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THE STUDY ON THE EFFECTS OF THE QUALITY MANAGEMENT SYSTEMS USED IN THE INFORMATION TECHNOLOGY UNITS/FIRMS IN TURKEY

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Abstract

It is considered several quality management systems (QMS) peculiar to the information technology (IT) to manage IT processes systematically. There are a lot of expected effects and benefits from these systems in the literature. In this study, these expected benefits were grouped according to literature research as increasing in product and service quality, increasing in the satisfaction and loyalty of customers, increasing in project management performance, increasing in the team management and motivation, financial benefits, managerial benefits. After that, it was tried to figure out whether or not the mentioned benefits are made by comparing the firms which were classified into three groups. First group firms have quality management systems peculiar to the information technology. Second group firms use general purpose quality management systems, and last group firms don't apply any of these quality systems. As a result of surveys and analyses, such differences were observed in some expected effects.

Keywords: Information technology, quality management systems, expected effects

1. INTRODUCTION

One of the most significant problems in information technology sector in Turkey is process which is not managed well and the result of this is excessive cost and quality problems. Many project results unsuccessfully because they haven't got enough resources and managerial attention or sometimes results extra cost and less quality. In World it has been made up quality and process management models which are admitted globally. And then these models try to implement to solve

these problems. Especially, within the 1990's years, it is rised the value added of IT in companies which uses the IT and it is understood that special structure of information is needed some quality models and standarts. Within the 2000's years, anymore the developing process of making up models and standarts has been accelerating. So, quality management systems (QMS) in IT are emerged currently and became widespread gradually. At the same time, QMS in IT can show some differences according to sector and structure of firm. But, it is important to be a QMS in corporate level to use effectively.

When we look at the issue from the quality responsibilities about software, it is prepared an obligation by DPT (State Planning Organization) in 2007 to lead the firms in public

sector which are in project setup level. According to the obligation, since 2007 if the estimated value of a IT project exceeds 5000000 TL(Turkish Liras), companies must have CMMI Level 2 or the other equivalent software quality certification, like SPICE Level 3 and AQAP 160 (DPT, 2007). At the same time, BDDK (Banking Regulation and Supervision Agency) have begun to control the information systems of banks according to COBIT criteria since 2010 (BDDK, 13.01.2010). So, the importance of using QMS in IT is increasing gradually because of obligations of government and increasing competition. Our purposes of this study are which QMS's can be used in IT and to see the situation of Turkish IT sector and other some sectors which in used IT intensively about QMS in IT. And also to see what are the benefits of using these QMSs to the firms. There are some questions to understand the purpose of the study. Did Quality Management Systems reach their goals in every firm which are different sectors? Or what percentage of the expectancies of firms meets? The ratio of unsuccess is 70% according to Gartner Analysis for CMMI which is one of these QMSs (Matthew, 2002). Similar to, according to the result of a study which compares the level of quality of firms which reach the CMMI level 5 and have the same business process, it is explained that although these firms have the same business level and CMMI level 5, it can not be said that these companies will reach the same excellent quality level and CMMI don't guarantee this condition (Honda, 2009). So in this context, it can be asked the success of QMS which used in IT and whether or not meet the expectancies of firms. In particular, we aim to research Turkish firms can whether or not reach the benefits which firms from outside of Turkey apply these systems reached and people who pioneered and applied these systems expect benefits from these systems. At the same time, there are not any studies on benefits of these special quality systems in Turkey. We aim to fill the research gap and to make a knowledge background for the firms which apply or want to apply these quality systems.

