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A Post Evaluation Framework to Evaluate ERP Project's Acceptance and Success in Saudi Arabia: Multi-Case Studies

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Abstract: Nowadays, the innovative technologies are the main part of the business organizations, which always support their business culture and processes. In recent years, several tools has been introduced. Enterprise Resources Planning (ERP) system is one of the information systems, which highly support business ideas and assist in their strategies. This research is focused on to measuring the impact and success of ERP in organizations. The research idea proposed in this study is using multi-dimensional approach by integrating the previous models based on the understanding and requirements of ERP project success factors.

Keywords: Enterprise Resources Planning (ERP), various factors, JR2, EFA.

1. INTRODUCTION

ERP project's implementation, acceptance and evaluating its impact on business organization is a complex procedure and requires multiple steps to apply it. The broad literature review presented in previous paper, acknowledged several approaches, variables and phases, proposed by different scholars which depend on particular circumstances of a country or organization where the proposed research applied. The research idea proposed in this study is using multi-dimensional approach by integrating the previous model based on the understanding and requirements of ERP project success factors.

Firstly, the study start with introducing the factors and variables used in research instrument. Further researcher presents the common characteristics of selected participants in each case study. Next the summary of different questions asked in interview session are illustrated in the tables to understand the responses in number format. Next the researcher validate and refined the proposed model using factor analysis. The relationships between the variables and correlation between different factors presented to highlight the significance of the research instrument and proposed model.

2. CRITICAL SUCCESS FACTORS – OVERVIEW OF RESEARCH INSTRUMENT

This research is focused on to measuring the impact and success of ERP in organizations. Therefore, to prove the methodology several variables has been used to discuss with the list of selected participants during the research process. Multi-dimensional variables investigated in this research which first confirmed and validated by experts in preliminary phase. The survey instrument designed to ask the opinion of participants selected from five case studies. Whereas each variable used in this research has been investigated with the help of at least two questions. The number of questions used under each variable is illustrated in table (1).

Table (1) number if items for each variable

Type of Factors	Factors	No. of Items
User Related Factors	Information Quality	3
	System Quality	2
	Service Quality	2
	Output Quality	2
	Job Relevance	3
	Image	2
	Result Demonstrability	3

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Intermediate Factors	Subjective Norm	4
	Perceived Usefulness	4
	Perceived Ease of Use	3
Success Indicators	Intention to Use / Use	5
	User Satisfaction	2
	Informational Benefits (Expert's Suggestion)	2
	Strategic Benefits (Expert's Suggestion)	2

3. ANALYSIS ON DATA COLLECTION

Multiple sources used to collect data from selected participants in five case studies. Mainly, literature review, questionnaire, expert suggestion, and interviews are the methods used in data collection. The list of evidences collected to support the idea presented in this research, which further confirmed with the help of experts as this is one of the important aspects of data collection as discussed by [1]. In this study, the findings are documented and analyzed using different quantitative and qualitative methods as described in later sections.

3.1. BASIC CHARACTERISTICS OF CASE STUDIES

Firstly, in this section some general characteristics presented from the data collection based on each case study. Therefore, four figures presented in this phase where each figure demonstrate the participants and case studies information in different ways. The idea here, is to understand the overview of number of participants, their experiences in using ERP systems, the size of the company and their level of work in the organization.

Altogether, 200 questionnaires sent to five different organization, in which, 150 returned with answers. Due to less number of experience using ERP, and incomplete and insufficient information, 20 questionnaires were discarded. Therefore, for final analysis and discussion 130 questionnaires were found with suitable and complete information. The total number of participants is feasible and meeting with the criteria explained by [2] as suggested that there must be 5 questionnaire of each variable selected in the research.

Figure (1) illustrates that there are total 130 participants have taken part in this research. The figure highlights that, from the organization Airline has largest number of respondents, which participated in this study. During the investigation it is evident that Airline is the large size organization using different kinds of ERP system in various departments. In addition, education1 is on the next by showing there were 30 participants took a part in this study. On the other side, bank1 is the firm showed least number of respondents took a part in this study. Education2 (25) and bank2 (20) are the remaining organization which provided their participation in this research work positively.

