

Linking Management Information Systems (MIS) Applications with High Performance: A Case Study of Business Organizations in Saudi Arabia

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Abstract

The current research was designed to measure the effectiveness of Management Information Systems (MIS) applications in refining the performance of the business organizations in Saudi Arabia. This study evaluated the impact of MIS applications on the organizational performance by minimizing the organizations' flaws and expenditures while elevating clients' satisfaction and ameliorating the general quality of different procedures. The field of study includes all the personnel in the different categories of the middle and high administration that counts up to 180 workers. A total number of 180 questionnaires were circulated among the workers and 100% of them were received. With the usage of statistical approaches that utilize mathematical rates and standard deviations, the researcher has reached the following: The research realized its objectives in improving the performance of the Saudi business organizations. Accordingly, it offered tools for limiting the chances of any flaw, increasing clients' satisfaction, decreasing overall expenditures, and improving the quality of general procedures. Several recommendations were brought to light as a result of this research study, which emphasized utilization of MIS applications to improve performance, on condition that all the requirements, procedure, and conditions are met in order to reduce errors, cost cut, improvement of operations, and customer satisfaction.

Key words: *MIS, applications, business organizations, performance*

1. Introduction

Management Information Systems (MIS), in broad terms, relate to all computer-based systems that offer managerial personnel and professionals the tools for effectively and efficiently managing, organizing and evaluating different departments of a business organization. 'MIS can include software that helps in decision making, data resources such as databases, the hardware resources of a system, decision support systems, people management and project management applications, and any computerized processes that enable the department to run efficiently' (Gupta, Sharma & Tripathi, 2010, P. 107). Laudon and Laudon (2011) define MIS as a set of procedures that collects, processes, stores, and disseminates information to support decision making and control. Following the same line, Sekhar (2007, p. 310) views MIS as 'a system that collects and processes data (information) and provides it to managers at all levels, who use it for decision making, planning, program implementation and control'.

The aim of using Management Information Systems (MIS) is to remove differences and lessen business flaws by using tools, techniques and applications of MIS. The MIS applications develop the effectiveness and efficiency of services and products, particularly in terms of time and cost, and seek to realize the desired qualities (Antony, 2004). The MIS is a modern field of study, locally and internationally, and therefore this study will investigate the role of utilizing its applications on the Saudi business organizations in order to ensure the highest levels of performance in these organizations.

The 20th and 21st centuries witnessed vast international challenges within the framework of globalization, fast technological changes and the widespread of information technology and the Internet. All these are challenges which oblige organizations for yet further openness, creativity and development in order to ensure continuous high quality of products and services on one hand, and cost cut, on the other.

In confrontation with these challenges, a number of modern administrative concepts and systems have emerged and have contributed effectively to the development of these organizations. The applications of information management technology are among the important modern techniques which have developed and spread vastly in our present-day world.

2. Literature Review

The literature on MIS highlights that MIS strategy or tools should be aligned with the decisions-making process. In other words, MIS application and decisions made by the managerial professionals or business owners should have a linking point between each other (Jarboe, 2005).

For business organizations, it should be an important consideration that MIS applications are highly complex and sophisticated undertakings and demand extreme caution and care on the part of managers and business persons. Therefore, it is highly recommended that business organizations ensure a careful selection of MIS professionals to control and manage their systems. Certainly, genuinely qualified and responsible MIS professionals will pave way for the durable success of business enterprises (Lingham, 2006).

Bee and Bee (1999) also view MIS applications as a tool to convert data from internal and external sources into information and communicate that information in an appropriate form, to managers at all levels in all functions to enable them to make timely and effective decisions for planning, directing and controlling the activities for which they are responsible.

A review of the related literature in the field has revealed that there are very few related studies which attempted to investigate the role of using MIS applications to improve and refine performance in the Saudi business organizations. So this study will fill that research gap.

In contrast there are foreign research studies which have investigated the role of utilizing MIS applications in improving performance in business organizations. The following are some examples of these research studies:

Antony (2004) conducted a study in which he listed seven benefits of using MIS applications. These are:

1. The improvement of the organization in its totality by means of work teams.
2. Change of the concept of error combating to error prevention.
3. Raise staff morale.
4. Omission of unnecessary procedures in operations.
5. Cost reduction of low quality items.
6. Staff satisfaction by means of spreading increasing awareness of and skill in using technology in problem-solving.
7. The adoption of objective data and facts in decision-making, instead of depending upon subjective personal opinions and assumptions.