2. LITERATURE REVIEW

When designing IT processes, several standards, guidelines, and best practices may be consulted depending on the environment e.g. COBIT, ITIL, ISO/IEC 20,000(Z'vanut, 2010). According to the information is obtained as a result of literature research, IT processes, several standards, guidelines, and best practices can be considered as a quality management systems used

in the field of information technologies shows the below. Although there are some studies examine one or several of these systems, using all of these QMS has not been a study yet. A maximum field of application of these ones, CMMI, COBIT, ITIL and ISO 20000 are seen as. At the same time, application areas of AQAP-160 and TICKIT are less than others, while it is seemed to be a tendency to decrease in the use of ISO 15504. In addition to these mentioned systems there are ISO 27000- Information security management systems, ISO 15288- Life Cycle Management — System Life Cycle Processes, ISO 12207- Software Life Cycle Processes, ISO 9126- international standard for the evaluation of software, and AQAP 2000, 2160, 110 120,150- for military software application.

But, these systems are not used in our study because these systems are made up for some special field of information technology. Now, it will be explained QMS used in our study briefly.

1.1 CMMI

CMMI (Capability Maturity Model Integration) was developed by the Software Engineering Institute(SEI) at Carnegie Mellon University as a response to the needs of the US Defense Department for better techniques for the selection of contractors (Rout, Fusani, El Emam, Goldenson, & Jung, 2007). CMMI aims to improve the usability of maturity models by integrating many different models into one framework. CMMI has got five maturity level (Kalaycı, 2008). CMMI is a process improvement approach that provides organizations with the essential elements of effective processes that ultimately improve their performance (Carnegie Mellon University, 20.03.2010). CMMI can be used to guide process improvement across a project, a division, or an entire organization. CMMI models provide guidance for developing or improving processes that meet the business goals of an organization. A CMMI model may also be used as a framework for appraising the process maturity of the organization (SEI- Technical Report. Draft V1.0, 2006).

2.2 COBIT

COBIT (Control Objectives for Information and related Technology) is an IT governance framework and supporting toolset that allows managers to bridge the gap between control requirements, technical issues and business risks. The COBIT framework provides a reference process model and common language for everyone in an enterprise to view and manage IT activities (IT Governance Institute , 2007). At the same

time, COBIT emphasizes regulatory compliance, helps organizations to increase the value attained from IT, enables alignment and simplifies implementation of the COBIT framework. The first framework document was published by ISACA (Information Systems Audit and Control Association) in 1996. COBIT have emerged before for audit of information technologies. At present, audit, control, management, and ultimately covers the concepts of governance (COBIT Official Web Site, 22.03.2010). COBIT consists of 34 IT processes and is a way for an organization to use in its attempts to "balance risk and control in a cost-effective manner" (Pederiva, 2003).

2.3 ITIL

ITIL (IT Infrastructure Library) provides a framework of Best Practice guidance for IT Service Management and since its creation, ITIL has grown to become the most widely accepted approach to IT Service Management in the world. It is a collection of defined and published best practice processes for IT Service Management (ITSM), developed in 1989 by the British government in their Central Computer Telecommunications Agency (now the Office of Government Commerce), in an effort to improve the management and efficiency of IT. (McNaughton, Ray, & Lewis, 2010). It provides a framework for the governance of IT, the 'service wrap', and focuses on the continual measurement and improvement of the quality of IT service delivered, from both a business and a customer perspective. This focus is a major factor in ITIL's worldwide success and has contributed to its prolific usage and to the key benefits obtained by those organizations deploying the techniques and processes throughout their organizations (ITIL Official Web Site, 12.03.2010).

2.4 ISO/IEC 20000

ISO/IEC 20000 is the international standard for IT Service management. In 2000, the world's first standard for ITSM, BS15000, was published. In 2005, ISO/IEC 20000 was first published, based almost entirely on BS15000. This standard comprises two documents, ISO/IEC 20000 – 1 and ISO/IEC 20000 – 2 (Menken & Blokdijk, 2008). It describes an integrated set of management processes for the effective delivery of services to the business and its customers. ISO 20000-1 is the 'Specification for Service Management, and it is this which is certifiable against. ISO 20000-2 is the ' Code of practice for Service Management', and describes best practices,

and the requirements of Part 1 (ISO 20000 Official Web Site, 23.03.2010)

