQM. When we look at the definitions, we can see that there are a lot of factors that determines and affects quality. These factors change with environment, culture and technology and this creates changes in the definition and implementation of quality (Sohal et al., 1992, p. 285). As such, this creates ambiguity and the problems related to the lack of a clear definition of TQM can be grouped into two categories. At the surface level, there are a lot of topics and approaches to quality management. Moreover, creating borders of TQM and distinguishing “TQM” from “Not TQM” can be a problem (Prajogo and Sohal, 2001). This makes TQM a harder topic and more deeply, a lack of definition makes it harder to apply TQM initiatives (Soltani et al., 2008). However, we have to make a definition of TQM because we need to distinguish TQM in practice; otherwise, we run the danger of accepting as TQM any practices that are so labeled (Soltani et al., 2008).

TQM is a management philosophy concerned with meeting the needs and expectations of customers. It is an integration of all the functions and processes within an organization to achieve a continuous improvement of the quality of goods and services.

Ross (1993) defines TQM as follows (Ross, 1993; cited in Powell, 1995):

“TQM is an integrated management philosophy and a set of practices that emphasizes, among other things, continuous improvement, meeting customers' requirements, reducing rework, long range thinking, increased employee involvement and teamwork, process redesign, competitive benchmarking, team-based problem-solving, constant measurement of results and closer

relationships with suppliers”.

It is essential to implement the TQM for survival in a highly competitive environment (Rajagopal et al., 2005, p. 335). When applied properly, it can increase the organizations’ performance, but it requires a fundamental shift in management practice and culture (Beer, 2003, p. 624). When we look at the implementation, we see that some small firms seem not to get the importance of TQM (Taylor, 1998). This is may be as a result of long commitment and hard work.

When organizations want to adopt TQM tools for their organizations, they want some output. As a result, the desired outcome is a set of behaviors, attitudes and processes which prevail throughout the stages of design, production, service, marketing and administration to produce high quality, defective free goods and services at a quality and cost suited to the market and with dependable delivery (Sohal et al., 1992, p. 285).

There are two core concepts in TQM (Yang and Wilkinson, 2001): hard and soft concepts. Hard concepts are statistical methods such as Pareto analysis, control charts, Ishakawa diagrams, system tools and performance evaluation, while training, employee recognition and teamwork can be regarded as soft aspects (Baykasoğlu and Dereli, 2003).

In implementation, we can start TQM with the cooperation of employees in order to achieve quality for the needs of the customers. One can achieve quality by controlling manufacturing/service processes to prevent defects, that is, the hard side of TQM, but there are soft sides too and these are certain set of values and beliefs shared by all organizational members (Galperin, 1999, p. 324)

In today’s highly competitive and highly changing environment, organizations should enhance their non-statistical abilities as they would for their statistical abilities. Smart computers can help organizations to keep data and analyze them, but for non-statistical methods, organizations need human resources. These methods can increase organizations’ quality and can be listed as follows (Hoerl et al., 1993 cited in Snee, 1998):

1. Understanding total quality management philosophy;
2. Developing the economic and technical knowledge aspects of the business;
3. Organizational development skills;
4. Consulting skills, including communication;
5. Teaching skills

These skills are soft aspects of TQM as well. The benefits of quality management can be summarized as follow (Tekin, 2009; p 11):

1. Increasing employee motivation an morale
2. Decreasing defective goods and junk rate
3. QM can decrease the cost of production
4. Protect customers

5. Reduce customer complaints
6. Increase confidence to the brand
7. Provide increased efficiency and productivity
8. With producing high quality products, the competition power of national industry can be increased and this creates favorable environment for exporting.

## **Contents and limits of the study**

The research was realized in 2008 and was limited to small and mid-sized enterprises (SMEs). Population of the research comprised the entire SMEs in GAP region.

## **RESEARCH METHODOLOGY**

### **Sampling**

Random sampling method was used to fill the questionnaire. Surveys sent randomly to the SMEs who registered to chamber of industry and chamber of trade in GAP region cities are: Kilis, Adıyaman, Gaziantep, Batman, Diyarbakır, Mardin, Siirt, Şanlıurfa and Şırnak. Of these 2000 participants, 1396 have returned the surveys. As such, the return rate is roughly 70%.

