THE IMPACT OF MANAGEMENT INFORMATION SYSTEMS ON ORGANISATIONAL PERFORMANCE WITH TOTAL QUALITY MANAGEMENT AS THE MEDIATOR

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ABSTRACT

The present study was conducted to bring attention to the importance of Total Quality Management (TQM) in applying Management Information System (MIS) and their effects on organisational performance, particularly in the oil sector. The main objective of this research is an attempt to investigate the relationship of MIS and organisational performance along with the mediating role of TQM at Missan Oil Company in Iraq.
The quantitative method applied the questionnaire-survey and structural equation modeling (SEM). A total of 250 questionnaires were distributed and a high rate of return (87.6%) has been achieved. After initial data screening, 201 responses were utilised to analyse the final data. The results revealed that MIS indicators, namely information quality, user satisfaction and net benefits are directly linked with organisational performance. Meanwhile, TQM mediates the relationship between five of the MIS indicators, namely system quality, information quality, use of system, user satisfaction and net benefits with organisational performance.
The findings of this study will be useful for the Iraqi oil sector as it will enhance their organisational performance through the use of appropriate MIS indicators.

Keywords: *Management Information Systems, Mis; Total Quality Management, Tqm, Organisational Performance, Missan Oil Company, Sem, Iraq.*

1. INTRODUCTION

Modern time management relies heavily on information to thrive. Nothing changes without information, and in general, it is believed that information is powerful and that its owner has power [1]. Furthermore, many organisations currently suffer from an excess of information. They need to manage all the information they have acquired in order to face the chaos of the digital era left behind by the rapid technological advances and the widespread knowledge dissemination [2]. In this context, the need for information systems has risen [3]. Therefore, organisations are heavily investing in information systems because they seek to maintain their competitiveness in order to remain in the market [4].

Apart from the accelerated pace of technological developments in the field of production, there has also been an evolution in the means of communication and the transmission of information. The growing competitive organisations are forced to take quick and effective decisions thus leading to the effectiveness of the organisational performance [5].Therefore, organisations now need tools to aid them to make quick and automated decisions, and to find ways to reduce uncertainty as only an effective management information system (MIS) can mitigate these challenges [6].

In addition, organisations in developed and developing economies need to transform their traditional bureaucratic management style into a highly value-effective and proactive approach. For this transformation, the adoption of effective quality strategies and practices is one of the key factors of success [7]. Therefore, performance improvement requires improved quality, hence the need to implement TQM as TQM is often considered a vital precedent of an

organisation's performance [8]. TQM is an ideology which has been described by management as the philosophy of general administration to assist the company to expect high quality in all its operations and processes [9]. In the same context, the study by [10] has proved that TQM has a positive effect on improving the performance of oil companies as well as the effect of implementation of TQM on organisational performance directly. Furthermore, TQM plays a positive mediation role in improving its performance [11]. The adoption of TQM by organisations has contributed to the formulation of organisation culture to achieve long-term and short-term goals. To achieve the wanted objectives of organisations, firstly it requires the establishment, development and strengthening of organisational culture and ensuring the participation of all its members [12].

Realistically, TQM and information systems (including MIS) have common goals. Some of the main goals of TQM in most organisations are to develop product and process quality to meet the needs of the organisation's members and consumers, and also to increase competitiveness and effectiveness. Whereas the objectives of information systems are to increase production, improve quality, improve services, lower costs, increase the competitiveness of companies [13].

The importance of the variables addressed in the current study is MIS, TQM, and organisational performance. However, the researcher found that limited literature is available for studying these variables in the field of the Iraqi oil industry. Moreover, the researcher believes that dealing with these variables will be important for the Iraqi oil sector because the modern risks associated with the processes of the Iraqi oil industry are enormous. Also, the macroeconomic problems such as the cost of the war on terror, inflation rates, exchange rates, unemployment rates, debt, debt service rates, export and import growth rates, political instability, lack of reliance on MIS in decision making, and poor TQM implementation all negatively affect the performance of the companies operating in the oil field in Iraq [14]. It would be of interest to note that the manager's monitor and evaluate the trends in their business environment through available internal and external channels of information which are made accessible to them by using modern IT [1].

Depending on the above, the current study discusses the impact of MIS on organisational performance in the context of TQM within the organisation. Therefore, the impact of MIS on organisational performance in the context of TQM was assessed by collecting data using a questionnaire that has been filled by sample opinions of managers at Missan Oil Company in Iraq.

2. OBJECTIVES OF THE STUDY

This research has the following objectives:
1. To examine the relationship between MIS indicators and organisational performance at Missan Oil Company.
2. To examine the relationship between MIS indicators and TQM at Missan Oil Company.
3. To examine the relationship between TQM and organisational performance at Missan Oil Company.
4. To examine the mediating role of TQM in the relationship between MIS indicators and organisational performance at Missan Oil Company.
5.

3. QUESTIONS OF THE STUDY

The present study attempts to answer the following questions:
1. Is there any relationship between MIS indicators and organizational performance at Missan Oil Company?
2. Is there a relationship between MIS indicators and TQM at Missan Oil Company?
3. Is there a relationship between TQM and organizational performance?
4. Does TQM mediate the relationship between the MIS indicators and organizational performance at Missan Oil Company?

5. LITERATURE REVIEW

4.1 Relationship Between Mis And Organizational Performance

MIS is recognised as one of the most significant accomplishments in the area of managerial business, which seeks to supply reliable, exact, relevant and complete information to directors towards increasing the organisational performance of firms [15]. Also, MIS assists in the functioning and monitoring of a company. Furthermore, it depicts the elements

and resources to guarantee the valid functioning of a firm [16]. According to [17] an information system is important for controlling the performance. It should provide feedback that can be monitored and evaluated to determine if the system is achieving the established or set standards. A good system is one that is adjustable so that appropriate information is produced and provided to end users. Measures on individual performance should be relevant to the organisation's objectives. People and systems should work together to ensure that desirable outcomes are achieved. Therefore, information systems form part of an effective performance management [18].

Evidence from many case studies have suggested that MIS increases productivity and performance such as [19] ، [20] ، [22] ، [21] ، [23].

4.2 Relationship Between Mis And TQM

The philosophy of TQM principle is that continuous improvement leads to a continuous flow of change by requesting for information systems [24]. The factors that enable the application of TQM to be successful involve management capability of quality information, production rationalisation, and automation. Therefore, organisations have increasingly found that IT and information systems are the main success factors of TQM. Thus, through the application of MIS, organisations should be able to implement TQM better [25].

