

Analysis of the usage process after ISO 9000 certification in the Turkish construction sector

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Abstract:

The ISO 9000 Quality Management System which is effective at establishing and evaluating the quality system of firms has been adopted in the construction sector later than in other sectors, however, it has spread quite fast among the construction firms. As an important topic, studies on ISO 9000 arise daily. It has been noticed that, both the national and international studies are generally based on the establishment of the ISO 9000 Quality Management System and the certification process, but the process after certification has been disregarded. However, examination of the process after certification is as crucially important as the process till receiving the certificate. Moreover, an evaluation of the benefit-cost relationship of the ISO 9000 Quality Management System is quite important for both raising the awareness of firms, which are planning to be certificated, and continuation of already certificated firms. This article analyses usage and application of the ISO 9000 in the Turkish construction sector after certification by using a field study. The impacts of the ISO 9000 Quality Management System on firms and benefit-cost ratio of the ISO 9000 certification are evaluated and examined; the positive and negative aspects of the ISO 9000 certification are put forth.

Keywords: *Turkish construction firms, quality management system, total quality management, iso 9000 certification usage process*

1. Introduction

Improvements occur rapidly in the construction sector as the new participants are added with a strong rivalry. In this situation, firms can only survive by reaching to a widened customer population and keeping the existing ones in their customer borders. Following this idea, firms in which 'customer satisfaction' has become a priority insist on some notions as productivity and quality management with a high level of sensitivity. The ISO 9000 Quality Management System as a quality management tool becomes essential due to its effects on establishing and evaluating the quality systems of firms. This system is recognised in both local and international sectors and the demand for this system has increased drastically. This increase is evident in the report published by ISO (ISO, 2009).

Table 1. *The change in the number of certificated and certificate processed firms according to years.*

Year	Number of Certificated Firms	Number of Certificate Processed Countries
2004	660 132	154
2005	776 608	161
2006	897 866	170
2007	951 486	175

The ISO 9000 Quality Management System has been adopted in the construction sector later than in other sectors; however, it has spread quite fast among the construction firms. Turkish construction sector understood the importance of the system later than other countries' construction sectors. Indeed, the number of companies with ISO 9000 Quality Management Certificate has risen quite fast. According to a research conducted in 2002, only 42% of Turkish Contractors Association (TCA) member firms owned an ISO 9000 Quality Management Certificate (Seyman, 2003). Nowadays 95% of TCA member firms own an ISO 9000 Quality Management Certificate (Yıldırım, 2009).

As the ISO 9000 Quality Management System is adopted and spread in the construction sector; it has been of interest to firms, researchers and experts; lots of books, articles and thesis studies have been conducted in domestic and overseas areas. According to the literature research, it has been observed that most studies are especially focused on the process of receiving an ISO 9000 Quality Management Certificate. In the existing studies, topics such as the reasons of firms for wanting to receive an ISO 9000 Quality Management Certificate, the firms themselves, the difficulties faced in the certificate process, the cost of receiving the certificate, the effects of ISO 9000 to product and process qualities and the harmony of the natural structure of ISO 9000 with the construction process are discussed. An analysis of the usage process of certificated firms, however is neglected. Nevertheless, for a full examination of the ISO 9000 Quality Management System, the usage process is as important as the process till receiving the certificate. The clarification of the situation related to the satisfaction or dissatisfaction derived from the usage of the certificate is necessary for a full examination of the ISO 9000 Quality Management System. Besides, evaluating benefit-cost relationship of ISO 9000 Quality Management System is quite important for both raising the awareness of firms, which are planning to be certificated, and continuation of the certificated firms. In this article, therefore, it is intended to analyse the usage process after certification with ISO 9000 Quality Management Certification in the Turkish construction sector. The usage process of the certificate has been evaluated in accordance with the results of the field study which is created according to the information collected in literature and applied to the Turkish construction firms. For that reason, some issues are specified such as the effects of the certificate usage to the construction firms, its benefits the satisfaction of expectations and the satisfaction degrees compared to the issues that the firms have tolerated in certification and usage processes. According to the information obtained, the enlightenment level of the firms related to the certification and usage processes will be increased and the usage process after ISO 9000 Quality Management Certification will be analysed in this article which has not been mentioned in literature till today.

2. Quality and quality assurance in construction sector

The term “quality”, has throughout the years, in different time zones, lived in diverse communities and for that reason it has been evaluated by different people with different cultural background from different point of views. “Quality” is seen as a systematic approach to perfection seeking by J. M. Juran and while it has been defined as “quality is the compliance with usage”, it has been identified as “the compliance with conditions” by P. B. Crosby. Efil (1998) has used the expression of “quality is the compliance with required properties” by containing both of the definitions. This expression includes two components, the required properties and the compliance with these properties. While the possession of the required properties for a product or a service is related to the quality of design, the compliance quality is related to the level of the compliance of the product with the pre-determined design. Apart from these, there are some definitions of “quality” in various standard booklets. “Quality”, according to TS-ISO 9005, is “the sum of the properties of a product or a service based on its’ satisfaction ability for the pre-determined or possible needs” (TSE, 2009). Japanese Industrial Standards Committee (JIS) perceives “quality” as a “production system which manufactures the product or the service through an economic way and satisfies the requirements of the consumers”. American National Standards Institute (ANSI and ASQC), in the year 1978, standardized the legal definitions in quality terminology and defined “quality” as “the ability of product’s or service’s sum of properties and characteristics for satisfying the needs” (Efil, 1998). All these definitions show that, in order to be able to mention quality, it is essential to provide the best of services.

This can only be possible by satisfying the needs expected from the existing product, service, process or formation. That is to say, in the scope of the term “quality”; “the compliance with usage, compliance with the aim, compliance with the needs and the customer satisfaction” takes place.

The term quality can be defined differently for each sector. The construction sector differs from other sectors with its unique project aspect. When the general definitions of quality and the construction sector are taken into consideration together, the “quality” term can be stated as “with a condition of a full customer satisfaction, in estimated time and cost limits, managing a project, supplying a product or a service with a manner of maximizing the profit however is possible”. The mentioned issue here is not only the quality of the product but also the quality of the process. The construction sector creates a product and also supplies a service while creating this product. According to Garvin (1998), there are eight dimensions of quality related to a product which are defined as Performance, Structural and Technical properties, Reliability, Compliance with the users and the environment, Beneficence, Aesthetic and Visible quality (Efil, 1998).