2.5 SPICE (ISO/IEC 15504)

ISO/IEC 15504, also known as SPICE (Software Process Improvement and Capability Determination), is a "framework for the assessment of processes" developed by the Joint Technical Subcommittee between ISO (International Organization for Standardization) and IEC (International Electrotechnical Commission). This International Standard provides a model for the assessment of software processes (SPICE-a, 15.10.2010). This model can be used by organizations describing processes that an organization may perform to acquire, supply, develop, operate, evolve and support software and the generic practices that characterize the capability of those processes (DPT-a, 2009). The model categorizes processes into five process categories (SPICE-b, 15.10.2010) and there are six capability levels that can be rated, from Level 1 to Level 5. A Level 0 is also defined, but this is not rated directly in the model (El Emam & Birk, 2000).

2.6 AQAP-160

AQAP stands for Allied Quality Assurance Publication and is NATO's standardization document that describes the demands regarding military supplies system. NATO has published a document called the AQAP-160 NATO Quality Requirements for Software Throughout the Life Cycle. This publication provides for a common framework for software life cycle processes based upon ISO 12207, Software Life Cycle Processes. AQAP-160 continues to utilize ISO9001 (1994/2000), Quality Standards and incorporates ISO 12207. Final edition is published AQAP-160 NATO Integrated Quality Requirements for Software Throughout the Life Cycle in 2001. This publication contains the requirements for a software quality (management) system (AQAP 160, 2001). This standart is given Ministry of National Defense in Turkey and is admitted equal to CMMI Level 2-3, SPICE Level 3 (DPT-a, 2009).

2.7 TICKIT

TickIT is about improving the quality of software and its application. Almost every business depends on the correct manipulation of information by computer systems. Software is the key to the successful operation of these systems - poor quality software can severely affect

efficiency and competitiveness. TickIT guides the developer to achieve this objective within the framework of ISO 9001 (TICKIT Official Web Site , 23.03.2010).

2.8 The Situation of QMS used in IT in Turkey

Experiment, speciality, financial power, dimension and quality become important to compete in international market in IT sector. When evaluated in terms of experience, it has been seen that IT firms in Turkey haven't got enough experience in this situation. One of the important conditions of competing in international markets is to support the firm's competencies with certification which is known and accepted by these markets. Some information about the certifications that IT firms in Turkey have is given in the Fig.1 (DPT, 2007).

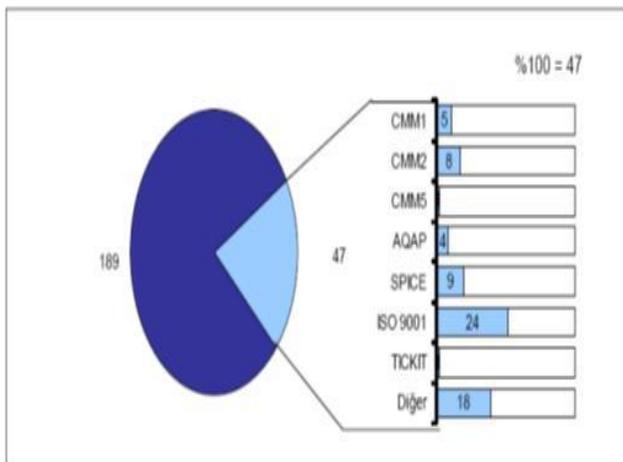


Fig. 1. Software development certifications of domestic firms

Especially, in recent years the firms have understood clearly the importance of these certifications. Government's supports and the

obligations of some Regulatory Committees have provided some increase in uses of QMS. With the results of reviewing the literature after QMS used in IT area are determined, in implementation phase, we have compared the firms which have QMS to the firms which have no QMS to determine what the effects of using the QMS are. These effects have been determined by former studies. We want to see which effects can be determined in IT firms which have QMS. Firstly, with the results of reviewing the literature, the expected effects from these systems have been determined and then they have been grouped with the opinions of specialists.