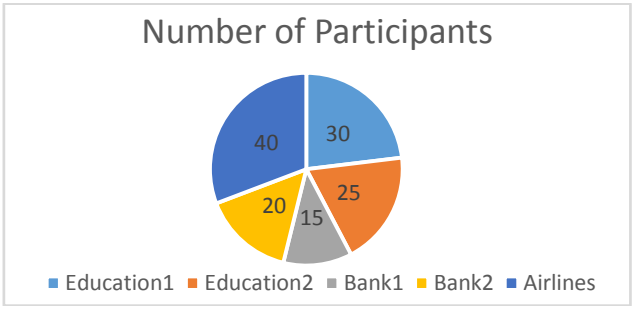

Figure (1) Number of Participants

Figure (2) is the figure demonstrates the number of employees in each organization. The question were asked from the participants to provide the approximate number of employees working in those organization. The purpose here is to understand the size of the organization, which can also help us to analyze the results based on their working environment, and we can imagine the approximate size of queries handle everyday by ERP system. Based on the values provided in this figure, education2 and Airline are the largest organizations supported us in this research, as the size of these companies is around 1000 employees. On the other side education1, bank1 and bank2 showing different number of employees such as 800, 200 and 300 respectively. The size of the organization also demonstrate the overall size of the internal and external stakeholders connected with the organization. It positively highlighting that the selected organizations in this research has great use of ERP system based on number of employees.

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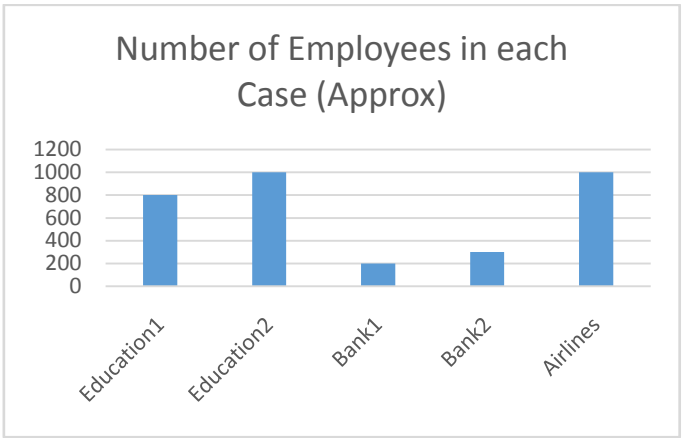

Figure (2) Number of Employees

The next question were asked to understand the credibility of each participants selected in this study by finding out respondent's number of experience working on ERP system. To know the participants experience while using and working on ERP system is the essential question in this study, as the main objective can only discovered from the participants which has at least some years of experience with working on ERP projects. As discussed earlier some of the questionnaires from participants were also discarded due to very less experience in working on ERP system. In this scenario, it can be clearly seen that the maximum number of participants taken part in this study having experience between six to ten years. While, the most experience participants (40 in numbers) in this study having ten or more than ten years of experience on ERP systems.

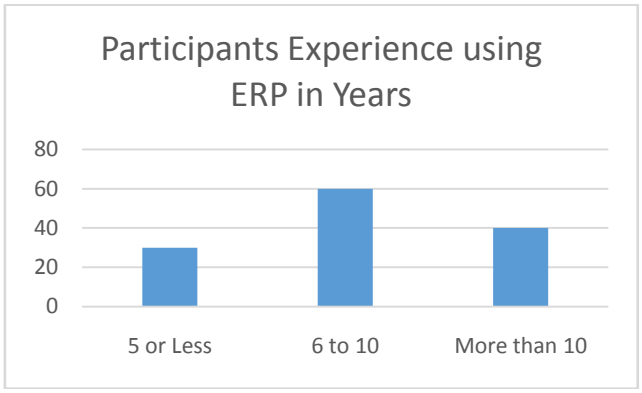

Figure (3) Participants Experience using ERP

The last figure (4) in this phase is to determine the level of participants in their respective organization. The question were asked to get the idea of their level using their designation in working organization. This figure highlights that from total number of 130 participants, while all of them have good experience working on ERP system, the most of them were assistant managers and regular users of the participants. This give us positive impact to this research as discussed in previous researches [3] that regular users and assistant managers are the main participants which can provide insight of ERP project with good intentions. While working on daily routine queries these kind of users are the powerful participants which can create positive impact on the results of the research on ERP system.

