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The Significance of Management Information System in Improving Organizational Performance and Effectiveness

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Abstract

The main purpose of this study was to show the role of management information system application in improving the performance of the public universities in Sulaimani city of Iraq. The study's sample consists of (200) of administrative employees from all the public universities in the city. The most important conclusion of the research is that all predicted variables of (System and Information Quality, Customer Satisfaction, User Training, Organizational Leadership, and Organization Services Quality) are significant and toward positive effect on the response variable which is Organization Performance of public universities. Furthermore, the results show that (System and Information Quality) and (Organization Services Quality) have the most and the least effects on the Organization Performance respectively. Likewise, the correlation coefficient between Organization Performance and each of the predicted variables is positive with a moderate level of power, and the most powerful relationship was between (Organization Performance) and (System and Information Quality).

In order to more effectively and successfully implement the management information system of the universities and to increase the organization's and employee's performance, it is suggested to the universities management to upgrade the existing management information system continuously and have a training program for all administrative staff of the university.

1. Introduction

Management Information Systems are upheld by corporate databases, which incorporate information created by exchange preparing, the focal reason for Management Information Systems is to furnish administrators with the data they have to make choices and understand issues Lapiedra Alcamí and Devece Carañana (2012).

All about business environments and how they use MIS is how do they develop their business processes and its arrangements by using MIS to a more effective arrangement, reporting, actualizing, and disseminate an association's business forms with the support of information technology, As management information system has a crucial effect nowadays on organizations, businesses in the world cannot continue their daily performance and their success in all aspects if they ignore technology, all the departments of the organizations are part of the continuous change, hence management information system can have an impact on many activities and the workflow (Bourgeois, 2014).

As (Asemi et al., 2011) highlighted management information system is one of the real PC based data frameworks. Its function is to collect the overall data need of the considerable number of directors in the firm or in some hierarchical subunit of the firm.

The potential accomplishment of a business relies upon its organizational performance, which implies its capacity to successfully execute systems to accomplish institutional goals. A few factors establish organizational performance, for example, the organization plan's efficiency, effectiveness, and results (Almatrooshi et al., 2016).

In Kurdistan Region of Iraq management information systems are not very advanced and not many research and studies have been done about this issue due to the late welcoming of the country to technological tools in the profession, curiosity of exploring management information system applications in public education sectors of higher education in Sulaimani city led to accomplishing this research in the purpose of getting correct data about how advanced and helpful these applications are used in public universities and how they affected organizational performance

Five factors were studied in this research depending on their importance in the public organizations and the results showed their reliabilities and significances, each of the factors as an independent variable shows it is impacting in different ratios on

organizational performance in the public universities of Sulaimani city which are Information and System Quality, Customer Satisfaction, User Training, Organizational Leadership, and Organization Services Quality. Furthermore, since five factors are used as predicted variables (independent variables) on the organization performance as a dependent variable, multiple linear regression model is used to analyze the dataset.

2. Literature Review

2.1. Management

According to (Akrani, 2011) Management is a person or a party of people that acknowledge duties to run an association, they Form, Establish, Lead and Run all the basic exercises of the association in which administration does not take the necessary steps themselves but they inspire others to take every necessary step and arrange all the work for accomplishing the goals of the association, in another word, administration unites every one of the elements of work, capital, Instruments, Resources, Approaches and Marketplaces and they utilize these assets for accomplishing the targets of the association.

2.2. Management Information System

The rapid changes in technology and the managers use of it makes management information systems important and necessary part of successful organizations, by time and the new IT tools that develops every day obliges businesses to follow them unless they will disappear if using old systems will remain in the firms Laudon and Laudon (2018).

According to Cornford and Shaikh (1992), information systems are purposive frameworks; they are set up for reasons and have targets or objectives, planned or built up to accomplish some expressed end. On account of PC-based information systems, the part that should be fulfilled by the data prerequisites of specific individuals or classes of individuals.

(Alter, 2008) reviewed that an information system is a unified and collaborating set of programming coordinated data advancements supporting person, collection, authoritative, or societal objectives.