2.9 Expected Effects

The special QMS's in IT provide some benefits according to many authors. There is a popular study on 35 firms by Carnegie Mellon University about providing benefits to the firms. and most software process improvement research { (El Emam & Birk, 2000); (Sun, 2008); (Rout, Fusani, El Emam, Goldenson, & Jung, 2007); (Ashrafi, 2003); (Huang & Han, 2006); (Rothenberger, Kao, & Van Wassenhove, 2010); (Jiang, Klei, Hwang, Huang, & Hung, 2004); (Subramanian, Jiang, & Klein, 2007)} focuses on Technical Reports of Software Engineering Institute(SEI). In this study, such subjects are discussed as: firm's expectations: reducing cost and time, increasing quality, productivity and ROI as tangible benefits; and increasing quality of work life, improving communication in organization, becoming organizational culture as intangible benefits and the other benefits. At the same time, according to (Malheiros, Paim, & Mendon, 2009), these benefits are: improved project budget and schedule prediction, software product cycle enhancement, productivity growth, final quality improvement, in terms of

Table 1
Expected effects and References

Expecting Effects	References
B1 Increasing in product and service quality	1,2,3,5,8,9,11,12,13,14,15,17,18
B2 Increasing in the satisfaction and loyalty of customers	1,3,9,11,12
B3 Increasing in project performance	16,17
Improving project schedule	1,3,12
Increasing in productivity	1,2,3,6,8,9,12,15
B4 Increasing in the team management and motivation	6,9,11,12
B5 Financial Benefits	
Decreasing in Cost	1,2,4,12,18
Increasing in ROI	1,2,3,6,7
Increasing in Revenue	3,7
B6 Managerial Benefits	
Providing proactive approach	4,7,12
Providing authority-responsibility balance	2,4,7
Improving inter-departmental relations	4,7,11,18
Providing process management approach	1,2,5,11
Improving risk management approach	2,4,7,9,11,18
Making standartization	4,9,10,11,15,18
Providing continuous improvement approach	4,7,10,11

- 1 (SEI- Technical Report. Draft V1.0, 2006)
- 2 (COBIT Official Web Site, 22.03.2010)
- 3 (Ferreira, et al., 2008)
- 4 (ISO 20000 Official Web Site, 23.03.2010)
- 5 (Staples & Niazi, 2008)
- 6 (Malheiros, Paim, & Mendon, 2009)
- 7 (Üvey, 2009)
- 8 (Honda, 2009)
- 9 (ITIL Official Web Site, 12.03.2010)
- 10 (SPICE Official Web Site , 23.03.2010)
- 11 (TICKIT Official Web Site , 23.03.2010)
- 12 (Goldenson & Herbsleb, 1995)
- 13 (Ashrafi, 2003)
- 14 (Huang & Han, 2006)
(Rothenberger, Kao, & Van Wassenhove, 2010)
- 15 (Jiang, Klei, Hwang, Huang, & Hung, 2004)
- 16 (Subramanian, Jiang, & Klein, 2007)
- 17 (Menken & Blokdijk, 2008)

Number of defects found, increase in team motivation, and ROI can be calculated using a variety of costs and aggregated benefits. And also, (Honda, 2009) considering that it is already known that CMMI improves product quality, he studied, whether or not every firm which has CMMI are at the same quality level. Beside these articles, thanks to the official sites of these systems, the benefits which will be provided when these systems are employed are determined. After that, we determined 6 basic effects with the help of specialists. Table 1 shows these effects and their codes as well as their references.

The relationship between information technology-specific quality management systems and their expected effects on the companies is shown in Fig. 2. It is expected that the firms which have these systems reach these effects. Hypotheses explaining this relationship have been used.

