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IMPACT OF APPLYING SIX SIGMA SYSTEMS TO MEASURE QUALITY FOR THE COMPETITIVE ADVANTAGE IN THE JORDANIAN TELECOMMUNICATIONS

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ABSTRACT

This study aimed at identifying the impact of applying six sigma systems to measure quality for the competitive advantage in the Jordanian Telecommunications. For that the researcher has adopted the descriptive survey methodology; which applies to this study aiming to analyse the impact of applying Six Sigma systems to measure the quality on the competitive advantage in the Jordanian telecommunications, by using the techniques of the field survey and collecting data from the study sample by using the questionnaire as the study tool. The study concluded that There are no statistically significant differences at the level of significance ($\alpha = 0.05$) of the impact of applying Six Sigma systems to measure the quality on the competitive advantage in the Jordanian telecommunications. And the study recommended that it's a must for applying the Six Sigma systems to measure the quality as a fundamental approach for the competitive advantage in the Jordanian telecommunications.

Keywords: Six Sigma Systems, Quality Improvement Tools, Jordanian Telecommunications

1.1 Introduction

Organisations are trying to realize an adjustment in arrangement to accomplish the move from the current circumstance to the circumstance that tries to be later on, this move frequently obliges them to take certain regulatory techniques, has generally been to take these activities are then measure and assess the stage, this is the capacity to quantify and assess one thing the capacity to oversee pointers (Al-Sayyed, 2015).

As today's business environment turns out to be progressively competitive, business organisations are turning out to be more forceful and element in distinguishing competitive systems that will guarantee beneficial presence. And as the present business condition turns out to be progressively focused, business associations are ending up noticeably more forceful and dynamic in recognizing aggressive procedures that will guarantee productive presence. Rivalry

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might be credited to business developments, progression in innovation and the changing interest of clients (Ndwiga, 2011).

Competition might be credited to business developments, progression in innovation and the changing interest of clients. Competition amongst business organizations might constrain the management to create business systems and techniques that would control an organization towards the maximization of benefits. This might be accomplished through expanded deals and decreased expense of creation (Kerzner & Kerzner, 2017).

The continuous and rapid changes occurring on the methods and ways of modern management practices at the present time, in addition to technological progress, and progress in accounting systems, has become a cornerstone in the management process, and despite the fact that modern management practices have been characterized to keep pace with technological advances; as the accounting traditional management methods did not keep pace with this development (Barkema, Baum & Mannix, 2002).

Modern management accounting is a branch of specialized accounting, which is primarily aimed at providing financial information, in addition to the provision of certain information for the purposes of financial departments to provide various services to organizations in carrying out its functions and assigned duties (Abu Nassar, 2005).

Modern management accounting techniques have relied on five dimensions: activities cost-based system, targeted costs, customer profitability analysis, Balanced Scorecard, Six Sigma system to measure quality (Garrison; Noreen, and Brewer, 2010).

There is no doubt that the Jordanian telecommunications sector (Zain, Umniah and Orange) is growing rapidly, led by Zain Group, which is the first of Jordan Telecom Company that launched mobile phone service (Ghaith, 2015). In addition is the intensification of the competitive environment between the Jordanian telecommunications companies, which calls for the need to adopt and requires companies of this sector to adopt modern management techniques, including modern techniques of management accounting (Aadela 2014).

Because of the expanded pressure of globalisation upon the world market, business competitiveness is as of now subordinate upon the creative capacities of organisations, in the area of products as well as in forms. One current approach depends on corporate execution estimation by methods for inner process execution estimations (Cummings & Worley, 2014).

Organizations are, subsequently, moving increasingly of their consideration from the nature of items to the execution and nature of interior business forms. The performance of business forms speaks to accomplishing the required outcomes in a given procedure, and its size is

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communicated by the contrast between the real and the required outcomes (Pérez López, Manuel Montes Peón & José Vazquez Ordás, 2005).