In the construction sector, service quality is as important as the product quality. With a strong rivalry, firms can only survive by keeping the customers satisfied. Nowadays, if a construction firm cannot provide a guarantee to its customers then it cannot compete with its rivals. Today, as well as cost and time, quality has also become a selective criterion.

Quality assurance is the whole of planned and systematic proceedings of a product or a service to satisfy the determined qualifications for quality. The principles of quality assurance which are developed for supplying a continuity of quality are “compliance with the aim” and “performing the right

one at the first time". Quality assurance, differently from quality control which focuses on determining errors created in production and construction, insists on preventing the occurrence of errors and focuses on production and construction management methods and procedural approaches for providing the quality in production system. The most essential aim of quality assurance in construction sector is providing the job with a required quality by the customer without any need of customer control among the process. This aim can be achieved by documenting the processes and how they occur, by controlling every process that they are completed correctly and lastly by saving this situation (Harris and McCaffer, 2006). Providing quality assurance is very important for construction firms to provide customer satisfaction. The reference frame of quality assurance is formed by International Quality Standard, ISO 9000 Quality Management Certificate.

3. ISO 9000 Quality management system in the construction sector

ISO 9000 is a quality management system which can be used for both creating a quality system and evaluating an existing quality system. It is a widened group of standards which have been established for quality assurance in manufacturing and service sectors. The ISO 9000 series require each firm to develop its own quality system as well as documentation and operation of it. It includes the responsibility of firm management for quality applications, purchasing strategies, education and the whole of applications related to quality management (Sanders, 1998).

The ISO 9000 series of standards are derived from the need of providing a compliance of many national and international existing standards in the world. It is still the general purposed quality assurance standard which is valid in almost all countries including Europe, U.S.A and Japan. Different codes are translated into the language of the country in question and published with its English version (Ashfor, 1989). In 1991, ISO 9000 series of standards were translated in Turkish and supplied as TS – ISO 9000 series.

As being a standard and guide rules which form international quality management system, ISO 9000 was prepared by ISO, a standards organization including 130 countries for establishing a world-wide common standards related to manufacturing, communication and trade. This series of standards, determining the quality understanding, criteria and the requirements as they have to be, contains design, development, production, facility, serving, last inspection and experiments to create a model for quality assurance between the seller and buyer. The ISO family consists of standards, guide rules and technical reports. These standards are always updated and controlled by Quality Management and Quality Assurance Technical Committee ISO/TC 176 which is formed by various job and job branches' international representatives belonging to ISO. First version of these standards was published in 1987 and inspected in 1994. Today's version was published in 2000 (ISO 2009).

3.1. Steps to ISO 9000 quality management certification

There are 15 steps for firms to follow in order to receive ISO 9000 Quality Management Certification and these steps show similarities among the various sectors (Goetsch and Davis, 1998).

1. Commitment at the Top For ISO 9000 Quality Management System to gain acceptance in an organization, for top management to demonstrate its commitment by being actively involved in the preparation process and to lead the employers.
2. Decision to Proceed For developing a rough estimate of cost for external services and time for internal tasks.
3. Steering Committee For pursuing and applying a quality system and monitoring its performance.
4. Steering Committee Training on quality philosophy, ISO 9000 Quality Management System documentation, and work likely to be necessary to satisfy the requirements.
5. Internal Auditor Selection and Training of the consultants in the certification preparation process.
6. Assessment of Current Compliance The phase of determining the requirements in order to receive an ISO 9000 Quality Management Certificate.
7. Plan Preparation Projects Listing the scheduled tasks needed to comply with the standards according to the results of the assessment.
8. Project Team Selection by the steering committee.
9. Team Training for creating trained teams among the employers of the organization.
10. Project Team Activation of the steering committee by organizing a meeting to supply general information about the project, to organize the meetings between the committee and the team and to determine the tasks and responsibilities.
11. Project Feedback and Monitoring of the steering committee from all teams.
12. Registrar Selection 6-18 months before certification audit.
13. Pre-Assessment Audit in order to determine possible problems before the certification audit.
14. Final Pre-Audit Touch-Up to avoid deficiencies.
15. Certification Audit of the registered firm by the audit team using 4 steps: opening-meeting, the audit, pre-exit meeting conference and the audit exit meeting.

3.2. Certification audits

Audits and observations are necessary for a good quality system. According to ISO 9001:2000 standard, validity period of the certificate is for three years. Towards end of this period, the firm requests an extension of the validity period of the certificate. ISO certification carries out audits in three steps: Documentation Audit: These audits are carried out by an audit team of the accredited certification organization in order to determine the consistence of ISO 9001:2000 certificate and system documents. At the end of this audit, the firm deserves to be certificated in case that system complies with the standard. Supervision Audit: These audits are carried out by an audit team of the accredited certification organization in order to determine if firm is still in compliance with the standard. These audits are carried out minimally once in a year. Pursue Audit: These audits are carried out in case that some crucial inconveniences are determined during documentation and supervision audits (Kalite ISO 2009). Turkish Standards Institution (TSE) is the certification organization for Turkey (TSE 2009).

3.3. Positive and negative sides of certification

Firms prefer to use the ISO Series of Quality Standards in order to; Increase the quality of the product/service, Customer satisfaction, efficiency and profit rate, The ability of measuring and documenting the effects of changes and delays, Management strength; To decrease the amount of loss during the process, To decrease the amendment cost of errors and deficiencies; To decrease the amount of conflicts and delays which are not caused by employer; To develop the managerial activities and structure; To supply the similar tasks to be planned and executed much easily; To provide a systematic recording; To provide the sub-contractors and suppliers to be controlled more efficiently; To provide planning and controlling systems to

gain attention; To make the firm to gain a competitive advantage and advance in risk management; To develop internal communication and evaluation system and the external communication; To facilitate the information flow between the employer, designer and partners as to determine the weak activities in internal audits and processes; To make the staff and the management group conscious of the quality issue. This situation is also valid for the construction sector. The quality system in the construction sector needs to be audited and reported according to the rules and compliance with the standards.