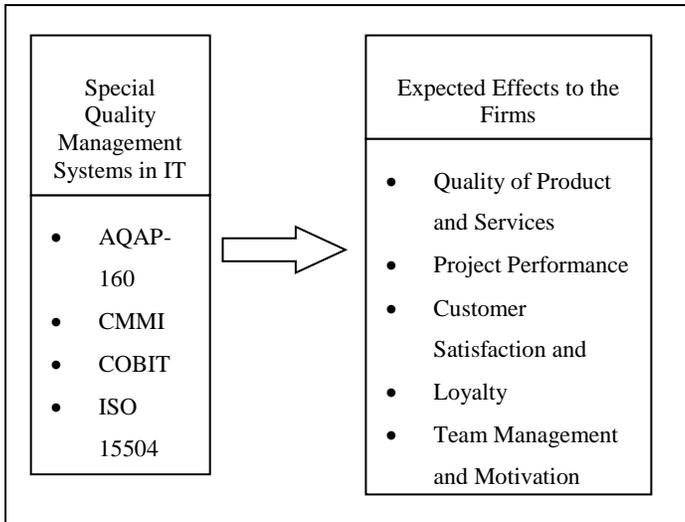


Fig. 2. The framework of the research

3. RESEARCH DESIGN AND METHODOLOGY

3.1 Survey Design

Survey study was conducted to examine the validity of the framework. For this purpose, a questionnaire was designed in order to collect data to investigate all questions in the survey. The questionnaire design was divided into two main sections. The first section aimed to obtain basic information about companies and their information of QMS. The second section for the questions in the second, five-point Likert scale

was used in order to evaluate the questions. The questionnaire was verified by six experienced advisers from both industry and academic field in order to validity the content. We modified and improved the questionnaire by revision and evaluation with the advisers. In this way, it is aimed to purify the survey items and rectified any potential deficiency.

Data Collection

The web base survey was prepared to obtain data for the study invitation requests were sent to participants via e-mail. In the invitation e-mail, the objective of the research and survey study was explained. To increase the return rate, the participants were informed that they would receive the results of the study if they returned the completed questionnaire. Questionnaire was active for six weeks. And then, these firms were called by telephone to response the survey. These firms which are in the study of the first 500 IT Firms in Turkey prepared each year by the Interpromedia Firm and regisreted large scale firms in Istanbul Chamber of Industry and in finance and logistics sector. The number of firms is close to 500. 94 respondents returned the completed questionnaire, yielding a response rate of 19%. After removing some responses due to data inconsistency and incompetence, the final valid sample for statistical testing was 93. The response rate can be considered acceptable in the light of the director-level target group. The targeted population was consisted of IT managers. These participant firms are divided into three groups. First group has at least one special QMS in IT that there are 35 firms in first group. Second group which use general purpose QMS has 19 firms. The third group which doesn't use any QMS has 40 firms. In Figure.3 there is distribution of the number of firms which have special QMS in IT according to every special QMS.

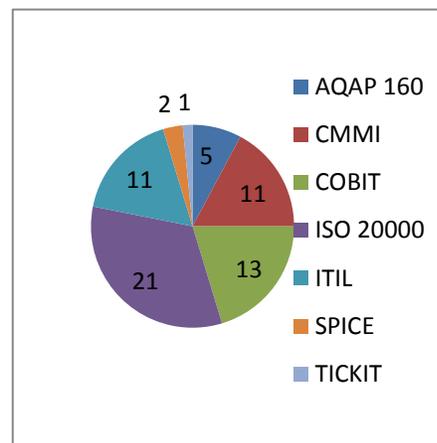


Fig.3. the distribution of QMS peculiar to IT

3.2 Hypothesis

It is determined six hypothesis in order to test the expected effects of QMS peculiar to IT. These are:

- H1. To Increase quality of product and service in firms which have QMS peculiar to IT
- H2. To Increase project performance in firms which have QMS peculiar to IT
- H3. To Increase financial benefits in firms which have QMS peculiar to IT
- H4. To Increase customer satisfaction and loyalty in firms which have QMS peculiar to IT
- H5. To Increase team management and motivation in firms which have QMS peculiar to IT
- H6. To Increase managerial benefits in firms which have QMS peculiar to IT

When we test the hypothesis whether or not the mentioned benefits are made by comparing the firms which use the QMS peculiar to the information technology in Turkey to the firms that use general purpose QMS like ISO 9001, and firms that don't use them. So, we will reach the result of whether or not there are any differences among these firm groups according to expected effects. So, our all hypothesis are in general form;

- H0: There aren't any differences among these firm groups according to expected effects
 - H1: There are differences among these firm groups according to expected effects
- In Fig. 4 it is showed the theoretical structure of obtaining hypothesis.