In a study by Pie-Shih (2006) of the companies which apply MIS and its effect on performance of business in Taiwan, he arrived at the following results:

1. The use of MIS applications has a positive effect on cost cut and reduction of error rate.
2. There is no correlation between the use of MIS applications and purchase rate.
3. There is appositive correlation between the use of MIS applications and customer satisfaction.

Yet in another study by Cheng and Shih (2010), to reduce errors in services provided by Sport Centers, through the use of MIS applications, they concluded that the use of MIS applications, improves performance, reduces service errors, and reinforces customer satisfaction.

3. Research Design

This section describes the research design and the methodology used in this study.

In the light of the studies discussed above, and in order to improve the performance of business organizations in the Kingdom of Saudi Arabia, the present researcher has developed a model for this study. This model utilizes MIS applications and it is based upon the following dimensions (Bergman & Klefsjo, 1994; Evans & Lindsay, 2010):

1. Error reduction
2. Customer Satisfaction
3. Cost cut
4. Improvement of operation quality

The sample of the study will cover the following sectors of business organizations:

1. Commerce sector
2. Industry sector
3. Banking sector

3.1 Questions of the Study

The aim of this study is to investigate the role of utilizing MIS applications as a means to improve the performance in Saudi business organizations. In order to achieve the aim of the study the following questions are formulated:

3.1.1 Main Question

What is the role of MIS applications in improving the performance of business organizations?

From this main question, four other branching questions are made:

1. What is the role of MIS applications in reducing errors in business organizations?
2. What is the role of MIS applications in cost cut in business organizations?
3. What is the role of MIS applications in improving the quality of operations in business organizations?
4. What is the role of MIS applications in raising customer satisfaction in business organizations?

3.2 Aims of the Study

The main aim of this study is to find out the role of using MIS applications as a means of improving performance in Saudi business organizations. This main aim will be achieved through the achievement of the following specific objectives:

1. Identifying the role of using MIS applications in business organizations in error reduction.
2. Identifying the role of using MIS applications in business organizations in cost cut.
3. Identifying the role of using MIS applications in business organizations in improving the quality of operations.
4. Identifying the role of using MIS applications in business organizations in raising customer satisfaction.

3.3 Significance of the Study

The significance of this study lies in its contribution to the field of Information Management Systems in general. The study, also, attempts to draw attention toward the importance of utilizing scientific models to improve the performance of business organizations which are strategic and significant partner in supporting the national economy (Martin, 2009).

3.4 Research Hypotheses

In the light of the research problem and the research questions, the following hypotheses are formulated:

3.4.1 Main Hypothesis

There is no correlation between the use of MIS applications and the improvement of the performance in business organizations.

From this main hypothesis the following hypotheses are made:

1. There is no correlation between the use of MIS applications and error reduction in business organizations.
2. There is no correlation between the use of MIS applications and cost reduction in business organizations.
3. There is no correlation between the use of MIS applications and the improvement of performance in business organizations.
4. There is no correlation between the use of MIS applications and customer satisfaction.

3.5 Study Model

Based upon the variables as expressed in the hypotheses, a virtual model of the study has been designed as follows:

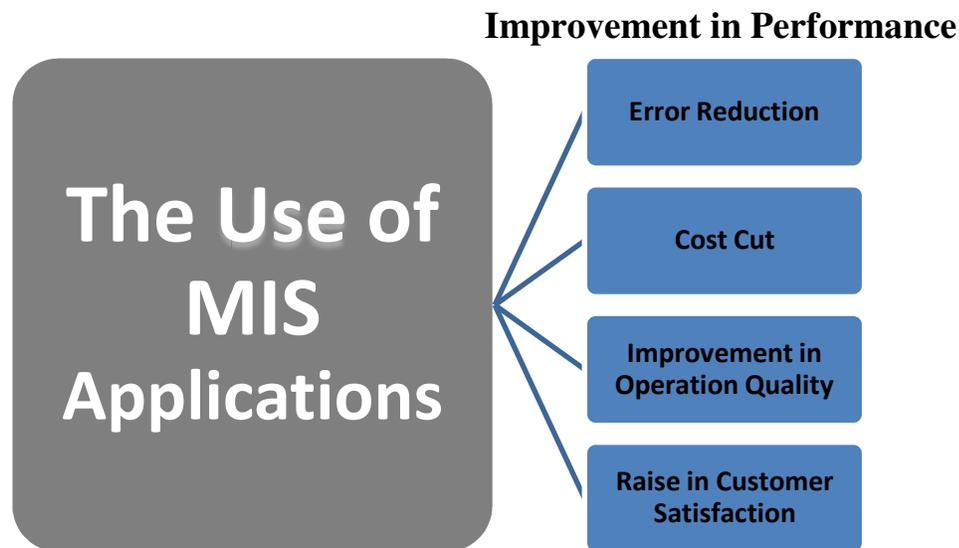


Figure (1) Study Virtual Model

3.6 Procedure

The procedure of the study involves the description of the population and sample of the study, limits of the study, methods of data collection, data analysis, and discussion of results.