As a matter of fact, TQM and information systems have common goals. In most companies, some of the basic aims of TQM are increasing competitiveness and effectiveness by improving product quality and processing to fulfill both the needs of the consumer and the firm. On the contrary, the goals of information systems are growing production, developing quality, improving services, declining costs, and increasing the firm's competitiveness [26]. Many researchers have since addressed the relationship between MIS and TQM such as [26] ، [27] ، [28] ، [29] ، [30].

4.3 Relationship Between TQM And Organizational Performance

In the past, TQM had helped in managing companies and organisations to develop their whole efficiency and performance on the road to attaining world-class position [31].

Choi and Eboch [32], had described TQM is described as a collective, interlinked system of quality practices that is associated with organisational performance.

Leading quality researchers, such as Deming, Crosby, and Juran, supported the positive association between quality implementation and organisational performance [33]. In the same direction many researchers claimed that TQM is considered as an important quality improvement and performance improvement tool [33] ، [34] ، [35] ، [36] ، [37].

4.4 Mediating Role Of TQM

Previously, much research has been conducted to test the direct impact of MIS on organisational performance. However, the said impact remains ambiguous which needs further clarification [38]. In other words, some other variables should be considered to detect the mechanism by which this impact can be better explained. This is why many researchers have urged future researchers to focus more on the subject and try to engage new variables that may affect the affiliation in a positive and significant way [39]. In this regard, TQM has been linked and studied as a way to demonstrate the impact of MIS on organisational performance. Through the use of TQM concepts, MIS may have the ability to achieve predefined goals and improve performance. TQM focuses on some significant domains such as leadership, continuous improvement, innovation, customer focus, strategic planning, benchmarking, service design, etc. The implementation of these techniques and practices in a company can help to achieve the required organisational performance. Logically, firms can benefit from TQM because of the elements of success [33].

Although researchers were not able to find any research that deals with the mediating role of TQM between MIS and organisational performance, but nevertheless, many researchers have since addressed the mediating role of TQM such as [11] ، [40] [41] ، [42] ، [43]. In this present research, the variables of MIS indicators were adopted as an independent variable that plays a major role in the mediating variable of TQM which affects the organisational performance as a dependent variable. The outline of the study is illustrated in Figure 1.
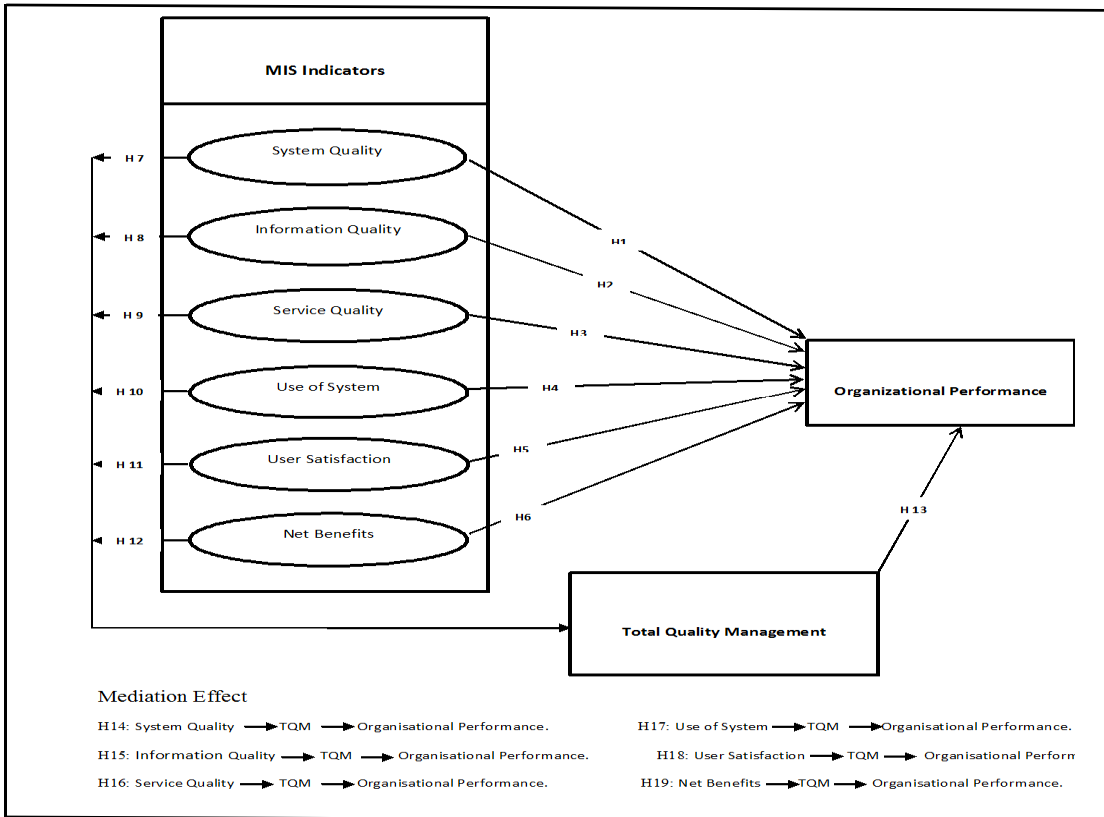
Figure 1: The Framework of Research

5. RESEARCH METHOD

The aim of the current research is to examine the role of MIS on organisational performance. In addition, the mediating role of TQM between the relationship of the MIS and organisational performance is also examined.

According to [44] "a research design is simply a framework or a study plan which is used as a guide for data collection and analysis. It is a scheme to complete the study. A research design is the blueprint for data collection and analysis". Hence, the descriptive research design is chosen for this study as [45] it depicts that descriptive research has the characteristic to answer the questions relating to where, what, how, when and why. The survey, in the form of mailed questionnaires was, therefore, the chosen research method to be utilised in this study. Attempting to offer "a snapshot of one point of time" [46]. The cross-section is a more suitable design to characterise the current study.

5.1 Population And Sample

The population in this study is made up

of managers of high, middle and low levels at Missan Oil Company. The researchers adopted the probability sampling in order to make generalization of the research findings to the study method using a sample of respondents. A highlighted earlier, there are various types of probability sampling, however, for this study; the researchers chose simple random sampling as a sampling method [47].