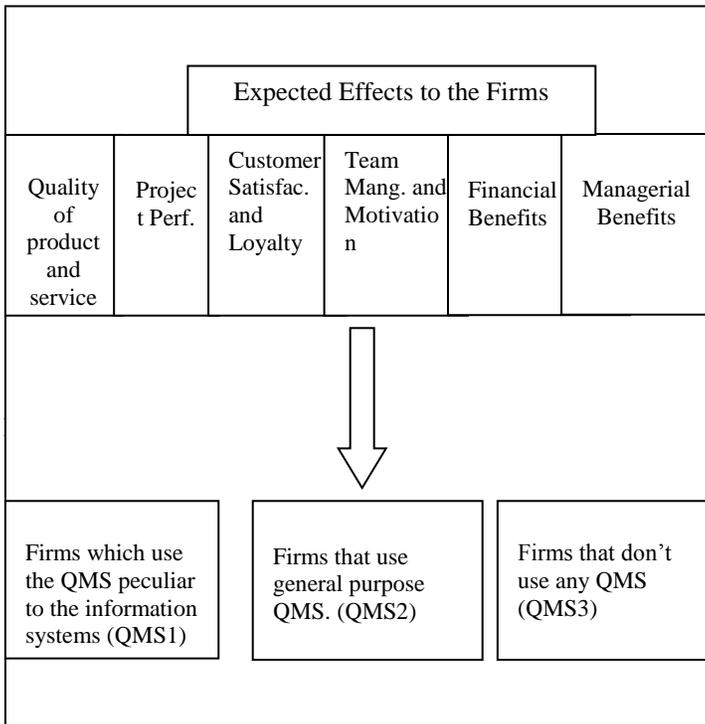


Fig. 4. Obtaining the hypothesis

4. ANALYSIS AND RESULTS

Firstly, it is made normality test to see the distribution of variables. All analyses were made by using SPSS. All variables have normal distribution in 95% reliability level. And then, for each factor, internal consistency was assured according to Cronbach's coefficient α since generally an α value of 60% is considered adequate for internal consistency (Hair, Anderson, Tatham, & Black, 2010). Cronbach's coefficient α values are given Table 2. It is showed that all variables are tested for reliability.

Table 2-
Cronbach's coefficient α
values

Factors	Cronbach α	N of Items
B1	0.626	3
B2	0.631	4
B5	0.649	5
B3, B4, B6	0.753	16

4.1 Component Analysis

In this section of the study, according to the result of this analysis there are parrelling between previous group and obtained group. Only the number of questions was reduced from 28 to 27 and 4 questions change place among factors after principle component analysis was applied. At the same time, it is changed the name of one factor from project performance into project management performance. The question of "We offer most cost-effective product/service compare to our competitors" is taken out to group financial benefits in one group. The result of principle component (PC) analysis is showed in Table 3.

4.2 Analysis of Variance

After principle component analysis, Analysis of variance (ANOVA) is employed in order to test the hypothesis for every factor. When hypothesis are set, as mentioned, the firms which have QMS peculiar to information technologies, the firms which uses other QMSs and the ones which do not use any QMS are compared to each other according to six effects and the hypotheses are tested.