### **Data collection method**

In this study, survey method was used to collect the data. Each participant answered 16 questions related to their TQM perception. Survey questions were coded as 1 - Strongly Agree, 2 - Mostly Agree, 3 - Partly Agree, 4 - Slightly Agree and 5 - Never Agree. So if someone checked mostly 1, 2 or 3, we assume that he/she has optimistic opinions about total quality management applications.

### **Data analysis method**

In this study, every participant has a value indicating his/her perception to TQM. We used frequency distributions to get the descriptive statistics, independent samples t test and ANOVA(s) to test the perception differences between gender, education and experience, factor analysis to reduce the question numbers and regression analysis to disclose the differences between businesses.

## **RESULT EVALUATION AND ANALYSIS**

### **Descriptive statistics**

Here, descriptive property of the data has been investigated. There are 4 descriptive groups namely business, education, gender and experience. When we look at the data, we can see that data are representing the region’s demographic characteristics. However, southeastern Anatolia is a developing region of Turkey, in that literacy rates, women’s participation to workforce, level of education and business construction are clustered around textile business, thereby reflecting the developing properties of the region.

## Education

We grouped education into 4 categories. Survey participants mostly (84.8%) graduated from primary education or high schools. This is mostly because in southern Anatolia, education levels are relatively small from other regions of Turkey and literacy rates are low in this region too. However, 19 participants did not want to answer this question.

## Gender

There is a dominant rate for men, because this survey is realized at businesses. In the southern region of Turkey, women's participation to workforce is relatively low than their male counterparts and this is the reason why most participants are male.

## Work/experience

One question was about „how many years they have been working on their current job“. Most of the participants had been working for 4 years or less in their jobs.

## Business

In this descriptive group, we integrated business into 5 categories namely textile, food, automobile-heavy industry-machine, lumber, iron and plastic-glass. Almost half of the participants were in textile business. This is because in this region, there are a lot of textile businesses.

## Analysis

### *Gender and TQM perception*

To measure the differences between gender and TQM perception, we performed independent samples t test. According to the results, on average, male participants perceive TQM efforts in a more positive manner ( $M = 81$ ;  $SD = 16.01$ ) than their female counterparts ( $M = 86.21$ ,  $SD = 13.83$ ) and the difference of this perception is statistically significant  $t(1394) = -4.80$ ,  $p < 0.05$  (Table 2).

### *Education and total quality management perception*

We performed one way analysis of variance (ANOVA) test to determine the differences between education and TQM. Hypotheses are as follow:

Null hypothesis states that mean differences are equal to

zero, that is, all means are equal:

$$H_0: \mu_1 - \mu_2 - \mu_3 - \mu_{4+} = 0$$

Alternative hypothesis states that at least one of the mean is different from others and can be stated as follows;

$$H_1: \mu_1 - \mu_2 - \mu_3 - \mu_{4+} \neq 0$$

According to one-way ANOVA results, there is a significant effect of education on TQM perception,  $F(4, 1391) = 10.068$ ,  $p < 0.05$ , thus rejecting null hypothesis Table 3. This finding is important, because having different education background seems to have effect on TQM perception. We conducted Tukey's post hoc analysis to get the difference between groups and the result revealed that there is no significant difference between

„primary school and high school“ and „primary school and no answer“ participants. Post hoc results found a significant difference between primary school participants' TQM perception and higher education participants' TQM perception. Also, there is a significant difference between „primary school“ and the participants who signed „other“ options to education question and higher education answer. In Turkish education system, the order of education is as follows: primary school, high school, higher education, undergraduate and so on. If we exclude „other“ and „no answer“ options, we can say that the higher a person gets education (Figure 1).

