



RELATIONSHIP BETWEEN HUMAN FACTORS AND ENTERPRISE RESOURCE PLANNING SYSTEM IMPLEMENTATION

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ABSTRACT:

Implementation of Enterprise Resource planning System (ERP) that has three stages; pre-implementation, mid-implementation and post-implementation. In many pervious works the researchers detected that the ERP pre-implementation stage failed at human factors. Therefore, this work studies the relationship between human factors and ERP implementation at Greater Amman Municipality (GAM) Case study. The statistical results showed that the human factor unaware of the importance of ERP system, which leads the system to fail.

Keywords: - Enterprise Resource Planning, ERP Implementation, Human factors, Public Service Organization, Top Management, Staff

1. INTRODCUTION

The implementation of any information system including the ERP system is sophisticated and complicated, and it requires a lot of preparations and readiness, although it is cost-effective on the long term, it can be costly to the organization to implement it.

Over the last few decades, there has been a great interest in the ERP system field, as the ERP system is an integrated solution to perform all basic functions in any organization regardless its field or activity (trade, non-profit, governmental, nongovernmental, and other large entities utilize ERP system. ERP system effectively integrates all information required by the operating process functions including finance, accounting, human resources, production, material management, allocation, distribution, sales, and reengineering, in addition to information technology. It is an integrated information system that integrates the enterprise's internal function working process, standardizes internal data processing procedures and combines the operational data generated by different

function [1]. It has been observed that the ERP system can be failure either in the design or implementation stage, the success or failure of the ERP system is subjected to many reasons, and the implementation of the ERP system in an organization can be very complex. It can be considered as a high-risk project since it almost affects the whole performance and functioning of the organization, thus it should be managed and planned properly. It is difficult and costly to implement the ERP system due to the tremendous needed time and resources.

The importance of this study that it discusses how the human factor does affect the ERP system implementation in the Jordanian organizations, it has recently used in the beginning, and the researchers are trying to figure out the factors that could affect the proper use of it. this study aims to enrich other studies about the ERP system, specially that it has been newly used in the Jordanian public service organizations. It should be mentioned here that Jordan is small country with few resources, and greatly influenced by the circumstances of the global economy. Besides, GAM represents the



Jordanian environment, it is an independent institution that uses its own resources, and it has been suffering from disability of budget, yet, GAM has recently implemented the ERP system, so this study is conducted to assess the readiness of GAM's human resources for such a huge project to ensure that the system is being implemented in a manner that achieves the best of it, and does not constitute a burden on the organization.

The GAM is going now through the early (pre-implementation) stage of the system, which make it possible for the researchers to monitor and observe the ability of the human factor to take responsibility for implementing the system, and that will consequently help to avoid the mistakes that could lead to system failure.

In addition to all above, this study can be considered as a foundation to other future studies regarding the ERP system implementation in governmental institutions and ministries in Jordan.

The Operational Definitions

ERP System: An integrated information system that helps the organization to integrate the functions and jobs to achieve the organizational goals.

ERP Implementation: A stage in the system Life Cycle and it is divided into: install, design, configure, test and prepare the software for use.

Top Management: A member of the senior management team that his/her role emerges as a leading advocate for the ERP project.

Staff: all the GAM's employees including managers, and excepting top managers

2. RELATED WORKS

Esteves, Pastor and Casanovas [2] studied the Measuring Sustained Management Support in ERP Implementation Projects. The results of this work are two folds; First, a Goals/Questions/Metric (GQM) Method plan to monitor and control ERP implementation projects is presented, second, a literature review on top management support and commitment on ERP implementation projects. This study attempts to define a first set of metrics for sustained management support in ERP implementation projects, and it is cited as the most relevant CSF in ERP implementation projects.

The study which is written in [3] aims to improve understanding of critical success factors affecting ERP implementation in Finland. The researcher explains that the Critical success factors may ensure

effective ERP implementation and a realization of the promised benefits. Factors affecting ERP implementation are complex and abundant. The research explain two variables of "Top management support" and "The Suitability of Software and Hardware" have been proven to be the extremely important factors in ERP implementation in Finland by the empirical data.

According to [4] research, he stated the Implementation of ERP system in USA and Malaysia, he claimed that adequate training programmed and psychological atmosphere are essential in the implementation of ERP. The results shows proper rewards, management openness to new ideas, human motivation and good crisis management are more important in the USA while appropriate operational technology, relationship of trust, gradual approach and ample time before deadline are more important in Malaysia.

[5] found that the human factors were one of the critical factors affecting ERP System implementation success in Jordanian business organizations.