(Zwass, 2020) mentioned that the information system is a collection of interrelated components that gather, manipulate, store and disseminate

information and provide a feedback mechanism for monitoring efficiency. Information system as linked components that are capable of gathering, analyzing, storing and transmitting information to assist decision makers in achieving the objectives of their organization. The information system is, in fact, the foundation of any corporation and agency.

According to (Karim, 2011) the information system is an inseparable part of the management system to provide appropriate information query resources for both system managers and the organization's management. described MIS as a method or process that gives detailed data necessary to manage organization efficiently. in comparison management information system can be as "the implementation, utilization and development of information systems by individuals, organizations and community."

As (Adeoti-Adekeye, 1997) highlighted current management information systems frequently utilizing radical computer tools have had moderately little achievement in giving administration with the data it needs, and the problems due to this condition are as following:

1. Absence of administration inclusion with the plan of the MIS.
2. Limited or wrong accentuation of the PC structure.
3. Excessive fixation on low-level information preparing applications especially in the accounting field.
4. Modest understanding by data experts of administration's valid data requirements and of company issues.
5. Deficiency of top management support.

(Khadermoh et al., 2013) found that Information Management (IM) is resolved in three elements:

1. Team Information sharing and Knowledge development.
2. Capacity to locate the right data when required.
3. Far-reaching arranging that incorporates information from all association assets.

These elements push the part of an arrangement between information system and association technique, it is truly imperative in an association and the capacity to adjust organization goals to information system strategy and it makes the workflow more effective plus the key targets of the organizations need to concur with the

information system objectives (Khadermoh et al., 2013).

The information management system as "a system consists of a network of all communication networks used by an organization", also there is an influence of accessing information on person's ability to manage and use data in short- and long-term organization and decision-making. It reported that the higher the availability of information, the higher the influence on both the performance and accuracy of management decisions (Karim, 2011)

Technologies in IT have extraordinarily encouraged organizational memory and the capacity to catch and incorporate express learning by making it simple to arrange, convey, absorb, store, and recover because memory is unmistakably unsteady and subject to disintegration and mistake; the human limit with regards to memory as a part of organizational memory is not as much as great. Inside an association, memory has additionally been very uncertain in light of the fact that, as a group of people, the firm is just ready to keep up an infinitesimal segment of the data that is right now accessible to it (Dewett and Jones, 2001).

Computer equipment is the physical hardware utilized for information, preparing and practicing in an information system. It comprises of the accompanying: the computer management unit; different info, product, and capacity devices; and physical media to interface these devices together. Capacity technology incorporates both the physical media for putting away information. New technologies including hardware and programming, connects the different bits of equipment and exchange information with one physical area then onto the next. Computers and interchanges gear can be associated in systems for sharing voice, information, pictures, sound, or even video All of these advancements speak to assets that can be shared all through the association and constitute the company's information technology (IT) and the system, the IT framework gives the establishment or stage on which the firm can construct its particular information system (Ally, 2015).

Through the advent and advancement of computers, network infrastructure and the Internet, humanity has reached the age of the modern information system. The information system is designed to provide the information required for managers and administrators to make rational decisions (Zwass, 2020).

The significant data structures and the connections in favor of management

decisions in three separate contexts. It has been demonstrated that multinational corporations are long in advance thanks to the Enterprise (Karim, 2011).

Applications guidelines established by current IT tools such as Enterprise Resource Planning (ERP), Knowledge Management Systems (KMS) and Customer Relations Management (CRM) to increase the quality and efficacy of the decision-making process. The population growth of organizations makes it crucial for these institutions to find a more effective way to manage employment and other organizational activities. Knowledge about jobs is critical, time consuming and we need the most efficient tools to handle it (Karim, 2011).

2.3. Organizational Performance

Organizational performance according to (Almatrooshi et al., 2016) can be defined as the percentage of the achievements of the organization's goals; In other words, organizational performance is the output of that organization compared to what was planned to achieve.