### *Experience and TQM perception*

We performed a one way analysis of variance (ANOVA) test to determine the differences between education and TQM. The hypotheses are as follow:

Null hypothesis states that mean difference is zero, that is, all means are equal. It can be notated as:

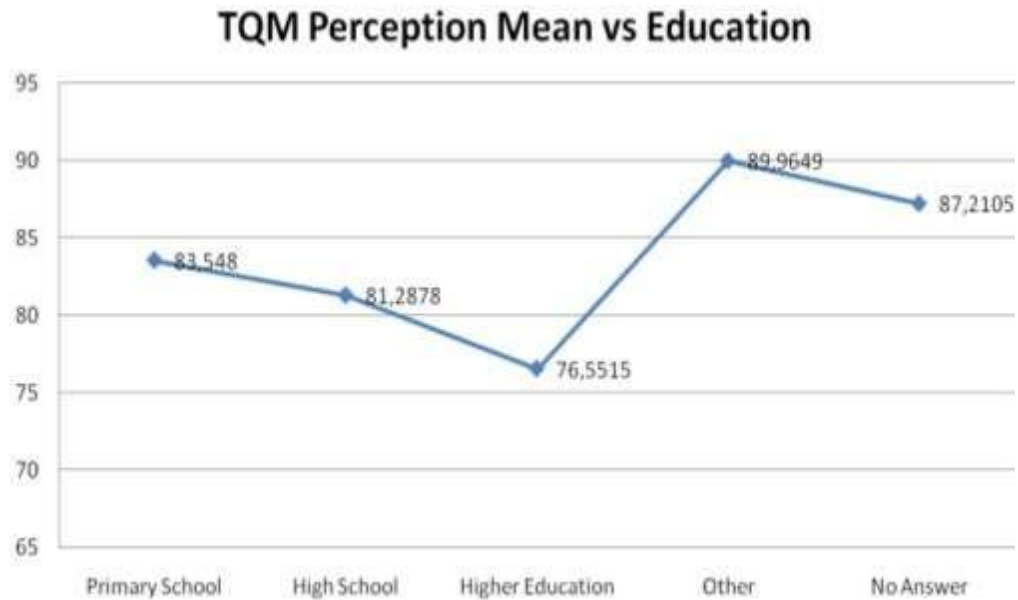
$$H_0: \mu_{ps} - \mu_{hs} - \mu_{he} - \mu_{oth} - \mu_{na} = 0$$

Alternative hypothesis states that at least one of the mean is different from others and can be stated as in Table 1.

$$H_1: \mu_{ps} - \mu_{hs} - \mu_{he} - \mu_{oth} - \mu_{na} \neq 0$$

There is a significant effect of experience on TQM perception ( $F(3, 1392) = 10.01$ ,  $p < 0.05$ ), thus null hypothesis is rejected (Table 4). Tukey's post hoc analysis was conducted to disclose the difference between groups.

Tukey post hoc analysis results indicate that there is a meaningful difference between 1 year and 2 years experience and no meaningful difference between 1 year and 3 years experience. Also, the mean difference



**Figure 1.** Education and means of TQM perception: Means plot.

**Table 1.** Demographic properties of participants.

| Variables              | Frequency | Percent |
|------------------------|-----------|---------|
| <b>Gender</b>          |           |         |
| Male                   | 1118      | 80.1    |
| Female                 | 278       | 19.9    |
| <b>Education</b>       |           |         |
| Primary school         | 562       | 40.3    |
| High school            | 622       | 44.6    |
| Higher education       | 136       | 9.7     |
| Other                  | 57        | 4.1     |
| No answer              | 19        | 1.4     |
| <b>Work experience</b> |           |         |
| 1                      | 325       | 23.3    |
| 2                      | 391       | 28.1    |
| 3                      | 321       | 22.9    |
| 4+                     | 359       | 25.7    |
| <b>Business</b>        |           |         |
| Textile                | 653       | 46.8    |
| Automobile             | 143       | 10.2    |
| Iron and steel         | 261       | 26.6    |
| Plastic and glass      | 229       | 16.4    |

**Table 2.** Gender and TQM perception: Independent samples t test results.

|                | Gender | Mean  | Std. dev. | Degree of freedom | t value | Sig  |
|----------------|--------|-------|-----------|-------------------|---------|------|
| TQM perception | Male   | 81.17 | 16.01     | 1394              | -4.80   | 0.00 |
|                | Female | 86.21 | 13.83     |                   |         |      |

