The effect of quality management processes (continuous improvement) on knowledge creation: A case study in telecommunication company of Hormozgan

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Abstract

Today, the managers of the organizations considered quality management due to the intense competitive pressures and the attempt for its sustainability. Based on various studies, it was concluded that establishment of good quality management in the organizations leads into the improvement of organization performance and achieving competitive advantage for the organization. Most of the activities done to improve the quality in organization require knowledge creation in the organization. A study was done regarding the effect of quality management processes on knowledge creation in Telecommunication Company of Hormozgan province. The present study evaluated the condition of quality management system processes (measuring customer satisfaction, dealing with the complaints of the customer, internal audit, management review, process monitoring/ product and corrective actions) of the organization regarding knowledge creation. The present study was descriptive-survey design from field branch. The study population was auditors and experts of quality management system. The calculated sample was 30 people in the company. The measuring instrument of the present study was a researcher-made questionnaire with 48 close questions. The reliability was calculated by Cronbach's alpha as 0.827. Finally, the results of the study emphasized on the fact that: processes (measuring customer satisfaction, dealing with the customer complaint, management review, corrective actions) in the organization led into the knowledge creation and share and improving the performance at lower average. The internal audit processes and process monitoring/ product in the organization led into the knowledge creation and share and improving the above average performance (desirable). The positive and negative factors in this case (6 cases) were analyzed and finally to improve the organization performance and increasing organizational knowledge, some solutions were presented.

Keywords: Continuous improvement, Knowledge management, Quality management.

Introduction

Most of the theorists and researchers agreed that if the quality management processes are followed in the organization, it leads into the improvement of organization performance (Adrian, Kevin, Roger, Schroeder, 2006) increasing productivity and profitability (Amabile, 1996). and more satisfaction of the customers (Anderson, Rungtusanatham &Schroeder, 1994). According to(Beer, 2003). It can be said that quality management processes effectively increased the operating efficiency of the organization, declined the costs and improved the productivity level in the organization(Benner, M. J. & Tushman, 2003). By a method called "Meta analysis" it was concluded that using quality management processes in the organization leads into the improvement of organizational performance(Afrazeh, Nezafati, 2007). There are a few researches relating the knowledge and quality management to each other as Pierce *et al.* (2006); Melkass (2007); Bryar (2004) in their studies referred to this relation. The paper "Integrating quality management practices with knowledge creation processes By

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Kevin Linderman et al. presented a basis to understand the relation between quality management and knowledge creation by Nonaka knowledge creation theory (Afrazeh, 2010).

Review of literature

The inclination to knowledge and learning for human being caused that even in the early centuries, he doesn't give up learning useful things but we observed the increasing significance of the knowledge and learning in social systems. Tom Stewart (1994) in a paper in fortune journal told the companies to give importance to what they know than what they have(Boiral, 2003). The study of the theoretical relation between quality and knowledge requires a clear definition of the concept of "knowledge". To define knowledge, we should distinguish between data concepts, information and knowledge. Knowledge is beyond the data and information (Adrian, Kevin, Roger, Schroeder, 2006). The data is a set of facts, sizes and statistics as raw and dispersed. The information is the established and processed data but knowledge is the relevant, precise and functional information (Chakravarthy, McEvily , Doz & Rau, 2003). A common definition of knowledge is "correct confirmed belief" (Beer, 2003). improving the organization capacity for effective actions (Brown&Duguid, 2000). Knowledge is consisting of experiences, skills, ideas and attitudes of people in value creation field (Adrian, Kevin, Roger, Schroeder, 2006). In most of the academic studies, two terms knowledge and learning are used equal. This can lead into the mistake in understanding the relation between the quality and knowledge. There is no clear border between knowledge and learning, thus separating some concepts as learning, knowledge management and knowledge is difficult (Crockett & Reinhardt, 2003). To clarify the distinction between these terms, they are classified into the followings:" Organizational knowledge", "Knowledge management", "Organizational learning", and "Learner organization". The present study focused on knowledge management. Knowledge management has been considered as one of the most important management concepts by many researchers and experts (Deming, 1994) and its significance is increased considerably (Dervitsiotis, 2003). Various definitions are presented for knowledge management and two of them are as:

Knowledge management is a set of the processes in which the information in a society is guided continuously and increasingly (Detert, Schroeder& Mauriel, 2000).