- a. **Delimitation of the Study:** Time: the second half of the year 1431 H – 2010. Place: the kingdom of Saudi Arabia, Jeddah, Riyadh, and Dammam.
- b. **Population and Sample:** The population of the study consists of the general managers of the business organizations, their assistants, and heads of departments.

The sample of the study is a simple random sample that consists of industrial, commercial and banking sectors. The total number of companies is 30; each company received 3 copies questionnaire. 180 copies of the questionnaire were returned and statistically analyzed.

- c. **Tools of Data Collection:** A questionnaire has been used for data collection in order to evaluate the role of using MIS applications in improving the performance of business organizations. The questionnaire has been constructed with reference to the research topic, the aims of the study, the questions of the research, and the type of desired data. The questionnaire consists of four main sections with a total of twenty – seven items which cover all dimensions, answer the research questions and help in the attainment of the research aims.
- d. **Statistical methods used in the study:** The data analyzed with a number of Statistical tools and with the application of SPSS, v.17.

4. Framework of the Study

In order to achieve the aims of the study, to answer its questions and according to the targeted population, the questionnaire has been constructed. It is meant to help achieve the aims and the requirements of the study, that is, to measure the role of using MIS applications in improving the performance of Saudi business organizations which used these applications. These organizations cover four sectors (industry, commerce and banking). 180 copies of the questionnaire were distributed to high and middle administrative staff members in 30 companies with 3 copies of the questionnaires to each company.

4.1 Statistical Treatment

Suitable statistical treatments have been selected from SPSS, and used. These include:

1. Frequencies and percentages for the description of the members of the population according to the personal characteristics.
2. Weighted means, standard deviations, used for judging and assessing the subjects' responses to the study variables.

3. Cronbach Alpha, used to verify the reliability of the data – gathering tool.
4. Simple regression test, used to measure the correlation between the independent variable and the dependent variable.
5. Variances, used to show data dispersion and its significance.
6. Multicollinearity Test, used to calculate the internal correlations of the independent variables in order to estimate the mutual effects of these variables on one another.

4.2 Estimate of Sample Size and Stratification

To select a suitable sample from the population, 30 companies which adopt MIS applications have been selected. They cover three sections: industry, commerce and banking. The researcher has adopted the American approach through the formula:

$$n = \frac{\chi^2 \times N \times K(1 - K)}{[\delta^2 (N - 1) + \chi^2 \times K(1 - K)]}$$

Where:

n= the lower limit of the size of the desired sample

N= the size of targeted population.

K= the per cent age of the phenomenon's occurrence

It is axiomatic that K-value is unknown, so either we estimate this value from a pilot sample (study) or alternatively we use the value (0.5) which offers the lowest limit of a sample size. In this study the researcher used K=0.50. δ =the largest error estimate permissible when calculating the probability of the occurrence of a phenomenon in a given population. It is equal to (0.05). χ^2 is found in Chi square table at one degree of freedom, and the desired level of confidence is equal to(95%), thus tabular Chi square is equal to(3.841) or equals (99%) and Chi squared is (6.635).

The researcher applied this formula at (95%) level of confidence to obtain a suitable sample size which is equal to (152) subjects. Then this number was divided among the various organizations under investigation. Because of the researcher's desire to get a genuine representative sample of the population, he distributed (200) copies of the questionnaire. When sorting out the returned copies of the questionnaire to make them ready for analysis, it became clear that (180) copies were valid for analysis. All these (180) copies were analyzed, so the sample size was greater than the minimal sample size suitable for the study. The distribution of the sample among the business sectors was as follows: Banking organizations (36) subjects, industry organizations (78) subjects and commerce organizations (66) subjects.

4.2.1 Characteristics of the Study Sample

The **characteristic features** of the sample are obtained via the analyses of the first section of the questionnaire which elicits general information about the respondents – questions 1 to 5.

Descriptive statistics (frequencies and per cent ages) are used to describe the features according to the professional and demographic factors (age, level of education, professional status, practical experience. business sector).