**Table 3.** Education and TQM perception: One-way ANOVA and Turkey post hoc analysis results.

| Characteristic   | Factor    | Categories       |                |                 |                  |       |           | F-value | P value |
|------------------|-----------|------------------|----------------|-----------------|------------------|-------|-----------|---------|---------|
|                  |           |                  | Primary school | High school     | Higher education | Other | No answer |         |         |
| TQM perception   | Education | N                | 562            | 622             | 136              | 57    | 19        | 10.068  | 0.000   |
|                  |           | Mean             | 83.55          | 81.29           | 76.55            | 89.96 | 87.21     |         |         |
|                  |           | SD               | 17.61          | 14.45           | 12.67            | 13.38 | 12.60     |         |         |
| Post hoc test    |           |                  |                |                 |                  |       |           |         |         |
| Education        |           | Education        |                | Mean difference |                  |       |           | Sig.    |         |
| Primary school   |           | High school      |                | 2.26            |                  |       |           | 0.093   |         |
|                  |           | Higher education |                | 6.99            |                  |       |           | 0.000   |         |
|                  |           | Other            |                | -6.42           |                  |       |           | 0.026   |         |
|                  |           | No answer        |                | -3.66           |                  |       |           | 0.852   |         |
| High school      |           | Higher education |                | 4.73            |                  |       |           | 0.012   |         |
|                  |           | Other            |                | -8.67           |                  |       |           | 0.001   |         |
|                  |           | No answer        |                | -5.92           |                  |       |           | 0.478   |         |
| Higher education |           | Other            |                | 2.46            |                  |       |           | 0.000   |         |
|                  |           | No answer        |                | 3.81            |                  |       |           | 0.042   |         |
| Other            |           | No answer        |                | 4.13            |                  |       |           | 0.963   |         |

**Table 4.** Experience and TQM perception: One-way ANOVA and Tukey post-hoc analysis results.

| Characteristic | Factor     |      | Categories |         |                 |                  | F-value | P value |
|----------------|------------|------|------------|---------|-----------------|------------------|---------|---------|
|                |            |      | 1 year     | 2 years | 3 years         | 4 years and over |         |         |
| TQM perception | Experience | N    | 324        | 392     | 321             | 359              | 10.01   | 0.000   |
|                |            | Mean | 85.58      | 81.79   | 82.66           | 79.08            |         |         |
|                |            | SD   | 15.69      | 16.17   | 14.83           | 15.71            |         |         |
| Post Hoc test  |            |      |            |         |                 |                  |         |         |
| Experience     |            |      | Experience |         | Mean difference |                  | Sig.    |         |
| 1 year         |            |      | 2 years    |         | 3.78            |                  | 0.007   |         |
|                |            |      | 3 years    |         | 2.92            |                  | 0.083   |         |
|                |            |      | 4 years +  |         | 6.51            |                  | 0.000   |         |
| 2 years        |            |      | 3 years    |         | -0.87           |                  | 0.880   |         |
|                |            |      | 4 years +  |         | 2.71            |                  | 0.083   |         |
| 3 years        |            |      | 4 years +  |         | 3.58            |                  | 0.015   |         |

between 1 year and 4 years experience is meaningful (Figure 2). We can roughly say that the higher a personnel's worked year (experience), the higher his positive manner for TQM implementation. This finding put forward the importance of education in TQM applications.

### Factor analysis

We asked participants 16 questions. These questions are based on general TQM books and articles. To disclose the factors that may lie behind the perception of TQM, exploratory factor analysis was performed. At the result of

the analysis, three factors were extracted.

First, to ensure the adequacy of sampling, we used KMO test. As such, this test assures the adequacy of sampling. Factors, factor loadings and reliability analysis can be found in Table 5. A solution that accounted for at least 45% of the total variance was regarded as satisfactory. After analyzing the data by using principal component analysis with a Varimax rotation, the 16 variables were reduced to three factors, which explained 47.3% of the total variance. As a result, factor loadings change from 0.44 to 0.77.