From the point of view of Barkly and Mory, knowledge management is identification and determining the existing intellectual capital in an organization, creating new knowledge to continue the competitive advantage of the organization, providing the access to wide spectrum of information, sharing is the best performance by using technology and all above items are provided(DiMaggio, 1997). They stated that knowledge management increases the organizational capacity as establishing the various knowledge management processes in the organization creates synergy among the information resources of the managers, customers and staffs of various departments of the organization and it leads into the improvement of organizational performance. Attaining up to date, exact, relevant and rare information in all businesses are vital (Douglas & Judge,2001). Today, the knowledge that is not copied is considered as an instrument to attain competitive advantage .Peter Drakr believed that the only competitive source of the organizations in future is knowledge and the organizations should consider it specifically (DiMaggio, 1997). To do so, the organizations should attempt via developing a knowledge-based culture to achieve knowledge (Douglas & Judge,2001).

As knowledge is created by summarizing the data and information and information processing, the knowledge can get old again, by great amount of information as they get old, the knowledge gets unacceptable and inefficient. According to Ashil " A wise person is the one who knows useful things not great amount of information".

Different types of knowledge

There are two types of knowledge
A. Explicit knowledge
B. Tacit knowledge

Explicit knowledge: Knowledge that is codified and conveyed to others through dialog, demonstration, etc.

Tacit knowledge: Deeply personal experience, sixth sense, perceptions, insights, and know-how that are implied or indicated but not actually expressed. These two types of knowledge are converted as followings:

From tacit knowledge to tacit knowledge (socialization)

From explicit knowledge to tacit knowledge (Internalization)

From tacit knowledge to explicit knowledge (externalization)

From explicit knowledge to explicit knowledge (Combination)

For management of the knowledge, the managers can take two approaches:

1- Converting it to explicit knowledge via documents, processes and data bank, etc (that is not useful as full conversion of tacit knowledge to explicit knowledge is not possible.

2- Improving tacit knowledge via interaction and strong human relations, motivation and giving reward and knowledge sharing to disseminate knowledge all over the organization and restraining the knowledge restriction in the mind of a few people. This causes that in case of leaving the organization by knowledge worker, the organization is not deprived of their tacit and intellectual knowledge. In systematic knowledge, knowledge creation and its mechanisms are the input of knowledge management process and the degrees of its application and interaction between them is affected by the outputs of this process, learner-teacher and instructor organizations.

Knowledge creation

Here, a brief explanation of knowledge creation is presented. The fact is that no health organization can claim it has adequate knowledge and by understanding this aim almost all the successful organizations with interaction with the environment attempt to create knowledge. As in knowledge management we deal with the learning, in knowledge creation, unlearned issues are considered to achieve the competitive advantage coping with the current informant competitors.

Knowledge creation has two aspects:

1- Ontology
2- Epistemology

1- Ontology: Knowledge is created by people and the organizations can not create knowledge without people. The role of organizations is only the supportive role preparing for knowledge creation. Thus, the organizational knowledge creation should be considered as organizationally improved the created knowledge by people.

2- Epistemology: Pulani considered the importance of tacit knowledge in human knowledge as considerable. He said that human beings attain knowledge by active organization of his experiences as most of them are not in writing (or not documented form). Thus, the knowledge being demonstrated in the words and numbers is only the ice peak of knowledge. Pulani said that we can know more than what we can say.

Knowledge creation mechanisms
1- Attain knowledge
2- lease
3- committed resources
4- Fusion
5- Consistency
6- Networks
7- Experiences

Spiral of knowledge

Spiral of knowledge - the relation between knowledge creation and outputs of knowledge management system-converting tacit knowledge to explicit knowledge and using explicit knowledge is used to developed tacit knowledge among people. New knowledge starts with a person. A prominent researcher has an attitude directing him to new patent. The attitude of a middle manager about the market trend is a catalyst to introduce a new product. A worker after many years of experience starts innovation in a new process. In all the examples, the individual knowledge of the employees is converted to organizational knowledge that is valuable for a company as whole. Giving the individual knowledge to others is the main activity of the knowledge creation organizations. This is done continuously at all levels in the organization.

In, 1985, experts at the Matsushita Electric Company were working hard on a home bread-making machine. But they were having trouble getting the machine to knead dough correctly. Despite their efforts, the crust of the bread was overcooked while the inside was hardly cooked. After the failure of the researchers, Tanaka, software developer, proposed a solution. The Osaka International Hotel had a reputation for making the best bread in Osaka. Why not use it as a model? Tanaka trained with the hotel's head baker to study his kneading technique. She observed that the baker had a special way of stretching the dough. After a year of trial and error, working closely with the project's engineers, Tanaka came up with product specifications —including the addition of special ribs inside the machine —that successfully reproduced the baker's stretching technique and the quality of the bread she had learned to make at the hotel.

Tanaka innovation showed the movement of two different types of knowledge. The finish point of the movement is the explicit knowledge, the product

features for bread machine is explicit, formal and systematic knowledge and it is changed into a generalized scientific formula or a computer program.