According to [48] the sample size for a population of approximately, 298 is 169. Therefore, the sample size for the current study is 250 to be considered as adequate and satisfactory to yield a confidence level of 95% with a 5% sampling error according to the previous opinions.

5.2 Measures

The survey method adopted different scales that were developed by the researchers. Nevertheless, these scales were also utilised in various contexts in the past. Consequently, this present research will validate the questionnaire in the Iraqi oil sector.

The questionnaire includes four broad types of questions. Section (A) aims to collect the demographic information of the respondents, which includes 7 questions that were supposed to collect some information about the participants. Section (B) includes 24 questions that are related to MIS indicators, and the model by [49] on the success of information systems. But the updated version by [50] is used to measure MIS, which includes six indicators, namely system quality, information quality, service quality, use of system, user satisfaction and net benefits. Each indicator has four items. The preparation of these items are based on [51] ٬ [52] ٬ [53] ٬ [54] ٬ [55] ٬ [56]. Section (C) includes 24 questions that are related to TQM, but the model by Malcolm Baldrige National Quality Award (MBNQA) 1987 is used to measure TQM, which includes six practices, namely the practice of leadership, customer focus, human resource management, strategic planning, process management, and information & analysis. Each practice has four items. The preparation of these items are based on [57]. Lastly, Section (D) includes 16

questions on organisational performance, including the balanced scorecard (BSC) which is used to measure the organisational performance, which covers four perspectives namely, (financial perspective, customer perspective, internal process perspective and learning & growth perspective). Each perspective includes four items. The preparation of these items is based on [58], the exception of the internal processes perspective has been relied upon [58] ٬ [59]. The five-point Likert scale was used from 1 strongly disagrees, 2 disagrees, 3 neutral, 4 agrees, and 5 strongly agrees for measuring the statement of each respective sub-question.

MIS Indicators are divided into six variables to reflect the complex role and relationship on these indicators. The variables related to the MIS include (system quality, information quality, service quality, use of system, user satisfaction and net benefits). Each variable has four items. The variables related to the MIS indicators are described in detail in Table 1.

Table1: Summary Items for MIS Indicators

Variables	Items	References
System Quality	1. The MIS in my company is easy to use.	[51]
	2. The functions of the MIS in my company meet my requirements.	[55]
	3. The MIS in my company is always available.	[54]
	4. The MIS in my company is safe.	[56]
Information Quality	1. The MIS in my company presents information in a useful format and is understandable.	[55] [52]
	2. The MIS in my company often presents information at a time suitable for its use.	[53]
	3. The MIS in my company provides more current (up-to-date) information.	[56]
	4. The MIS in my company provides the beneficiaries with accurate information.	
Service Quality	1. The response time of the MIS in my company is good.	[55]
	2. The MIS in my company provides a decent service for users.	[53]
	3. The service quality of the MIS in my company affects the extent to which the system can be used.	
	4. My company has specialists in MIS to address technical problems and emergencies if any.	[54] [56]
Use of System	1. I often use the MIS applied in my company.	[56]
	2. I am very interested in the process of continuing to use the MIS in my company	

	to accomplish the tasks entrusted to me.	[53]
	3. The human and material resources supporting the MIS in my company have helped its success.	[54]
	4. The number of participants in the use of MIS in my company has been constantly increasing since its inception.	
User Satisfaction	1. Using my company's MIS helps improve productivity.	[55]
	2. The MIS in my company is very efficient.	[54]
	3. The MIS in my company is flexible enough.	[53]
	4. I am satisfied with the accuracy and objectivity of my company's MIS.	[51]
Net Benefits	1. Using the MIS in my company helps reduce the time allotted to accomplish my tasks.	[56]
	2. Using the MIS in my company will improve my job performance.	[51]
	3. The application of the MIS in my company helps increase productivity.	
	4. The MIS in my company enhances the effectiveness of my job.	

The purpose for the mentioned questions in the questionnaire is to support the hypothesis of the relationship between the basic MIS indicators (system quality, information quality, service quality, use of system, user satisfaction and net benefits) with the organisational performance.

TQM covers six measures, namely the practice of leadership, customer focus, human resource management, strategic planning, process management, and information & analysis. Each variable includes four items. These items on the scale are divided as is shown in Table 2.

Table2: Summary Items for TQM

Variables	Items
The Practices of Leadership	1. Senior management in my company has similar beliefs about my company's future direction.
	2. Senior management in my company often cares about changes and supports the implementation of a culture of improvement, learning and innovation to achieve "excellence".
	3. Employees in my company have the opportunity to participate in the implementation of the change procedures required.
	4. My company has a high level of target unit at the individual and department level without any barriers.
Customer Focus	1. My company constantly gets input from customers to identify and meet their needs and expectations.
	2. My company has close relationships with its customers and works to create easy channels to communicate with them.
	3. My company constantly listens to customer's complaints and works to solve them first hand.
	4. My company uses a variety of methods to measure customer satisfaction.

Human Resource Management	1. My company conducts ongoing training programmes to develop staff capabilities including jobs planning.
	2. My company is interested in measuring employee satisfaction periodically and regularly.
	3. My company runs two-way communication from "top to bottom" and "bottom to top".
	4. My company always cares about maintaining a working environment to ensure the health and safety of all employees.
Strategic Planning	1. My company establishes a clear vision supported by all employees to determine the direction of its future business.
	2. My company uses comprehensive planning tools that contribute to the review of short and long-term goals.
	3. My company pays great attention to developing its plans, policies and objectives to meet the aspirations of all stakeholders and the community.
	4. My company adopts a major strategy with the approval of senior management covering all operations and at all levels.
Process Management	1. My company maintains clear and documented instructions that are understood by all employees about the procedures.
	2. My company adopts advanced statistical methods in improving processes and reducing contrast.
	3. My company continues to establish strategic partnerships with suppliers.
	4. My company has a supplier evaluation guide and rating according to internationally accepted performance standards.
Information & Analysis	1. My company uses an effective performance measurement system to assess overall organisational performance.
	2. Data and information about my company's performance are always available to the relevant parties.
	3. The senior management of my company meets regularly to determine its performance and use it as a basis for future decisions.
	4. My company compares consistently with similar companies in the field of work.

Source: Adapted from D.Prajogo & A.Sohal, 2006 [57].