[6] they looking for understand the difference between ERP implementation's CSF in developed and developing countries? Understanding this subject can help to implement ERP systems properly in developing nations. This research shows that in developed and developing countries "top management" was one of the important factors which necessary for success implementing ERP.

According to [7] the researchers selected 24 factors collected from the various past research studies. The top most five factors found to be critical were professional manpower, project scope definition, and business process re-engineering, top management support and change management. The research found professional manpower as the top most critical factor whereas different past studies showed top management as a top most factor. It is speculated that the professional manpower in countries like Pakistan may have less awareness and practical exposure of ERP system implementation. So the organizations may not ignore this factor during the implementation of ERP.

3. THE MODEL

The researchers depend on previous relevant studies in their approach to design the research model, they select the common factors among these studies that demonstrate the human factors that

affect the application of the ERP system, and join them in accordance with the Jordanian environment and the objective of the research to build the model.

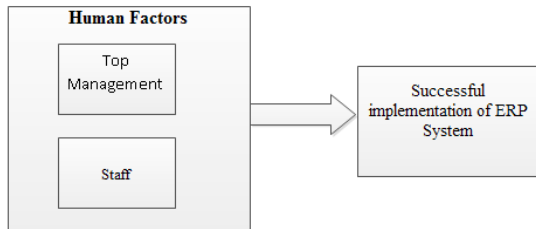


Fig. 1. Proposed Model: Relation between the Human Factors and the implementation of ERP

Figure (1) illustrates the proposed with the independent human factors affecting the ERP system implementation (the top management), the success of a major project like an ERP system implementation depends on the strong and sustained commitment of both the top management and the staff as they considered as the front line soldiers in the organization who are directly connected to the ERP system [8-14].

3.1. The Hypotheses

(H): There is a significant correlation between the human factors in general and the implementation of the ERP system.

(Ha): There is a significant correlation between top management support and the implementation of the ERP system.

(Hb): There is a significant correlation between staff and the implementation of the ERP system.

3.2. The Methodology

The methodology of this research is based on deductive and quantitative method, thus, a questionnaire is designed to measure the impact of the independent and dependent human factors on GAM.

3.3. The Population and Sample

The population of the research consists of the all employees in GAM/main branch, which is estimated around 2000 employees, the sample size of this population to achieve an acceptable size for analysis is 322 according to (Sekaran, 2006)[14]. (600) questionnaires were randomly distributed to the working staff in the GAM main branch building,

(400) of them were valid for analysis. Each item in the questionnaire was divided into 5-points according to Likert-type scale, and was determined in five levels as the follows: strongly agree given (5) degrees, agree given (4) degrees, neutral given (3) degrees, disagree given (2) degrees, and strongly disagree given (1) one degree. In addition, to use judge scale for the responses, which divided to (high, medium, low), depending on questionnaire four classes (1-1.99), (2-2.99), (3-3.99) and (4-5). By dividing judge scale classes on the five alternatives (strongly agree, agree, neutral, disagree, and strongly disagree (like the following calculation method) $1.33=3 \div (1-5)$ As the following in this research the level of significance of the measures was distributed according to table (1).

Table 1: Measures Significance Levels

Likert Scale Levels	Range
Strongly Disagree	1_1.80
Disagree	1.81_2.61
Neutral	2.62_3.42
Agree	3.43_4.23
Strongly Agree	4.24_5

3.4 The Statistical Analysis

The statistical analysis that is used the following statistical ways by using Statistical Package for the Social Sciences (SPSS) program version (12) to analyze every item in the questionnaire:

-Means and Standard deviation: to examine the hypothesis, and to identify the relative importance .

-Cronbach's Alpha: to verify the reliability of the used questionnaire, in this research, Cronbach's Alpha values ranged between (0.75 – 0.89)

- Correlation: is a term that refers to the strength of a relationship between two variables. A strong, or high, correlation means that two or more variables have a strong relationship with each other while a weak, or low, correlation means that the variables are hardly related. Correlation coefficients can range from -1.00 to +1.00. The value of -1.00 represents a perfect negative correlation while a value of +1.00 represents a perfect positive correlation. A value of (0.00) means that there is no relationship between the variables being tested. (www.sociology.about.com). In this study the researcher used Pearson correlation test to find a correlation between the dependent and independent variables [14].



In this research Correlation used to check the relation between the Human Factors and ERP System Implementation.

As for the questionnaire, the researcher calculated Cronbach's Alpha for all the areas to test the reliability for each area, Cronbach's Alpha values ranged between (0.75 - 0.89).