1-Age Group

This table shows the sample distribution according to age – group

Table (1) Sample Distribution According to Age

Age group	Frequency	Per cent age
From 20 to 29 years	36	6.7%
From 30 to 39 years	51	23.3%
Equal to 40 or greater then	93	70%
total	180	100%

It can be seen in table (1) that most of the staff members in the high and middle administration in business organizations are among the age group 40 years or more than 40 years, equals (70%). Second comes the age – group 30 – 39 years, with (23.3%).

The age group 20—29 years has only (6.7%). This clearly indicates that high and middle administrative staff members, who belong to the higher age-group, do possess good work experience and administrative maturity.

2-Educational Level

The following table shows the distribution of the subjects according to their educational level.

Table (2) Sample Distribution According to Educational Level

educational level	Frequency	Per cent ages
General Secondary	000	0%
Bachelor Degree	108	70%
Post Graduate	072	30%
Total	180	100%

As shown in Table 2, most of the subjects in the high and middle administrative positions in the business organizations are from among bachelor degree holders. They constitute (70%) of the sample and this is, of course, a high percentage. The percentage of the general secondary is zero percent, while the percentage of those with post graduate degrees is (30%). This indicates that there is a high educational level among those subjects who hold high and middle administrative positions.

3-Professional Level / Status

The following table shows the frequencies and percentages of the subjects distributed according to their professional level.

Table (3) Sample Distribution by Professional Level

Professional Level	Frequency	Percentage
General Manger	36	6.7%
Administrative Manager	63	36.6%
Head of Department	81	56.6%
Total	180	100%

As shown in table (3), the number of general managers is 36, (6.7%) of the sample. The number of administrative managers is 63, (36.6%) of the sample, while the number of heads of departments is 81, (56.6%). This indicates that there is an inverse relation between the number of subjects and the administrative level. The higher one moves the less number, one gets. This is quite reasonable and it is imposed by the nature of the organizational hierarchy in organizations.

4-Years of Experience

Table (4) shows distribution of the subjects according to years of experience.

Table (4) Distribution of Sample by Years of Experience

Number of Years of Experience	Frequency	Percentage
5 or less years	39	10%
6 to 15years	66	40%
16 or more years	75	50%
Total	180	100%

From table (4), one can notice that the category of experience 16 years or more, receives the highest frequency and per cent age 75, 50%. The range of experience 6 to 15 years has got 40% and the last category 5 or less years of experience has got 10%. This indicates that the subjects in the high and middle administrative positions have sufficient working experience to run the business organizations under investigation.

5-Business Sector

The following table shows the distribution of the business organizations according to the business sector they belong to.

Table (5) Sample Distribution by Business Sector

Business Sector	Frequency	Per cent age
Industrial	78	53%
Commercial	66	40%
Banking	36	07%
Total	180	100%

As can be seen in table (5), the industry organizations come top with 53%, the commerce organizations second with 40%, and finally the banking organizations with only 07%.

4.2.2 Description of Sample's Responses with Reference to the Study Variables

The main part of the questionnaire which has been designed to elicit the fundamental data is, in fact, a measure of the role of using MIS applications for improving the performance of business organizations. This part consists of 27 items distributed among four main sections; each section tests the hypothesis that relates to it.

Section one

This includes items numbers 1—6. It is about error reduction.

Section two

This section includes items 7—14. It is about customer satisfaction.

Section three

This section includes items 15-21. It is about cost cut.

Section four

This section includes items 22—27. It is about the quality of operations.

The response level of each item has been graded according five-point Likert scale. Five ordered response levels are used (1, 2, 3, 4, 5,) to be symmetric with the set of responses (completely agree, agree, neutral/ undecided, disagree, completely disagree). Weighted means (WX), standard deviations (SD), and the variance coefficient (V.C) have been applied to measure (the extent of) homogeneity and harmony among the samples responses. The assumed mean (3) has been used as a criterion to measure and evaluate the degree of the sample responses within the verbal estimates of the questionnaire weights. Then the attitude forwards the use of MIS applications for improving performance in Saudi business organizations, has been identified through the values of the weighted means as shown in table (6) below:

Table (6) Directions of the Implication of MIS Applications (Abdul Fattah, 2007, p. 540)

Weighted means	The direction of the implication of use
From 1 to 1.79	Completely disagree
From 1.80 to 2.59	Disagree
From 2.60 to 3.39	Undecided neutral
From 3.40 to 4.19	Agree
From 4.20 to 5	Completely agree

A covering letter has been attached to and sent together with each copy of the questionnaire. The letter explains the aim of the study, provides a brief background about MIS applications, explains method of responding to the items, and ensures the confidentiality of information.