The performance of the procedure is assessed by looking at really accomplished and required estimation of the expressed file of the procedure, which can be the span of the procedure, costs for the procedure, the nature of the procedure, included esteem, the quantity of abilities, and the quantity of developments. To make the required procedure execution supportable their ability must be guaranteed, i.e., the required procedure quality. Correct choices assume an essential part in the quality affirmation process and they might be founded on the circumstance investigation utilizing proper apparatuses and techniques for operational administration and quality change. The Six Sigma philosophy (SSM) is utilized as the procedure quality affirmation and change technique, as its execution has accomplished huge cost diminishments, for the most part in the machine, car, and electric and specialized industry (Rathilall, 2015).

Six Sigma has been connected in the industrial enterprises as well as in the region of the services, health, and public administration, both in the private and public field, where there is a solid introduction on the client, quality, time, and execution (Sujova, Simanova and Marcinekova, 2016).

Six Sigma begun in the 1980s as a corporate methodology containing an arrangement of strategies for development of manufacturing forms and the disposal of deformities in the Motorola organisation. The primary objective of the technique was to limit the scattering of the attributes basic for nature of the made items and performed procedures and setting of the normal esteems moving toward the objective esteems characterized by the clients. The utilization of SSM achieved changes inside a brief timeframe, prompting the lessening of deformities in the items utilizing a similar work, innovation, and outline, while expending less cost. On account of the system, Motorola picked up the main position in the region of the quality and was granted the Malcom National Quality Award. General Electric was one of the main organisations receiving the SSM from Motorola and in the a long time since presentation they ascertained that the strategy had spared them $750 million, net, in the wake of subtracting all expenses, including the cost on the technique.

A project-driven management approach to improve the organization’s products, services is the six sigma method, it is also a business strategy that works on improving customer requirements understanding, business systems, productivity, and financial performance.

The implementation of the six sigma method successfully, the challenges are immense, however, the benefits of applying the six sigma method to technology-driven, project-driven organizations are equally great (Kumar, Singhal & Kansal, 2014).

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1.2 Problem Statement

The need for gap analysis between the scientific development of the techniques of management accounting and the reality of its application in practice is necessarily required to determine the dimensions of modern management accounting techniques, and the possibility of their application in business organisations in light of the continued dominance of traditional techniques.

Jordanian telecommunications sector is an important and vital sector in supporting the Jordanian economy; and because of its links to other sectors, it was necessary for this sector to adopt modern management practices, including the modern management accounting techniques, which would have a positive impact in increasing its market share, and meeting the needs of companies in this sector, as well as impacts on the competitive advantage of specifically. Thus, the study problem can be analyzed in attempting to answer the following question: What is the impact of applying Six Sigma systems to measure the quality on the competitive advantage in the Jordanian telecommunications?

1.3 Study Hypothesis

Upon the research problem and its main question; the researcher has adopted the following hypothesis: **H0:** There will be no statistically significant differences at the level of significance ($\alpha = 0.05$) of the impact of applying Six Sigma systems to measure the quality on the competitive advantage in the Jordanian telecommunications.

1.4 Research Methodology

The methodology adopted by the researcher is a descriptive survey methodology**;** for being one of the most popular methodologies used in the field of behavioural science (Wright, Debra et al, 2010)**,** which applies to this study aiming to analyse the impact of applying Six Sigma systems to measure the quality on the competitive advantage in the Jordanian telecommunications, by using the techniques of the field survey and collecting data from the study sample by questionnaire.

1.5 Study Tool

The study relied mainly on the self-managed questionnaire designed and prepared by the researcher. After examining the literature and theoretical studies relevant to the subject of this study; whether in periodicals, books or other references, the questionnaire was formed in two parts and as follows:

***Part I*:** Includes information relating to the respondents and their organisations.
***Part II*:** Includes (7) paragraph related to the Six Sigma systems to measure quality

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1.5.1 Questionnaire Validity

Ensuring the face Validity of the measurement tool was the aim; the questionnaire was reviewed by a number of faculty members of the Jordanian universities in the same field of the research (Appendix 2), for identifying the suitability of the questionnaire for the goals to be achieved, and by retrieving all suggestions, all the necessary adjustments on the paragraphs of the questionnaires was made, by deleting, adding some paragraphs, and by rephrasing others.