The purpose of the mentioned questions in the questionnaire is to support the hypothesis on the relationship of TQM which mediates the relationship between MIS indicators and organisational performance.

The BSC is used to measure organisational performance, which includes four perspectives (financial perspective, customer perspective, internal process perspective and learning & growth perspective). Each variable includes four items. These items in the scale are divided as it is shown in Table 3.

Table3: Summary Items for Organisational Performance

Variables	Items
Financial Perspective	1. My company is prioritising programmes that are very effective in cost containment. 2. My company is very effective in maintaining spending. 3. My company has sufficient funds to provide service programmes. 4. My company has a clear vision of the process of allocating financial resources proportionately across programmes.
Customer Perspective	1. My company is constantly working to meet the expectations of its customers. 2. There has been significant improvement in the quality of my company's products. 3. There has been significant improvement in my company regarding the timing of meeting the needs of its customers. 4. The demand for my company's products is growing significantly.
Internal Process Perspective	1. My company practices improved methods in its planning processes. 2. My company is interested in improving quality control processes. 3. My company takes a broad interest in its policies and procedures. 4. My company seamlessly connects communications across all organisational levels.
Learning & Growth Perspective	1. My job is directly related to my area of speciality. 2. My job gives me a sense of accomplishment. 3. In my company, I received enough information to meet the requirements of my assigned task. 4. My company provides the training I need to meet my job requirements.

Source: Adapted from V.Y. Blackmon, 2008 [58]. And C. Mafini & D.R. Pooe, 2013[59].

The purpose of the questions mentioned in the questionnaire is to support the hypothesis on the relationship of MIS indicators with the organisational performance. Also, this is to support the hypothesis on the relationship of TQM with the organisational performance.

6. RESULTS

This section discusses the findings obtained from the data analysis. The section outlines the process of data preparation and data screening. It also provides a description of the participants. The current study used Structural Equation Modeling (SEM) techniques for further data analysis. Finally, the results of the hypothesis testing are offered.

6.1 Detection Of Missing Data

In the present study, 250 questionnaires were distributed and 219 questionnaires were returned during data collection process. This implies a response rate of 87.6%. According to [60] a response rate less than 50% shows a minority of the response rate which may lead to incorrect generalisation of the study results of the population. For the current study, the response rate is higher than 50%. Thus, it can be considered sufficient for the generalisation of the results for the current study. However, during the initial screening of the data collected, 4 questionnaires were found to contain missing values.

6.2 Detection Of Outliers

Multivariate outliers in the current study

were detected through Mahalanobis distance statistic using AMOS 21 [45]. The results of the Mahalanobis distance test showed 14 observations out of which 215 were considered as outliers.

The 14 observations were considered outliers and were eliminated from the data before proceeding to the next stage of data analysis. The results of the Mahalanobis distance test are given in Table 4. Thus, 201 questionnaires were subsequently used for final data analysis.

Table4: Observations Farthest From the Centroid (Mahalanobis Distance)

Observation Number	Mahalanobis d-squared	p1	p2
195	99.770	0.000	0.000
178	89.114	0.000	0.000
189	85.474	0.000	0.000
132	83.694	0.000	0.000
33	82.134	0.000	0.000
187	81.835	0.000	0.000
111	78.845	0.000	0.000
129	77.786	0.000	0.000
88	76.154	0.000	0.000
38	73.438	0.000	0.000
12	71.039	0.000	0.000
185	69.868	0.000	0.000
130	69.612	0.000	0.000
174	69.221	0.000	0.000

6 .3 Demographic Of Respondents

The employee profile of the 201 respondents is illustrated in Table 5. It shows that there are more male employees (77.1%) than their female counterparts (22.9%). In terms of age, a majority with 58.2% of the total respondents is below 30 years old followed by (29.4%) aged 31-40 years old. The other age groups are distributed as follows: 41-50 (10.9%), and above 50 (1.5%). Majority of the respondents (60.7%) are Bachelor degree holders, (29.1%) with professional qualification level, Baccalaureate / Diploma holders, (36.3), (3%) Master holders and no one holds a PhD doctorate. In terms of experience, (39.3%) of the total respondents have less than 5 years of working experience in the present organisation, the other experienced groups are distributed as follows: 6-10 (27.3%), 11-15 (19.9), 16-20 (9.5), and above 20 years (4%). From the level of job positions by the respondents in the organisation, (74.1%) are managers of unit or section, (20.9%) are managers of department, and the remaining (5%) are senior managers such as general managers and directors. In terms of the duration of the job position, a majority with (58.6%) of the total respondents were having experience between 1-5 years, followed by (29.4%) duration of the job position 6-10 years, whilst (17%) of respondents have above than 10 years in this field.

Table 5: Demographic Profile of Respondent

Profile	Categories	Frequency	Percent
Gender	Male	155	77.1
	Female	46	22.9
Age	Below 30 Years	117	58.2
	31-40 Years	59	29.4
	41-50 Years	22	10.9
	Years0Above 5	3	1.5
Education	Baccalaureate / Diploma	73	36.3
	Bachelor Degree/Professional Qualification	122	60.7
	Master Degree	6	3
	PhD Degree	0	0
Experience	Less than 5 Years	79	39.3
	6 - 10 Years	55	27.3
	11 - 15 Years	40	19.9
	61 - 20 Years	19	9.5
	Years0Above 2	8	4
Level of job position	Manager of Unit or Section	149	74.1
	Manager of Department	42	20.9
	General Manager/ Deputy General Manager / Manager of Division	10	5
Length of job position	Less than 2 Years	59	29.3
	3 - 5 Years	59	29.3
	6 - 10 Years	49	24.4
	Years0Above 1	34	17

6 .4 Reliability Analysis

Cronbach's alpha is used to examine the reliability of the internal consistency of the constructs. A cut-off point of 0.70 in the alpha's value which indicates an acceptable degree of reliability of the construct [46].

Table 6 shows the results of the pilot testing and found it to be consistent. The SPSS software version 24 is used for estimating the internal consistency of the instrument. Results indicated that the reliability of each construct is above a threshold value of 0.70. This indicates the internal consistency of the questionnaire for the current study.