But the start point of Tanaka innovation is another type of knowledge that is not described easily-Tacit knowledge- As the head baker of the hotel knew it. Tacit knowledge is completely personal and its formulation and exchanging it with others is difficult. In addition, tacit knowledge has cognitive dimensions. Some dimension as mental models of belief, perspectives as evident by us and we can not explain them easily.

The spiral of knowledge is as:

TACIT-TACIT: Sometimes, a person shares his tacit knowledge directly with another one. For example, Tanaka apprentices herself to the head baker and learns his tacit skills through observation. She is "socialized" into the craft. But socialization into the craft is limited than knowledge creation issue. It is true that the apprentice learns the skills of the master but neither master nor apprentice don't achieve the systematic attitude in their job and as their knowledge is not turned into explicit knowledge, it can not be used easily as a whole about an organization.

EXPLICIT-EXPLICIT: A person can combined some separated parts of explicit knowledge with each other and forms a new whole. For example, the auditor of a company, he collects various pieces of information in the organization and by combining them provides a financial report. This report is new knowledge being achieved of the information attained by various resources. But this combination doesn't develop the existing knowledge of the company really.

TACIT-EXPLICIT: When she is able to articulate the foundations of her tacit knowledge of bread making, she converts it into explicit knowledge, thus allowing it to be shared with her project-development team. Another example is the accountant of the company. Based on his tacit knowledge of many years experience, a new innovative approach to control the company budget is coined instead of formulating an ordinary financial program.

EXPLICIT-TACIT: Besides that explicit knowledge is used in the organization, the company employees internalize it gradually and use it to develop and change the frameworks of tacit knowledge. For example, auditing plan created another view about the financial control system of the organization. Other employees use this plan as innovatively and considered it a part of required tools for their activi-

ties. In a knowledge creation company, four mentioned items have dynamic interaction and it is a kind of spiral of knowledge.

Tanaka at first learnt the tacit secret from the head baker of the hotel, then he converted this code to explicit knowledge to exchange it with the research team members and other employees of Matsushita Electric Company. Then, the research team standardized this knowledge and registered in the guidance books and transferred the result to its products.

Finally, by the experiences attained of the production of new product, Tanaka and his research members improved their tacit knowledge. They found via discovery and observation that the product like bread machine can present high quality products. In other words, the machine should bake the bread with the high quality bread is baked by professional bakers.

Now, the terms of quality management system are defined:

Quality: A degree of fulfilling the regulations by a set of inherent features (ISO9000:2005)

Quality management: The coordinating activities to direct and control an organization about the quality

Continuous improvement: An iterative activity to increase the ability of fulfilling the requirements

The continuous improvement goal in a quality management system is increasing the satisfaction of the customers and other beneficiary parties. The actions to improve are as following:

a. The analysis of the existing situation to identify the acceptable fields

b. Determining the goals for improvement

c. Searching for possible solutions to achieve the goals

d. Assessment of the solutions and selecting the solutions

e. Establishing the selected solution

f. Measuring, confirmation, analysis of the results of establishment to determine the fulfillment of the goals

g. recognizing the changes

The results are reviewed as necessary to determine more opportunities for improvement. Thus, improvement is considered a continuous activity. The feedbacks of the customers and other beneficiary parties, auditions and review of quality management system can be used to identify the improvement opportunities. Comprehensive quality management is a set of systematic activities that the

organization is changed to achieve to an effective organization in fulfilling their top goals and presenting the good quality product or service as it can meet the satisfaction of the customers at appropriate time or good price. The evaluation of a performance as a part of the main factor of performance management system is an effective tool for systematic, comprehensive review of the activities and the results of the performance of an organization(Edmondson, 1999). Quality management is a process in which all the organizations do it to improve their performance, they can do it as systematic or rapidly, specific(Ericsson&Hastie, 1994)The evaluation of the performance is the process giving the organizations the opportunity of identification of the problems and correct action about them before they are not controlled (Evans.& Lindsay, 1999).

Improving quality is an activity based on learning and knowledge emphasizing on learning (Gibbons, 2000) and knowledge creation (Evans. & Lindsay, 1999). Learning and knowledge creation depend upon the management method of perception processes of employees in improving quality.

Comprehensive quality and continuous improvement are raised as examples not only producing explicit knowledge but also producing tacit knowledge (Grant, 1996).

The tacit knowledge is arising from the fact that the knowing of any person is more than his abilities expressing them. Tacit knowledge depends to a person himself as these factors play important role in producing tacit knowledge. Due to the difference of individual qualities of the employee, tacit knowledge can be presented as a special model for the people of the organization. This model is knowledge framework for easy understanding of the organizational issues in cased of the lack of adequate information(Hahn, Hoerl.& Zinkgraf, 1999). Tacit knowledge based on individual model focused on the probability of doing new actions.