1.5.2 Questionnaire Reliability

For ensuring the Reliability of the questionnaire, the researcher used the internal consistency coefficient (α) according to the alpha Cronbach equation, and the value of (α) 97%, which is very high when compared with the minimum acceptable of 60% .

The reliability of the study tool was tested by applying a sample of twenty employees, then reapplying after (15) days on the same sample, by which the Pearson correlation coefficient were extracted showing a result of (0.921); indicating a high degree of reliability. These employees were excluded from the distribution of the questionnaires later.

1.5.3 Scaling

Rating of the responses was based on likert scale to be the considered the most appropriate in this survey due to the nature of the questions asked.

Five categories of answers were provided for each question starting either with "'Strongly agree" to "Strongly disagree" which would be scaled from the most positive towards the most negative response accordingly. It is also understood that Likert scale is not limited to five categories of answers only, however, in the present study, providing five choices was believed to be the most appropriate situation, so as to direct answers towards a specific destination that serves the objectives of this study. The questionnaire paragraphs, upon the five-point Likert scale; to measure the variables of the study, and for the purposes of the analysis the weights of the answers were distributed as shown in the table (1):

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Table 1: The distribution of response options in the questionnaire according to the five-point Likert scale

option	Class
Strongly Agree	5
Agree	4
NA	3
Disagree	2
Strongly Disagree	1

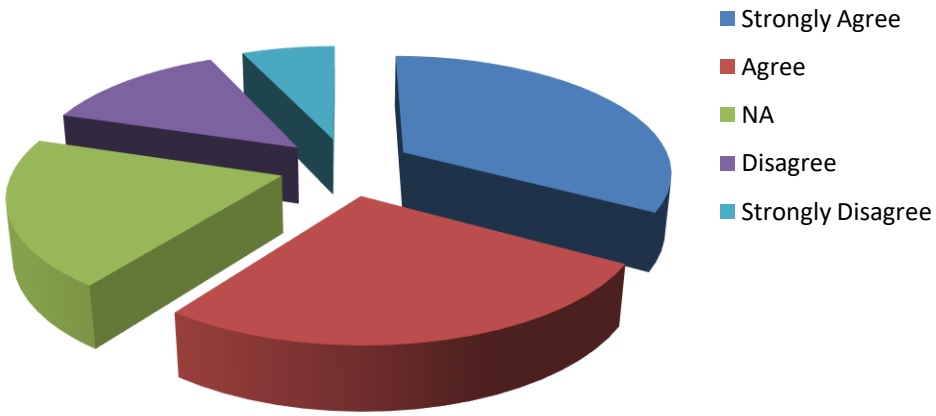

Figure 1: Graphic distribution of the response options in the questionnaire according to the five-point Likert scale.

1.5.4 Statistical Treatment

Statistical methods will be used within the Statistical Package for Social Sciences software (SPSS) for data processing through field study of a sample study in order to answer questions about the study and testing of hypotheses To fulfill the analyzing the information and data, the following steps will be followed:

1. Descriptive of arithmetic averages, standard deviations, and percentages and grades.
2. Calculating the arithmetic mean to know the average answers respondents for each phrase of the study variables expressions, and the standard deviation to identify the extent of deviation of their answers for each phrase of the study variables phrases, and each axis of the main axes of the arithmetic average.

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3. Multiple regression (multiple regression) in order to test the relationship between the independent variable on the dependent variable, it is used to predict changes in the dependent variable that affects the number of independent variables.
4. Pearson correlation coefficient to ensure the stability of the tool and an equation-Cronbach's alpha coefficient find internal consistency of the instrument.
5. (t-test) for one sample to detect denote averages study sample estimates differences.

1.6 Results display

1.6.1Characteristics of the study sample

This section presents results on the characteristics of the respondents; by extracting frequencies and percentages to describe their responses to the first part of the questionnaire variables (gender, age, Years of Experience, Job Title).

The following is a review of the personal and functional properties of the study sample:

1.6.1.1 The study sample and the study population

The telecommunication sector in Jordan is composed of three companies (Zain group, Orange group and Umniah group) with a total population of (32,567) employees. Therefore, the study sample is with the size of (3000) employees of the three companies confirming about (10%) of the study population.

