

**The Level of TQM Implementation in Industrial Companies Holding ISO 9001 Certification: Analytical  
Study at SDI Samarra in Iraq**

**Zeyad Mustafa Hamed Khawka**

**Dept. of Business Administration**

**Faculty of Economic and Administration**

**Al – Iraqi a University –Iraq**

**Abstract**

The concept of Total Quality Management (TQM) is based on a set of principles, tools and practices that can be applied by any organization in order to achieve the best possible performance, improve productivity, increase profits and domestic and global market share. This will set the bases towards globalization and penetrating the world markets which will only accept companies that featuring quality in their products and services. The awareness of implementing TQM in global business organizations has increased in recent years.

There is a misunderstanding and mixing between holding ISO9001 certificate and TQM which will be clarified throughout this paper. An analytical case study is carried out in SDI Samarra; a company specialized in medicines and medical supplies manufacturing in Samarra city of Iraq. SDI Samarra holds ISO 9001 certificate since 2008. A specially designed questionnaire survey covering six core principles will be distributed followed by statistical and factor analysis. The most important finding of the study is that the company lacks the implementation of TQM fundamentals while fulfilling ISO9001 requirements.

**Key Words:** TQM, ISO 9001, SDI Samarra, Quality Management, Factor Analysis.

**1. INTRODUCTION**

A number of people talking about the ISO as if they are talking about the total quality management, but there is a difference meaning. ISO is the brief of the International Standard of Organization, which is the organization that put an international standard for the quality management system to any productive or service institution. The institutions can not satisfy only with guaranty of the product quality, but its need a total quality and continuation according to the specifications needed from the organization. ISO 9001 found to work on consolidation the minimum limit of what the international quality management should be in any institution. So TQM is wider and bigger than ISO 9000. When the organization apply ISO9000

system, it is not necessary apply the total quality, it is possible that one department or one production line from many lines in the institution gets ISO9001 certificate, and that is depend on the management's philosophy for preparing the resources of the organization to apply the total quality for her superior and distinction. The institution in this case goes to race on improvement, development, innovation, and renewal in all their activities, and what apply of methods and techniques, and all outcomes introduce in form of goods and service.

## **2. Concept of TQM:**

Total Quality Management (TQM) is an enhancement to the traditional way of doing business. It is a proven technique to guarantee survival in world-class competition. Only by changing actions of management will be the culture and actions of an entire organization be transformed. TQM is for the most part common sense. Analyzing the three words, we have Total – Made up of the whole. Quality – Degree of excellence provided by a product or service. Management – Act, art or manner of handling, controlling, directing etc. TQM is the art of managing the whole to achieve excellence. (Suri & Sharma, 2013, 8-9).

## **3. Fundamentals of TQM:**

The total quality management on a number of pillars can be called the Fundamental can be summarized as follows:

### **First: TQM Requirements:**

The adoption of total quality management (TQM) and its implementation within organizations requires providing the requirements that make it easy interaction between the principles of total quality management and components leading to tangible positive results. Since the adoption of the administration of the philosophy of total quality management (TQM) and its application helps to raise the level of performance through successful implementation of TQM and philosophy (Hawi, Hassan: 2008, 6-7).

### **Second: TQM Tools:**

The quality is inseparable from the statistical tools used in the measure it and strengthening by documents. The goal of quality tools is to remove the sources of change that can be monitored in products and services and the adoption of most of total quality management tools on the basis of

statistical control of processes. The total quality tools not only help in determining what happens inside the process, but also it refers to the potential causes of occurrence ( Kortell : 2011,47 ) .

### **Third: The Emergence of Total Quality Management:**

Each of ( Al-Najjar and Jawad ) see that the meaning of quality has changed and evolved over time , in the beginning of the twentieth century, the quality management means checking products to ensure their conformity with the specifications. In the forties of the last century quality gained statistics characters were statistical sampling techniques used to evaluate the quality. In the sixties and thanks to the pioneers of quality, quality concept has taken a broader meaning as it came to be seen as a quality to include the entire organization and not just the production process. In the early seventies of the last century, the meaning of quality change in the business world dramatically. And in the early eighties the US industry lost market share to foreign competitors, Toyota company and Honda have become major players in the industry and market cars in America (Al-Najjar and Jawad: 2012, 243).