From quality point, the knowledge is used as the guidance, Deming fundamental knowledge(Hargadon& Fanelli,2002). is an example of the set of guidance principle. Explicit knowledge has functional features due to operating focus on the processes. The operating knowledge in quality due to the need to the measurement processes, analysis, improvement and control is explicit as six sigma project(Harry& Schroeder, 2000).In addition, the application of the quality measures (e.g. Parto charts, statistical control of process, flowcharts) actualizes the knowledge and makes the knowledge

explicit. Like the explicit knowledge related to the ability of improving the products and processes in the organization.

According to Deming, learning in quality is focused on reduction of variance. In reduction of the variance, many quality techniques such as process management, processes drawing, improvement of the processes and consistency with the improved processes are used and these techniques emphasized on efficiency and increasing innovation (Kaynak, 2003).

The comprehensive quality plans as TQM, ISO9000 and six sigma emphasize on measurement techniques and methods and improving the effective organizational processes on organizational performance (Kaynak, 2003).

The new researches associated knowledge and quality management with each other. In the first researches, "analytic models" were used to perceive the relation between quality and learning. Fine applied an analytical model and found that by the increase of quality level in the organization during a definite time period, learning and knowledge creation were increased. Other researchers evaluated various engineering, the relation between quality and knowledge. For example, Sitkin et al. (1994) applied such methods (Kueng, 2000). In a study "The quality of data, information and knowledge in prospective processes" considered the relation between quality management and knowledge. They believed that for any prospective processes, the useful and applied data were required. Thus, the organizations can improve their quality of their strategic knowledge and information quality and by establishing the quality management processes. Knowledge creation theory Lapre & Van Wassenhove (2001) considered the relation between knowledge and quality and it is studied as field in Telecommunication Company.

Problem solving method

Different types of data collection methods
- Using the existing files and documents
- observation
- interview
- Questionnaire

To measure the responses presented by the respondents, 5-point Likert scale was used ranging very much to very little. Generally, the scales are used by evaluation of the attitudes, judgment, and beliefs and other attributes that are not being measured.

This questionnaire was based on 6 processes of quality management system (measuring customer satisfaction, dealing with the customer complaints, internal audit, process monitoring/product, management review, corrective actions). IN each process, the first question of knowledge creation and the second question are dedicated to improving the organization performance in the related process and 6 next questions are the reasons that are completed after the analysis from the respondents and the results estimation leads into the responding of the reason of the existing knowledge condition in the organization.

Table 1. Questionnaire structure

Process name	Questions
Measuring customer satisfaction	1 to 8
Dealing with the complaint	9 to 16
Internal audit	17 to 24
Process monitoring/product	25 to 32
Management review	33 to 40
Corrective actions	41 to 48

Research questions

Main questions

1- Do you learn new things in the process of measuring customer satisfaction (survey)?

2- Based on the results of measuring customer satisfaction, is there any change in improvement in the activities of the company?

The effective factors in the results extracted of the main questions in six questions form:

1- Is there any negligence in correct performance of the existing method in the organization?

2- How is the scientific level of the employees of the organization regarding the performance of the process?

3- Is the existing method applied for the organization (being designed in accordance with the organization)?

4- Is there any motivation to present the new ideas among the employees of the organization?

5- Do the employees of the organization consider improvement their duty and they are inclined to analyze the issues?

6- Is there any need to new method (based on the organization conditions)?

For the next processes, the same questions are asked.

Data analysis

In data analysis, the required study tests as t-test and other tests were used. For data analysis, SPSS 19 was applied.

Organization introduction

Partnership Telecommunication Company of Hormozgan presented the communicative and tele-communication services as value added and data form of local, financial and international and leasing the lines and the classifications are as:

1- Fixed telephone communication

2- Mobile communication

3- Data communication

By advance technology, based on the recommendations of International Telecommunication Union (ITU) in Hormozgan including Bandarabas and 14 affiliated towns (Rudan, Minab, Hajiabad, Khamir,etc) to attain customer satisfaction and development of the communications of strategic policies were the bases of the company plans.

1- Top management of the organization, continuous improvement of the systems and the methods were the necessary requirements of improving the services quality and it was fulfilled based on the participation of all the structures of the organization.

2- Human resources are the main capital of the organization. The empowerment of the employees in all job classes to improve the efficiency, effectiveness and improving the organization performance to attract the satisfaction of the customers.

3- Top management of the organization is determined to use the up-to-date technology to increase, speed, accuracy and easy presentation of the services to the customers.

4- Considering the economical principle of the activities by using private empowerment and consulting services.

Continuous improvement

The organization should continuously improve the effectiveness of quality management system via using quality policy, quality goals, audit results, data analysis, corrective actions and improvement management review.