The occurrence of some negative side effects are also to be expected by the usage of the ISO 9000 Quality Management System. The most frequent ones are; To increase the bureaucracy inside the firm, To decrease the creative thought and applications, To cause defects sourced by the procedures' different interpreted parts, To increase the paperwork and the expenditures, To slow the decision speed, To decrease the employees' motivation. The cost of receiving and using ISO 9000 Quality Management Certificate is also considered as a negative side effect. These costs which are compulsory for the firms can be listed as; Registration fee, Audit fee and Optional consultant fee. Also, there exist some additional negative aspects which occur after the firms have received ISO 9000 Quality Management Certificate. These are Inspection audit costs, Material setup costs, Documentation system maintenance costs, Employees' education costs and The employees' extra work-hour costs related to the ISO 9000 Quality Management System's maintenance.

The effect of certification cost differs according to firm size. Certification cost is not very effective, especially in large-sized firms when it is compared to the firms gained benefits. In addition, especially most of the small and medium sized firms indicate that their worries are about the ISO 9000 Quality Management System's adaptation and cost (Love, Li, 2000).

3.4. Research on ISO 9000 in the construction sector

Although ISO 9000 Quality Management System is new to the construction sector compared to other sectors, there exist a lot of studies related to this topic.

In a research conducted in 2003 by S.X. Zeng et al., the usage of ISO 9001:2000 in the Chinese construction sector has been evaluated by use of a survey study. %23 of 300 ISO 9000 certificated firms have participated in the survey study. According to the results of this study, it has been thought that ISO 9000 is not enough by itself in order to develop quality; it needs to be combined with Total Quality Management to provide the best contribution (Zeng et al. 2005).

With an obligation started in 1988, firms accepted ISO 9000 as a quality assurance system in Hong Kong. According to research conducted in 1999 by Chin and Pu and in 2001 by Choi and Chin at Hong Kong, the success criteria of ISO 9000 application have been gathered into 4 groups which can be seen in Figure 1 (Chin and Choi, 2003).

According to the research conducted by K. S. Chin and T. W. Choi, the evaluation has been made by prioritizing the success criteria in ISO 9000 application in Hong Kong construction sector. The data collection is based on the appointments made with 7 experts; 3 contractor and 4 consultant

firms (providing architectural and construction service). The answers of the consultant firms from the most to least important ones are, Commitment at the top, Human resources, Systems and Technics and Organizational changes. The answers of contractor firms from the most to least important ones are, Commitment at the top, Systems and technics, Human resources and Organizational changes (Chin and Choi, 2003).

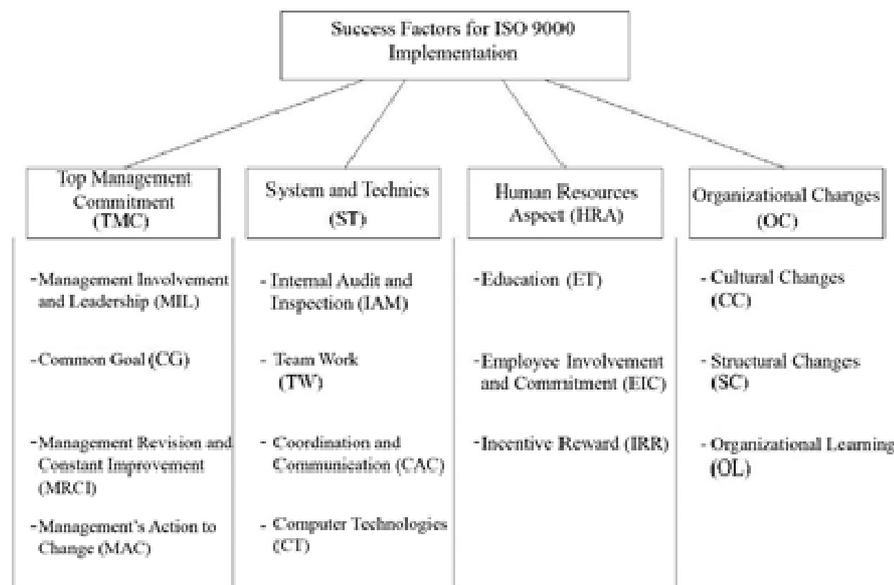


Figure 1. Success factors for ISO 9000 implementation in Hong Kong construction sector.

ISO 9000 standards were accepted and applied in America later than in other countries. "ISO 9000 and American Construction Sector Research" is conducted in order to determine the obstacles that prevent ISO 9000's application, efficiency and acceptance in construction firms in America. It is based on the results of the survey sent to both ISO 9000 certificated and non-certificated firms. According to the results of this study, reasons lead the firms to certification, the difficulties faced during the certification receiving process, the reasons make firms to abandon are listed. It has been determined that; ISO 9000 is not suitable for small-sized firms and is not followed by them, there is not a direct relation between the certification time and firm size and endorsement, the less the time (duration) the less the cost is and large-sized firms' certification costs are higher than the other ones (Chini and Valdez, 2003).

"ISO 9000 Standards: Perception and Experience Research in British Construction Sector" which is conducted by Moatazed et al., in order to inspect quality management system efficiency in British construction sector has been completed in the year 1998. With the survey prepared as a part of the research; the reasons for firms to accept ISO 9000, its effective areas and negative sides are examined. With this research, it is determined that the correct application is to apply standards to existing works; not to apply existing works to standards. Also, the study emphasizes that ISO 9000 quality standards are only a management tool and it cannot be enough to solve problems by itself (Moatazed et al. 1999).

In order to determine the ISO 9000 certification cost and the benefits to firms, "The Cost and Benefits of ISO 9000 Series" titled study is prepared by Leung and Chan in 1999 (Leung, Chan, Lee, 1999). The field research of this study is conducted among the certificated construction firms in Hong Kong. The reasons for receiving certificate of these firms and the obstacle faced during certification process are covered. The findings of the survey study are primarily grouped on the basis of sectors. According to the survey results of construction firms; %46 of firms are of the opinion that certification cost is low and the benefits gained from certification are higher than its cost. The firms considering certification not to be expensive are of the opinion that it is worth to effort to receive a certification. According to the firms considering certification to be expensive, the cost of extra working time of employees is not welcomed both in the receiving process or after as an additional cost. According to the findings of the field study, the length of the certification process and the time passing after certification directly affect the determination of cost-benefit ratio.