The success of an association comprises in the productivity of each individual of its staff; along these lines, labors accomplishment can be characterized as an element of organizational leadership(Almatrooshi et al., 2016).

As stated by AL.Gharaibeh and Malkawi (2013), what led governments to become electronic and was the result of the happening of E-Government was the huge effect of technology that has an impact on reducing time, cost and effort in the management of the organizations. As a result, management information systems were born in order to organize all the management's duties by collecting, organizing, analyzing data and giving final reports of those data in the shape of understandable information which affects the efficiency and effectiveness of the organization performance.

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3. Methodology

The study aimed to identify the role of the management information system of the public universities in Sulaimani city of Iraq. The primary data was collected from the administrative staff of the public universities, and these data were gathered by a survey questionnaire which is classified into six main variables, a dependent variable (Organization Performance) and 5 independent variables which are (System and Information Quality, Customer

Satisfaction, User Training, Organizational Leadership, and Organization Services Quality). Then for rating the answers of the questions, a five point Likert-type scale was used in such a way that (gives 1 to Strongly Disagree) to the highest weight of the paragraph, (gives 5 to Strongly Agree), and three other weights are (2 to Disagree, 3 to I Do Not Know, and gives 4 to Agree). Furthermore, the Multiple Linear Regression Model and Correlation Coefficient were used to analyze the data by using JMP software which is statistical analysis tool as SPSS software.

Research Problem and Question

A management information system is one of the most beneficial manners to provide the data to recognize a lack of performance area of the organization and shows how to make better business productivity for decision making, easier communication and increases customer satisfaction. The problem of the study is to know whether the existing management information system of the public universities has an adequate capacity for problem-solving and decision making, and the main questions of this study are:

1- What is the usefulness of the management information system at the public universities?

2- What are the difficulties of using a management information system in the university processes?

3-What is the aggregate effect of MIS on organizational performance?

Objective of the Research

The objective of this study is to clarify the role of using Management Information System application of improving the performance of the public universities and institutions in Sulamnai city of Iraq.

Importance of the Research:

The most advantageous of this study is useful for public universities to identify the benefits of the existing management information system in the university process towards time-saving, easy to access the information, find the precise information for decision making, increasing customers satisfaction which are students and alumni, and whether or not it made a facilitated communication among all university staff.

Research Hypothesis and Model

- There is a significant effect of organizational leadership measures on

the organizational performance of public universities.

- There is a significant effect of customer satisfaction on the organizational performance of public universities.
- There is a significant effect of user training on the organizational performance of public universities.
- There is a significant effect of system and information quality on the organizational performance of public universities.
- There is a significant effect of organizational service quality on the organizational performance of public universities.

Since five predictor variables (Management Information System Quality, Customer Satisfaction, User Training, Organizational Leadership, and Organization Services Quality) are investigated on the Organization Performance, a multiple linear regression model is used to test hypotheses and analyze the dataset.

Sampling and Data Collection

Questionnaires were implemented to collect the data of this study, and the simple random sampling was used to collect a sample size of 200 of administrative employees from all the public universities and higher educational institutions in Sulaimani city of Iraq, in which 75 employees from the University of Sulaimani, 75 employees from the Polytechnical University of Sulaimani, and 50 employees form Sulaimani Technical Institute were randomly chosen to collect the data.

Furthermore, the questionnaire consists of 6 variables with 30 questions for all variables, in which 5 questions for the dependent variable (Organization Performance), and 5 independent variables (System and Information Quality, Customer Satisfaction, User Training, Organizational Leadership, and Organization Services Quality) with 5 questions for each. All the independent and response variables resulting in the data of the study are given in Table 1.