### **Fourth: TQM Domain:**

Knowing the things that get out of something helps to recognize well in the fact of this thing, and what comes out of the total quality are much, including logos , posters and banners and Administration speeches about Quality alone and temporary campaigns for quality. While the quality range is that the quality is to be the philosophy product of a regulatory push to continuous attention and improvement on the production of goods and provision of high quality services. Holding seminars and training programs on the total quality can be excellent sources of information and to increase motivation, but it cannot be the basic tool by which to develop and strengthen the management philosophy, and that these programs are among a bigger quality improvement strategy plan, and quality control programs depends on the quality of higher manufacturing and not on tougher inspection standards to get rid of defects (Kortell: 2011, 52).

### **Fifth: Total Quality Management Nature:**

(Athuri and Maqtari) sees that the quality is the product of the culture of the company, and must be driven out of it. Culture are the all ideas and values espoused by all members of the company, and the leaders and managers reflects these values and ideas throw their attitudes and behavior, and over time most of the staff adopt these trends and their behaviors become similar to the behavior of managers and leaders ( Kortell:2011,54 ) .

**Sixth: The Quality of Production and Services:**

The quality of the product measured according to the point of view of production through quality performance, which in turn depends on the quality design and quality conformance. Quality design concerned in strictly of the characteristics of the product or manufacturing specifications. Where quality of conformity care about the extent of product matching or factory to basic requirements.

**The Relationship between TQM & ISO System:**

The relationship between TQM and ISO lies in that the international standards series is the first step to achieve total quality management, when the organization follow the primary standards series as a system of quality will achieve the total quality objectives as a perfect case seeking industrial organizations to achieve, international standards came to work to unify the minimum limit of what should be the quality management system globally in any institution. (Qandil: 2008, 44).

**4. Related Work**

**1. AIDweik and others (2014):** Titled "**Total Quality Management Application in companies earned ISO9001 Certificate in Kalel Governorate**". The study aim is to know the total Quality Management Application in companies earned ISO 9001 certificate in Kalel Governorate. The company may earn ISO 9001 certificate as a start to follow up to apply total Quality Management Application philosophy. The research community was all the companies earned ISO9001 in Kalel Governorate (11 companies), choosing deliberate Sample from the community, the number then become (6) companies.

The results show that the company uses ISO9001standered help in applying the eight basic factors in quality management (designing product or service, operations management, administration relationship with suppliers, quality reports, training, empowering employees, the role of quality office, and the role of leadership), which help to improve quality performance, even in companies don't renew the certificate they committed with the standard needed for quality at least in their minimum requirement. Getting the certificate is only the beginning on the quality path and not a result. (Al Dweik& others, 2014).

**2.Salman Khalid,& other study (2011):** Titled "**TQM Implementation in Textile Manufacturing Industry to Success**"This exploratory study has provided an insight into implementation of TQM in Pakistani textile manufacturing industry and factors that were considered to be critical to adoption of TQM. The

cross sectional results show that TQM is largely implemented in manufacturing/operating function and little in other functional areas. TQM is a philosophy mainly adopted by large organizations. Whereas, SME businesses are still lagging behind larger one's when it comes to introducing and adopting new managerial philosophy and advanced technology. Many SMEs have stopped at quality system certification, rather than pursuing further continuous improvement efforts by adopting TQM.

**3.Smadi Study (2006):** Titled "**Adoption of total quality management (TQM) in Dubai manufacturing firms**" Samdi completed his study which aims to develop general framework used by the administration to made self-assessment for applying total quality management system in industrial companies, also to encourage the administration to go forward to complete application task.

The study conclude that this industrial companies knows the system of total quality management and there is no big differences between them in understand and apply the system. The study show that the companies concentrate on some total quality management principles and neglect others. The big concentration are on leadership and post workers principles, and neglect focus on customers principle. The researcher recommend to focus on all total quality management principles throw and after applying this frame. (Smadi, 2006).

### **Research Methodology**

#### **1. Problem definition:**

There is a mixing between ISO9000 concept and TQM, so many companies concentrate on getting ISO9000 certificate as an ultimate goal while lack the success achieved by competitors applying TQM fundamentals.