1.6.1.2 The study sample by gender

The data presented in figure (2) and on the distribution of the sample by gender shows that most of the respondents are males; with a number of (1920) males forming (64.0%) of the study sample, while (1080) are females forming (36.0%) of the study sample.

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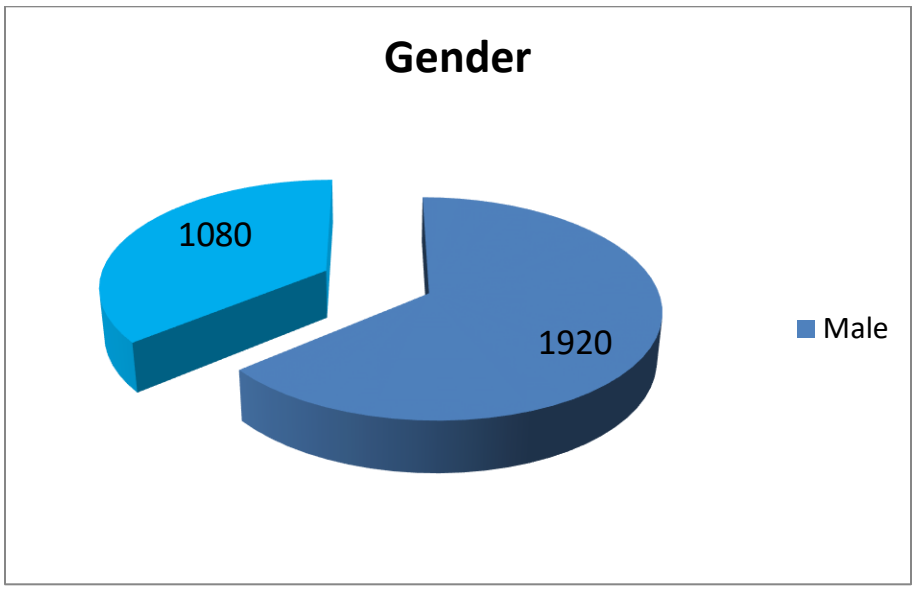

Figure 2: The study sample by gender

1.6.1.3 The study sample by age group

The data presented in figure (3) and on the distribution of the sample by age group shows that with a number of (1390) for the 20 – Less than 30 age groupforming (64.3%) of the study sample, while (930) are of the 30 – Less than 40 age group forming (31.0%) of the study sample, while (360) are of the 40 – Less than 50 age group forming (12.0%) of the study sample and while (220) are of the 50 – Less than 60 age group forming (7.3%) of the study sample.

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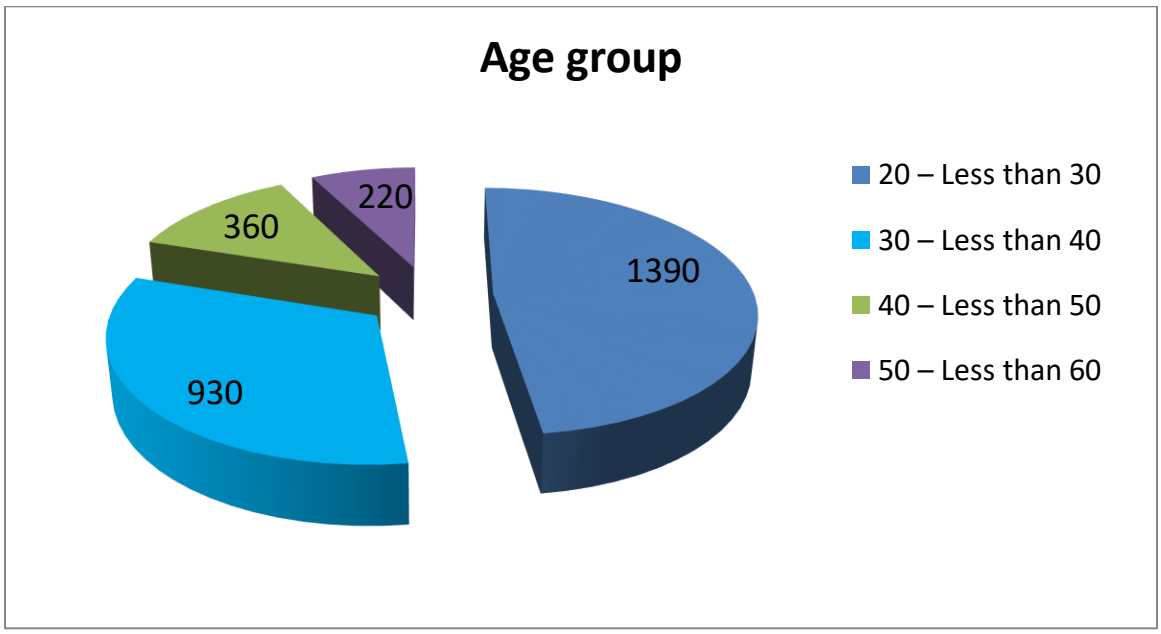