Table 1: The distribution of predicted and response variables

Dependent Variable	Independent Variables
Organization Performance	System and Information Quality
	Customer Satisfaction
	User Training
	Organizational Leadership
	Organization

	Services Quality

4. Analysis and Results

Figure 1 shows the Cronbach's alpha values which are measures the reliability of a data set in such a way that, as the Cronbach alpha is closer to one, it shows the higher internal consistency reliability (Sekaran and Bougie 2016). To see whether a data set is suitable for statistical analysis, the reliability coefficient of all scales of the data should be 0.70 or higher, then it is considered acceptable (McNeish, 2018). As the results show, the Cronbach's α values for the overall score and all individual scales were more than 0.70, in which for all questions of the dependent variable (Organization Performance) and all questions of independent variables of (System and Information Quality, Customer Satisfaction, User Training, Organizational Leadership, and Organization Services Quality) are between (0.8709 – 0.8867), suggesting that the items have very good internal consistency. In other words, the reliability coefficients for all study dependent and independent variables are accepted, and the data is possible for statistical analysis and scientific research.

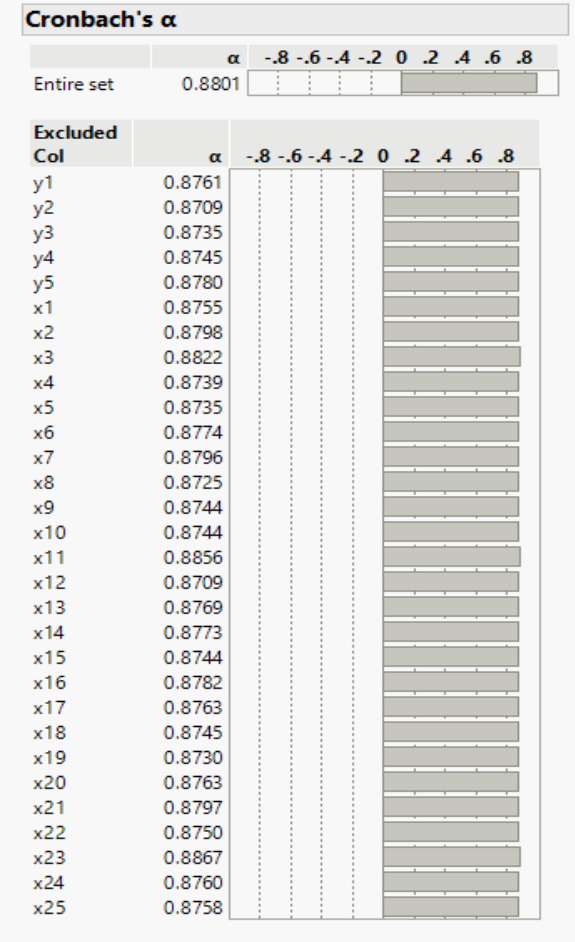

Figure 1: The value of the reliability coefficient for the internal consistency of each variable

Figure 2 illustrates how the predicted and the real values of the response variable (Organization Performance) are related to each other. Furthermore, it indicates that the predicted variables (System and Information Quality, Customer Satisfaction, User Training, Organizational Leadership, and Organization Services Quality) are linearly related to the Organization Performance.

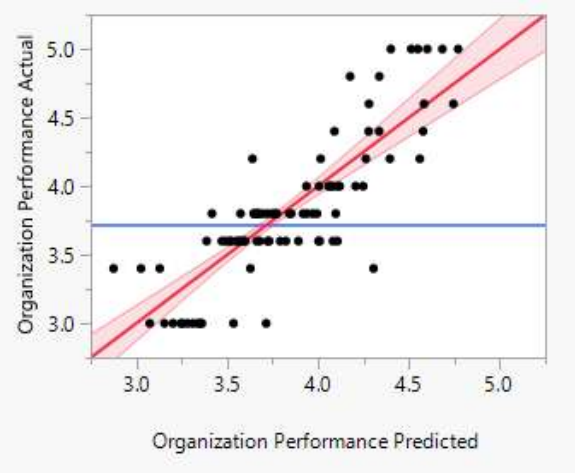

Figure 2: Actual by Predicted plot

In Table 2, R^2 shows the amount of variance of the response variable by the changes in predictor variables. Thus, the variables (System and Information Quality, Customer Satisfaction, User Training, Organizational Leadership, and Organization Services Quality) altogether explain 66.70 % of the variance in Organization Performance, and the remaining 33.30% of the variation of response variable is assumed to be due to random variability or some other factors which are not related to this research. Besides Root Mean Square Error (MSE = 0.277027), showing that within every gathering of these predictor variables, the standard deviation of Organization Performance is 0.28. Furthermore, the mean of response variable = 3.45, and total observations number equal to 200.