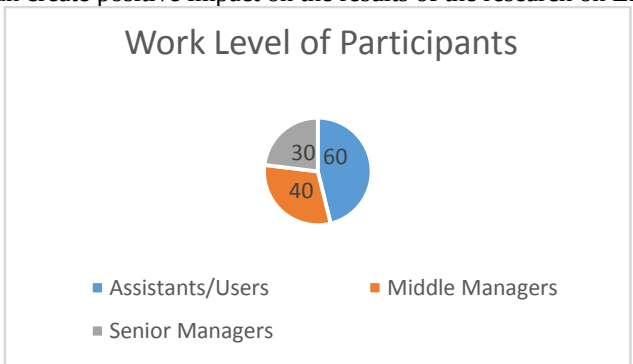

Figure (4) Work Level of Participants

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4. ERP PROJECT: ANALYSIS ON CSF IN CASE STUDIES

Based on the above explanation, it has been evident that ERP system creates positive impact on the organization. During the discussion with the participants in case studies, the previous section explores the summary of different general questions asked from them. Furthermore, this section provides the data analysis collected with the help of designed questionnaire. For a clearer understanding, a well-prepared questionnaire using a Likert scale, from 1 to 7, which designed to examine how strongly subjects agree or disagree with the statement [4].

In general, all participants agreed that ERP projects are essential for the organization in current situations. Whereas it provides positive benefits to the organization. To provide understanding from the dataset Table (7) illustrates the summary of means and variance for the critical success factor, user-related variables. Altogether, there are 7 variables under user-related factor, which further consists of 17 items which were asked from five case studies. As shown in the table, the mean value for each variable is above 5 except JR2 (Job Relevance variable). Which highlights that all of the participants were their level of agreement. The possible reason for this low score variable is that might not suggested the correct item for this variable. On the other side, the highest values 5.8 achieved by OQ1 (Output quality), as output quality can majorly improve by using ERP system.

Table (7) Means of CSF – User Related Variables in Case Studies

Variable	Label	Min	Max	Mean	Variance
Information Quality	IQ1	5	7	5.4	2.7
	IQ2	1	7	5.2	2.0
	IQ3	3	7	5.7	1.9
System Quality	SQ1	5	7	5.3	2.9
	SQ2	1	7	5.2	2.4
Service Quality	SRQ1	1	7	5.2	2.4
	SRQ2	3	7	5.7	1.9
Output Quality	OQ1	2	7	5.8	1.8
	OQ2	5	7	5.4	2.7
Job Relevance	JR1	3	7	5.7	1.9
	JR2	1	7	4.2	2.5
	JR3	1	7	5.2	2.0
Image	IM1	3	7	5.7	1.9
	IM2	5	7	5.3	2.9
Result Demonstrability	RD1	1	7	5.2	2.4
	RD2	1	7	5.2	2.8
	RD3	5	7	5.4	2.7

The second category of critical success factors is the list of intermediate variable as depicted in Table (8). Intermediate variables are those who can indirectly influence the organization, and can be helpful during the evaluation process of ERP system. For this phase, 11 different question were investigated from the participants in five case studies. All items were associated with four different kind of variables under this category. Almost all items in this category received the level of agreement from the participants except two variables (SN3 & PE1). The mean value received for SN3 and PE1 is between 4 and 5, which highlights that the items are not clearly understand or agreed by the participants. Moreover, in this category the highest score 5.8, variable can be seen in the table is SN4, which is related to subjective norm. The question was about to use of ERP system whenever it requires, and appreciated by the senior management. The participants has shown high level of agreement with this item, which is showing, the use of ERP system is very important whenever it required. As this is, the first stage of analysis, therefore, the low-scored variables has not excluded from the model. However, it went through to the next step of exploratory factor analysis, to get better understanding about the irrelevant items in the variables.