The quality researchers considered various dimensions for quality management. Two views are considered: (Adrian, Kevin, Roger & Schroeder, 2006). Quality management is defined as focus on customer, continuous improvement and work team in the organization while Sitkin et al. (1994) defined quality management as customer satisfaction, continuous improvement and systematic view. Al-

though both definitions are similar to each other, the definition of Sitkin et al. considered the concept of "systematic view" to the organization and it is consistent with the view of quality theorists including Deming. In the present study, the second definition is used. In the reference paper, the three dimensions (customer satisfaction, continuous improvement, systematic view) are relevant to knowledge creation theory of Nonaka and the descriptive principles and procedures of quality management are defined to relate knowledge and quality management with each other. Taking the strategy of continuous improvement in quality management system led into the reduction of the costs in the organization and by the transition of the organization from state to private and entering stock market, the organization aims are changed. Now, the organization is aimed to increase EPS (earnings per share) and to achieve this, the organization considered two methods: Increasing income, reduction of the costs and the increase of prices is not logical in the present market. Thus, the organization used the strategy of reducing the costs in accordance with the continuous improvement.

The present study in accordance with reference paper focused on the relation between continuous improvement and knowledge creation processes by field study in Telecommunication Company of Hormozgan and how management procedures of quality (continuous improvement) led into the knowledge creation in the organization and organization performance.

Identification of the existing condition

Continuous improvement in the organization can lead into the increase of "value" for the customers, reduction of the mistakes and problems, increasing productivity and improving the organizational performance [31]. Real improvement requires that the organization considers knowledge creation activities in the organization. This issue is possible via different procedures as following.

Continuous improvement process in Telecommunication Company of Hormozgan was monitored and measured by the following criteria of the table. To consider a ruler for the scale, the criteria are based on quantity.

The input of this process is internal audit, the results of monitoring, the data analysis, corrective actions/preventive and management review.

Table 2. The review of the identification of the existing condition.

No	Criteria	Acceptable limit	Measurement monitoring period
1	$100 \times \dfrac{Performed\ decisions}{The\ decisions\ taken\ in\ management\ review\ meeting}$	85 %	Ater each meeting of management review
2	Holding internal audit of the fields based on audit plan	At least 95 %	After each internal audit
3	$100 \times \dfrac{The\ number\ of\ performed\ corrective\ actions}{The\ total\ preventive\ or\ corrective\ actions}$	At least 75%	6 months

The output of continuous improvement is as:
• Taking decision to improve the effectiveness of the system and processes
• Quality improvement of the services
• Financing the resources (financial, humanistic, etc)

Continuous improvement (ascending improvement, ladder improvement) is a process or productivity improvement tool to create fixed growth or consistent and improvement in all parts of a process or processes. Continuous improvement guarantees the stability of the process and its improvement in future. When the aim is the organization growth and development, identification of all the processes and development of measurement analysis of each of the stages is necessary. Some tools of continuous improvement are including corrective actions analysis, preventive activities, internal audit and customer satisfaction. ISO management systems as quality management system or environmental management system use this tool to guarantee that the general purpose of the organization is acquired.

The methodology of continuous improvement

Lean production

Six Sigma

Kaizen

PDCA cycle

One of the most powerful ideas presented by Deming is continuous improvement cycle (PDCA). This cycle is consisting of four stages:

The first stage is planning to change anything you try be improved.

The second stage is doing the change at small scale.

The third stage is the observation and checking results

The fourth stage is act, decision making

Then, this cycle is iterated frequently. No one makes any change in the cycle negating it in the next cycle. This is just wasting time. When there is a change in planning, you wonder :" I believe this change makes it better. If it was not so, you learnt a great example of this failure.

The more the improvement of the procedure, they improved their knowledge in this procedure. Improvement of product and process requires more understanding and better theory.

Maybe this is not more than the application of scientific method in business, but improving the product and process is possible only in this way. Continuous improvement is recognized as the most effective way to improve the return and improving the quality in the companies. Continuous improvement refers to both gradual and innovative improvement in organizational performance. The improvements can lead into some results as increasing the value for the customers, reduction of the defects, increasing productivity, improved cycle of performance time period, security and morale.

The real progress need that the organizations perform the educational activities Kaynak, 2003). Mostly this is done by structure methods of improvement like PDCA cycle (Kueng, 2000). Normally, this process is started by formation of some teams to record knowledge and creativity of human resources (Lapre & Van Wassenhove, 2001).

Then, the team presented some ideas with the aim of progress and then tested his ideas by strong quality management tools and data analysis technique (Lapre& Van Wassenhove, 2001).

Finally, the teams by presenting the quality control mechanism to recognize the progresses actualized their solutions (Linderman, Schroeder, Zaheer & Choo, 2003). All the activities lead into the creation of new organizational knowledge.

To evaluate the condition of quality management system processes of the organization about knowledge creation, a questionnaire was provided and via the auditors and experts of quality management system, the questions were responded.