To ensure the reliability of these three factors, we used Cronbach's Alpha test. According to the results, all the

## TQM Perception Mean vs. Experience

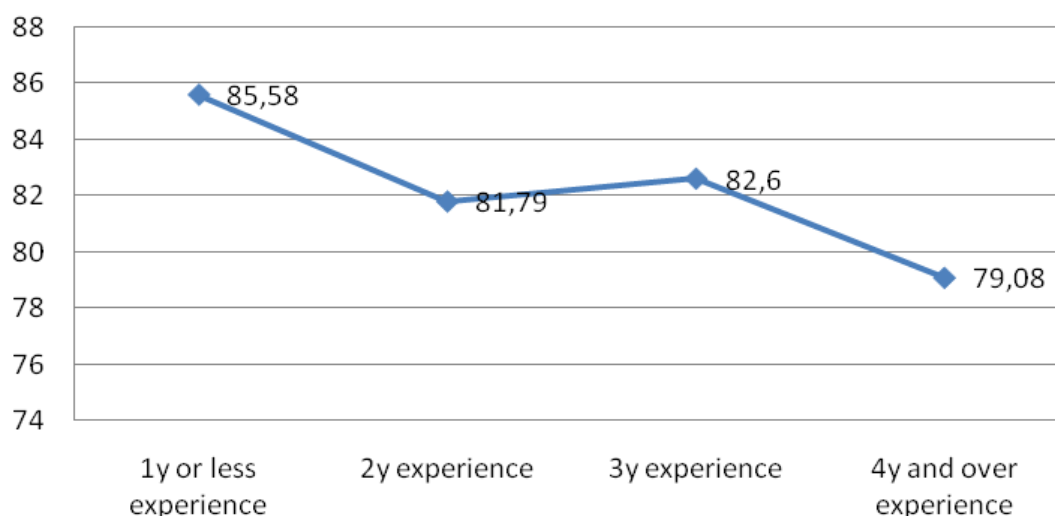


Figure 2. Experience and means of TQM perception: Means plot.

Table 5. Factor analysis results.

| Factor and variables                                     | Varimax rotated loading |          |          |             |
|----------------------------------------------------------|-------------------------|----------|----------|-------------|
|                                                          | Factor 1                | Factor 2 | Factor 3 | Communality |
| <b>F1 – Management level</b>                             |                         |          |          |             |
| Does your business has a vision                          | 0.77                    |          |          | 0.77        |
| Management efforts to take the advantage of my knowledge | 0.69                    |          |          | 0.69        |
| Is your management active in rehabilitation efforts      | 0.61                    |          |          | 0.61        |
| Management encourages and supports learning activities   | 0.55                    |          |          | 0.55        |
| Can you reach management on every problem                | 0.54                    |          |          | 0.54        |
| Does your management lead to get business aims?          | 0.50                    |          |          | 0.50        |
| <b>F2 – Employee</b>                                     |                         |          |          |             |
| Employees participate to work in education actively      |                         | 0.74     |          | 0.74        |
| Employee participation in decision making                |                         | 0.74     |          | 0.74        |
| Financial resources spending appropriately for employees |                         | 0.64     |          | 0.64        |
| Workplace hygiene is adequate                            |                         | 0.58     |          | 0.58        |
| Effective communication between managers and employees   |                         | 0.55     |          | 0.55        |
| <b>F3- Award</b>                                         |                         |          |          |             |
| Do you get award for effective study                     |                         |          | 0.75     | 0.75        |
| Is it suitable to make awards for numeric data           |                         |          | 0.73     | 0.73        |
| Do you agree on the fairness of awards                   |                         |          | 0.64     | 0.64        |
| Seminars and conferences to boost effectiveness          |                         |          | 0.53     | 0.53        |
| Supporting innovative initiatives                        |                         |          | 0.44     | 0.44        |
| <b>Total variance explained</b>                          |                         |          |          |             |
| % of variance explained                                  | 16.572                  | 16.510   | 14.216   | 47.300      |
| Cronbach"s alpha                                         | 0.735                   | 0.731    | 0.708    |             |
| Eigenvalue                                               | 4.762                   | 1.501    | 1.305    |             |

Kaiser-Meyer-Olkin measure of sampling adequacy: 0,880; Bartlett"s test of Sphericity,  $\chi^2 = 5292,741$ , significance at  $p < 0.05$ .

three factors" reliability is higher than 70%. As such, it ensures the reliability of components/factors.

At the end of the factor analysis, we got three factors namely management related issues (or management shortly), employee related issues (employee) and award issues (award) (Figure 4). These three factors are well exploratory of the 16 questions.