#### **2. Research Importance:**

The importance of this research isto highlight the importance of TQM for companies holding ISO9001 and directing the top manager's attention towards the TQM tools and practices. Moreover, shed light on successful stories by and experiences companies applying TQM and proven its practical efficiency around the world.

#### **3. Research aims:**

The research aims are:

- Diagnosis the situation in the industrial companies that earn ISO9001 certificate and examine whether the principles of the TQM is practiced in these companies.
- Determine the relation existing between fundamentals of TQM.

**4. Major research hypothesis:**

The major research hypothesis is as follows:

1. The industrial companies that holds ISO9001 certificate are applying fundamentals of TQM as well.
2. The style used to measure to how extend that SDI Samarra is applying fundamental of TQM throw two conditions:
  - a. The hypothesis accepted if the arithmetic average value of the sample's answer equal (4) and higher, and the percentage of the application level of the fundamental of total quality equal or higher than (80%).
  - b. The hypothesis rejected if the arithmetic average value of the sample's answer less than (4) and the percentage of the application level of the fundamental of total quality less than (80%)(kortell,2011,60).

**5. Research population and sample:**

The research population is SDI in Samarra, one of Ministry of Industry and Mineral companies in Iraq. SDI holds ISO9001-2008 from VEXIL Australian- New Zealand Company. The sample was 40 questionnaire survey distributed to SDI related staff.

**6. Statistical methods:**

The questionnaire was collected, and the data analyzed using (IBM SPSS AMOS, V.19.0) statistical methods such as:

- 1) Descriptive statistical methods (percentage, Arithmetic average, standard deviation, applied level).
- 2) Analytical statistical method, the factor analysis was used because:
  - a. Summarize all variables and creates a functions that relates each factor to other variables.
  - b. Show the variables that scores higher number of answers.
  - c. Find out the correlation of each variable with others.

**THE OPERATIONAL FRAMEWORK****Brief summary about the company**

SDI was initially established according to the economic and technical cooperation agreement between Iraq and Soviet Union in 1959. SDI industry initiated in 1966 according to the general organization law No. 66 in year 1965 and the official opening was in 1969 and the Pilot production started in 1973. It has been adapted to their legal status according to company's law No. 22 in 1997 and a capital of (271.644) million Iraq Dinars, the company's capital was increased to (1.771.644) billion Iraq Dinars in 1999. The main office and the factory of the company is in Samarra- Saladin governorate on land area 176 Acres, the number of employee currently is (3564) distributed among various divisions. The company's production are more than 400 sort of drugs such as (pills, capsule, anti-abiotic, relievers, tonics , syrups, pendants, Ointments , creams, disinfectants, gargling , eye drops , oral drops, ampoule and vials , oral rehydration , and suppositories).

The most important reasons to choose this company are:

1. SDI holds ISO9001 certification since 2008.
2. SDI Pharmaceutical products are characterized by high quality, reasonable price, and high trust by Iraqi customer.
3. SDI is the most important drugs and medicine company in the Middle East because it is operate in accordance with international constitutions (USA, UK) (Zaiter and others,2012).

**Data Analysis**

This section is in the analytical side through the analysis of samples and extracts the results of the sample under study, where we will use descriptive statistics measures (repetition, percentage, mean, standard deviation, application level).

**First: Sample distribution and analysis:****1- Analysis of the characteristics of the study sample in Productivity Company surveyed:**

The study focused on the distribution of questionnaire in the state company for drugs industry and medical appliances in Samarra which have the international quality management system certification ISO 9001-2008 from the joint Australian- New Zealand company VEXIL. Forty questionnaires was distributed in the company, forty replies has been restored and represented 100% restored. The

questionnaire was designed to gather the necessary research and hypothesis-related basic research data, and consists of six parts each part contains five questions, all of which are related to the question of the level of application of the fundamentals of total quality in the company surveyed.

-Total Quality Management requirements.

- Total Quality management tools.

-Emergence of Total Quality Management.

-Total Quality Management Domain.

-Nature of Total Quality Management.

-Production and Service Quality.