To define what is the position of continuous improvement procedures in terms of knowledge creation processes? and to define the relation of continuous improvement and knowledge creation in the organization.

Methodology

The introduction of study population

The population is all the real or assumed members to generalize the study findings to them. Or population is a group of people, objects or the events at least with one common feature or attribute. The study population is the main population by which the sample is obtained.

Sampling means the selection of some people, events and objects of one defined population as the representative of population. In other words, sampling is selection of a percent of a population as its representative.

The sampling in the present study was internal auditors and experts of quality management system with above BA degree in Hormozgan Telecommunication Company as 30 people.

For data analysis, the required stud y tests as t-test and other tests were used. For data analysis, SPSS 19 was used.

Table 3. The frequency of gender of the study population.

	Fre-quency	%	Valid per-centage	Accumulative percentage
Man	22	73.3	73.3	73.3
Woman	8	26.7	26.7	100.0
Sum	30	100.0	100.0	

Data analysis and Results

A. The analysis of measurement process of customer satisfaction:

Question 1: Do they learn new things in customer satisfaction measurement process (survey)?

H0:$\mu \geq 3$ The knowledge produced via customer satisfaction process is at above average level.

The knowledge produced via measurement process of customer satisfaction is at lower average level H0:μ≥3

Result

Sig.(2-tailed) = p - value = 0.00<0.05 = a

As p-value (customer satisfaction variable) is smaller than a, H0 is rejected.

Two values in column (95% Confidence Interval of the Difference) is not zero, this causes that H0 is rejected and it shows the evident difference.

Thus, knowledge creation in the organization via the measurement process of customer satisfaction is at lower average level.

Question 2: Based on the results of customer satisfaction measurement, is there any changes in the activities of the company to improve?

Improvement in company activities via measurement process of customer satisfaction is at above average level H0:μ≥3

Improvement in company activities via measurement process of customer satisfaction is at lower average level H0:μ<3

Result

Sig.(2-tailed) = p - value = 0.00<0.05 = a

As p-value (improvement by customer variable) is smaller than a, H0 is rejected.

Two values in column (95% Confidence Interval of the Difference) is not zero, this causes that H0 is rejected and it shows the evident difference.

Based on the results extracted of the questionnaire, both issues of knowledge creation and continuous improvement of the organization via this process are at lower average level that is not good for us. The factors of this defect in this process are as:

Table 4. Defect factors in the process.

No.	Reasons and factors	Abbreviation
1	Negligence in correct performance of the existing method.	Cause 1
2	Scientific level of the employees	Cause 2
3	The functional method	Cause 3
4	The motivation to present the new ideas	Cause 4
5	The inclination of the employee to analysis the issues	Cause 5
6	Needing a new method	Cause 6

Table 5. The descriptive analysis by software and calculation of the mean of the scores in each factor

	N	Minimum	Maximum	Mean	Std. Deviation	
	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic
cause 1 customer	30	1	4	2.20	.169	.925
cause 2 customer	30	1	3	1.57	.104	.568
cause 3 customer	30	4	5	4.43	.092	.504
cause 4 customer	30	1	4	2.23	.171	.935
cause 5 customer	30	1	4	2.40	.189	1.037
cause 6 customer	30	1	5	2.80	.222	1.215
Valid N (listwise)	30					

As it can be said, the second factor: The scientific level of the employee had the lowest score and it showed that the employees don't have the required conditions in terms of scientific experience and specialization.

B. The analysis of dealing with the customers' complaint

Question 9: Do they learn new things in dealing with customer complaints?

Learning in company via dealing with customer complaint is at above average level H0:μ≥3

Learning in company via dealing with customer complaint is at lower average level H0:μ<3

Result

Sig.(2-tailed) = p - value = 0.00<0.05 = a

H0 is rejected. This test showed that in Telecommunication Company, dealing with customer complaint doesn't lead into the knowledge creation and sharing at good level.

Question 10: Based on the results of dealing with the customer complaints, is there any change in the activities of the company to improve?

Improvement of the company activities via dealing with customer complaint is at above average level H0:μ≥3

Improvement of the company activities via cus-

tomer complaint is at lower average level H0:μ<3

Result

Sig.(2-tailed) = p - value = 0.00<0.05 = a

H0 is rejected. This test showed that in Telecommunication Company, dealing with customer complaint doesn't lead into the improvement of the performance of the activities at good level.

After the descriptive analysis by software and the calculation of the scores mean in each factor, the following results are achieved:

As it is said, the third factor: The applied nature of the existing method had the lowest score and it showed that dealing with customer complaint is not systematically applied for the organization and based on the above table, there is no need to a new method.

C.   The analysis of internal audit process

Question 17: Do you learn new things in internal audit process?