The questions that are related to management level attitudes of TQM constitute one group; business vision, management effectiveness, the reachability of management staff on problematic issues and encouraging approach to personnel.

On employee factor, there are items such as: employee participation to decision making, workplace hygiene, spending financial resources on behalf of employee/personnel comfort and effective communication between management and employees.

Lastly, on award dimension, there are award-related items such as getting award when working effectively, the fairness of awards, suitability of awards on numerical data, participating seminars and conferences as a reward and lastly, supporting innovative initiatives.

To see the structure more clearly, we can show each question on a graph in which the coordinates are related to the questions" factor loadings.

In Figure 3, we can see the three dimensional view of factor loadings belonging to 16 questions. The first 5 questions were related to Factor 2 (Component 2), the next 6 questions – 6, 7, 8, 9, 10 and 11, were related to Factor 1 (Component 1) and the other 5 questions – 12, 13, 14, 15 and 16 were related to Factor 3 (Component 3).

### Regression analysis

At the end of the factor analysis, there were 3 dimensions of TQM perception. These are management related, employee related and award related factors. These three factors are used in regression analysis to get the relationships between factors and business. Three equations were used to determine the relationships and we used multivariate linear regression models and dummy variables. Textile was assumed in all models as constant because of the sampling volume, while food, auto, iron and plastic industries had the value of 1 in their dummy variables, respectively.

We want to get the relationships between TQM perceptions and businesses and as such, three regression models were used to disclose the relations between industries:

$$\text{Management} = b_0 + b_1(\text{Food}) + b_2(\text{Auto}) + b_3(\text{Iron}) + b_4(\text{Plastic}) + \varepsilon_0$$

$$\text{Employee} = \beta_0 + \beta_1(\text{Food}) + \beta_2(\text{Auto}) + \beta_3(\text{Iron}) + \beta_4(\text{Plastic}) + \varepsilon_1$$

$$\text{Award} = \theta_0 + \theta_1(\text{Food}) + \theta_2(\text{Auto}) + \theta_3(\text{Iron}) + \theta_4(\text{Plastic}) + \varepsilon_2$$

When we examine the relationships on management dimension of TQM perception, we can see that the most pessimistic sector is textile industry, while the most optimistic one is plastic industry (Table 6).

In employee dimension, textile industry does not perceive TQM implementation in a positive manner. Moreover, textile industry workers/managers do not agree with the effective communication, business hygiene and employee participation to decision making at their firms. For employee dimension, the most optimistic industry is iron-steel.

On award dimension, automobile industry workers/managers perceive award issues in a negative manner than other industries, whereas iron steel workers are the most optimistic one.

To show the factors and the TQM perception more clearly, we draw the figure 5.

Figure 5 has two dimensions. On the horizontal dimension, there is TQM perception which has roughly two components: optimistic and pessimistic, while on the vertical dimension, one can see TQM perception and its factors (management, employment and award).

The main aim of this figure is to display which sector is strong-weak on which factor. It accomplishes this task by placing sectors with regards to their TQM perceptions and factors. For example, Automobile workers do not agree with the fair distribution of awards in their firms.