Table 6: Result of Reliability Analysis

Sr.	Dimension	Alpha (α)	No. of items
1	System Quality	0.837	4
2	Information Quality	0.847	4
3	Service Quality	0.784	4
4	Use of System	0.890	4
5	User Satisfaction	0.791	4
6	Net Benefits	0.817	4
7	MIS	0.928	24
8	TQM	0.900	24
9	Organisational Performance	0.901	16

7. MEASUREMENT MODEL

In this present research, SEM was utilised to test the measurement and structural model using AMOS 21 software. As a prerequisite for testing the relationship of the obvious item with their respective latent constructs, the confirmatory factor analysis (CFA) was performed as recommended by [61]. The findings showed that all the values are within the accepted range [62]. The measurement model was tested in two steps. First, all measurement models were examined individually with the latent constructs of system

quality, information quality, service quality, use of system, user satisfaction, net benefits, TQM and organisational performance.

The results suggested that items SQ31, SQ4, US1, NB4, CF1, HR2, PM1, IA2, CP1, CP4, IP2, IP4 and LG1 were found to have an unacceptable low factor loading of less than 0.5.

Consequently, these factors were also dropped from the analysis. Then, all the measurement models were tested jointly till fruition on the model fitness and validity and reliability issue. Figure 2 shows the results for CFA.
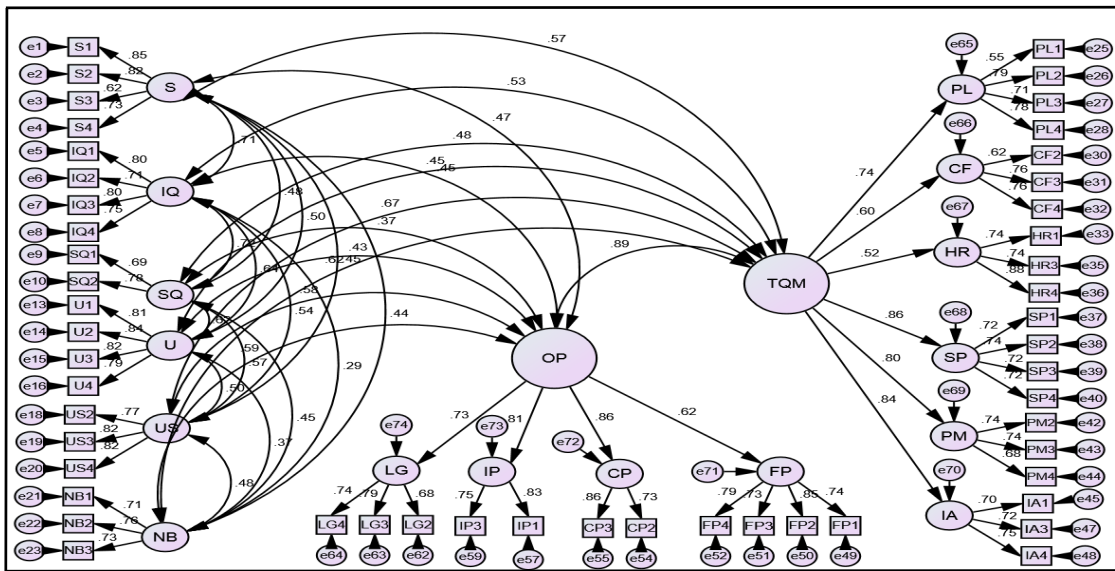

Figure 2: Overall Measurement Models of All Constructs

The results showed there is sufficient improvement in the fit values of the model with df=713. The Chi square for this model is $\chi2=1646.647$, $\chi2/df=1.388$, RMR=0.067,

SRMR=0.0539, CFI=0.909, TLI=0.903 and RMSEA=0.044, which demonstrates the fitness of the model as presented in Table 7.

Table 7: Overall Measurement Model

Statistics	Fit Indices	Level of Acceptance	Obtained Model fitness value
Absolute Fit	$\chi2$	P>0.05	1646.647
	DF		1186
	CMIN/DF	<5	1.388
	RMR	<0.8	0.067
	SRMR	<0.8	0.0539
Incremental Fit	CFI	>0.90	0.909
	TLI	>0.90	0.903
Parsimony Fit	RMSEA	<0.8	0.044

CMIN/DF =Normed Chi-Square; $\chi2$ =Chi-square; DF= Degree of Freedom; Minimum Chi-square; CFI= Comparative Fit Index; TLI= Tucker Lewis; RMR= Root Mean Square Residual; RMSEA= Root Mean Square Error of Approximation and SRMR=Standardized Root Mean Square Residual.

7.1 Convergent Validity

Convergent validity is described as the level agreed upon by many of the items that measure the same concept [63]. As suggested by [45], the construct convergent validity can be evaluated by using the item loadings, average variance extracted (AVE) and composite reliabilities (CR) of the construct. All the item loadings must be more than 0.50 as recommended by [64]. The AVE of every construct must be above 0.50 based on [65]. In addition, the CR values represent the level to which the construct indicators have discovered the latent variable which must be above 0.70 as recommended by [46]. Table 6 displayed that the values of AVE for all the constructs were larger than 0.50 thus indicating all the constructs have sufficient convergent validity. Also, Table 8 displayed that all the constructs have an acceptable reliability ranging from 0.706 to 0.889 as they are larger than 0.70. Hence, this research does not violate the constructs convergent validity.

Table 8: Convergent Validity Analysis

Constructs	AVE	CR
System Quality	0.577	0.843
Information Quality	0.583	0.848
Service Quality	0.546	0.706
Use of System	0.667	0.889
User Satisfaction	0.641	0.842
Net Benefits	0.540	0.778
TQM	0.546	0.874
Organisational Performance	0.578	0.843

7.2 Discriminant Validity

Discriminant validity is the degree in which the items of the latent construct is really different from all the other latent constructs items [45] ; [66]. There are many ways to establish discriminant validity. The first criterion indicates that the value of inter construct correlation should be less than 0.85 in order to establish the discriminant validity [46]. A second criterion is that the square root of AVE must be larger than all inter-construct correlations of the respective construct [64].

Table 9 explains the squared inter-construct correlation of each variable and AVE. The findings denote that all the constructs have sufficient discriminant validity as the square root of AVE is higher than the inter-construct correlation of each variable and the values of inter construct are minus 0.85. This means the findings provide enough evidence of the constructs discriminant validity.