Table 2: Cronbach's Alpha for the research fields

Field	Value of (α)
Human factors	0.75

*The Cronbach's alpha statistical results in table (2) showed that there are stability distribution results at the human factor field (more than 0.6).

4. THE RESULTS AND ANALYSIS

The Results after applying the required Statistical Analysis are reviewed by describing the demographic characteristics of the paper sample as shown in table (3), after that the hypothesis testing results are reviewed below.

Table 3: Demographic characteristics for the research sample

Variable	Sample	
	Percentage	Frequency
Sex		
Male	57.2	229
Female	48.8	171
Total	100.0	400
Age		
25 years old or less	21.9	87
25 – less than 35 years	44.6	178
35 – less than 45	23.4	92
45 years or more	10.1	43
Total	100.0	400
Education Level		
Diploma	22.5	90
B.C.	64.9	259
M.S.	12.6	51
Total	100.0	400
Occupation		
Top Level Management	8.6	34
Middle Management	48.6	194
Operation	42.8	172

Management		
Total	100.0	400
Years of being in service		
Less than one – 5 years	33.3	133
5-less than 10 years	29.1	117
12 –less than 15 years	26.3	105
15 years or more	11.3	45
Total	100	400

To analyze the data and examine hypotheses, descriptive statistics for each field calculated, in addition to use multiple correlations. Means and Standard deviation calculated for each field in the independent factor (human factor) and table (4) shows the results.

Table 4: Descriptive Statistics for the Human Factors.

Factors	Descriptive	
	Mean	Standard Deviation
Human factors	2.48	0.59
1 Top Management Support	2.19	0.603
2 Training	3.93	0.577
3 User Perception of Use ERP System	2.38	0.592

The table (4) shows descriptive statistics for for the Human Factors as a independent factor, first the Top Management where the Mean is (2.19) and the Standard deviation around (0.603). The highest Mean for the sub- factor Training (3.93) with Standard deviation (0.577).

Table 5: Total mean for independent factors

Factors	Mean	Significance level
Human Factors	2.48	Disagree

For testing the hypotheses the researchers tries to answer two questions:



First: Is there a relationship between ERP System and the Human Factors?

Second: the availability (degree of readiness) of the Human Factors for ERP System implementation in GAM?

(H): There is a significant correlation between the human factor and the implementation of the ERP system in GAM.

The researcher adopted the following approach to examine this hypothesis, first, calculated the Means, Standard Deviation and factor analysis (loading) for each item of the human factors in GAM. Second, Pearson correlation is calculated. Tables from (6) to (9) show the results.

(Ha): There is a significant correlation between top management support and the implementation of ERP system.

Table (6) observes the results of the descriptive statistics and loading for the top management support.

- Total Mean is (2.19) with Standard Deviation of (0.603).
- All items are calculated in one group number (1).
- Highest Mean (3.07)
- In significance level is neutral for item number (5), with highest Standard deviation of (1.19).
- The Lowest Standard deviation is (0.506) for item number (10) and Mean of (2.33).
- The same Mean for items (1) and (8).

The total mean for group (1) is in disagree significance level which indicates a lack of the top management support for the implementation of the ERP system.

To testing this sub-hypothesis the researcher calculate the mean, standard deviation and factor analysis for all items (from 1 to 10) and calculate the correlation between group (1) which includes the items from (1 to 7) and group (2) which has the items (from 8 to 10).

Table 6: Descriptive Statistics and loading for the Top Management Support

Item	Mean	Std	Loading
1.The Top Management provides specialized managers to supervise the new ERP System in the organization.	2.33	.611	.790

Item	Mean	Std	Loading
2. The Top Management supports the solutions provided by the system.	2.37	.732	.821
3. The Top management fully supports the project manager during the preparation of the new ERP project.	2.40	.965	.854
4. The Top Management provides sufficient support for the work team responsible for the ERP System.	2.28	.797	.881
5. Top Management presents any needed of human resource when implementing the ERP System.	3.07	1.19	.878
6. Top Management presents sufficient money required for upgrading ERP System from time to time.	2.36	.861	.881
7. Top management presents full support to the maintenance operations needed to the system in our organization	2.87	.810	.880
8. The Top Management support the system in order to support the administrative decision making process.	2.33	.855	.846
9. The Top Management likes sometimes to be part of the change project.	2.61	.708	.694
10. Top Management presents support in order to employees participation in applying a new system.	2.33	.506	.800
Total	2.19	0.603	

Table (7) shows the result of Pearson correlation between top management (Group 1) and the ERP system (Group 2).