Learning in company via internal audit process is at above average level H0:μ≥3

Learning in company via internal audit process is at lower average level H0:μ<3

Result

Sig.(2-tailed) = p - value=.475>0.05 = a

H0 is supported. This test showed that in Telecommunication Company, internal audit process leads into the knowledge creation and sharing at good level.

Question 18: Based on the results of internal auditing process, is there any changes in the activities of the company for improvement?

Improvement of the company activities via internal auditing process is at above average level H0:μ≥3

Improvement of the company activities via internal auditing process is at lower average level H0:μ<3

Result

Sig.(2-tailed) = p - value=.056>0.05 =a

H0 is supported. This test showed that in Telecommunication Company, internal auditing process leads into the improvement of the performance of the activities at good level.

After the descriptive analysis by software and the calculation of the mean of the scores in each factor, the following results are followed (see table 6).

As it is observed, the first factor, the correct implementation of internal audit method in the organization caused that this process leads into knowledge creation and improvement of the activities in Telecommunication Company.

Table 6. The descriptive analysis by software and calculation of the mean scores in each factor.

	N	Minimum	Maximum	Mean	Std. Deviation
cause1 customer	30	2	5	3.67	.802
cause2 customer	30	1	4	1.93	.944
cause3 customer	30	1	3	1.73	.640
cause4 customer	30	1	4	2.07	.944
cause5 customer	30	1	4	2.27	1.015
cause6 customer	30	1	2	1.33	.479
Valid N (listwise)	30				

D.   The analysis of monitoring process/product

Question 25. Do you learn new things in monitoring process and products?

Learning in company via monitoring process and products is at above average level H0:μ≥3

Learning in company via monitoring process and products is at lower average level H0:μ<3

Result

Sig.(2-tailed) = p - value=0.05 = a

H0 is supported. This test showed that in Telecommunication Company, monitoring process and products leads into the knowledge creation and sharing at good level.

Question 26. Based on the results of the monitoring the processes and products, is there any change in the activities of the company for improvement?

Improvement of the company activities via monitoring the processes and products is at above average level H0:μ≥3

Improvement of the company activities via monitoring the processes and products is at lower average level H0:μ<3

Result

Sig.(2-tailed) = p - value=.214>0.05 = a

H0 is supported. This test showed that in Telecommunication Company, monitoring the processes and products leads into the improvement of the performance of the activities at good level.

After the descriptive analysis by software and the calculation of the mean of the scores in each factor, the following results are followed:

Table 7. The descriptive analysis by software and calculation of the mean scores in each factor

	N	Minimum	Maximum	Mean	Std. Deviation
cause 1 monitoring process &product	30	1	5	2.97	1.033
cause 2 monitoring process &product	30	2	3	2.40	.498
cause 3 monitoring process &product	30	3	5	4.33	.661
cause 4 monitoring process &product	30	1	4	2.07	.944
cause 5 monitoring process &product	30	1	4	2.37	.928
cause 6 monitoring process &product	30	4	5	4.47	.507
Valid N (listwise)	30				

It is proposed that to improve the process performance and achieving the high level in increasing organizational knowledge and improving the performance of the company, the current method is changed.

E. The analysis of management review process

Question 33. Do you learn new things in management review process?

Learning in company via management review process is at above average level H0:μ≥3

Learning in company via management review process is at lower average level H0:μ<3

Result

Sig.(2-tailed) = p - value = 0.00<0.05 = a

H0 is rejected. This test showed that in Telecommunication Company, management review process doesn't lead into the knowledge creation and sharing at good level.

Question 34: Based on the results of management review meeting, is there any change in the activities of the company?

Improvement of the company activities via management review process is at above average level H0:μ≥3

Improvement of the company activities via management review process is at lower average level H0:μ<3

Result

Sig.(2-tailed) = p - value = 0.00<0.05 = a

H0 is rejected. This test showed that in Telecommunication Company, management review process doesn't lead into the improvement of the performance of the activities at good level.

After the descriptive analysis by software and the calculation of the mean of the scores in each factor, the following results are followed:

Table 8. The descriptive analysis by software and calculation of the mean scores in each factor.

	N	Minimum	Maximum	Mean	Std. Deviation
cause 1 management reviews	30	1	5	2.77	1.040
cause 2 management reviews	30	1	5	2.70	.988
cause 3 management reviews	30	1	5	2.93	1.081
cause 4 management reviews	30	1	4	1.90	.803
cause 5 management reviews	30	1	4	2.20	.887
cause 6 management reviews	30	3	5	4.43	.568
Valid N (listwise)	30				

Based on the above table, for improvement the management review process and achieving knowledge creation are required. The above method was in accordance with the need of the organization.

F. The analysis of corrective actions process

Question 41: Do you learn new things in corrective actions process (arising from the results of audit and monitoring)?