We put five alternatives to answer every question, to give the investigator his opinion towards all of the questions and that on a scale of five degrees ( strongly agree - agree - neutral - I do not agree - do not strongly agree ) with the aim of getting gradation for answers where they were grading respectively ( 1,2,3,4,5 ) .



**Table(1):The characteristics of individuals in the company covered in the study:**

Type	Bracket	Frequency	Percent
<b>1.Gender</b>	Male	35	87.5%
	Female	5	%12.5
<b>2.Age</b>	25 and above	3	%7.5
	26-35years	16	40%
	36-45years	11	%27.5
<b>3. Working period in the company</b>	46 years and over	10	25%
	More than 3 years	39	97.5%
	Less than a year	1	2.5%
<b>4. Scientific qualification</b>	Academic	29	%72.5
	High school	9	%22.5
	less than high school	2	%5.0
<b>5. Job title</b>	Department head or administration manager	14	%35.0
	Supervisor or observer	16	%40.0
	Worker or officer	10	%25.0
	Production and maintenance	18	%45.0
<b>6. Work place</b>	Quality	5	%12.5
	Sales and marketing	6	%15.0
	Others	11	%27.5

The study sample was distributed on several properties as in the following table (2):

- 1- Gender: The majority of the sample was male , as represented recurrence (35 )with (87.5 %)percent of the total sample , and females accounted for recurrence (5) by (12.5 %)percent .
- 2- Age: The majority of respondents were in the age ( 35-26 y ) which represented a recurrence (16)with (40% ) percent of the total sample , followed by age ( 45-35 y ) recurrence (11) and rate ( 27.5 % ), followed by age (46 years and above ) recurrence (10) and rate (25%), and comes in the fourth age (25 years and under ) repeating (3) and rate ( 7.5% ).

- 3- Years working in the company: The vast majority of the sample rate was ( more than 3 years) recurrence (39) and rate ( 97.5 % ) , which means that the majority of employees in the company are experienced and that the proportion of people working in the company (less than one year) by recurrence (1) The rate of ( 2.5% ) .
- 4- Qualifications: The vast majority of the total sample (academic) recurrence (29) and rate ( 72.5 % ) , followed by (high school ) , reaching a recurrence (9) and rate (22.5 % ) , and finally (less than secondary school ) recurrence (2) and accounted for (5%) .
- 5- Job Title : The majority of the samples were from working as ( observer or supervisor ) recurrence (16) and percentage (40%) of the total samples , leadership ratio ( Head of the Department or director ) , the recurrence (14) and percentage (35% ) , and operational workers ( worker or employee ) recurrence (10) and rate (25%) .
- 6- Workplace or departments : that the majority of the samples were in the department ( production and maintenance) repeating (18) and rate (45%) of the total sample , and recurrence ( other sections ) (11) by ( 27.5 % ) , followed by department ( marketing and sales ) recurrence (6) (15% ) , and finally the Department (Quality ) recurrence (5) and rate ( 12.5 % ) .

### **Second: Data analysis or research results**

It have been identify a sample of the company's employees under study through statistical tests that have been adopted for the analysis in this aspect and use a descriptive statistics standards. we use the arithmetic mean, standard deviation, the application level and factor analysis with the result of the questionnaire in company . The results of the statistical analysis to the level of application of the fundamentals of total quality of the company surveyed as shown below table (2):

**Table(2): Fundamentals of Total Quality**

	Ferries	Mean	Standard deviation	application Level
<b>First/ Total Quality Management requirements</b>				
1	The company Higher Management committed to accomplish the heist quality degree	4.6	70%	0.744
2	Total quality management is essential goal for the company management	4.65	77.5%	0.769
3	Company management supports the participation of all worker in completion of proper quality	4.225	42.5%	0.946
4	The company always work to improve the quality of their product	4.725	75%	0.505
5	Company motivational programs based on accomplish highest quality required	3.9	25%	0.955
	<b>Total Average</b>	4.425	58%	0.783
<b>Second/ Total Quality management tools</b>				
6	Easy access to the information that used in quality management	32.5%	0.769	4.15
7	The information used in planning are available and easy to get	15%	1.131	3.525
8	Company employees use miscellaneous statistical methods	17.5%	1.109	3.475