Table 9: Discriminant Validity Analysis

Variables	SQ	IQ	SQ	U	US	NB	TQM	OP
System Quality	**0.759***							
Information Quality	0.709	**0.763***						
Service Quality	0.483	0.723	**0.739***					
Use of System	0.498	0.643	0.622	**0.817***				
User Satisfaction	0.451	0.538	0.571	0.499	**0.800***			
Net Benefits	0.438	0.293	0.449	0.371	0.483	**0.734***		
TQM	0.574	0.529	0.483	0.454	0.668	0.622	**0.737***	
Organisational Performance	0.466	0.455	0.371	0.426	0.582	0.587	0.693	**0.760***

*diagonal show the square root of AVE

7.3 Hypothesis Testing

SEM is utilised to provide a path analysis for exogenous and endogenous variables by AMOS 21. Figure 3 shows the relationship between MIS indicators and TQM to examine whether or not there is a statistically significant relationship. Each path presents a total variation clarified in the endogenous variable with

observance on the exogenous variables. The findings display the significant model fit Chi square for this model which is $\chi 2= 1.818$, DF=1, RMR=0.024 it should be near 0, SRMR=0.0235 which should also be near 0, TLI=0.947 which is near to 1, CFI=0.998 is also near to 1 represents a perfect fit, RMSEA=0.064 from 0.05 to 0.08 represents modesty in model.
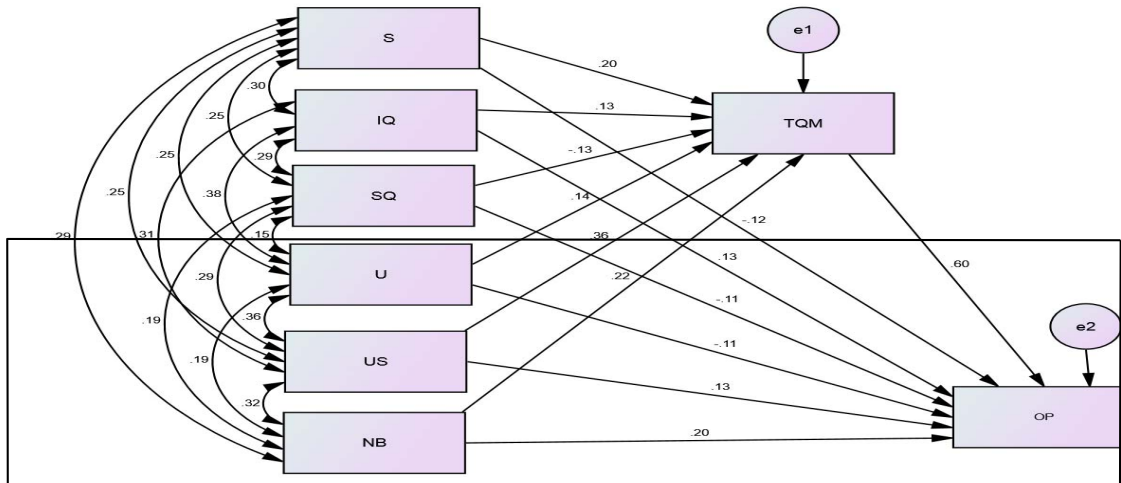

Figure 3: Results of structural model

First hypothesis states that H1: System quality is positively related to organisational performance. Table 10 shows that path H1: System quality ➔ Organisational performance have an unstandardised estimate of -0.086, standardised path coefficient of -0.12, standard error of 0.040, and the critical ratio was

-2.134. The hypothesis was established to test the positive relationship. For this reason the H1 has been rejected and the study establishes a negative relationship between system quality and organisational performance.

Table 10: Hypothesis results

Path			Estimate	S.E.	C.R.	P	Label
OP	<---	S	-0.086	0.040	-2.134	0.033	Not Supported
OP	<---	IQ	0.090	0.040	2.280	0.023	Supported
OP	<---	SQ	-0.072	0.036	-1.980	0.048	Not Supported
OP	<---	U	-0.073	0.037	-2.001	0.045	Not Supported
OP	<---	US	0.098	0.048	2.040	0.041	Supported
OP	<---	NB	0.175	0.050	3.506	***	Supported
TQM	<---	S	0.118	0.035	3.373	***	Supported
TQM	<---	IQ	0.073	0.035	2.087	0.037	Supported
TQM	<---	SQ	-0.073	0.032	-2.292	0.022	Not Supported
TQM	<---	U	0.076	0.032	2.372	0.018	Supported
TQM	<---	US	0.233	0.039	5.920	***	Supported
TQM	<---	NB	0.163	0.043	3.821	***	Supported
OP	<---	TQM	0.729	0.079	9.171	***	Supported

Second hypothesis states that H2: Information quality is positively related to organisational performance. Table 10 shows that path H2: Information quality ➔ Organisational

performance have an unstandardised estimate of 0.090, standardised path coefficient of 0.13, standard error of 0.040, and the critical ratio was 2.280 with a p value of 0.023, which is less than

0.05. This proves that there is sufficient evidence to agree to the study hypothesis. Consequently, H2 was accepted. The research established a direct relationship between information quality and organisational performance.

Third hypothesis states that H3: Service quality is positively related to organisational performance. Table 10 shows that path H3: Service quality ➔ Organisational performance have an unstandardised estimate of -0.072, standardised path coefficient of -0.11, standard error of 0.036, and the critical ratio was -1.980. The hypothesis was established to test the positive relationship. For this reason the H3 has been rejected and the study establishes a negative relationship between service quality and organisational performance.

Fourth hypothesis states that H4: Use of MIS is positively related to organisational performance. Table 10 shows that path H4: Use of system ➔ Organisational performance have an unstandardised estimate of - 0.073, standardised path coefficient of -0.11, standard error of 0.037, and the critical ratio was -2.001. The hypothesis was established to test the positive relationship. For this reason the H4 has been rejected and the study established a negative relationship between the use of system and organisational performance.

Fifth hypothesis states that H5: User satisfaction is positively related to organisational performance. Table 10 shows that path H5: User satisfaction ➔ Organisational performance have an unstandardised estimate of 0.098, standardised path coefficient of 0.13, standard error of 0.048, and the critical ratio was 2.040 with a p value of 0.041, which is less than 0.05. This proves there is sufficient evidence to agree to the study hypothesis. Consequently, H5 was accepted. The study established a direct relationship between user satisfaction and organisational performance.