Table (8) Means of CSF – Intermediate Variables in Case Studies

Variable	Label	Min	Max	Mean	Variance
Subjective Norm	SN1	1	7	5.3	2.2
	SN2	1	7	5.2	2.8
	SN3	1	7	4.7	2.7
	SN4	2	7	5.8	1.8
Perceived Usefulness	PU1	1	7	5.2	2.0
	PU2	1	7	5.3	2.2

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	PU3	1	7	5.2	3.0
	PU4	5	7	5.6	2.3
Perceived Ease of Use	PE1	1	7	4.7	2.7
	PE2	5	7	5.4	2.4
	PE3	1	7	5.3	2.2

Table (9) Means of Success Indicators in Case Studies

Variable	Label	Min	Max	Mean	Variance
Intention to Use / Use	IU1	3	7	5.7	1.9
	IU2	1	7	5.2	2.4
	IU3	2	7	5.8	1.8
	IU4	3	7	5.5	3.0
	IU5	5	7	6.3	0.9
User Satisfaction	US1	3	7	5.7	1.9
	US2	5	7	5.4	2.4
Informational Benefits	INF1	5	7	6.3	0.9
	INF2	5	7	6.0	0.7
Strategic Benefits	ST1	5	7	5.3	2.9
	ST2	1	7	5.2	2.0

The last category of variable used in the proposed model was related to success indicators of ERP system as illustrated in Table (9). These variables will actually provide the level of acceptance and success of ERP system in an organization. To get the answer of these variables 11 question were asked from the participants under four different kinds of variables.

In addition, in this category two new variables were introduced after the preliminary phase in this research. The experts suggested to replace the net benefit by informational benefits and strategic benefits, as both of them are most common benefits we can achieve through ERP system. In the main study, it can be clearly seen that both of the variable highly supported by participants from five case studies. Whereas informational benefits got more than 6 mean in both items, which is showing that the respondent has shown high level of agreement with this kind of benefits and can be achieved through ERP system. On the other side, almost all variables has shown their level of agreement as shown in Table (4.9) that mean values for each item is more than 5, whereas 5 demonstrate that the participants has somewhere agreed with the item.

In addition, to filling the survey using five case studies, as discussed in Table (7, 8, 9), we further asked the same kinds of questions from expert panel. The purpose here to compare the level of understanding between case studies and experts. Table (10), illustrates the summary of each variables, corresponding to the number of item. Whereas the next columns showing the mean and variance values between the case studies and expert judgement.

According to the Table (10), the level of agreement with the expert is high, as the number of expert was much lower than number of participants in case studies. In both ways, the level of agreement shown positive from the case studies and expert judgment. Information benefits has achieved high means from both case studies and with expert as well. On the other side, there is no significant difference in any variable except the job relevance variable which shows the 5 in case studies and 6 in expert judgment. The possible reason is experts might understand the level of question more accurately rather in case studies they might have confused by giving the answer for this question. Otherwise, in other variable the difference between the mean values in case studies and expert judgement have not shown high difference. This indicates the possible outcome of the proposed model is positive in the eye of experts and case studies. Therefore, the model is further analyzed through exploratory factor analysis in the next section. Before that, following are number of figures to understand more about the opinion collected from case studies and experts.

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Table (10) Comparison of CSF between Case Studies and Expert Judgment

Variables	No. of Items	Case Studies		Expert Judgment	
		Mean	Variance	Mean	Variance
Information Quality	3	5.4	2.8	5.8	1.5
System Quality	2	5.2	2.5	6.1	0.4
Service Quality	2	5.5	2.6	6.3	1.0
Output Quality	2	5.6	2.4	6.3	0.5
Job Relevance	3	5.0	2.5	6.0	1.2
Image	2	5.5	2.4	6.3	0.5
Result Demonstrability	3	5.2	2.5	6.2	0.6
Subjective Norm	4	5.2	2.1	6.3	1.1
Perceived Usefulness	4	5.3	2.5	6.1	0.4
Perceived Ease of Use	3	5.1	2.5	6.0	1.2
Intention to Use / Use	5	5.7	2.4	6.3	0.5
User Satisfaction	2	5.5	2.5	6.1	0.4
Informational Benefits	2	6.1	2.6	6.3	1.0
Strategic Benefits	2	5.2	2.4	6.2	0.4

5. Evaluating Instrument Reliability and Correlation

After detailed discussion on descriptive and statistical summary on collected data from case studies and experts on ERP project acceptance and success model presented in previous section. This section, demonstrate the next test perform to assess the instrument's reliability. Instrument's reliability is the important test to perform which can provides the analysis on how reliable are the instrument's items. It further describes the correlation between the variables and under each variable the different items. Here, variable means the main critical success factor proposed in the model, while items mean the list of the questions asked from the respondents.