Besides the studies which focus on ISO 9000, there have been also studies concerned with the compatibility and integration of ISO 9000 Quality Management System with other quality systems and standards. "Total Quality Management Application Research in Construction by ISO 9001:2000" was conducted by Low Sui Pheng and Jasmine Ann Teo in the middle of 2001 at Singapore. With this study, the contractor firms' adaptability to TQM has been researched and their level of understanding has been inspected. The aim of the study is to determine if there is a difference between these two notions or not. The survey prepared as a part of the study has been sent to 188 contractor firms which are registered to BCA-Building and Construction Authority. %20.7 of them replied. According to the survey results, firms are aware of the benefits of ISO 9001:2000 but their awareness of TQM is less. Most of them are aware of the similarity between ISO 9001:2000 and TQM and it is so possible for them to apply TQM after ISO 9001:2000 (Pheng and Toe, 2003).

"ISO 9001, ISO 14001 and OHSAS 18001 Management Systems: Integration for Construction Firms, Cost and Benefits Research" discusses the similarities and differences of the ISO 9001 Quality Management Systems, the ISO 14001 Environmental Management Systems and the OHSAS 18001 Job Health and Security Evaluation Systems. In this study conducted by Pheng and Kwang, application cost of integrated management systems, benefits and construction firms' improvements about certification on integrated management systems have been analysed. The survey, prepared as a part of the literature study, was sent to 51 firms with integrated management systems and %59 of them replied. According to the results, there is %1-5 increase in cost to educate the employees to manage the system, to improve and to apply the system, to spend organizational energy and effort during the certification process and extra equipment for IMS. Firms, therefore, think that the application cost of IMS is not much. Most of the firms agree that IMS has an important benefit for firms to overcome the difficulties in the construction sector both local and global as well as to gain the customer trust and improve the firm's image. The firms' point of view is that the gained benefits outweigh the cost (Pheng and Kwang, 2005).

"Integration of ISO 9001 and OHSAS 18001 Research" was conducted by Low Sui Pheng and Chin Young Pong and observes the integration of

OHSAS 18001:1999 and ISO 9001:2000 version. This study was conducted among 96 firms in Singapore and the possibilities/difficulties and benefits/cost of integration between OHSAS 18001:1999 and ISO 9001:2000 has been inspected. Most of the firms think that the integration will be easy although it has been insisted on potential problems and application difficulties related to the sector (Pheng and Pong, 2003).

There are also many sources of books and thesis studies about Quality, Total Quality and ISO 9000 Quality Management System in local literature. The history of those studies show that, with the increase of the comprehension of quality's importance and necessity and the number of the ISO 9000 certificated firms, there has been also an increase in the number of these studies. According to the research conducted on the web site of The Council of Higher Education in Turkey, there are 242 doctorate and master thesis studies about ISO 9000 in different universities in Turkey. Inspected notions are filtered with the construction sector since it is valid in all sectors.

The aim of the study with the title of "Quality Management in the Turkish Construction Sector" conducted by Sanlılar in 1998 is to determine the value of quality management and future politics in the Turkish construction sector. The results of the survey study which collects information about quality management methods used by firms in the Turkish construction sector, show that most of the firms are aware of the importance of quality management and interested in quality improvement issue. Since the TQM application is a new subject in the Turkish construction sector and the experience of TQM applications is not enough; firms face problems in some areas and there are deficiencies in documentation, communication, education and process development. Firms think that the ISO 9000 Quality Management System provides a good basis for Total Quality Management and for that reason they consider to apply for the ISO 9000 Quality Management System (Sanlılar, 1998).

"ISO 9000 Standards in the Turkish Construction Industry" titled study conducted by Turk, D.T. in 1999 aims to introduce and to guide the application of ISO 9000 quality standards in Turkish construction firms. According to the field study; it has been indicated that, most of the employers in Turkey still do not offer ISO 9000 certificate but there are signs that this situation will change in the near future (Turk, 1990).

The main purposes of the study "Expectations from ISO 9000 Certificate of Turkish Construction Firm and Satisfaction" which was conducted by Seyman in 2003, were indicated as, to analyse the basic reasons of Turkish construction firms to gain ISO 9000 certificate, to inspect the obstacles and cost that firms face with during the certification process and after the process, to learn the benefits of certification brings to firms and to research the compatibility of ISO 9000 Quality Management System's natural structure to construction process. The results of the survey showed that, the interest of Turkish construction firms in ISO 9000 certification has increased highly. The main reasons of ISO 9000 certificated Turkish construction firms to gain the certificate are listed as; the management's requirement, to develop the management systems and customer satisfaction. The firms sealing certification face the largest cost in employee overtime pay. As a result, most of the firms who participated the field study indicated that they met their expectations from ISO 9000 certification and they are satisfied from it although they think that it is early to evaluate certification's benefit-cost ratio (Seyman, 2003).

In local research, the analysis of the ISO 9000 Quality Management System is only made for document receiving process; usage process is not included. However, to indicate the satisfaction or dissatisfaction from using it is as important as receiving an ISO 9000 certificate. Moreover, an evaluation of the benefit-cost relationship of the ISO 9000 Quality Management System is quite important for both raising the awareness of firms, which are planning to be certificated and continuation of already certificated firms.

4. The field study which analyses the usage process after certification in ISO 9000 certificated Turkish construction firms

4.1. The aim and target group of the research

This research, which focuses on the process after ISO 9000 Quality Management Certificate in the Turkish Construction Sector, aims to examine the benefits of ISO 9000 Quality Management Certificate to firms, the time required to receive the certificate, an indication of the costs necessary in and after receiving the certificate, an evaluation of the benefit and the costs necessary in and after receiving the certificate and a determination of the satisfaction level of certification. In addition, it is determined whether or not the inspection audits are carried out regularly and whether or not they are beneficial to the firms in question.

ISO 9000 certificated firms which are the members of the Turkish Contractors Association (TCA) are determined as the target group of the study. According to the telephone conversations made with 141 TCA member firms, it is learned that 5 firms are the same firm although they have different names, 5 firms do not have ISO 9000 Quality Management Certification or fall into abeyance and 2 firms do not execute a construction activity anymore. ISO 9000 Quality Management Certificated 129 firms are called to explain the aim of the survey and the survey form is sent to them. Table 2 shows the general distribution of the firms in Turkey and their participation in the survey. The field study was conducted with %29 participation of the target group which can be seen from Table 2 as well.

Table 2. The participation of the firms composing the target group of the field study.