Figure 3: The study sample by age group

1.6.1.4 The study sample by qualification

The data presented in figure (4) and on the distribution of the sample by qualification shows that with a number of (2487) for the Bachelor degree forming (82.6%) of the study sample, while (410) are of the Master degree forming (13.6%) of the study sample, while (112) are of the PhD holders forming (3.8%) of the study sample.

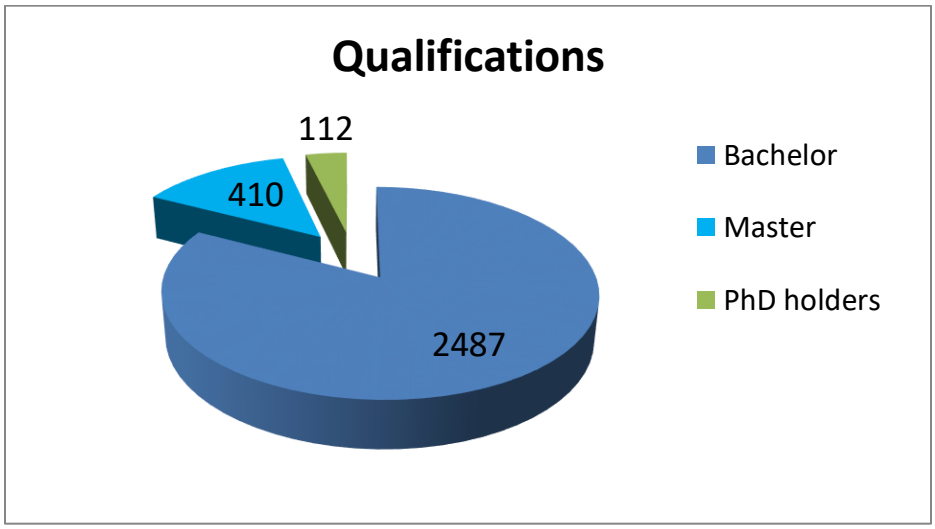

Figure 4: The study sample by qualification

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1.6.1.5 The study sample by years of experience

The data presented in figure (5) and on the distribution of the sample by years of experience shows that with a number of (700) for the One year – Less than two years forming (23.3%) of the study sample, while (950) are of the Two years – Less than four years forming (31.6%) of the study sample, while (890) are of the Four years – Less than eight years forming (29.6%) of the study sample, and (460) are of the More than eight years forming (15.3%) of the study sample.