9	Company employees subject to statistical censorship training	5%	0.955	3.1
10	Encouragement on statistical methods development to improve quality	32.5%	1.154	3.725
	<b>Total Average</b>		1.023	3.595
		20.5%		

### Third/ Emergence of Total Quality Management

11	Communication between management and employees focus on ways of improving quality not on reducing cost	42.5%	1.215	3.9
12	There is a shared commitment in improving quality	50%	0.853	4.3
13	Suppliers selection don't based on only low prices	12.5%	0.944	3.675
14	Always working to improve quality	77.5%	0.867	4.625
15	The company's manager offering a good models to follow	10%	1.231	3.15
	<b>Total Average</b>	38.5%	1.022	3.93

### Fourth/ Total Quality Management domain

16	Improving quality is a continuous component not a temporarily slogan or campaign	70%	0.905	4.525
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17	Managers really believe in the important of quality improvement	55%	1.905	4.25
18	All department in the company completely involve in quality improvement	80%	1.080	4.25
19	Quality meeting is a part of the quality strategic plan	70%	0.960	4.475
20	Quality improvement desire pushes the inspection programs	35%	0.723	4.2
	<b>Total Average</b>	62%	1.114	4.34

#### Fifth / Nature of Total Quality Management

21	Quality is very important and one of the selected shared value	82.5%	0.723	4.2
22	Company's employees have some effects on Wording the company massage	30%	0.828	4.675
23	Employees aware that their performance is affecting quality	62.5%	1.007	4.4
24	Mergers between quality tools and comprehensive quality management Techniques	30%	1.143	3.775
25	Training focus on helping in solve problems and improvement	55%	1.143	4.4
	<b>Total Average</b>	52%	0.968	4.29

#### Sixth/ Production and service quality

26	Offer a good service to the client and interest in watching production quality	67.5%	1.011	4.45
27	Company orders relay on what be directly learned from costumer	22.5%	1.191	3.625
28	Training on effectiveness listening to costumer	20%	1.191	3.375
29	Meeting to know more about costumer needs	37.5%	1.011	4.05
30	Using documents for search and evaluation to know costumer needs	40%	1.310	3.775
	<b>Total Average</b>	37.5%	1.142	3.855

**Notes on the table (2):**

- 1- Total quality management requirements : The arithmetic mean of the requirements of total quality management is respectively ( 4.6, 4.65, 4.225, 4.725, 3.9 ), the standard deviation of the results is respectively ( 0.744, 0.769, 0.946, 0.505, 0.955 ), rates of application level is respectively ( 70, 77.5, 42.5, 75, 25 ), the mean of the arithmetic average ( 4.425 ) and standard deviation ( 0.783 ) and application level (58% ). These results prove that the company does not apply Total Quality Management requirements.
- 2- Total quality management tools : the arithmetic mean of the tools of TQM is respectively ( 4.15, 3.525, 3.475, 3.1, 3.725 ) and the standard deviation of the results respectively ( 0.769, 1.131, 1.109, 0.955, 1.154 ) rates of application level is respectively ( 32.5, 15, 17.5, 5, 32.5 ) and the mean of the arithmetic average ( 3.595 ) and standard deviation ( 1.023 ) and application level ( 20.5 % ), and these results prove that the company does not apply total quality management tools.
- 3- The emergence of TQM : The arithmetic mean of the origins of TQM is respectively ( 3.9, 4.3, 3.675, 4.625, 3.15 ), the standard deviation of the results respectively ( 1.215, 0.853,

0.944, 0.867, 1.231 ), rate of application level is respectively ( 42.5, 50, 12.5, 77.5, 10 ), and the mean of the arithmetic average (3.93), the standard deviation ( 1.022 ), and application level ( 38.5 % ). These results prove that the company does not apply the emergence of Total Quality Management.