Table 2: Summary of Fit

R-Square	**0.667015**
Root Mean Square Error	**0.277027**
Mean of Response	**3.721**
Observations (or Sum Wgts)	**200**

Table 3 shows the analysis of variance, it uses to test whether the means of predicted variables (System and Information Quality, Customer Satisfaction, User Training, Organizational Leadership, and Organization Services Quality) are equal, and all equal to zero.

$H_0: \mu(System\ and\ Information\ Quality)$
$= \mu(Customer\ Satisfaction)$
$= \mu(User\ Training)$
$= \mu(Organizational\ Leadership)$
$= \mu(Organization\ Services\ Quality)$
$= 0$

$H_1: at\ least\ on\ of\ the\ means\ of\ the\ predicted\ variable$

It is clear in Table 3 that the P-value = 0.0001, and it is less than $\alpha = 0.05$. In that case, we reject H_0 and accept H_1 (the means of the predicted variables are not equal to zero), indicating that at least one of the independent variables has affected on Organization performance of the public universities.

Table 3: Analysis of Variance (ANOVA)

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	5	29.823421	5.96468	77.7216
Error	194	14.888379	0.07674	**Prob > F**
C. Total	199	44.711800		<.0001*

One of the linear regression model assumptions is that the data should be normally distributed, and for this purpose, the Goodness-of-Fit test used in which the null hypothesis is that "The sample data is from the normal distribution". If the test is significant, the distribution is non-normal. Furthermore, Shapiro-Wilk W test had used here. According to the results of Table 4, Since the $(Prob < W) = 0.6115$, and it is bigger than $\alpha = 0.05$, there is no evidence to reject the normality of the residuals. Thus, the fit of the residuals of the response variable (Organization Performance) comes from a normal data.

Table 4: Goodness-of-Fit Test (Data Normality Test)

Shapiro-Wilk W Test	
W	**Prob<W**
0.976051	0.6115

Note: Ho = The data is from the Normal distribution. Small p-values reject Ho.

In Table 5, since the P-values of all variables (System and Information Quality, Customer Satisfaction, User Training, Organizational Leadership, and Organization Services Quality) less than $(\alpha = 0.05)$, these variables are statistically significant and have some effect on Organization Performance, and the linear regression equation will be:

Organization Performance = -0.638558+ 0.3859228 **(System and Information Quality)** + 0.2132607 **(Customer Satisfaction)** + 0.2576913 **(User Training)** + 0.1791974 **(Organizational Leadership)** +0.1319319 **(Organization Services Quality)**

According to the regression equation, the estimated beta of System and Information Quality= 0.3859228 and it shows the positive relation between (Organization Performance) and (System and Information Quality). In other words, with increasing every one-unit of (System and Information Quality) of the public universities, the Organization Performance increases by 38.59%. Besides, for Customer Satisfaction, the estimated coefficient = 0.2132607, and it shows that (Organization Performance) increases by 21.33% as increasing any one level more of Customer Satisfaction which are students and alumni. Likewise, the estimated coefficients of User Training, Organizational Leadership, and Organization Services Quality equal to 0.2576913, 0.1791974, and 0.1319319 respectively, indicating that with increasing any one-unit of these predicted variables (User Training, Organizational Leadership,

and Organization Services Quality), the response variable of Organization Performance severally increases by 25.77%, 17.92%, and 13.19%.

Furthermore, Table 5 shows the 95% confidence intervals of each variable, and it clarifies that the population mean value of each independent variable falls between the lower and upper of the variable with 95% confidence intervals.