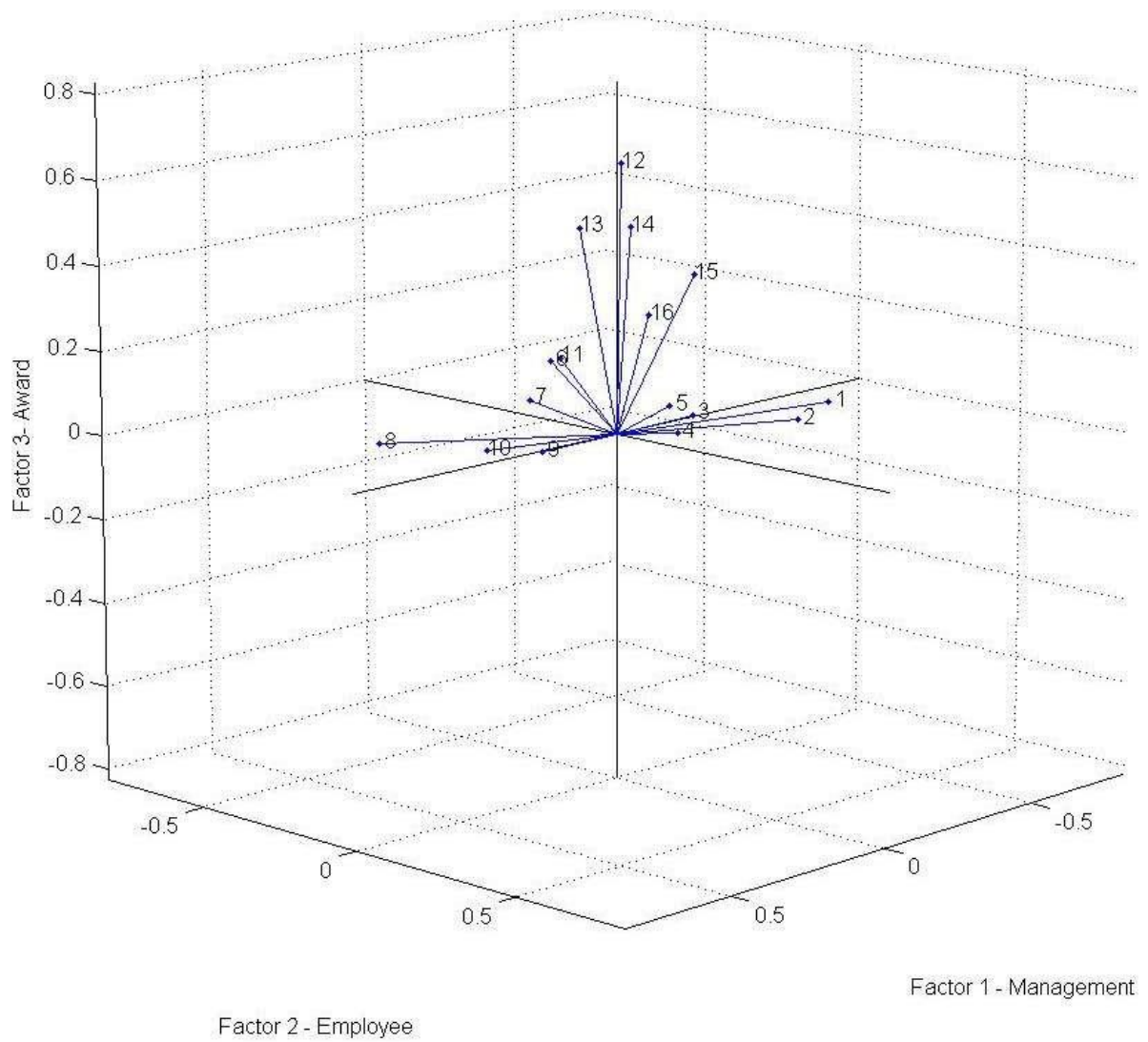
## RESULTS AND DISCUSSION

TQM applications will contribute to business performance, whereas businesses have to give more attention to quality to keep with the fierce competition of the globalized world. For this reason, the firm must know itself very well. This paper tries to help businesses by showing the actual perceptions. Businesses and practitioners can change their behaviors with that knowledge and TQM efforts will be more efficient.

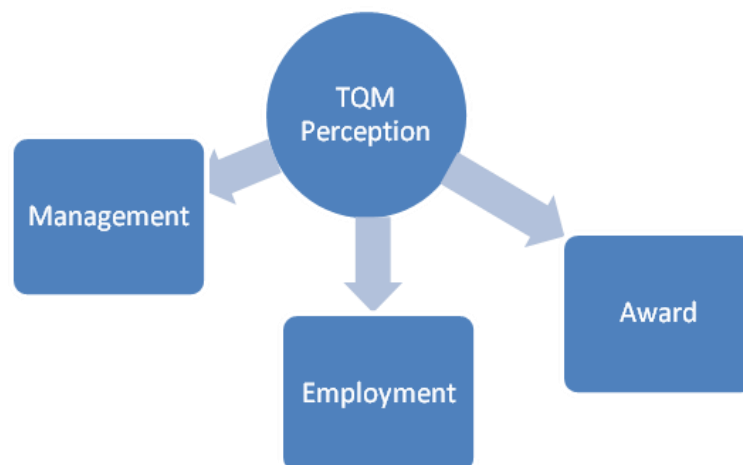
An implementation of TQM efforts on some levels within different businesses has been tried and the efforts seem to be continually practiced with time. These efforts' density changes within businesses.