- 4- The domain of Total Quality Management: the arithmetic mean of the scope of TQM is respectively ( 4.525, 4.25, 4.25, 4.475, 4.2 ), the standard deviation of the results respectively ( 0.905, 1.905, 1.080, 0.960, 0.723 ), rates of application level respectively ( 70, 55, 80, 70, 35 ), and the mean of the arithmetic average ( 4.34 ), standard deviation ( 1.114 ), and application level ( 62% ). These results prove that the company does not apply Total Quality Management domain in high scale percentage.
- 5- The nature of TQM: The arithmetic mean of the nature of Total Quality Management is respectively (4.2, 4.675, 4.4, 3.775, 4.4) and the standard deviation of the results respectively (0.723, 0.828, 1.007, 1.143, 1.143) rates of application level respectively (82.5, 30, 62.5, 30, 55) and the mean of the arithmetic average(4.29), standard deviation (0.968), and the level of the application (52%), and these results prove that the company does not apply the nature of Total Quality Management.
- 6- Quality of production and services: The arithmetic mean of the quality of production and services is respectively ( 4.45, 3.625, 3.375, 4.05, 3.7705 ), the standard deviation is respectively ( 1.011, 1.191, 1.191, 1.011, 1.310 ), rates of the level of application respectively ( 67.5 , 22.5, 20,37.5, 40 ) and the mean of the arithmetic average ( 3.855 ), standard deviation ( 1.142 ), and application level (37.5%), and these results prove that the company does not apply production and services quality system.

### **Hypotheses Test:**

#### **Taste of Major Hypotheses:**

1. Which states that the companies apply ISO9001 system apply fundamental total quality, and the basic role to taste the major hypotheses will depend on that the Base decisions are:
  - The hypothesis accepted if the arithmetic average value of the sample's answer equal (4) and higher and the percentage of the application level of the fundamental of total quality equal (80%).

- The hypothesis rejected if the arithmetic average value of the sample's answer less than (4) and the percentage of the application level of the fundamental of total quality less than (80%).

Table (3) show the below result:

<b>Table (3) apply fundamental of total quality</b>					
	Fundamental of total quality	Mean	Standard deviation	Application level	Accept/reject
1	<b>Total Quality Management requirements</b>	4.43	0.783	58%	Reject
2	<b>Total Quality management tools</b>	3.60	1.023	20.5%	Reject
3	<b>emergence of Total Quality Management</b>	3.93	1.022	38.5%	Reject
4	<b>Total Quality Management domain</b>	4.34	1.114	62%	Reject
5	<b>Nature of Total Quality Management</b>	4.29	0.968	52%	Reject
6	<b>production and service quality</b>	3.86	1.142	37.5%	Reject
7	<b>Total Mean</b>	4.07	1.008	44.75%	Reject

From the data in the table (3), this indicates that the value of the total arithmetic average is (4.07), and that the overall average of standard deviation is (1.008), which means the existence of deviations in the application of the fundamentals of total quality. The overall percentage of the level of application of total quality fundamental is ( 44.75 % ) which is less than (80%) which means rejection of the original hypothesis and accept the alternative hypothesis which is the company included in the study that implements the ISO 9001 system does not apply total quality fundamental. In order to identify the evaluation of the sample components to what extent applying the fundamentals of total quality in the company, the result in the table (15) shows the following:

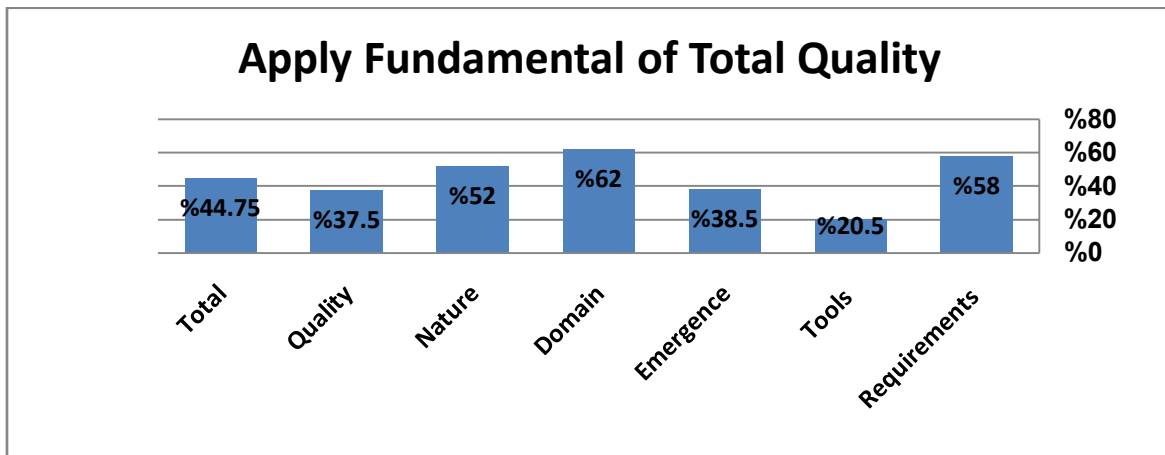
- The arithmetic average of the requirements of Total Quality Management (4.43) and the application level reached (58%), which means rejection of the original hypothesis and accept the alternative