4.3 Validity of Instrument

To ensure the validity of the questionnaire as a data-gathering tool, Cronbach Alpha formula has been used for all copies of the questionnaire. Table (7) below shows the test of validity:

Table (7) Cronbach Alpha Validity Test

No	Section/ validity	No. of items	Cronbach alpha / value
1	Error Reduction	6	0.86
2	Customer Satisfaction	8	0.92
3	Cost Cut	7	0.96
4	Operations Quality	6	0.89
	Questionnaire as a whole	27	0.9075

Cronbach Alpha value of the whole Questionnaire is 90.75, which is very good because it is greater than the accepted per cent age 60%. This indicates that the questionnaire is valid.

4.4 Independent Variables

The standard deviations and means of the subjects' responses have been calculated. These are the responses to the items about the variables of using MIS applications for improving performance in Saudi business organizations.

4.4.1 First: Error Reduction

The following table shows the Means and Standard Deviations of the Items.

Table (8) Means and Standard Deviations of the Items on Error Reduction

NO	Items	Mean	SD	CV%
1	The use of MIS applications helps identify problems in operations and helps reduce defects.	3	0.19	4.75
2	The use of MIS applications helps reduce repeating the same task several times	3.8	0.44	11.50
3	The use of MIS applications connects standards with the regular and important activities which would lead to error reduction and operations correction.	3	0.21	4.95
4	The use of MIS applications enables organizations to measure deviations of products quality and this enables them to reduce these deviations.	3	0.20	5.0
5	The use of MIS applications enables a company to apply statistics, interpret their values, and reduce errors	3.5	0.52	14.8
6	The use of MIS applications helps block possible reasons and helps identify key variables which affect outcomes.	3	0.21	7

It is obvious from the data in table (8) above that the use of MIS applications helps identify operational problems and helps reduce defects, with arithmetic mean equals 3. The use of MIS applications also helps reduce the repetition of the same task several times, with arithmetic mean 3.8. The use MIS applications also connects standards with the regular and important activities which would lead to error reduction and operations correction, with the mean equals 3. Moreover, the use of MIS applications enables the business organization to measure deviations in product quality which would in turn, lead to deviation reduction. The mean of this item is 3. In addition, the use of MIS applications enables companies to use statistics and to interpret their values so as to reduce errors. Finally, the use of MIS applications helps block probable reasons and helps identify key variables which affect outcomes. The mean of this is 3. In the light of these results, it is obvious that the use of MIS applications in business organizations, and according to the respondents in the high and middle administrative positions, would lead to error reduction in the business organization. The coefficient of variance (CV) has been calculated to show the data dispersion and its significance and the result is (CV)=4.75, which is less than 20%, thus all items are accurate and the best item is "the use of MIS applications helps identify operations problems and helps reduce defects.

4.4.2 Second: Increase Customer Satisfaction

Table (9) Means and Standard Deviations of the Items on Customer's Satisfaction.

NO	Items	Mean	SD	CV%
7	The use of MIS applications helps the organization do continuous improvements to its products, to suit customers' desire.	3.9	0.24	6.15
8	The use of MIS applications enables the organization to adapt and respond rapidly to the needs of the local market.	4	0.23	5.75
9	The use of MIS applications enables the organization to find out what customers want, not what they think they want.	3.8	0.42	11.0
10	The use of MIS applications enables the organization to earn the reputation for accuracy in the fulfillment of the dates of delivery of products to customers.	3.9	0.30	7.69
11	The use of MIS applications would lead to the adoption of new and innovative ways of production.	4	0.21	5.25
12	The use of MIS applications enables the organization to know the important features in the products or services for the sake of quality for customers.	3.7	0.52	14.05
13	MIS applications projects address the factors that are important to the customers' expectations in which the ratio of effort to the effect is low.	3.5	0.61	17.4
14	The use of MIS applications helps identify defects which greatly affect the most important qualities for customers.	4	0.22	5.5

From Table (9) above it is clear that the use of MIS applications helps the organization to do continuous improvements to its products to suit its customers' desire. The arithmetic mean for this is 3.9. The use of MIS applications enables the organization to adapt and respond rapidly to the needs of the local market.