	Number of Firms	Participants	Non-participants
Istanbul firms	46	22	24
Ankara firms	78	15	63
Other	5	0	5
Total	129	37	92
Percent (%)	100	29	71

The authorized employees were asked to answer all of the questions of the survey form in order to increase the reliability of the answers.

4.2. Question groups of the research

The questions in the survey form are grouped into two in order to reach the aim defined above. The first group of questions aim to recognize the firm and the authorized person responsible from quality who has filled in the survey forms. According to the answers of these questions, it is aimed to

determine the profile of the certificated Turkish construction firms. The second group of questions contain four sub-groups of questions which are related to the process after receiving ISO 9000 Quality Management Certificate. The questions in the Audits group aim to determine whether or not the inspection audits which control the firms' compatibility to ISO 9001:2000 standards are carried out regularly and whether or not the firms get benefits from these audits. The questions in the Certification Cost group are intended to estimate the time and cost required for receiving the certificate and the cost of after certification, the questions in the Benefits of Certification group evaluate the benefits of certification to firms, the questions in the Cost-Benefit Evaluation of Certification seek to establish a relation of the benefits and the costs before and after receiving the certificate as well as the satisfaction level with the certification.

4.3. Findings

The findings of the field research are evaluated in two groups similar with the questions in the survey form.

Findings about the Firms and the Authorized Persons in Charge of Quality
The firms who participated in the field research have been active in the construction sector for 4 – 64 years and most of them (60 % of them) are being active in the sector for 24 – 44 years. The activity areas of the firms according to the application frequency are; industrial facility, infrastructure, building, transportation, energy facility, marine buildings, communication facility, real estate property evaluation, restoration and prefabricated projects.

77% of firms indicated that %20 - %80 of their works and %3 of firms indicated that all of their works (100%) are at international level and %20 of firms indicated that their works are totally at local level. Averagely, 70% of firms bid 20 times a year and %91 of firms are selected in 4 bids a year.

%3 of firms gained ISO 9000 Quality Management Certificate in 1997. 86% of them gained the certificate between the years 1999 and 2004; 11% of them gained between the years 2005 and 2007 and %75 of firms gained their certificates by foreign registration institutions.

The positions, numbers and percentages of the authorized people in charge of ISO 9000 Quality Management Certificate are shown in Table 3.

Table 3. The numbers and percentages of the authorized people who are in charge of ISO 9000 Quality Management Certificate in firms participated in the field study.

The Position of Authorized Person in Firm	Number	Percentage (%)
Quality Systems Manager	10	27
Quality Manager	6	16
Quality Management Representative	6	16
Management Systems Responsible	5	14
Finance Manager	4	11
Quality Systems Expert	3	8
Quality Systems Assistant Manager	2	5
Management Representative Assistant	1	3

45% of authorized people in charge of quality and ISO 9000 Quality Management Certificate in participating firms have graduated from the civil engineering, 25% from economy, 6% from metallurgy engineering, 6% from psychology, 6% from geology engineering, 6% from electric and electronic engineering and 6% from urban planning departments of universities.

30% of authorized people have been working for 0-2 years, 22% for 3-5 years, 24% for 6-8 years, 16% for 9-11 years, 8% for 12 and more years in their firms. 92% of the authorized people's work experience changes from 5 to 30 years in the sector. 8% of them have a work experience of more than 30 years.

Findings about the Process after ISO 9000 Quality Management Certificate
The questions related to ISO 9000 Quality Management Certificated Turkish construction firms' point of views and evaluations about the process after ISO certification which participated in the field research are placed at the second section of the survey.

Findings about the Audits
86% of ISO 9000 Quality Management Certificated Turkish construction firms' inspection audits which participated in the field research are made once in a year where 11% of the firms' are made twice in a year. 3% of firms' inspection audits are made at firm's centre once in a year and twice in the construction site by their willing. 78% of the firms that participated in the survey study think that ISO 9000 Quality Management Certificate related internal audit process is essential for sustainable development. 62% of them think that regulatory activity analysis used in the audita is important to use in order to determine the reasons for low performance in the process and 51% of the participating firms state that it is important for an effective audit that the register institution auditor is from the construction sector.

Findings about the Certification Cost
49% of firms gained ISO 9000 Quality Management Certificate within 0-6 months, 31% of them within 6 months-1 year, 14% of them in 1-1,5 years, 3% of them in 1,5-2 years and 3% of them in more than 2 years.

53% of firms indicated that certification does not have an effective cost to their firms. 19% of firms indicated that certification amortised in 1-12 months and for 6% of the firms this time is between 1-3 years. In 19% of firms, the effect of the cost has not been calculated yet. 46% of firms indicated that there has not been any additional cost creating displeasure after receiving the certificate. 54% of them indicated that, there have been additional costs after certification that dissatisfied them. These firms listed the additional costs after certification according to their dissatisfaction levels. These are; costs for additional time the employee's need for keeping the ISO 9000 Quality Management System on, inspection audit costs, equipment setup costs, documentation system sustaining costs and employees' education costs.

Findings about the Benefits of Certification
100% of the firms questioned indicated that ISO 9000 Quality Management Certificate provides advantages to their firms. 89% of the firms questioned think that owning an ISO 9000 Quality Management Certificate provides an advantage to take a new job. Firms determined the benefits of ISO 9000 Quality Management Certificate to themselves as shown in Table 4.

Table 4. The ratio of the benefits of using an ISO 9000 Quality Management Certificate in Turkish construction firms.

The Benefits of ISO 9000	Percentage (%)
It has provided a systematic registration.	95
Internal communication and evaluation system have improved.	89
It has made the employee, especially the management, conscious about the quality.	89
Managerial activity and development structure have been provided.	84
Risk management has improved.	84
Customer satisfaction has increased.	81
Permanent development in operating has provided.	81
It has provided a competitive advantage to the firm in local and foreign markets.	73
Production quality and delivery process have been guaranteed.	70
There has been a development in external communication.	68
Fast and efficient working has been developed.	68
Decrease in the amount of loss has been observed.	57
Profit ratio (profitability) has increased.	51

Findings about the Cost-Benefit Evaluation of the Certification

73% of the firms questioned think that the benefits gained from ISO 9000 Quality Management Certificate are worth more than the certification cost. On the other hand, 8% of them indicate that certification cost is more than its benefits. There has not been any evaluation in 19% of firms. 89% of the firms questioned indicated that they are satisfied from certification. The rest of %11 indicated that they are indecisive. There is not any firm that is dissatisfied from certification.