Sixth hypothesis states that H6: Net benefits are positively related to organisational performance. Table 10 shows that path H6: Net benefits ➔ Organisational performance have an unstandardised estimate of 0.175, standardised path coefficient of 0.20, standard error of 0.050, and the critical ratio was 3.506 with a p value of 0.000, which is less than 0.05.

This proves there is sufficient evidence to agree to the study hypothesis. Consequently, H6 was accepted. The study established a direct relationship between the net benefits and organisational performance.

Seventh hypothesis states that H7: System quality is positively related to TQM. Table 10 shows that path H1: System quality ➔ TQM have an unstandardised estimate of 0.118, standardised path coefficient of 0.20, standard error of 0.035, and the critical ratio was 3.373 with a p value of 0.000, which is less than 0.05. This proves there is sufficient evidence to agree to the study hypothesis. Consequently, H7 was accepted. The research established a direct relationship between system quality and TQM.

Eighth hypothesis states that H8: Information quality is positively related to TQM. Table 10 shows that path H8: Information quality ➔ TQM have an unstandardised estimate of 0.073, standardised path coefficient of 0.13, standard error of 0.035, and the critical ratio was 2.087 with a p value of 0.037, which is less than 0.05. This proves there is sufficient evidence to agree with the study hypothesis. Consequently, H8 was accepted. The research established a direct relationship between information quality and TQM.

Ninth hypothesis states that H9: Service quality is positively related to TQM. Table 10 shows that path H9: Service quality ➔ TQM have an unstandardised estimate of -0.073, standardised path coefficient of -0.13, standard error of 0.032, and the critical ratio was -2.292. The hypothesis was established to test the positive relationship. For this reason, the H9 has been rejected and the research established a negative relationship between service quality and TQM.

Tenth hypothesis states that H10: Use of MIS is positively related to TQM. Table 10 shows that path H10: Use of system ➔ TQM have an unstandardised estimate of 0.076, standardised path coefficient 0.14, standard error of 0.032, and the critical ratio was 2.372 with a p value of 0.018, which is less than 0.05. This proves there is sufficient evidence to agree to the study hypothesis. Consequently, H10 was accepted. The research established a direct relationship between using the system and TQM.

Eleventh hypothesis states that H11: User satisfaction is positively related to TQM. Table 10 shows that path H11: User satisfaction ➔ TQM have an unstandardised estimate of 0.233, standardised path coefficient of 0.36, standard error of 0.039, and the critical ratio was 5.920 with a p value 0.000, which is less than 0.05. This proves there is sufficient evidence to agree with the study hypothesis. Consequently, H11 was accepted. The research established a direct relationship between user satisfaction and TQM.

Twelveth hypothesis states that H12: Net benefits are positively related to TQM. Table 10 shows that path H12: Net benefits ➔ TQM have an unstandardised estimate of 0.163, standardised path coefficient 0.22, standard error of 0.043, and the critical ratio was 3.821 with a p value 0.000, which is less than 0.05. This proves there is sufficient evidence to agree with the study hypothesis. Consequently, H12 was accepted. The research established a direct relationship between net benefits and TQM.

Thirteenth hypothesis states that H13: TQM is positively related to organisational performance. Table 10 shows that path H13: TQM ➔ Organisational performance have an unstandardised estimate of 0.729, standardised path coefficient 0.60, standard error of 0.079, and the critical ratio was 9.171 with a p value 0.000, which is less than 0.05. This proves there is sufficient evidence to agree with the study hypothesis. Consequently, H13 was accepted. The study established a direct relationship between TQM and organisational performance.

The fourth objective of the current study was to examine the mediating role of TQM in the relationship between MIS indicators and organisational performance at Missan Oil Company. In this study, all direct effects were investigated by using SEM. In addition, the study calculated indirect effects to test the mediation of TQM between MIS indicators and organisational performance. Therefore, the hypotheses regarding the suggested mediation impacts of TQM in the empirical test were introduced as follows: H14, H15, H16, H17, H18 and H19. TQM mediates the relationship between MIS indicators (system quality, information quality, service quality, use the system, user satisfaction, and net benefits) and organisational performance.

The mediation analysis was done in two stages as prescribed by [67]. In the first stage, direct relationships without mediators were calculated. Thus, the direct relationship of system quality and organisational performance usage was tested during the first stage to test Hypothesis H14. Table 11 shows the results of the mediation analysis. The results indicated that the direct effect of   S ➔ OP was significant at b = 0. 206 with a p value of 0.003, which is less than 0.05. In the second stage, mediator was entered in the model and indirect effect was calculated. The indirect effect of path S➔TQM ➔OP was 0.296. Furthermore, to test the significance of the indirect path, the study used bootstrapping for the significance of the indirect effects as prescribed by [67]. Results indicated that the indirect path was significant as the p value was 0.001. This p value is less than 0.05. Thus, hypothesis H14 was accepted. Moreover, the mediation is full as the direct effect was significant before mediation but not significant after entering mediation in the model.

Table 11: Mediation Analysis

*** Significant at p<0.01.

Hypotheses	Direct Relationship without mediator	p value	Direct Relationship with mediator	p value	Indirect effect	P value (bootstrap)	Result
S➔TQM➔OP	0.206	0.003	-0.090	0.108	0.296	0.001	Significant, Full Mediation
IQ➔TQM➔OP	0.288	***	0.052	0.345	0.236	0.001	Significant, Full Mediation
SQ➔TQM➔OP	0.046	0.515	-0.049	0.347	0.095	0.038	Not Significant
U➔TQM➔OP	0.226	0.001	-0.065	0.244	0.291	0.001	Significant, Full Mediation
US➔TQM➔OP	0.462	***	0.341	0.045	0.341	0.001	Significant, Partial Mediation
NB➔TQM➔OP	0.421	***	0.266	0.005	0.266	0.001	Significant, Partial Mediation

Thus, the direct relationship between information quality and organisational performance usage was tested at the first stage to test Hypothesis H15. Table 11 shows the results of the mediation analysis. The results indicated that the direct effect of IQ ➔ OP was significant at b = 0.288 with a p value less than 0.05. In the second stage, mediator was entered in the model and indirect effect was calculated. The indirect effect of path IQ ➔ TQM ➔ OP was 0.236. Furthermore, to test the significance of the indirect path, the study used bootstrapping for the significance of the indirect effects as prescribed by [67]. Results indicated that the indirect path was significant as the p value was 0.001. This p value is less than 0.05. Thus, hypothesis H15 was accepted and arising from there, exists a full mediation of TQM between information quality and organisational performance.