The mean of this item is 4. The use of MIS applications enables the organization to find out what they think they want. The mean for this item is 3.8. The use of MIS enables the organization to earn the reputation for accuracy in the fulfillment of the dates of delivery of products to customer s, and the mean is 3.9. The use of MIS applications would lead to the adoption of new and innovative ways of presenting products, and the mean is 4. The use of MIS applications enables the organization to know the important features in the products or services for the sake of quality for customers. The mean of this is 3.7. The use of MIS applications in projects addresses the factors that are important to the customers' expectations in which the ratio of effort to the effect is low. The mean of this is 3.5. Finally, the use of MIS applications helps identify defects which greatly affect the most important qualities for customers. The mean for this is 4. These results clearly indicate that the use of MIS applications in business organizations, and according to the subjects' responses, would lead to customer satisfaction. The (CV) has been calculated (=5.25) which is less than 20%. Thus, all the items are accurate and the best is that "the use of MIS applications would lead to the adoption of new and innovative ways of presenting products.

4.4.3 Third: Cost Cut

Table (10) Means and Standard Deviations of Items on Cost Cut

NO.	Item	Mean	SD	CV%
15	The use of MIS applications helps the organization provide products of low prices compared to competing products.	3.9	0.24	6.15
16	The use of MIS applications makes the organization pursue a strategic leadership of lowest cost and highest sales.	4	0.23	5.75
17	The use of MIS applications helps the company provide products at low cost, through continuous studies to reduce unnecessary expenses.	3.8	0.42	11.00
18	The use of MIS applications reduce the costs of waste, scrap and the repetition of the same work	3.9	0.30	7.69
19	The use of MIS applications helps reduce the costs of products or services delay.	3.5	0.63	18.0
20	The use of MIS applications helps reduce costs of services the organization loses because of customer's dissatisfaction.	3.7	0.51	13.7
21	The use of MIS applications helps reduce opportunities lost because of lack of time and necessary resources.	4	0.22	5.5

As it can be seen in table (10) above, the use of MIS applications helps the organization provide products of low price than competing products. The mean of this item is 3.9. The mean of the second item the use of MIS applications makes the organization pursue a strategic leadership of lowest cost and highest sales' is 4.

The mean of the next item 'the use of MIS applications helps the company provide products at low cost, through continuous studies to reduce unnecessary expenses, is 3.8. The item number eighteen costs of waste, scrap and the repetition of the same work, has got the mean of 3.9. The item "the use of MIS applications helps reduce the costs of products of services delay", has the mean of 3.5. Item number twenty, the use of MIS applications helps reduce costs of services which the organization loses because of customer dissatisfaction has got the mean of 3.7. The item, "the use of MIS applications helps reduce opportunities lost because of lack of time and necessary resources, has got a mean equals 4. These results indicate that the use of MIS applications in business organization according to the employees in high and middle administrative positions would increase customer satisfaction. The calculation of (CV) of the data dispersion and significance indicates that all the items are perfect because (CV) is less than 20%. The best rank is that of "the use of MIS applications helps reduce opportunities lost because of lack of time and necessary resources", which is 5.50.

4.4.4 Fourth: Quality of Operation

Table (11) Means and Standard Deviations of the Items on Quality of Operations

NO.	Item	Mean	SD	CV%
22	The use of MIS applications would help the organization understand the important factors that affect the quality of operations.	3.8	0.42	11.0
23	The use of MIS applications would distinguish the organization as having products of high quality compared to competitive products.	3.5	0.63	18.0
24	The use of MIS applications would help the organization operate with maximum efficiency to improve operations.	3.9	0.30	7.69
25	The use of MIS applications would distinguish the organization as having flexibility scale in production processes based on studies of demand forecasting.	4	0.22	5.5
26	The use of MIS applications would help identify the sources of deviation in the features necessary for quality operations.	3.9	0.24	6.15
27	The use of MIS applications would help the organization identify important internal processes that affect the quality standards and the results of the process.	4	0.23	5.75

As shown in table (11) above, the use of MIS applications would help the organization understand the important factors that affect the quality of operation. The mean of this item is 3.8. The use of MIS applications would distinguish the organization as having products of high quality compared to competitive products. The mean of this item is 3.5. The use of MIS applications would help the organization operate with maximum efficiency to improve operation. The mean is 3.9. The use of MIS applications would distinguish the organization as having flexibility scale in production processes based upon studies of demand forecasting. The mean for this is 4. The use of MIS applications would help identify the sources of deviation in the features necessary for quality operations, and the mean of this is 3.9. Finally, the use of MIS applications would help the organization identify important internal processes that affect the quality standards and the results of the process. The mean of this is 4. These results indicate that the use of MIS applications in business organizations, according to the employees in high and middle administration positions, would increase customer satisfaction. The (CV) has been computed for the significance and dispersion of data and it has been found that all the items are perfect; (CV) is less than 20%. The best rank is the use of MIS applications would distinguish the organization as having flexibility scale in production processes based on studies of demand forecasting. Its rank is 5.5.