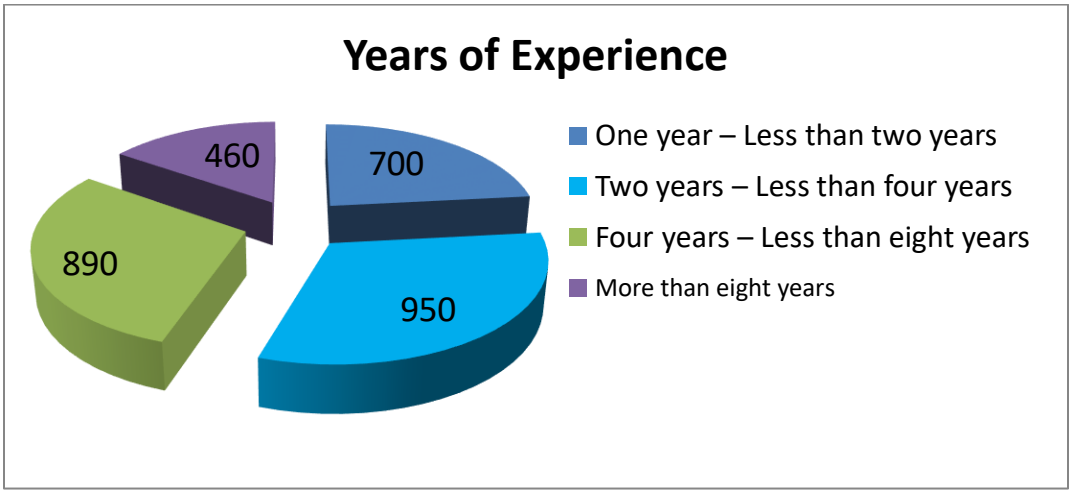

Figure 5: The study sample by years of experience

1.6.1.6 The study sample by Job title

The data presented in figure (6) and on the distribution of the sample by job title shows that with a number of (320) for the Director forming (10.6%) of the study sample, while (690) are Mangers forming (23.0%) of the study sample, while (880) are Supervisors forming (29.3%) of the study sample, and (910) are Accountants forming (30.3%) of the study sample, and (300) are Auditor forming (10.0%) of the study sample.

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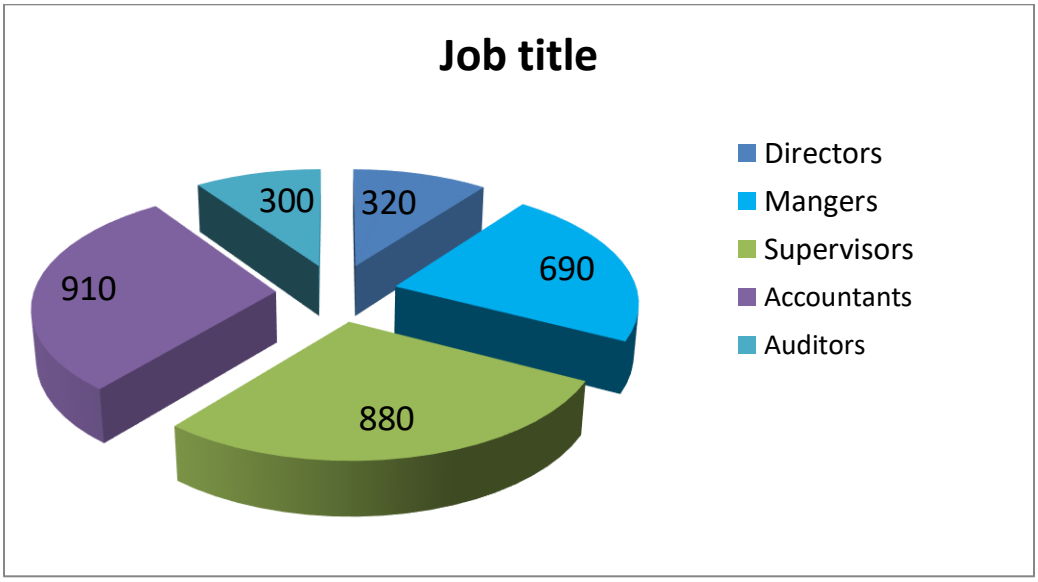

Figure 6: The study sample by job title

1.6.2 Trends toward Six Sigma systems to measure quality

Table (2) shows the arithmetic means, standard deviations, rank and the level for the members of the study sample answers measuring the attitudes towards Six Sigma systems to measure quality.