- 1- To increase quality of product and service in firms which have QMS peculiar to IT

According to Levene testing, because of the value of p is $0.038 < 0.05$ in 95% reliability level, Anova testing can not be used. So, we can use Brown-Forsythe testing. When this testing was done because of the value of p is $0.024 < 0.05$ Ho hypothesis was rejected. So, there are differences among the groups according to increasing quality of product and service. To answer between which groups, the differences occur, we look at Tamhane testing. As a result, there are differences between QMS1 and QMS2 groups.

Table 3

The result of PC analysis

Factors

B1 Increasing in product and service quality

B2 Increasing in the satisfaction and loyalty of customers

B3 Increasing in project management performance

Improving project schedule

Increasing in productivity

Improving inter-departmental relations

B4 Increasing in the team management and motivation

B5 Financial Benefits

Decreasing in Cost

Increasing in ROI

Increasing in Revenue

B6 Managerial Benefits

Providing proactive approach

Providing authority-responsibility balance

Providing process management approach

Improving risk management approach

Making standartization

Providing continuous improvement approach

2- To increase customer loyalty and satisfaction in firms which have QMS peculiar to IT

According to Levene testing, because of the value of p is $0.610 > 0.05$ in 95% reliability level, Anova testing can be used. Because value of Anova p is $0.049 < 0.05$ Ho hypothesis was rejected. Thus, there are differences among the groups according to customer loyalty and satisfaction. To answer between which groups, the differences occur, we look at Scheffe testing. As a result, there are differences between QMS1 and QMS3 groups.

3- To increase project management performance in firms which have QMS peculiar to IT

According to Levene testing, because of the value of p is $0.495 > 0.05$ in 95% reliability

level, Anova testing can be used. Because value of Anova p is $0.531 > 0.05$ Ho hypothesis was not rejected. Hence, there are no differences among the groups according to project management performance.

4- To increase team management and motivation in firms which have QMS peculiar to IT.

According to Levene testing, because of the value of p is $0.664 > 0.05$ in 95% reliability level, Anova testing can be used. Because value of Anova p is $0.023 < 0.05$ Ho hypothesis was rejected. So, there are differences among the groups according to team management and motivation. To answer between which groups, the differences occur, we look at Scheffe testing. As a result, there are differences between QMS1 and QMS2 groups and also QMS1 and QMS3.

5- To increase financial benefits in firms which have QMS peculiar to IT.

According to Levene testing, because of the value of p is $0.523 > 0.05$ in 95% reliability level, Anova testing can be used. Because value of Anova p is $0.781 > 0.05$ Ho hypothesis was not rejected. Thus, there are no differences among the groups according to financial benefits.

Table 4

Significance values of tests

Hypothesis	Significance		
	of Levene Statistic	Significance of Brown-Forsythe	Sig. of F Test
H1	0.038	0.024	-
H2	0.61	-	0.049
H3	0.495	-	0.531
H4	0.664	-	0.023
H5	0.523	-	0.781
H6	0.925	-	0.050

6- To increase managerial benefits in firms which have QMS peculiar to IT.

According to Levene testing, because of the value of p is $0.925 > 0.05$ in 95% reliability level, Anova testing can be used. Because value of Anova p is $0.05 \leq 0.05$ Ho hypothesis was rejected. Therefore, there are differences among the groups according to managerial benefits. To answer between which groups, the differences occur, we look at Scheffe testing. As a result, there are differences between QMS2 and QMS3 groups. Significance values of tests are shown in Table 4.

At the same time, we want to check for differences in firm age and number of employees.

Thus responses return within three weeks of the first mailing were classified as early (n=36), while those received after three weeks were classified as late (n=65) (Wu, 2010). The ANOVA indicates no significance difference between these two groups in firma age ($p=0.47$) and number of employees ($p=0.33$).