4.5 Testing Hypotheses

The coefficient of linear regression analysis has been used to verify the hypotheses. The principle upon which the null hypothesis (H₀) is accepted is that the computed value of (F) is less than the tabular value. The null hypothesis (H₀) is rejected if the computed value of (F) is greater than the tabular value.

4.6 Main Hypothesis

There is a correlation of statistical significance between the use of MIS applications and the improvement of performance in business organizations.

4.7 Branching Hypotheses

This section provides details of the four branching hypotheses.

4.7.1 First Branching Hypothesis

Null Hypothesis: There is no correlation of statistical significance between the use of MIS applications and the reduction of errors in business organizations.

Alternative Hypothesis: There is a statistical significant correlation between the use of MIS applications and the reduction of errors in business organizations.

Table (12) the Results of Multiple Regression Analysis to Test the First Branching Hypothesis

Computed F	Tabular F	Sig.	Null hypothesis	Correlation Coefficient
7.207	2.0049	0.000	Rejection	0.711

From Table (12) one can notice that the correlation between the two variables is strong and positive, $R = 0.711$. The significance of this value is revealed through (F) test. The computed (F) value is 7.207 and it is greater than the tabular (F) value.

The correlation value is significant at (0.000) level, which means there is a correlation between the use of MIS applications and the reduction of errors.

4.7.2 Second Branching Hypothesis

Null Hypothesis (H0): There is no correlation of statistical significance between the use of MIS applications and the increase of customer satisfaction, in business organizations.

Alternative Hypothesis (H1): There is a correlation of statistical significance between the use of MIS applications and customer satisfaction in business organizations.

Table (13) the Results of Multiple Regression Analysis to Test the Second Branching Hypothesis

Computed F	Tabular F	Sig.	Null hypothesis	Correlation Coefficient
6.370	2.0049	0.000	Rejection	0.685

It can be seen in table (13) that there is a strong positive correlation between the two variables, $R = 0.685$. The significance of this value is revealed through (F) test, where computed (F) = 6.370, is greater than the tabular (F) value. The correlation has significance at (0.000) level. This means there is a correlation between the use of MIS applications and customer satisfaction.

4.7.3 Third Branching Hypothesis

Null Hypothesis (H0): there is no a statically significant correlation between the use of MIS applications in business organizations and cost cut.

Alternative Hypothesis (H1): there is a statistically significant correlation between the use of MIS applications and cost cut.

Table (14) the Results of Multiple Regression Analysis to Test the Third Branching Hypothesis

Computed F	Tabular F	Sig.	Null hypothesis	Correlation Coefficient
7.110	2.0049	0.000	Rejection	0.701

As it can be seen in table (14) above the correlation between the two variables is strong and positive, $R = 0.701$. The significance is revealed through (F) test where computed (F) is 7.110 and thus it is greater than the value of tabular (F) it is also significant at (0.000) level. This means there is a correlation between the use of MIS applications and cost cut in business organizations.

4.7.4 Fourth Branching Hypothesis

Null Hypothesis (H0): There is no a statistically significant correlation between the use of MIS applications and operation quality in business organizations.

Alternative Hypothesis (H1): There is a statistically significant correlation between the use of MIS applications and operation quality.

Table (15) the Results of Multiple Regression Analysis to Test the Fourth Branching Hypothesis

Computed F	Tabular F	Sig.	Null hypothesis	Correlation Coefficient
4.730	2.0049	0.000	Rejection	0.502

As it can be observed in table (15) above the correlation between the two variables is strong and positive, $R=0.502$. The significance of this value is revealed through (F) test, where the value of computed (F) is 4.370, and thus it is greater than the value of the tabular (F), moreover, it is significant at (0.000) level. This means that there is a correlation between the use of MIS applications and the quality of operations.

Testing the Strength of the Study Model

$$VIF = \frac{1}{1 - r^2}$$

VIF test has been applied to test the strength of the model. The value of VIF is 1.724, which is less than (5). This means that there is no interference between the independent variables, that is, there is no multicollinearity, and this reflects the strength of the study model.

5. Findings and Recommendations

This section gives a detailed description of the findings of the study and offers clear recommendations in the light of these findings.