4.4. The evaluation of findings

- The Qualifications of the Firms Participating in the Field Research and Authorized People in Charge of Quality

Most of the firms participated in the field study are 20-40 years old. The number of the firms established in the near past is very low (8%). This situation shows that establishing a quality system in firms requires experience. Similarly, the number of 50-60 year old firms which amount to 3%, can be shown as the reason of old firms' difficulty in adapting to the new system.

73% of firms' yearly endorsements change between 0-100 million US \$. This situation shows that firms with a low level of endorsement pay a lot of importance to ISO 9000 Quality Management System in order to increase their market share. 20% of firms are active only in Turkey while the other 80% are also active in abroad. It indicates that ISO 9000 Quality Management Certificated Turkish construction firms play an active role on the international market. Additionally this situation can be explained as a reason why firms apply for the ISO 9000 Quality Management System which is recognized in abroad.

78% of participating firms gained ISO 9000 Quality Management Certificate between the years 2000 and 2004. The number of the firms that were certificated before 2000 and after 2004 is very low. The reason for the number of firms that gained the certificate before 2000 being low can be that

the firms were not familiar with the ISO 9000 Quality Management System, they were waiting for the 2000 version of ISO 9000 Quality Management Certificate or the ISO 9000 Quality Management System were not spread in local and international markets like they are today. The reason of the number of firms that gained the certificate after 2004 being low can be that Integrated Management Systems' usage has been started to discuss which gathers ISO 9001, ISO 14001, OHSAS 18001, HACCP 22000 etc. under one title and satisfies all the requirements.

The important point is that most of the firms gained their certificates by foreign registration institutions and there is no firm that gained its certificate by TSE. The reason of getting certificated by foreign registration institutions can be explained by either operating in the international market or as an intention to gain an advantage to work in abroad. However, in a research conducted by Erel and Gosh in 1996, different result was reached. According to the findings of this study, 57% of Turkish firms were certificated from TSE and 13% of them gained their certificate from foreign registration institutions. It is important to emphasize that this study contains all sectors in Turkey and the performance request of Turkish construction firms in international areas was not at today's level.

In firms with ISO 9000 Quality Management Certificate, most of the authorized people in charge of quality are civil engineers. Although there are participants with a different background, 63% of authorized people are engineers and most of them are authorized or in charge of quality systems departments. 70% of these people have been working in the same firm at least for 3 years and 76% of them have a minimum 5 years of experience in the sector. Since the firms give the responsibility of ISO 9000 Quality Management Certificate and quality to experienced people in the sector, it may be an indicator of the importance they pay to this issue.

- The Evaluation of the Findings about the Process After ISO 9000 Quality Management Certificate in Firms

The time of receiving certificate is generally 1 year for participant firms. It can lengthen to 2 years under some conditions. Turkish construction firms do not think that certification cost is expensive. They think that certification does not have an effective cost and amortises quickly. It is seen that ISO 9000 Quality Management Certificate is committed by the top management because it is required in international market.

The inspection audits which control the continuity of compatibility to the ISO 9000 Quality Management System are performed regularly in all firms. 86% of the firms which participated in the field study perform inspection audits once and the others perform more often in a year. This situation indicated that certification is paid a lot of importance both by the firms and registration institutions. Other findings of the field research also support this result. 78% of the firms that participated in the survey study think that ISO 9000 Quality Management Certificate related internal audit process is essential for sustainable development and regulatory activity analysis used in audit that are important to use in order to determine the reasons of low performance in process. These points indicate that firms get benefits from audits. Additionally, firms think that the register institution auditor's being from construction sector is important for an efficient audit. However, according to the results of the study conducted by Seyman (2002), the top obstacle that

the firms face during the certification process is the lack of knowledge of auditors about the problems of the construction sector. This situation which forces firms during certification process does not affect them in inspection audits made after certification.

Participating firms indicated that receiving certification does not have an effective cost to firms but some additional costs after certification create displeasure. These additional costs are; additional time the employee's need for keeping ISO 9000 Quality Management System on, inspection audit costs, equipment setup costs, documentation system sustaining costs and employees' education costs. In a research conducted by Kumaraswamy and Dissanayaka (2000) in Hong Kong, similar conclusions (findings) have been reached. Firms indicated the increase in documentation and spending much time in management as the most frequent displeasures. It has been reached to the same finding in the research containing 23 main industry branches which was conducted by Law et al. (1999).

For all the firms, ISO 9000 Quality Management Certificate provided a systematic registration in firms, improvement in internal communication and evaluation system, a consciousness of management and staff on quality, improvement in managerial activities and structure, improvement in risk management, an increase in customer satisfaction and sustainable improvement in operation.

In Turkish construction firms, competitive advantage in both local and foreign markets has been provided, production quality and submission process has been guaranteed, external communication has developed, fast and efficient working has been improved, amount of loss has decreased and profitability has increased. In the literature research which has been made through the findings of the field research, it can be said that the positive effects of certification which has been discussed under the title of "The Benefits of ISO 9000 Quality Management Certificate" are also valid for Turkish construction firms.

Participating firms think that benefits gained from ISO 9000 Quality Management Certificate are more than the certification cost. By this finding, it can be thought that firms are satisfied. This situation can be explained as the reason of the increase in interest by firms to ISO 9000 Quality Management System. In a similar study which is conducted by Leung, Chan and Lee (1999), according to the answers of participant firms which have been certificated for 1-3 years, 58.2% of construction sector and 64.9% of all sectors indicated that the benefits of ISO 9000 Quality Management Certificate are more than its cost.

This situation can be explained as the reason of the increase in interest to ISO 9000 Quality Management System in the construction sector. Turkish construction firms' expectations have been supplied from ISO 9000 Quality Management Certificate and they are satisfied.

5. Conclusion

The ISO 9000 Quality Management System that is spreading through international areas rapidly and becoming effective in all sectors, has been adopted in the construction sector later than in other sectors, however, outspreaded quite fast along construction firms. Its' adoptability in Turkey

has occurred later than in other countries. As the ISO 9000 Quality Management System is spreading in the sector, plenty of research has been conducted related to this subject. However these studies have been focused on ISO 9000 Quality Management Certificate's receiving process; usage process of the certificate and the indication of satisfaction or dissatisfaction by the usage of certificate have been neglected. The analysis of the usage process is important in order to have a full evaluation of ISO 9000 Quality Management System. Additionally, evaluating benefit-cost relationship of ISO 9000 Quality Management System is quite important for both consciousness-raising of the firms, which is planning to be certificated, and continuation of certificated firms.