Table (2): Arithmetic means, standard deviations, rank and the level for the members of the study sample answers measuring the attitudes towards Six Sigma systems to measure quality

NO	Statement	A M	S D	Rank	Level
29	The six sigma level is where the performance at each function, process, or operation is nearly perfect	2.87	0.712	2	Medium
30	It is often the modern management accounting techniques responsibility to suggest improvements and provide controls necessary to drive an organization toward the near-zero defect goal	3.11	0.761	1	Medium
31	The costs come about directly in terms of the corrective actions like warranty work, and indirectly through lost customer satisfaction that can adversely impact future sales	1.09	0.512	7	Low

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32	The principal components of the Six-Sigma as a quality improvement framework include a close understanding of customers' needs, the use of performance measures, an attentiveness on enhancing business processes, and ultimately the generation of tangible business results	1.22	0.571	5	Low
33	Six-Sigma is a process improvement methodology that allows companies to drastically improve their bottom line by designing and monitoring everyday business activities in ways that eliminate the causes of defects or mistakes in business processes by focusing on the outputs that are important to the customer satisfaction	2.65	0.702	3	Low
34	Six-Sigma implementation enhance the competitive position	1.10	0.543	6	Low
35	Six-Sigma implementation increases profitability	1.34	0.601	4	Low
	General average	1.91	0.581	-	Low

(AM): is the arithmetic mean, (SD) is the standard deviation

The Six Sigma systems to measure quality variable is measured in paragraphs (29-35), as illustrated in table (2), and that the arithmetical means for answers of the study sample that measure the information systems variable ranged between (3.11 - 1.09). most of these arithmetic means shows no approval of the study sample on the paragraphs that measure the Six Sigma systems to measure quality in the whole sector variable, since all the arithmetic means are less than the default mean.

Also noted that the paragraph, which states "It is often the modern management accounting techniques responsibility to suggest improvements and provide controls necessary to drive an organization toward the near-zero defect goal" had the highest approval grades; as its arithmetic mean was (3.11) and its standard deviation was (0.761), while the paragraph, which states "The costs come about directly in terms of the corrective actions like warranty work, and indirectly through lost customer satisfaction that can adversely impact future sales" had the lowest approval grades; as its arithmetic mean was (1.09) and its standard deviation was (0.512).

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Overall, the general average of the arithmetic mean for the answers of the respondents is equivalent to (1.91) and the standard deviation is equivalent to (0.581), which indicates no approval of the respondents upon the scale of these paragraphs was low, and that their attitudes were negative.

This can be explained as that the whole sector of the telecommunications companies have no interest in the Six Sigma systems to measure quality as a prerequisite to keep up with developments of the modern management accounting techniques for competitive advantage for the successive locally and internationally, in order to survive in the market and to continue competing in the telecommunications sector.

1.7 Testing the study hypothesis

H05: There will be no statistically significant differences at the level of significance ($\alpha = 0.05$) of the impact of applying Six Sigma systems to measure the quality on the competitive advantage in the Jordanian telecommunications.

1.7.1 Testing the hypothesis upon gender

In order to determine the significance of these differences, one way ANOVA test was used. The results are as shown in the table (3).

Table 3: Analysis of variance test to determine the significance of differences for impact of applying Six Sigma systems to measure the quality on the competitive advantage in the Jordanian telecommunications upon gender

Variance Source	Total squares	Freedom Degrees	Squares Average	"P" Value	Level of significance
Between groups	5.427	2	0.545	0.07	0.116
Within groups	126.569	448	0.337		
Total	**131.996**	**450**			

Results in Table (3) indicate that there are no statistically significant differences between the responses of the study sample on the impact of applying Six Sigma systems to measure the quality on the competitive advantage in the Jordanian telecommunications upon gender.

Therefore, the null hypothesis will be adopted There will be no statistically significant differences at the level of significance ($\alpha = 0.05$) of the impact of applying Six Sigma systems to

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measure the quality on the competitive advantage in the Jordanian telecommunications (upon gender).

1.7.2 Testing the hypothesis upon age

In order to determine the significance of these differences, one way ANOVA test was used. The results are as shown in the table (4).

Table 4: Analysis of variance test to determine the significance of differences for impact of applying Six Sigma systems to measure the quality on the competitive advantage in the Jordanian telecommunications upon age

Variance Source	Total squares	Freedom Degrees	Squares Average	"P" Value	Level of significance
Between groups	4.678	4	0.567	0.12	0.110
Within groups	129.345	446	0.449		
Total	**134.023**	**450**			

Results in Table (4) indicate that there are no statistically significant differences between the responses of the study sample on the impact of applying Six Sigma systems to measure the quality on the competitive advantage in the Jordanian telecommunications upon age.