5.1 First: Findings

Based upon the data analysis, it can be concluded that:

1. There is a strong and positive correlation between the use of MIS applications and error reduction in business organizations. This is achieved through:
 - a) Identification of problems in operations and reduction of defects.
 - b) Reduction of repeating the same work several times.
 - c) Connecting standards with the important and regular activities.
 - d) Measuring deviations in the quality of products.
 - e) Knowledge of how to use statistics and how to interpret the values of these data.
 - f) Blocking probable reasons and identifying key variables which negatively affect outcomes.
2. There is a positive and strong correlation in business organizations between the use of MIS applications and customer satisfaction. This is accomplished through:
 - a) Doing continuous improvements of products so as to suit customers' desire.
 - b) Fast response and quick adjustment to local market needs.
 - c) Knowledge of what customers want, not what they think they want.
 - d) Accuracy in the fulfillment of product delivery to the customers.
 - e) Adoption of new and innovative ways in production.
 - f) Knowledge of key features in products and services for the sake of quality to customers.
3. There is a positive and strong correlation between the use of MIS applications in business organizations under study, and cost cut. This is attained through:
 - a) Provision of products with low prices compared to competitive products.
 - b) Adoption of strategic leadership that maintains less cost and high sales.
 - c) Producing products of low cost through continuous studies of minimizing unnecessary expenses.
 - d) Reduction of the cost of waste and scrap and repetition of the same work.
 - e) Reduction of the cost resulting from delay of products or services.
 - f) Reduction of cost of activities that the organization loses.
 - g) Reduction of lost opportunities.
4. There is a positive and strong correlation in business organizations between the use of MIS applications and operations quality. This is done through:
 - a) Understanding the important factors that affect operations quality.
 - b) To be distinguished with high quality products compared to competitive products.
 - c) Working with highest efficiency so as to improve operations.
 - d) Flexibility scale in production processes based on demand forecasting.
 - e) Identification of sources of deviations in the necessary features of operations quality.
 - f) Identification of the important internal processes which affect quality standards.

5.2 Second: Recommendations

In the light of these findings, these recommendations can be made:

In an environment characterized by rapid, sudden and unpredictable changes, the researcher sees that it is important to adopt an information system that connects MIS applications and the dimensions of performance improvement. The available information resources must be utilized by means of the best and most ideal methods in order to achieve the results that these sources are meant to achieve, and speed up decision-making based on available information, through the adoption of a comprehensive and integrated work plan so as to utilize MIS applications to improve performance, on condition that all the requirements, procedure, and conditions be met in order to reduce errors, cut cost, leading to improvement of operations and customer satisfaction, as follows:

5.2.1 First: Error Reduction

1. Improvement of operation processes through identification of operation problems and error reduction.
2. Reduction of errors by avoiding repetition of the same work several times.
3. Connecting standards with the regular and important activities so as to arrive at a work system void of errors.
4. Measuring deviations in results quality so as to lessen errors and maximize quality.
5. Explanation of how to use statistics and the interpretation of their values, so as to be used in error reduction.
6. Blocking of probable reasons and identifying key variables that negatively affect outcomes.

5.2.2 Second: Customer Satisfaction

1. Doing continuous improvements to the products so as to suit customers' desires, and increase their satisfaction.
2. Increasing customer satisfaction through quick adaptation and fast response to the needs of the local market.
3. Producing what customers want, not what they think they want.
4. Interest in post-sell services, and accuracy in fulfilling products delivery dates.
5. Facing competition through the adoption of new and innovative ways of production to attain customer satisfaction.
6. Knowledge of the important features of products and services for the sake of quality to customers.
7. Knowledge of the most important feature for the customers and identifying defects that greatly affect these features.

5.2.3 Third: Cost Cut

1. Reducing the cost of production processes which will in turn provide products with low prices compared to competitive products.
2. Using MIS applications as a means to adopt the strategy of minimum cost and maximum sales.
3. Doing continuous studies to minimize unnecessary expenses so as to produce products with low cost.
4. Reduction of waste and scrap and repetition of the same work several times throughout the production stages.
5. Reducing expenses resulting from delay in products or services delivery.
6. Reduction of loss resulting from customers' dissatisfaction.
7. Reduction of lost opportunities because of time and resources.

5.2.4 Fourth: Operations Quality

1. Interest in the important factors which affect operations quality, and the understanding of these factors.
2. Be distinguished with high quality products compared to competitive products.
3. Improving production processes at all stages through working with highest possible efficiency.
4. Flexibility of scale in production processes based upon studies of demand forecasting, and production according to needs.
5. Identifying the sources of deviations in key features for the sake of quality of operation and remedy.
6. Identification of the important internal processes which affect quality standards and the outcomes of production processes.

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