Therefore, evaluating the overall instrument's reliability, Cronbach's alpha test performed. The test analyze the instrument through the means of items under each variable, which also highlights the inter-correlation between the items. For each variable if the value of Cronbach's alpha is close to 1, means the correlation between the items is very high, and they are internally consistent with each other. Cronbach's alpha is highly supported and used by many scholars in their researches, for measuring the internal consistency of the items [4]. As defined, the value of this test vary from 0 to 1 (closer to 1 means high consistency).

According to the scholars the lowest acceptable value for this test is 0.70 [2]. After performing this test, it can be seen in Table (11) that all of the items are showing the value more than 0.70, which indicate that the instrument's items are acceptable, understandable and adequate and can be used for further analysis. In this scenario, only the subjective norm is the variable which got just acceptance value which is 0.70. Subjective norm is the variable which is quite descriptive and complex in nature as discussed earlier [5].

Therefore, the lowest value of subjective norm in reliability test also suggesting that the same case happened by investigating this variable in Saudi organizations. But as researchers discuss previously, that subjective norm is effective variable in evaluating the performance and impact of ERP system in an organization. To keep in this mind, the variable kept in the model for further analysis and validation purposes, using exploratory factor analysis performed in later section in this study.

Table (11) Instrument's Reliability Test

Type of Factors	Factors	No. of Items	Cronbach's Alpha
User-Related Factors	Information Quality	3	.82
	System Quality	2	.78
	Service Quality	2	.89

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	Output Quality	2	.90
	Job Relevance	3	.76
	Image	2	.89
	Result Demonstrability	3	.93
Intermediate Factors	Subjective Norm	4	.70
	Perceived Usefulness	4	.87
	Perceived Ease of Use	3	.75
Success Indicators	Intention to Use / Use	5	.90
	User Satisfaction	2	.91
	Informational Benefits	2	.92
	Strategic Benefits	2	.95

6. MODEL VALIDATION USING EXPLORATORY FACTOR ANALYSIS

Table (11) proved the internal consistency of the instrument used in this research in data collection process to verify the ERP acceptance and success model presented in previous study. After successful test of Cronbach's alpha, in this section, the proposed framework factors validated using Exploratory Factor Analysis (EFA). Factor analysis is the test used to validate the instrument using the data collected from multiple resources and numerous respondents. It normally performed to explore the principal structure in the presented data model [6].

EFA helps the researcher to differentiate between the variables and their corresponding item by using statistical analysis and measuring inter-correlation between the dimensions and respective measuring factors. In addition, it also provides the analysis where researcher can understand the unrelated items or variables based on understanding of selected data sets [7]. Macada and Beltrame (2012), performed the EFA test on their proposed model using the data sets collected form Brazilian firms, explained that EFA is implemented to find out the correlation between the factors presented in the model by articulating new sets of variables based on communal characteristics, known as factors.

In this section, the EFA applied on the selected data using all explanation and requirements described in previous researches [2], [6]. The purpose for applying EFA is to validate the model using set of criteria and dimensions. It will further help to identify the correlation between the variables, and specially exclude the items, which are unrelated.
There are different criteria presented by scholars, which can be helpful to understand the difference between best-fit variables and worst fit variables. It further works to keep the variables, which care best fit, while the unconnected items need to be removed from the model to make it perfect. Scholars explained the standard ways of applying the factor analysis; firstly, the eigenvalues must be larger than 1 in order to accept the factors. Secondly, the Keiser-Meyer-Olkin (KMO) value must be 0.6 or above, which helps to evaluate the sampling fit of items. Thirdly, the Bartlette's sphericity test must be lower than the alpha value, which helps to identify the inter-correlation between the variables presented in the model. In addition, [2] suggested the criteria for number of questionnaire required for applying factor analysis, which is minimum 5 responses is essential for each variable.

Furthermore, the scholar suggested the values for accepting the factor loading for each items is based on the three standard factor loading values, which are +/0.30 (considered acceptable), +/0.50 are (moderately important), and +/0.70 (very important) [2]. It means, if the values are between 0.30 to 0.50, have very low chances of acceptance, as the variable has very low correlation and therefore, must be removed. On the other side, if the factor loading values are between 0.50 to 0.70, are reasonably important, based on the analysis it can be removed if not beneficial. Lastly, if the factor loading values are bigger than 0.70, means the variables are much correlated and should be remained in the original model.