hypothesis which means does not apply total quality management requirements. There are no much difference compared to the level application of the other fundamental of total quality.

- The arithmetic average of the tools of total quality management is (3.60) and the application level reached (20.5%), which means rejection of the original hypothesis and accept the alternative hypothesis, does not apply total quality management tools.
- The arithmetic average of the emergence of total quality management is (3.93) and the application level reached (38.5%), which means rejection of the original hypothesis and accept the alternative hypothesis, does not apply emergence of Total Quality Management.
- The arithmetic average of total quality management domain (4.34) and the application level reached (62%), which means rejection of the original hypothesis and accept the alternative hypothesis, does not apply Total Quality Management domain.
- The arithmetic average of total quality management nature (4.29), and the application level reached (52%), which means rejection of the original hypothesis and accept the alternative hypothesis, does not apply nature of Total Quality Management.
- The arithmetic average of the quality of production and services (3.86) and the application level stood at (37.5%), which means rejection of the original hypothesis and accept the alternative hypothesis, quality production and services do not apply.

The figure (1) shows application level of the fundamental of total quality and as follow:

**Figure (1): Application level of the fundamental of total quality**

It is evident from Figure (1) that the fundamentals of the total quality did not reach the end hypothesis required which set at (80%), that achieves the level of application of the fundamentals of total quality. Where the lowest percentages of the level of application are (20.5%), and the highest level of the application reached to (62%), the total general level of application (44.75 %), this means that the basic hypothesis did not materialize.

#### **Factor Analysis:**

Factor analysis: Is one of the statistical methods used in the study of phenomena to return it to the most important factors that affect them, or summarize multivariate to less number of factors called so, that each of these factors have function linking him to some or all of the variables.

The main purpose of factor analysis is the study of relationships between a number of variables seen  $X_1 \dots X_p$ , in terms of a set of premise elements not seen  $F_1 \dots F_m$ , is called common factors which we care about. The installation of this factor depend on a set of statistical principles, such as regression or correlation, so their number become less than the original number of variables, and this helps to understand the nature of relations between the original variables. the basic idea of the factor analysis is the premise of factors that influence the phenomenon ( the Abbasi:2011, 2) .

Communalities in factor analysis: A variable contribution in all of the factors .

Note: Suppose that:

- 1- **X1 = Total Quality Management Requirements.**
- 2- **X2 = Total Quality Management Tools.**
- 3- **X3= Emergence of Total Quality Management.**
- 4- **X4 = Total Quality Management Domain.**
- 5- **X5 = Nature of Total Quality Management.**
- 6- **X6 = Product and Services Quality.**

Table (4) represents initial values and derived for communalities. The initial values of communalities equal to the one in the way of the basic components in the case of the adoption of the Matrix links, and communalities taken equal to the variance of each variable in the case of adoption of matrix variations.

Table (4) represents initial values and derived for communalities. The initial values of communalities equal to the one in the way of the basic components in the case of the adoption of the Matrix links, and communalities taken equal to the variance of each variable in the case of adoption of matrix variations.

**Note** from data in table (4) that the value obtained for the variable X1 indicate that 0.753 of variations in the variable X1(total quality management requirements) interpreted by interrelated factors values , and the value of communalities ranging from 0 to 1 and reflects the multi- correlation coefficient square of the variable X1 with factors. In general, note that 0interrelated factors explain the high percentage of variables contrast, the lowest percentage of 0.393 is for variable X5(nature of total quality management).