The direct relationship of service quality and organisational performance usage was tested during the first stage to test Hypothesis H16. Table 11 shows the results of the mediation analysis. The results indicated that the direct effect of SQ ➔ OP was insignificant at b = 0.046 with a p value 0.515, which is above than 0.05. According to [68] the independent variable SQ must be significantly related to the dependent variable OP. Thus, hypothesis H16 was rejected.

The direct relationship on the use of MIS and organisational performance usage was tested during the first stage to test Hypothesis H17. Table 11 shows the results of the mediation analysis. The results indicated that the direct effect of U ➔ OP was significant at b = 0.226 with a p value 0.001, which is less than 0.05. In the second stage, mediator was entered in the model and indirect effect was calculated. The indirect effect of path U ➔ TQM ➔ OP was 0.291. Furthermore, to test the significance of the indirect path, the study used bootstrapping for the significance of the indirect effects as prescribed by [67]. Results indicated that the indirect path were significant as the p value was 0.001. This p value is less than 0.05. Thus, hypothesis H17 was accepted. Thus, the full mediation of TQM exists between the use of MIS and organisational performance.

Thus, the direct relationship of user satisfaction and organisational performance usage was tested at first stage to test Hypothesis H18. Table 11 shows the results of the mediation analysis. The results indicated that the direct effect of US ➔ OP was significant at b = 0.462 with a p value less than 0.05. In the second stage, mediator was entered in the model and indirect effect was calculated. The indirect effect of path US ➔ TQM ➔ OP was 0.341. Furthermore, to test the significance of the indirect path, the study used bootstrapping for the significance of the indirect effects as prescribed by [67]. Results indicated that the indirect path were significant as the p value was 0.001. This p value is less than 0.05. Thus, hypothesis H18 was accepted. Moreover, the mediation is partial as the direct effect was significant before mediation and after entering mediation in the model.

Thus, the direct relationship of net benefits and organisational performance usage was tested at first stage to test Hypothesis H19. Table 11 shows the results of the mediation analysis. The results indicated that the direct effect of NB ➔ OP was significant at b = 0.421 with a p value less than 0.05.

In the second stage, mediator was entered in the model and indirect effect was calculated. The indirect effect of path NB ➔ TQM ➔ OP was 0.266. Furthermore, to test the significance of the indirect path, the study used bootstrapping for the significance of the indirect effects as prescribed by [67]. Results indicated that the indirect path were significant as the p value was 0.001. This p value is less than 0.05. Thus, hypothesis H19 was accepted. Moreover, the mediation is partial as the direct effect was significant before mediation and after entering mediation in the model.

7.4 SUMMARY OF HYPOTHESES FINDINGS

The relationship between MIS indicators, TQM and organisational performance was examined. Nineteen hypotheses were formed based on previous studies and frameworks, and were tested with the collected data using SEM of AMOS. A summary of the nineteen hypotheses is shown in Table 12. Testing of the hypotheses is to show evidence of support that a

theoretically specified model fits the sample data.

Table 12: Summary of Hypotheses Findings

Hypothesis	Results
H1: System quality is positively related to organisational performance.	Not Supported
H2: Information quality is positively related to organisational performance.	Supported
H3: Service quality is positively related to organisational performance.	Not Supported
H4: Use of MIS is positively related to organisational performance.	Not Supported
H5: User satisfaction is positively related to organisational Performance.	Supported
H6: Net benefits are positively related to organisational performance.	Supported
H7: System quality is positively related to TQM.	Supported
H8: Information quality is positively related to TQM.	Supported
H9: Service quality is positively related to TQM.	Not Supported
H10: Use of MIS is positively related to TQM.	Supported
H11: User satisfaction is positively related to TQM.	Supported
H12: Net benefits are positively related to TQM.	Supported
H13: TQM is positively related to organisational performance.	Supported
H14: TQM mediates the relationship between system quality and organisational performance.	Supported
H15: TQM mediates the relationship between information quality and organisational.	Supported
H16: TQM mediates the relationship between Service quality and organisational performance.	Not Supported
H17: TQM mediates the relationship between use of MIS and organisational performance.	Supported
H18: TQM mediates the relationship between user satisfaction and organisational performance.	Supported
H19: TQM mediates the relationship between net benefits and organisational performance.	Supported

8. CONCLUSION

Based on research and data processing which has been carried out in accordance with the methods described, it can

be concluded as follows:
1. The results indicated that MIS indicators (information quality, user satisfaction and net benefits) positively influence organizational performance. The result of the research is in line with the findings of the [21] ; [39] ; [69].

2. The results of this study indicated a negative

relationship between MIS indicators (system quality, service quality and use of system) and organisational performance at Missan Oil Company. Due to the low efficiency of the MIS used by the company, in addition to the weakness of the users of these systems. This is in line with the findings of [70] who indicated that there was no relationship between MIS and organisational performance because of the low and poor organisational culture towards MIS. According to [14] the poor technology, poor safety and training procedures, outdated training, poor training and poor safety procedures are also amongst the most cited issues in Iraqi oil sector.

3. The findings of the current research revealed that MIS indicators (system quality, information quality, use of system, user satisfaction and net benefits) are more relevant to enhance TQM at Missan Oil Company. The result of the research is in line with the findings of the [24] ; [25] ;[30] ; [71].

4. The current study findings indicated that service quality is not related to TQM at Missan Oil Company. Because the MIS at Missan Oil Company provides a low level of service. This result implicitly correlates with the findings of [72] who referred to a significant gap remains between the successes with TQM for the information system in many companies.

5. The current research found that TQM influences on organisational performance. The results are consistent with the existing literature, such as the studies of [33] ; [73] ; [74] ; [75] ; [76] ; [77], which stated that the implementation of TQM practices leads to improved performance and increased competitiveness by the organisations.

6. This study attempt to examine the mediate role of TQM in the relationship between MIS indicators and organisational performance. MIS positively connects to TQM [25] which is positively related to organisational performance [76]. Also the findings revealed that the impact of system quality, information quality, use of system, user satisfaction and net benefits on organisational performance was mediated by TQM while service quality was not mediated by TQM at Missan Oil Company. The findings of this research is in line with the results of [11] ; [40] ; [41] ; [43] which proved the role of mediation for TQM in improving organisational performance.

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