With this field research which is a part of this study, the usage process after ISO 9000 Quality Management Certification in Turkish construction firms is analysed, the benefits of the firms gained and the cost they came over are indicated and satisfaction levels of certification's usage process are determined. The benefits of ISO 9000 Quality Management Certificate to firms, the time of receiving certificate process, the indication of costs in receiving process and after receiving process, the evaluation of the benefit and the costs of receiving the certificate and after receiving it and the determination of the satisfaction level of certification are examined. Also, it is determined whether or not the inspection audits are carried out regularly and whether or not the firms gain benefits from these inspections.

Supported both by the literature research and field research, it can be understood that Turkish construction firms' expectations have been supplied by receiving ISO 9000 Quality Management Certificate and they are satisfied with the certification. This situation also indicates that the interest in future to ISO 9000 Quality Management System from construction sector will increase rapidly. However, according to the developments, it can be said that Integrated Management Systems which gather the management systems such as ISO 9001, ISO 14001, OHSAS 18001, HACCP ISO 22000 etc. under one title and satisfy the requirements at the same time will provide much benefit to the firms. That is why; it can be put forward that in future studies it is necessary to determine the similarities and differences between integrated system, the compatibility between them, the advantages, disadvantages and obstacles they bring and the tendency of firms to these systems.

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Türk inşaat firmalarında ISO 9000 sertifikasyon sonrası kullanım sürecinin irdelenmesi

Uluslararası alanda hızla yayılan ve her sektörde etkisini gösteren ISO 9000 Kalite Yönetim Sistemi, inşaat sektöründe diğer sektörlere göre çok daha geç benimsenmiş, ancak büyük bir hızla yayılmıştır. Türk inşaat sektöründe yer bulması

ise diğer ülkelere göre daha uzun sürede gerçekleşmiştir. ISO 9000 Kalite Yönetim Sistemi'nin sektörde yayılmasıyla doğru orantılı olarak çok fazla çalışma yapılmıştır. Bu çalışmalar ISO 9000 Kalite Yönetim Sertifikası alma süreci üzerinde odaklanmış, sertifika kullanım süreci, kullanımından elde edilen memnuniyet veya olumsuz durumun ortaya konması çalışmaları ihmal edilmiştir. Oysa ki sertifika kullanım sürecinin irdelenmesi ISO 9000 Kalite Yönetim Sistemi'nin bir bütün olarak değerlendirilebilmesi açısından önemlidir. Ayrıca, ISO 9000 Kalite Yönetim Sistemi'nin kullanımının fayda-maliyet ilişkisinin değerlendirilmesi, gerek sertifika almayı düşünen firmaların bilgilendirilmeleri, gerekse sertifikalı firmaların kalite sistemlerini devam ettirmeleri açısından oldukça önemlidir.

Bu maktelede, Türk inşaat sektöründe ISO 9000 Kalite Yönetim Sertifikasyon sonrası kullanım sürecinin incelenmiştir. Sertifikanın kullanım süreci Türk inşaat firmalarına uygulanan alan çalışmasının bulguları ışığında değerlendirilmiştir. Firmaların sertifika elde etme ve kullanma süreci boyunca katlandıkları unsurlara karşılık, sertifikanın kullanımının inşaat firmalarına etkileri, sağladığı faydalar, firma beklentilerini karşılayıp karşılamadığı ve memnuniyet dereceleri belirlenmiştir. Ortaya konan bu bilgiler ışığında inşaat firmalarının sertifikasyon elde etme ve kullanma konusunda bilgilendirme düzeyleri arttırılacak ve bugüne kadar literatürde değinilmemiş olan ISO 9000 Kalite Yönetim Sertifikasyon sonrası süreç bu maktelede irdelenmiş olacaktır.

ISO 9000 Kalite Yönetim Sertifikasyonuna sahip olmak için firmaların belirli bir sıra takip edilerek gerçekleştirmesi gereken ve sektörler arasında benzerlik gösteren on beş adım vardır Bunlar; *Üst Yönetimin Taahhüdü, Devam edip etmeme kararı, Yürütücü Komitenin Kurulması, Yürütücü Komiteye Eğitim Verilmesi, İç Denetçilerin Seçimi ve Eğitimi, Uyumun Değerlendirilmesi, Plan Hazırlık Projeleri, Proje Ekibinin Oluşturulması, Ekiplere Eğitim Verilmesi, Proje Ekibinin Harekete Geçirilmesi, Geri Besleme Alma, Gelişimi İzleme ve Yeni Talimatlar Vermesi, Kayıt Kuruluşunun Seçimi, Ön Değerlendirme Denetimi, Ön Değerlendirme Denetimi Sonrası Düzeltmeler, Sertifikasyon Denetiminin Yapılmasıdır.*

Firmalar; *Ürün/hizmet kalitesini, müşteri memnuniyetini, verimlik ve kar oranını arttırmak, Değişiklik ve gecikmelerin etkisini ölçme ve belgeleme, Yönetim gücünü arttırmak, Süreçteki israfı azaltmak, Hatalardan ve eksikliklerden kaynaklanan tekrar yapma ve düzeltme maliyetini azaltmak, Gecikmeleri ve ihtilafları azaltmak, Yönetimsel faaliyetleri geliştirmek, Benzer işlerin daha kolay planlamasını/gerçekleştirilmesini sağlamak, Sistemli kayıt tutulmasını sağlamak, Taşeron ve tedarikçilerin daha etkin biçimde kontrolünü sağlamak, Planlama ve kontrol sistemlerinin önem kazanmasını sağlamak, Firmaya rekabet avantajı ve risk yönetiminde iyileşme sağlamak, İçsel iletişim ve değerlendirme sistemini ve dış iletişimi geliştirmek, İşveren, tasarımcı, ortaklar vs. arasındaki bilgi akışını kolaylaştırmak, Düşük performanstaki faaliyetleri belirleyerek sürecin iyileştirilmesini kolaylaştırmak, Personeli / yönetim grubunu, kalite konusunda bilinçlendirmek için ISO 9000 Kalite Standartları serisinin kullanımını tercih etmektedirler.*