Keeping in mind all the standards and requirements of factor analysis, the instrument's validity applied using principal component analysis method to load the factors and achieve acceptable measuring factors. In addition, to principal component analysis, varimax rotation and Kaiser Normalization were selected for statistical analysis. The result of factor loading for user-related variables is shown in Table (12).

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Table (12) EFA for User-Related Variables

Variables	Items	Factors						
		1	2	3	4	5	6	7
Information Quality	IQ1	.19	**.80**	.11	.23	.29	.41	.28
	IQ2	.10	**.76**	.12	.20	.23	.42	.33
	IQ3	.19	**.85**	.11	.21	.28	.17	.33
System Quality	SQ1	**.91**	.28	.41	.23	.48	.27	.15
	SQ2	**.85**	.33	.42	.45	.11	.31	.17
Service Quality	SRQ1	.13	.29	.23	.34	.28	.12	**.87**
	SRQ2	.12	.23	.20	.19	.33	.11	**.79**
Output Quality	OQ1	.23	.45	**.86**	.19	.15	.33	.45
	OQ2	.20	.46	**.80**	.25	.17	.41	.30
Job Relevance	JR1	.29	.11	.25	**.89**	.25	.33	.27
	JR2	.23	.12	.24	.24	**.40**	.26	**.30**
	JR3	.28	.11	.27	**.76**	.27	.17	.45
Image	IM1	.28	.48	.35	.30	.13	**.86**	.29
	IM2	.33	.40	.31	.25	.12	**.77**	.23
Result Demonstrability	RD1	.23	.27	.29	.15	**.76**	.25	.11
	RD2	.20	.31	.23	.17	**.80**	.21	.12
	RD3	.21	.18	.28	.36	**.82**	.37	.11

The result in Table (12) illustrates that the seven factors determined with larger than 1 value of eigenvalue with total explained variation was 78.05% in all measuring items. The value of sampling accuracy recorded as greater than 0.6, showing that all measuring factors can be included in factor analysis. Furthermore, value of KMO was 0.911, which is highlighting that the test was successful. Based on the KMO value, the result can be indicated as "marvelous" as described by Kaiser and Rice (1974), which shows that the test sample is "fit". Finally, the Bartlette's test (0.00) was significant and suggested that most of the items are correlated.

The EFA test run and explained the proper factor loading, which extracted seven factors as user-related variables also consist of seven factors namely; information quality (factor 2), system quality (factor 1), service quality (factor 7), output quality (factor 3), job relevance (factor 4), image (factor 6) and result demonstrability (factor 5) as depicted in Table (12). To make proper understanding and interpretability the suppress value assigned in this test was .10. Whereas the selection criteria for each item is based on under which factor it has got the highest values within the row. Based on the suppress value, all factors loaded within the range of the values between .10 to .91.

Table (12) highlights the seven factors extracted which ultimately making the test successful as initially user-related variable were seven as mentioned in designed instrument. Furthermore, all items were loaded under the same factor as described in this section. Proper differentiation and discrimination is feasibility seen in the results generated with exploratory factor analysis. The value for each item as shown in Table (12) is higher than 0.5 factor loading, which considered the good for the significance of factor loading as described by [2]. All items' values loaded greater than .50 are significant and positively accepted for the factor under which it has been loaded.

Other than the appropriate factor loading in all factors with their corresponding items, only item JR2 which is related to Job Relevance factor is not loaded properly. JR2 is cross-loaded into two factors; factor 5 which is related to result demonstrability and factor 7 which belongs to service quality. In each factor the value of JR2 is loaded as .40 in factor 5 and .30 in factor 7. As described by the [2] that if the value of factor loading for any item is loaded between .30 to .50 can be accepted if they can related to the particular factor where its loaded.