Term	Estimate	Std Error	t Ratio	Prob>|t|	Lower 95%	Upper 95%
Intercept	-0.638558	0.246117	-2.59	0.0102*	-1.123966	-0.15315
System and Information Quality	0.3859228	0.056598	6.82	<.0001*	0.274297 3	0.4975484
Customer Satisfaction	0.2132607	0.04318	4.94	<.0001*	0.128098 9	0.2984225
User Training	0.2576913	0.059229	4.35	<.0001*	0.140875 2	0.3745075
Organizational Leadership	0.1791974	0.049859	3.59	0.0004*	0.080862 9	0.277532
Organization Services Quality	0.1319319	0.055796	2.36	0.0190*	0.021887 2	0.2419767

To show whether and how strongly pairs of variables are related, the correlation coefficient, which is a statistical technique, was used. There are two directions of the correlation coefficients as shown in Figure 3, in which the correlation coefficient value could be either positive or negative, and it is between -1 and +1.

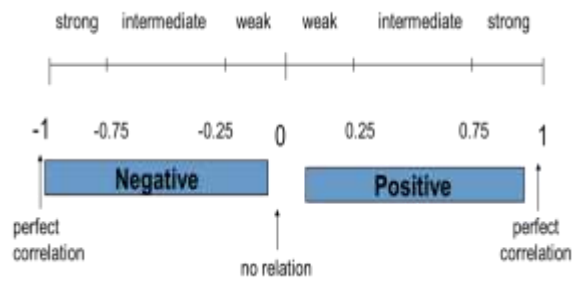

Figure 3: Strength and Direction of Correlation Coefficient

Table 6 illustrate the power of correlation between variables. As a result, the response variable (Organization Performance) has a positive and moderate correlation with each of the predicted variables. In other words, as each variable of predicted variables increases, (Organization Performance) also increases. Additionally, the Organization Performance of a public university has the strongest correlation with the current System and Information Quality of the university (0.6573) and has the lowest correlation with Organization Services Quality (0.4091). On the other hand, the results show that there is no any highly correlated between predictor variables (System and Information Quality, Customer Satisfaction, User Training, Organizational Leadership, and Organization Services Quality), indicating that there is not collinearity problem in the data which is one of the multiple linear regression assumptions.

Table 6: Correlation Matrix between Variables

Variables	Organization Performance	System and Information Quality	Customer Satisfaction	User Training	Organizational Leadership	Organization Services Quality
Organization Performance	1.0000	0.6573	0.5778	0.6119	0.5841	0.4091
System and Information Quality	0.6573	1.0000	0.4415	0.3835	0.4593	0.2534
Customer Satisfaction	0.5778	0.4415	1.0000	0.4527	0.2608	0.2379
User Training	0.6119	0.3835	0.4527	1.0000	0.5304	0.3197
Organizational Leadership	0.5841	0.4593	0.2608	0.5304	1.0000	0.4149
Organization Services Quality	0.4091	0.2534	0.2379	0.3197	0.4149	1.0000

Data from Figure 4 just as the results of Table 6 shows the correlations between the response variable Organization Performance with each of the predicted variables (System and Information Quality, Customer Satisfaction, User Training, Organizational Leadership, and Organization Services Quality) in one side, and between the predicted variables on the other side.