ISO 9000 Kalite Yönetim Sistemi kullanımı ile karşılaşılan olumsuzluklar; *Firma içi bürokrasiyi arttırması, Yaratıcı düşünce ve uygulamaları azaltması, Prosedürlerin farklı yorumlara açık olması nedeniyle aksaklılara neden olması, Kırtasiye işlerinin ve masraflarının artması, Karar alma hızının yavaşlaması, Çalışanların motivasyonun azalması* dır. Ayrıca ISO 9000 Kalite Yönetim Sertifikası alma ve kullanmanın belirli bir maliyeti bulunmaktadır. Katlanılması zorunlu bu maliyetler firmalar için olumsuz bir unsur oluşturan bu maliyetler *Kayıt ücretleri, Denetim ücretleri ve Opsiyonel danışman ücretleri* dir. İç şirket yeniden yapılanma maliyetleri de bazı firmalarda, sertifikasyon sürecinde, etkili olmaktadır. Ayrıca, ISO 9000 Kalite Yönetim Sertifikası alındıktan sonra oluşan ve bazı firmalarda hoşnutsuzluk yaratan *Gözetim denetimleri maliyetleri, Ekipman ayar maliyetleri, Dokümantasyon sistemi sürdürme maliyetleri, Çalışanların eğitimi ile ilgili maliyetler ve ISO 9000 Kalite Yönetim Sistemini sürdürmek için çalışanlar tarafından harcanan ek zaman maliyeti* mevcuttur.

ISO 9000 Kalite Yönetim Sertifikası sonrası süreci irdeleyen alan çalışmasında ise firmaların sertifikaya sahip olma süresi, maliyeti, sertifikasyon sonrası maliyetinin belirlenmesi, sertifika elde etme ve sonrasında katlanılan maliyet ile elde edilen

faydanın değerlendirilmesi ve memnuniyet derecesinin ne düzeyde olduğunu belirlenmesi hedeflenmiştir. Türk Mühendisler Birliği üyesi olan ve ISO 9000 Kalite Yönetim Sertifikalı firmalar çalışmanın hedef kitesidir. 141 firma ile telefon görüşmesi yapılmış ve uygun olan 129 firmaya anket formu gönderilmiş, 37 firmadan gelen yanıtlar değerlendirmeye alınmıştır.

Alan araştırması sonuçlarına göre, firmaların %49'u ISO 9000 Kalite Yönetim Sertifikasını 6 ayda, %31'i 1 sene içinde, %14'ü ise 1.5 sene içinde edinmiştir. Firmaların %53'ü sertifikasyonun etkin bir maliyetinin olmadığını, %19'u sertifikasyonun maliyetini 1 - 12 ay arasında, %6'sı ise 1 - 3 yıl arasında karşıladığını belirtmişlerdir. %19'unda ise maliyetin etkisi hesaplanmamıştır. Firmaların % 46'sı sertifikasyon alımından sonra hoşnutsuzluk yaratan herhangi bir ek maliyetin olmadığını, %54'ü sertifikasyon sonrası ek maliyetlerin bulunduğunu ve bunlardan dolayı hoşnutsuz olduklarını belirtmişlerdir. Firmalar açısından sertifikasyon sonrası oluşan ek maliyetler, hoşnutsuzluk yaratma derecesine göre *ISO 9000 Kalite Yönetim Sistemi'ni sürdürmek için çalışanların harcadığı ek zaman maliyeti, Gözetim denetimleri ücreti, Ekipman ayar ücretleri, Dokümantasyon sistemi sürdürme maliyetleri ve Çalışanların eğitimi ile ilgili maliyetler* dir.

Firmaların %73'ü ISO 9000 Kalite Yönetim Sertifikasından elde edilen faydanın, sertifikasyon maliyetinden, %8'i ise sertifikasyonun maliyetinin elde edilen faydadan fazla olduğunu ifade etmiş, %19'u ise bu konuda bir değerlendirme yapmamıştır. Firmaların %89'u sertifikasyona sahip olmaktan memnun olduğunu, %11'i ise bu konuda kararsız olduğunu belirtmiştir. Sertifikasyon kullanımından memnun olmayan firma bulunmamaktadır.

Firmaların % 78'i ISO 9000 Kalite Yönetim Sertifikasını 2000-2004 yılları arasında almışlardır. Sertifikalarını, 2000 yılı öncesinde ve 2004 yılı sonrasında alan firma sayısı oldukça azdır. 2000 yılı öncesinde sertifika alan firma sayısının az olmasının, firmaların o dönemde, ISO 9000 Kalite Yönetim Sistemi'ni henüz tanımamış olmalarından, ISO 9000 Kalite Yönetim Sertifikasının 2000 versiyonunu beklendiklerinden ya da ISO 9000 Kalite Yönetim Sistemi'nin hem yerel hem de uluslararası pazarda günümüzdeki kadar yayılmamış olmasından kaynaklandığı düşünülmektedir. 2004 yılı sonrasında sertifika alan firma sayısının az olmasının nedeninin ise, son dönemlerde ISO 9001, ISO 14001, OHSAS 18001, HACCP ISO 22000 gibi sistemlerinin tek çatı altında toplandığı ve gereklerin aynı anda karşılandığı Entegre Yönetim Sistemlerinin kullanımının tartışılmaya başlanmış olduğu düşünülmektedir.

Bu çalışmanın gerek literatür gerekse alan araştırması sonucunda elde edilen bulgulara dayalı olarak; Türk inşaat firmaların ISO 9000 Kalite Yönetim Sertifikasına sahip olmakla beklentilerine ulaştıkları ve sertifikasyondan memnun oldukları söylenebilir. Bu durum, inşaat sektöründe ISO 9000 Kalite Yönetim Sistemi'ne gelecekteki ilginin hızla artacağını da göstergesidir. Ancak yaşanan gelişmelere dayalı olarak ISO 9001, ISO 14001, OHSAS 18001, HACCP ISO 22000 gibi yönetim sistemlerinin gereklerin aynı anda karşılandığı, Entegre Yönetim Sistemlerinin uygulanmasının firmalara daha fazla fayda sağlayacağı, bunun için de gelecek çalışmalarda entegre edilen sistemlerin birbirlerine uyumunun, kullanımının getireceği avantaj ve dezavantajların ortaya konularak firmaların bu sistemlere olan eğilimlerinin belirlenmesinin gerekli olduğu söylenebilir.