Table (13) EFA for Intermediate Variables

Intermediate Variables				
Variable	**Items**	**Factors**		
		1	**2**	**3**
Subjective Norm	SN1	.12	**.89**	.37
	SN2	.26	**.69**	.24

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	SN3	.23	**.90**	.31
	SN4	.28	**.87**	.26
Perceived Usefulness	PU1	**.87**	.12	.38
	PU2	**.79**	.25	.15
	PU3	**.91**	.12	.16
	PU4	**.82**	.25	.36
Perceived Ease of Use	PE1	**.37**	**.45**	.29
	PE2	.35	.23	**.76**
	PE3	.31	.28	**.79**

Therefore, the possibilities have been checked if JR2 can possibly be merged with result demonstrability and service quality. The first factor where JR2 is cross-loaded is "result demonstrability", which is related to ask from the users about what they feel if they can discuss and show the results generated by ERP system to others. Based on this description the item JR2 (job relevance) does not match with result demonstrability in any ways. On the other side JR2 also checked with the second factor known as "service quality". In this factor the items asked from the users were related to check their opinion about the quality of services provided by the ERP system. In conclusion, due to low loading and cross-loading in two different factors the JR2 eliminated from the model.

The second factor analysis performed on intermediate variables, which is the second part of the designed instrument. Based on the all standards and requirements of factor analysis [2], the instrument's validity applied using principal component analysis method to load the factors and achieve acceptable measuring factors. In addition, to principal component analysis, varimax rotation and Kaiser Normalization were selected for statistical analysis. The result of factor loading for intermediate variables is shown in Table (13)

The result in Table (13) demonstrate that the three factors determined with larger than 1 value of eigenvalue with total explained variation was 75.15% in all measuring items. The value of sampling accuracy recorded as greater than 0.6, showing that all measuring factors can be included in factor analysis. Furthermore, value of KMO was 0.90, which is highlighting that the test was successful. Based on the KMO value, the result can be indicated as "marvelous" as described by Kaiser and Rice (1974), which shows that the test sample is "fit". Finally, the Bartlette's test (0.00) was significant and suggested that most of the items are correlated.

The EFA test run and explained the proper factor loading, which extracted three factors as intermediate variables also consist of three factors namely; Subjective Norm (factor 2), Perceived Usefulness (factor 1) and Perceived Ease of Use (factor 3) as shown in Table (13). To make proper understanding and interpretability the suppress value assigned in this test was .10. Whereas the selection criteria for each item is based on under which factor it has got the highest values within the row. Based on the suppress value, all factors loaded within the range of the values between .12 to .90.

Mainly, Table (13) explore the intermediate variables, where the variable loaded separately due to the different category defined in the designed instrument. Most of the items loaded under the same factor except two of the items loaded in other factors with low loading as well. The first item SN2 that is related with subjective norm loaded in same factor but quite low loading with value of 0.69. As earlier discussion the item can be good acceptable if the value is more than 0.70. As compare to low acceptance value which consider the value less than 0.50, this item were kept in the model as the loading values is very near to good acceptance value and higher than the moderate acceptance.
The next item need to be discussed from the Table (13) is PE1 related to "perceived ease of use". In this item we investigated with the respondent about the how easy to use the ERP system. There can be two explanation of getting low loading for any item. The first one is that, item was quite similar to the PE2 (easy to get the ERP), secondly it may be possible that participants did not response it with clear state of mind while similar question asked in different ways. Normally, if the item loaded in different factors there can be reason that item was not clear to the respondent or item may be related to other factor. Therefore, the chances of transferring this item to other factor analyzed further. But the item is not sufficient to be shifted to other two variables; subjective norm and perceived usefulness the loading was less than the acceptance level. Therefore, after detailed analysis the item PE1 was eliminated due to cross-loaded and low factor loading.

Finally, third factor analysis performed on success indicators, which is the third part of the designed instrument. Based on the all standards and requirements of factor analysis [2], the instrument's validity applied using principal component analysis method to load the factors and achieve acceptable measuring factors. In addition, to principal component analysis, varimax rotation and Kaiser Normalization were selected for statistical analysis. The result of factor loading for success indicators is depicted in Table (14).

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The result in Table (14) highlights that the four factors extracted with larger than 1 value of eigenvalue with total explained variation was 77.25% in all measuring items. The value of sampling accuracy recorded as greater than 0.6, showing that all measuring factors can be included in factor analysis. Furthermore, value of KMO was 0.91, which is highlighting that the test was successful. Based on the KMO value, the result can be indicated as "marvelous" as described by Kaiser and Rice (1974), which shows that the test sample is "fit". Finally, the Bartlette's test (0.00) was significant and suggested that most of the items are correlated

.