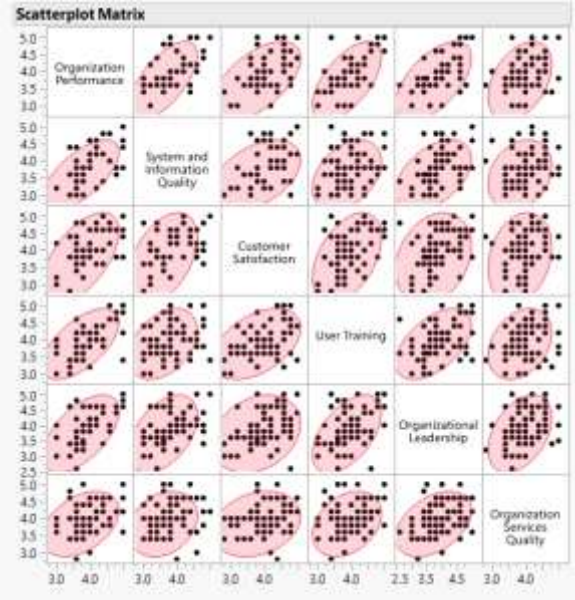

Figure 4: Scatterplot Matrix of the Correlation Between the Predictor Variables

5. Conclusion

The objective of this study is to demonstrate the role of using Management Information System application of improving the performance of the public universities and higher educational institutions in Sulaimani city of Iraq. According to the results, all predicted variables of (System and Information Quality, Customer Satisfaction, User Training, Organizational Leadership, and Organization Services Quality) are statistically significant and have a positive influence on the response variable which is Organization Performance of public universities. In other words, with increasing every one-unit of each of the explanatory variables in a public university, the Organization Performance of the university increases. Likewise, the results show that the existing System and Information Quality of a public university have the most impact on the Organization Performance of the university. In addition, the strongest and positive relationship between Organization Performance and System and Information Quality of the university compared to other relationships.

6. Recommendation:

- Similarity research and study could use on the management information system of the private universities to see the differences and resemblances with the management

information system of the public universities.

- It is recommended that the public university's management information system is technically updated its information systems constantly to improve the system and reduce the faults of the system, and it leads to improving organizational performance.
- The university management should have more seminars and training programs for university staff on how to use the information system in order to more effectively implement the management information system and improve their performance.

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Appendix

A copy of the questionnaire survey.

The Significance of Management Information System in Improving Organizational Performance and Effectiveness

This survey is to find out the role of MIS in governorate universities in Sulaimaniyah – Iraq.

Note: The questions asked and the information gathered will not be used in any other way and be kept **strictly confidential.**

Please tick the square that you see most suitable as: 1= very poor, 2= poor, 3= fair, 4= good and 5= very good

A. System **and Information** quality:

		1	2	3	4	5
1	How do you think the managing system that is used by your company is developed and up to date?					
2	Did technology helped in your company to make better decisions?					
3	the system Flexible enough in your opinion					
4	Does your company have fewer errors because of using IT tools?					
5	Does the information that you get at work is supported by computer systems?					

B. Top management support measure **(Organizational Leadership):**

		1	2	3	4	5
1	Has senior management encouraged the use of the MIS in your department?					
2	Do you think the leaders' behavior towards technology has affected your application of Mis at your organization?					
3	Does the management of your company understand the vital meaning and importance of MIS?					
4	Does the top manager participate in the decision-making process actively?					
5	Does the top management help you in finding resources and the needs for doing your job?					

C. Customer satisfaction:

		1	2	3	4	5
1	Do you think better managing **(the existing information system)** of your company will make customers more satisfied?					
2	Do you think your company management system is effective and efficient?					
3	Does your company have short time responses to their clients?					
4	Are the customers satisfied with the employees' performance?					
5	Does your company information system meet the expectations and needs of the customers?					

D. Personnel Issues (User Training)

		1	2	3	4	5
1	Is your company staff trained adequately to use MIS in the organization?					
2	Do personnel training influence the user's ability to request for information from MIS?					
3	Are the Security Strategies adopted for MIS use sufficient for protecting unauthorized access to information?					
4	Do you think it is appropriate to control access to the MIS database?					
5	Do you feel comfortable in using the system?					

E. Usefulness of the system **(Organization Performance):**

		1	2	3	4	5
1	The information available is appropriate to complete the work.					
2	Information system help in improving the efficiency of employee in the administrative system					
3	How much computer systems helped you to perform your job faster?					
4	How much using technology and managing it made productivity of you and					

	your company more?					
5	Did management systems help you to get announcement and information in the company easier?					

F. Organizational services quality

		1	2	3	4	5
1	Are you provided with appropriate devices & equipment to get the job done?					
2	Does the hardware available in the organization have a high capacity to accomplish the work required?					
3	Are the necessary expertise's available to deal within the devices with in the organization?					
4	Did the management of your company give you training on how to use computer systems at your job?					
5	Do the technical support teams have the knowledge to do their job well?					