Table(4) Communalities

X	Initial	Extraction
X1	1.000	.753
X2	1.000	.553
X3	1.000	.610
X4	1.000	.676
X5	1.000	.393
X6	1.000	.572

Extraction Method: Principal Component Analysis.

**Distinctive contrast components values:**

It is extracted from the results of the following table (5):

Component	Total Variance Explained					
	Initial Eigen values			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	3.557	59.286	59.286	3.557	59.286	59.286
2	0.862	14.362	73.649			
3	0.562	9.374	83.023			
4	0.404	6.738	89.761			
5	0.341	5.684	95.445			
6	0.273	4.555	100.000			

Extraction Method: Principal Component Analysis.

**The table (5)**(above) shows the characteristic values of the matrix of correlations (components contrast) and a whole is equal to the rank of the matrix which is a 6 as the number of variables, the first main component has a biggest distinctive value (or component contrast) variation is equal to 3.557 and explains by 59.286 of the total variations of the variables studied as:

Contrast ratio interpreter for the component = characteristic values / Total distinctive values \* 100.

Contrast ratio interpreter first component is  $59.286 / 6 * 100 = 988.1$  the rest of factors neglect because distinctive value less than one.

**Matrix components:**

It is extracted from the results in the table (6) following:

From the data of the table (6) we get the following results:

The first factor equation:

$$F1 = 0.868X1 + 0.743X2 + 0.781X3 + 0.822X4 + 0.627X5 + 0.756X6$$

This makes it clear that the factor F1 more relevant to variables (X1, X2, X3, X4, X5, and X6) as the interpreter contrast ratio is  $4.597 / 6 * 100 = 76.616$

	Component
	F1
X1	.868
X2	.743
X3	.781
X4	.822
X5	.627
X6	.756
Total	4.597
Extraction Method: Principal Component Analysis.	
a. 1 components extracted.	

The table (7) shows the values that have been more linked to variables in the following:

Through the results of the table (7) it is evident that the fundamentals of the total quality interconnected with each other.

	Component
	F1
X1	X1
X2	X2
X3	X3
X4	X4
X5	X5
X6	X6

**Conclusions:**

1. The industrial company studied earns ISO9001, but that do not help here too much in applying the fundamentals of total quality according to the study sample, the whole percentage of the applying level of the total quality fundamentals equal 44.75%.
2. There are variations in applying level of the fundamental of total quality in the company, the highest percentage was 62% for total quality management, the lowest was 20.5% for total quality management tools. These variations affect the application level of the total quality fundamental.
3. The general trend for total quality management supplies was (Deeply agree) with arithmetic average (4.43) and apply level percentage (58%) which means that the company under study do not apply total quality management supplies.
4. The general trend for total quality management tools was (Agree) with arithmetic average (3.6) and apply level percentage (20.5%), this is not match with the essential hypothesis which means that the company do not apply total quality management tools.
5. The general trend for total quality management establishment was (agree) with arithmetic average (3.93) and applies level percentage (38.5%) this is not match with the essential hypothesis which means that the company do not apply total quality management establishment.
6. The general trend for total quality management nature was (Deeply agree) with arithmetic average (3.34) and applies level percentage (62%) this is not match with the essential hypothesis which means that the company does not apply total quality management nature.
7. The general trend for total quality management rang was (Deeply agree) with arithmetic average (4.29) and apply level percentage (52%) this is not match with the essential hypothesis which means that the company do not apply total quality management rang.
8. The general trend for product and service quality was (agree) with arithmetic average (3.86) and applies level percentage (37.5%) this is not match with the essential hypothesis which means that the company does not apply product and service quality.
9. The 6 study variables was summarized to one variable by factor analysis technique which explained by the first component which explain in the table (17) which have the biggest value (3.557) and percentage (59.286%).

10. There are a correlation between fundamental of total quality which explain in the factor analysis and show the saturation in each variable, that the fundamental of total quality are bound with each other and less value was (0.627) for total quality nature, and highest value was (0.868) for total quality management supplies which the most correlated than the others.

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