5. CONCLUSION

In this study, we try to figure out whether or not the mentioned benefits are made by comparing the firms which use the quality management systems peculiar to the information systems in Turkey. The variables are evaluated by using normality, reliability and principal component analysis and a model is established. And then the hypothesis is examined by Anova tests. As a result, in terms of an increase in product and service quality, there are differences between the firms which use the quality management systems peculiar to the information systems and firms that use general purpose QMS. It is known that quality is not ignorable element in IT especially in the software based products. This result shows that quality management systems peculiar to the information systems provide this expected effect for Turkish firms. In terms of an increase in customer satisfaction and loyalty, it is found that differences between the firms which use the QMS peculiar to the information systems and firms that don't use any QMS. This result agrees with the view of QMS to the customer and request to make him a loyal customer and moreover the target that regards him as a stakeholder and acting according to it. In terms of an increase in project management performance, there is not any difference observed in the performance of project management among firms. This shows that QMS peculiar to the information systems haven't reached to the expected level for these systems in terms of project management in Turkey. In a similar way, there is the same situation about financial benefits. Although having these systems provides some benefits, firms do not have enough competencies to convert non-financial benefits to financial benefits. In terms of an increase in team management and motivation, having differences among the firms which use the QMS peculiar to IT and firms that use general purpose QMS and firms that don't use any QMS means that these systems provide team work, good relationship among team members and high motivation for them. Finally, when we look at the effects of QMS on managerial benefits, there are

differences between firms that use general purpose QMS and firms that don't use any QMS. This shows that firms that use general purpose QMS have better management philosophy than the firms that don't use any QMS. This result is exciting for us, because, managerial differences are not significant between the firms which use the QMS peculiar to IT and firms that don't use any QMS. Furthermore, according to the answers of survey, we can say that SPICE and TICKIT systems are used less than the others. Also, while ISO 20000 has become widespread in IT firms, COBIT has been used in banks especially.

6. RESEARCH LIMITATION AND FURTHER STUDY

In this study we can not compare quality management systems peculiar to the information systems in terms of expected effects. Because, there is not enough number of firms which use the QMS peculiar to IT and some firms are using these systems together. If it is reached enough number, this analysis can be made. Similarly, it can be made a comparison within themselves to levels of CMMI and COBIT. At the same time, it can compare the firms which have ISO 20000, firms which have ISO 9000 and firms which have not any standarts to see ISO reach whether or not the target and expectancies of creating QMS peculiar to IT (ISO 20000). Finally, this study is limited in that the analysis is based on perceptual data. This perceptual approach creates difficulties for managers of specific businesses in applying the research results to practical problems involving specific businesses (Wu, 2010). It can be used financial report of firms to see financial benefits instead of perceptual questions notwithstanding Turkish firms are conservative about giving these information.

Effects and Questions

Increasing in product and service

We are satisfied with our service and product quality
Errors are largely realized and corrected in internal tests
We offer better quality product/service compare to our competitors

Increasing in the satisfaction and loyalty of customers

There are coming complaints from our customer very often
Customer complaints are solved effectively.

We are ready to meet customer needs and satisfy customer expectations in the future
We are in continuous communication with our customers and we always take feedback from our customers

Increasing in project management performance

We estimate the project cost and schedule often takes place outside
We contribute to harmony between departmants with IT projects performed
There are coming complaints from team members
Our projects often take longer time than we expected
It can be often not possible to reach our project goals with the available resources

Increasing in the team management and motivation

We promote and encourage our employees about team work
I think this problem must be foreseen when I faced with any problems
We are pleased with cooperation and harmony between team leaders and members

Financial Benefits

We are satisfied with our service and product cost
We are very good in our ROI(Return on Investment) compare to our competitors
We can not provide any increase in our ROI(Return on Investment)
We think that we have good enough income from our products and our services

Managerial Benefits

Problems are tried to be prevented before they occur
Although it is given a lot of responsibilities, it is not given enough authority to fulfill these responsibilities.
We always create project schedule for our projects
We work process-based when we perform the projects
We analyze risks which can be occured before project planning
We can try to prevent risks which can be occured
All our processes and services are made within the framework of specific standards
All our processes are continuously improved

organizations. *Software Quality Professional*, 11, 4.

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