Table 7: Relation between Top Management and ERP System

		Group 1	Group 2
Group 1	Pearson Correlation	1	.571(**)
	Sig. (2-tailed)	.	.000
	N	400	400
Group 2	Pearson Correlation	.571(**)	1
	Sig. (2-tailed)	.000	.
	N	400	400

**Correlation is significant at the 0.01 level (2-tailed).



Group 2 consists of the items (11,12,13, and 14) taken from the questionnaire as shown in table (8). By looking at this table, we can perceive the positive correlation between top management and ERP system.

Table 8 : Descriptive Statistics and loading for the ERP System

Item	Mean	Std	Loading
11.ERP System support and success the decision making processes.	4.05	.558	.847
12.ERP System can support and achieve our objectives.	4.14	.647	.805
13.ERP System will contribute in enhancing the exchange of ideas & experiences between the employees in the organization.	4.08	.573	.877
14.The ERP System in the organization helps in facilitating the tracking of the operations in any department at any time.	2.41	.510	.677
15.ERP System has positive effects on groups' values regarding learning & innovation issues.	4.05	.677	.916
16.The new (ERP) system will facilitate information sharing & exchanging experiences between the employees.	3.98	.681	.894
17.ERP System in the organization contributes in facilitating the work procedures.	2.46	.530	.617
18.The ERP system will increase the capacity of communication between citizens and Employees.	4.10	.628	.854
Total	3.70	0.527	

Hence, referring to tables (7) and (8), the Hypothesis can be stated as:

(Ha): There is a significant correlation between top management support and ERP system implementation. "Acceptable", however, the lack of the top management support will consequently lead to the system implementation failure.

(Hb): There is a significant correlation between staff and the ERP system implementation. In order to test the Hypothesis, the researcher used two groups; first, (Group3): (The employees training), this Group

includes the items from (19) to (28). Table (9) shows the descriptive statistics and loading for the staff training.

Table 9: Descriptive Statistics and loading for the Staff Training

Item	Mean	Std	Loading
19. A time table was set to train all the users of the new ERP system.	3.01	.894	.624
20. The training program of ERP System provides the users with all the needs to understand and use the system.	2.81	.925	.776
21. The training capabilities of the ERP System provided by the organization are sufficient to support the technological change resulted from Applying the system	1.85	.890	.730
22. We have a comprehensive training plan to train the employees on using the new system.	2.01	.788	.674
23. The capability of the training programs affects the success of the ERP System.	1.84	.908	.771
24. We have special sets and software to train our employees on ERP System	2.11	.868	.790
25. The ERP System in the organization is simple and assesses the users in self-training through following the instructions.	2.24	.905	.821
26. The training on the ERP System in the organization needs to set a special procedure before training the employees on using it.	2.07	.813	.854
27. The organization provides the qualified employees & the requirements needed to train the users on using the system.	2.49	.950	.881
28. Training the employees before implementing the ERP System contributes in minimizing mistakes during using the system in the future.	2.17	.829	.712
Total	2.43	.577	

The other Group is (Group 4) (The perception of the ERP system use), and it includes the items from (29) to (37). Table (10) demonstrates the descriptive statistics and loading for the perception of the ERP system use.

- The Mean of the most items which were calculated in group number (3) is in disagree



significance level with total Mean of (2.43), and standard deviation of (0.577).

- The highest Mean is (3.01) for item number (19)
- The lowest Mean is (1.84) for item number (23) with Standard deviation of (0.908).

The above indicates that the employees don't have enough training for using the ERP system.

The results in table (10) are consistent with the level of the staff's perception and understanding of the importance of this system.

Table 10: Descriptive Statistics and loading for the Perception of Use ERP System

Item	Mean	Std	Loading
29. Our employees did not find difficulties in dealing with the ERP System.	2.35	.974	.762
30. ERP System in the organization is easily understood due to its capabilities and usage.	2.41	.594	.684
31. ERP System in the organization contributes in facilitating the work procedures.	2.46	.630	.617
32. The ERP System in the organization is flexible	2.32	.724	.752
33. The ERP System in the organization is easy to be reached & dealt with.	2.36	.693	.638
34. The ERP System in the organization helps in facilitating the tracking of the operations in any department at any time.	2.41	.510	.677
35. ERP System in the organization is easily understood.	2.35	.703	.754
36. ERP System in the organization is easy to learn.	2.40	.540	.743
37. The new ERP System in the organization is responding fast to the citizens needs and quickly inserts the request in the system	2.44	.866	.694
Total	2.38	0.592	

- It is shown in table (10) the Mean of (Group 4) which is (2.38), and that means that it is in disagree significance level with Standard deviation (0.592).
- The highest Mean for item (31) is (2.46)
- The lowest Mean for item (32) is (2.32) with Standard deviation of (0.724).