Major findings of this study are as follow: First, male employees tend to perceive TQM efforts positively and more useful than their female counterparts. Secondly, education creates perception differences on TQM and higher educated employees perceive TQM more positively. Also, experience contributes to TQM efforts in a positive way and more experienced employees appreciate TQM efforts than low-educated counterparts. As a suggestion, TQM efforts were first introduced to more experienced workers because of their tendency to perceive TQM efforts positively.

We performed factor analysis to reduce the variable number and compare the factor scores and the industry. Factor analysis revealed three factors, namely: management, employee and award. However, the relations



**Figure 3.** Factor dimensions and questions.



**Figure 4.** TQM perception factors.

**Table 6.** Regression analysis results.

| Regression results |              |        |         |       |               |              |
|--------------------|--------------|--------|---------|-------|---------------|--------------|
|                    | Coefficients | Beta   | t       | Sig.  | F             | Sig.         |
| <b>Model 1</b>     |              |        |         |       | <b>70.178</b> | <b>0.000</b> |
| Management         | 0.251        |        | 7.014   | 0.000 |               |              |
| Food               | 0.006        | 0.002  | 0.088   | 0.930 |               |              |
| Auto               | -0.196       | -0.060 | -2.329  | 0.020 |               |              |
| Iron               | -0.247       | -0.359 | -14.081 | 0.000 |               |              |
| Plastic            | -0.720       | -0.267 | -10.268 | 0.000 |               |              |
| <b>Model 2</b>     |              |        |         |       | <b>9.713</b>  | <b>0.000</b> |
| Employee           | 0.156        |        | 4.025   | 0.000 |               |              |
| Food               | -0.208       | -0.079 | -2.804  | 0.005 |               |              |
| Auto               | -0.248       | -0.075 | -2.725  | 0.007 |               |              |
| Iron               | -0.513       | -0.148 | -5.356  | 0.000 |               |              |
| Plastic            | -0.287       | -0.106 | -3.786  | 0.000 |               |              |
| <b>Model 3</b>     |              |        |         |       | <b>11.997</b> | <b>0.000</b> |
| Award              | 0.104        |        | 2.693   | 0.007 |               |              |
| Food               | -0.165       | -0.063 | -2.230  | 0.026 |               |              |
| Auto               | 0.184        | 0.056  | 2.019   | 0.044 |               |              |
| Iron               | -0.468       | -0.135 | -4.898  | 0.000 |               |              |
| Plastic            | -0.312       | -0.116 | -4.130  | 0.000 |               |              |

**Figure 5.** TQM perception factor and perception levels.

between factors and industries are as follow:

1. On management dimension, textile industry perceives TQM efforts more negatively, whereas iron industry perceives it more positively.
2. Textile industry employees are the most pessimistic industry workers about the employee related issues. For example, textile industry workers do not believe that they are participating in the decision making process or in the quality of employee-management level communication.
3. Automobile industry workers seem to feel unfairness

on award distribution or the distribution process implementations of their firms.

In our findings, it is found that textile industry workers are mostly disagreeing with the statements of the survey.

This may be due to the structure of the industry. The production structure of textile business in southeastern Anatolia of Turkey is labor intensive. This means that there is not so much automation. People do most of the routine works in this industry with their hand power and that is the reason may lie behind their negative

perception.

The most optimistic industry seems to be iron-steel industry and we think the reason for this phenomenon is automation and institutionalization. To establish a heavy industry business such as an iron steel industry, one needs lots of capital. This is only possible with lots of shareholder and a huge structure, because the size brings institutionalization to industry.

This study revealed that different businesses percept of TQM efforts differently. For example, TQM efforts in textile industry in SAP region seem not to get credit from workers.

When the research results are considered, it would be clear that the employee's participation in management will contribute to TQM philosophy. In this field, the usage of taking note, thinking room (Paksoy, 2001), lean on management, learning organization, etc. techniques will contribute to TQM effectiveness.

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