Therefore, the null hypothesis will be adopted There will be no statistically significant differences at the level of significance ($\alpha = 0.05$) of the impact of applying Six Sigma systems to measure the quality on the competitive advantage in the Jordanian telecommunications (upon age).

1.7.3 Testing the hypothesis upon Qualifications

In order to determine the significance of these differences, one way ANOVA test was used. The results are as shown in the table (5).

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Table 5: Analysis of variance test to determine the significance of differences for impact of applying Six Sigma systems to measure the quality on the competitive advantage in the Jordanian telecommunications upon Qualifications

Variance Source	Total squares	Freedom Degrees	Squares Average	"P" Value	Level of significance
Between groups	3.578	3	0.879	0.667	0.451
Within groups	130.119	447	0.781		
Total	**133.697**	**450**			

Results in Table (5) indicate that there are no statistically significant differences between the responses of the study sample on the impact of applying Six Sigma systems to measure the quality on the competitive advantage in the Jordanian telecommunications upon Qualifications.

Therefore, the null hypothesis will be adopted There will be no statistically significant differences at the level of significance ($\alpha = 0.05$) of the impact of applying Six Sigma systems to measure the quality on the competitive advantage in the Jordanian telecommunications (upon Qualifications).

1.7.4 Testing the hypothesis upon Years of Experience

In order to determine the significance of these differences, one way ANOVA test was used. The results are as shown in the table (6).

Table 6: Analysis of variance test to determine the significance of differences for impact of applying Six Sigma systems to measure the quality on the competitive advantage in the Jordanian telecommunications upon Years of Experience

Variance Source	Total squares	Freedom Degrees	Squares Average	"P" Value	Level of significance
Between groups	4.561	4	0.872	0.341	0.334
Within groups	132.998	446	0.499		
Total	**137.559**	**450**			

Results in Table (6) indicate that there are no statistically significant differences between the responses of the study sample on the impact of applying Six Sigma systems to measure the

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quality on the competitive advantage in the Jordanian telecommunications upon Years of Experience.

Therefore, the null hypothesis will be adopted There will be no statistically significant differences at the level of significance (α = 0.05) of the impact of applying Six Sigma systems to measure the quality on the competitive advantage in the Jordanian telecommunications (upon Years of Experience).

1.7.5 Testing the hypothesis upon Job Title

In order to determine the significance of these differences, one way ANOVA test was used. The results are as shown in the table (7).

Table 7: Analysis of variance test to determine the significance of differences for impact of applying Six Sigma systems to measure the quality on the competitive advantage in the Jordanian telecommunications upon Job Title

Variance Source	Total squares	Freedom Degrees	Squares Average	"P" Value	Level of significance
Between groups	5.441	5	0.779	0.145	0.144
Within groups	132.178	445	0.457		
Total	**137.619**	**450**			

Results in Table (7) indicate that there are no statistically significant differences between the responses of the study sample on the impact of applying Six Sigma systems to measure the quality on the competitive advantage in the Jordanian telecommunications upon Job Title.

Therefore, the null hypothesis will be adopted There will be no statistically significant differences at the level of significance (α = 0.05) of the impact of applying Six Sigma systems to measure the quality on the competitive advantage in the Jordanian telecommunications (upon Job Title).

1.8 Study recommendations

Based on the discussions and explanations included in the study and the result reached, the study provides a set of recommendations that will hopefully be a benefit for the Jordanian telecommunication sector and the companies operates in the telecommunication sector in Jordan; and these recommendations are:

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- Exploring the need and benefits of applying modern management accounting techniques and how they can improve the efficiency of the telecommunications sector in Jordan.
- Applying the Six Sigma systems to measure the quality as a fundamental approach for the competitive advantage in the Jordanian telecommunications.
- Conducting more and deeper researches concerning the implementation of modern management accounting techniques in the Jordanian telecommunications.

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