Table (14) EFA for Success Indicators

Variable	**Items**	**Factors**			
		1	**2**	**3**	**4**
Intention to Use / Use	IU1	.37	.19	**.90**	.33
	IU2	.35	.10	**.87**	.29
	IU3	.31	.19	**.81**	.23
	IU4	.28	.38	**.80**	.28
	IU5	.33	.15	**.86**	.35
User Satisfaction	US1	.23	**.90**	.37	.15
	US2	.39	**.94**	.35	.25
Informational Benefits	INF1	**.89**	.45	.26	.44
	INF2	**.84**	.32	.44	.23
Strategic Benefits	ST1	.38	.12	.40	**.87**
	ST2	.15	.25	.17	**.91**

The EFA test run and explained the proper factor loading, which extracted four factors as success indicators also consist of total four factors namely; Intention to Use/Use (factor 3), User Satisfaction (factor 2), Informational Benefits (factor 1) and Strategic Benefits (factor 4) as shown in Table (13). To make proper understanding and interpretability the suppress value assigned in this test was .10. Whereas the selection criteria for each item is based on under which factor it has got the highest values within the row. Based on the suppress value, all factors loaded within the range of the values between .10 to .94.

All factors and their corresponding items related to the success indicators were loaded successfully under the same factor they asked from the participants of case studies. The items in this category were related to understand the user's point of view regarding how to measure the success of ERP. In other words, the major success indicators of ERP system is discussed in this phase, those success indicators can help in order to validate the model using real case studies in next phase. Therefore, the item US1 which is related to user satisfaction loaded with highest value (0.94), where the item is related to the performance of the ERP system based on user's opinion.

In other variables in this test were two different kinds of intangible benefits asked in this category. Informational benefits and strategic benefits factors were added in the instrument based on the expert suggestion and it considered the researcher's finding and new addition in the model during the preliminary phase. Furthermore, the modification were taken to the case studies, and asked their opinion through designed instrument. The result of EFA is showing the modification is approved by the ERP users, managers and experts. As both of them loaded successfully in the same factor with more than the acceptance level, which considered as 0.70, whereas the ST2 got the second highest factor loading (0.91), showing the good understanding and interpretation by ERP users.

Table (15) Summary after Exploratory Factor Analysis

Type of Factors	**Factors**	**No. of Items**		
		Literature Review	**Preliminary Work**	**After EFA**
User-Related Factors	Information Quality	3	3	3
	System Quality	2	2	2
	Service Quality	2	2	2

	Output Quality	2	2	2
	Job Relevance	3	3	2
	Image	2	2	2
	Result Demonstrability	3	3	3
Intermediate Factors	Subjective Norm	4	4	4
	Perceived Usefulness	4	4	4
	Perceived Ease of Use	3	3	2
Success Indicators	Intention to Use / Use	5	5	5
	User Satisfaction	2	2	2
	Informational Benefits	-	2	2
	Strategic Benefits	-	2	2
	Total	**35**	**39**	**37**

In conclusion, in this section after performing the exploratory factor analysis, the summary of the literature review, preliminary work, and EFA is shown in Table (15). Firstly, the ERP acceptance and success model was extracted from literature review, which further taken to the ERP experts based on Saudi organization. After discussion with them, the model was integrated and modified by adding two new variables, related to net benefits namely; informational and strategic. Furthermore, the model was investigated with the help of ERP users, managers, and experts from five case studies selected from Saudi region. The stepwise modification is highlighted in Table (15).

7. SUMMARY

The study presented the summary analysis on the data collected from five case studies and ERP experts selected from Saudi Arabia. Firstly, the paper starts by presenting the investigation on common characteristics and idea of ERP project's success, acceptance and evaluation from case studies and expert judgement. To validate and modify the proposed framework the investigation preformed with the help of case studies and ERP experts. Different figures and tables presented in this study to provide the better interpretation of the collected data. Finally, to find out the correlation between the variables and their items factor analysis performed. After detailed analysis on EFA results, the model has been validated and modified by eliminating two items from the framework which has not largely supported by respondents and experts in case studies. As for the future work, the research will validate the final model by applying it on particular case study.

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