Learning in company via corrective actions process is at above average level H0:μ≥3

Learning in company via corrective actions process is at lower average level H0:μ<3

Result

Sig.(2-tailed) = p - value = .026<0.05 = a

H0 is rejected. This test showed that in Telecommunication Company, corrective actions process doesn't lead into the knowledge creation and sharing at good level.

Question 42- Based on the results of corrective actions, is there any change in the activities of the company?

Improvement of the company activities via corrective actions process is at above average level H0:μ≥3

Improvement of the company activities via corrective actions process is at lower average level H0:μ<3

Result

Sig.(2-tailed) = p - value =.001<0.05 = a

H0 is rejected. This test showed that in Telecommunication Company, corrective actions process doesn't lead into the improvement of the performance of the activities at good level.

After the descriptive analysis by software and the calculation of the mean of the scores in each factor, the following results are followed:

Table 9. The descriptive analysis by software and calculation of the mean scores in each factor.

	N	Minimum	Maximum	Mean	Std. Deviation
cause 1 corrective actions	30	1	5	2.90	1.213
cause 2 corrective actions	30	1	5	2.67	1.213
cause 3 corrective actions	30	1	2	1.50	.509
cause 4 corrective actions	30	1	4	2.23	.898
cause 5 corrective actions	30	1	4	2.30	.837
cause 6 corrective actions	30	1	3	1.67	.606
Valid N (listwise)	30				

To reform the mentioned process and achieving the best results, the existing method is not applied and it should be changed.

Discussion and conclusion

After the analysis, the following results of questionnaire data were extracted:

1- Customer satisfaction measurement process: The organization in terms of achieving and sharing knowledge and improving the performance is at lower average that is not good.

• Actions to eliminate the problem: The knowledge of the employee about performing the process is weak and as the organizational was government, there was no sensitivity on measuring the customer satisfaction and by changing the organization structure and goals, it is required to use high education employees and to hold the training courses about the survey for the related people and use the experienced consultants besides the employees for customer data analysis.

2- Dealing with the customer complaints: The organization in terms of achieving and sharing knowledge and improving the performance is at lower average that is not good.

• Actions to eliminate the problem: As most of the complaints of financial issues (debt price, performance price, etc) are required and responding these complaints is evident. The nature of this process is simple and there is no need for change.

3- Internal audit process: The organization in terms of achieving and sharing knowledge and improving the performance is at above average that is good for us.

• Strengths: Correct implementation of internal audit by the auditors

• Recommendation for improving: Holding training courses for the auditors and experts to review the learnt items and visiting the similar successful organizations achieving positive results. During the audit, the training is given to the auditee and some pamphlets are provided by the quality guarantee department.

4- Process monitoring/product: The organization in terms of achieving and sharing knowledge and improving the performance is at above average that is good for us.

• Strengths: Functionality of the method

• Recommendation for improvement: It is recommended that based on the changes in the structure of the company after privatization, it is re-

quired to do some revisions on product features and its indices via holding some meetings with the experts. Formation of specialized teams as scientifically, the support of top management of the results of monitoring and applying them.

5- Management review process: The organization in terms of achieving and sharing knowledge and improving the performance is at above average that is not good for us.

• Actions to eliminate the problem: As the owners of the related process are top managers of the organization, it is required to have the required justification regarding his implementation and take decisions of management sessions in accordance with the organization goals and present to the people in the organization.

6- Corrective actions process: The organization in terms of achieving and sharing knowledge and improving the performance is at above average that is not good for us.

• Actions to eliminate the problem: It is required that the measures defined in the fields are finalized for confirmation and implementation in specialized committees and to take decision to finance the required resources for implementation and after the successful implementation and achieving the best result, the action is approved and is given to all the departments and this improves the organization and knowledge sharing.

It is required to focus on motivation discussions in the organization and a good reward system in accordance with the activities is provided and this increases the creativity and knowledge creation of the organization.

Table 10. The explanatory methods linking knowledge to quality management.

Knowledge quality	Socialization (tacit-tacit)	Externalization (tacit-explicit)	Combination (explicit-explicit)	Internalization (explicit-tacit)
Customer satisfaction	Complaints management system, audio mechanism, communication with the customer	The design of process/product, achieving the voice of the customer	Analysis of the customer information, ACSI SERVQUAL Index	Customer feedback, continuous supervision, customer satisfaction, customer stories
Continuous improvement	Teams, developing the groups, processes, teams behavior	Imagination of using intellectual tools of left hemisphere	Data analysis by intellectual tools of right hemisphere	Controlling the processes, continuous supervision and corrective action, study process control.
Systematic view	Multi-functional employees, Concurrent Engineering matrix organization, multi-functional teams	System view, holistic view, SIPOC	Balance score card, management dashboard process	Stability in aim

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