To test the correlation between the staff and the ERP system, the researchers used two groups; (Group 5) (which includes groups (3) and (4) for staff), and (Group 6) (which includes the items (12, 13, 15, 16, 17 and 18) from the ERP system questionnaire shown in table 3).

Table(11) shows that the correlation between the staff and the ERP system is (0.621) in significance at the 0.01 level (2-tailed). that means that there is a positive correlation between the two variables, accordingly, the awareness of the staff about the importance of the ERP system will lead to a success of system implementation, but, tables (9) and (10) show that the staff is unaware of the importance of the system.

Table 11: Correlation between Staff and ERP System

		Group 5	Group 6
Group 5	Pearson Correlation	1	.621(**)
	Sig. (2-tailed)	.	.000
	N	400	400
Group 6	Pearson Correlation	.621(**)	1
	Sig. (2-tailed)	.000	.
	N	400	400

**Correlation is significant at the 0.01 level (2-tailed).

According to the above results:

Hypothesis (Hb): There is a significant correlation between the staff and the ERP system implementation "Acceptable", but the lack of the staff's perception of the ERP use and the poor training leads to the failure of the system implementation.

From all stated results the researchers conclude that:

(H): There is a significant correlation between the human factor and the implementation of the ERP system in GAM "Acceptable".

5. CONCLUSION

This work has presented the relationship between Human Factors (Top managements and Staff in GAM) and ERP system at the pre- implementation stage, the statistical results showed that the correlation between the Human Factors and ERP system positively significant. Therefore, the success of ERP system implementation depends on the Human Factors awareness about the importance of the system. However, the human factors are unaware of the importance of the system due to not acquiring



enough training for using the ERP system, which leads the system to fail.

To solve the unawareness problem, GAM should make workshops and training courses about the characteristics of the ERP System and its importance, flexibility, usability for Staff and Top management, and to participate Staff members whom involve in the ERP System Implementation to guarantee decreasing their refusing of accepting the ERP system, supported by Top management commitment.

References

1. Adam, M. (2009). The Critical Success Factors OF Enterprise Resource Planning Implementation: Malaysian and American Experiences. *University* . Cyberjaya, Malaysia: Multimedia University.
2. Almashaqba, Z. (2009). Critical Factors Affecting An Enterprise Resource Planning Systems (ERPs) Implementation Success In Jordan. *University* . Amman: The Arab Academy for Banking and Financial Sciences.
3. Bradford, M. (2000). The Implementation of Enterprise Resource Planning: An Innovation Diffusion Approach. *University* . Knoxville: University of Tennessee.
4. E. J.Umble, a. M. (2002). Avoiding ERP implementation failure. *Industrial Management* , 44 (1), 25-33.
5. J. Esteves, J. P.-C. (2002). Measuring sustained management support in ERP implementation projects: a GQM approach. *Proc. Americas Conference on Information System* , Vol. 8, Paper 190.
6. J. Motwani, D. M. (2002). Successful implementation of ERP projects: evidence from two case studies. *International Journal of Production Economics* , 75 (1), 83-96.
7. L. Zhang, M. K. (2003). Critical success factors of enterprise resource planning systems implementation success in China, Proc. . *Annual Hawaii International Conference on System Sciences* , 36, pp. 10.
8. M. Moohebat, A. A. (2010). A Comparative Study of Critical Success Factors (CSFs) in Implementation of ERP in Developed and Developing Countries. 2 (5), 99-110.
9. P. Bingi, M. K. (1999). Critical issues affecting an ERP implementation. *IS Management* , 16 (3), 7-14.
10. S. I.H. Shah, R. H. (2011). Socio-technical factors affecting ERP implementation success in Pakistan: an empirical study. 5 (3), 742-749.
11. S. M. Imroz, L. R. (2009). Application of Q-methodology in Critical Success Factors of Information Security Risk Management . *University* . Omaha: University of Nebraska.
12. Sekaran, U. (2006). *Research methods for business: A skill building approach* . NewYork: John Wiley & Sons.
13. Stephen, J. (2000). *Keeping Up with ERP* . Ohio: Machine Design.
14. Yingjie, J. (2005). Critical success factors in ERP implementation in Finland. *University* . Sweden: The Swedish School of Economics and Business Administration.