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An Investigation Study on Optimizing Enterprise Resource Planning (ERP) Implementation in Emerging Public University: Al Baha University Case Study

Moh'D Suliman Shakkah[1], Khaled Alaqeel[2], Ali Alfageeh[3], Rahmat Budiarto[4]

[1] MIS Department, Faculty of Administrative and Financial Sciences Albaha University, Saudi Arabia
[2] Ministry of Commerce & Industry, AlKarj branch office, Saudi Arabia
[3] Information Technology Center, Albaha University, Saudi Arabia
[4] Smart Networked Computing Research Group, College of Comp. Sc. & I.T., Albaha University, Saudi Arabia

Article Info	ABSTRACT
Article history: Received Apr 14, 2016 Revised Jun 29, 2016 Accepted Jul 10, 2016 **Keyword:** BPR ERP ORGD Project management System integration	This work investigates the correlation between the organizational readiness in Albaha University (ABU) and the respective Critical Success Factors (CSFs) with regards to the Enterprise Resource Planning (ERP) implementation. The investigation also considers some suggestions to improve the ABU's ERP systems and roadmap towards the self – development strategy and reduce vendor-dependency. A survey regarding ERP to the end-user, expert and developer in ABU was conducted. The analysis of the results in this work confirmed with the results of an existing work. The four significance success factors: Project Management, Business Process Re-engineering (BPR), System Integration, and Training and Education are recommended to be adopted to assure the smooth adoption of ERP at Albaha University.

Corresponding Author:

Rahmat Budiarto,
Smart Networked Computing Research Group,
College of Computer Science & Information Technology, Albaha University,
P.O. Box 1988, Albaha, 65431 Kingdom of Saudi Arabia.
Email: rahmat@bu.edu.sa

1. INTRODUCTION

The four critical success factors (CSFs) that helping to achieve effective implementation of Enterprise Resource Planning (ERP) projects are project management (PM), business process re-engineering (BPR), system integration (SI), and training and education (TED). The Organizational readiness (OGRD) is significantly and positively associated with these CFSs. Managerially, this knowledge can help in better planning, management and control of ERP projects [1].

In the other hand, a number of studies have been completed that look into the success / failure rates of IT projects in general [2],[3]. These studies indicate that serious problems exist across a broad cross-section of industries. A study of 5,400 large scale IT projects (projects with initial budgets greater than $15M) conducted by McKinsey [4] finds that the well-known problems with IT Project Management are persisting. Among the key findings quoted from the report:
- 17 percent of large IT projects go so badly that they can threaten the very existence of the company
- On average, large IT projects run 45 percent over budget and 7 percent over time, while delivering 56 percent less value than predicted.

There are a number of interesting studies with statistics on project success rates, such as Standish Group's famous Chaos report garnered attention starting in the mid 90s, in particular based on very high reported project failure rates (~ 90% are not successful). More recent data from their 2013 report shows improvement, but still only 39% of projects are successful, with 61% either 'failed' or 'challenged' [5].

The Information System and Application development in Albaha University is still progressing. The development of the Information Technology in general is not so encouraging, especially the development of ERP systems. Based on a study conducted internally in 2013, Albaha University (ABU) has the following problems.

- Low user satisfaction level
- No well communication between ITCenter and end user entity
- High vendor dependency
- Lack of IT awareness program
- Automation of many key process is partial
- Absence of documentation of the roles, responsibilities, and accountabilities
- Absence of well-defined organizational and process framework
- Limited IT standards and common policies and procedures.

At the same time, ABU has positive factors that are believed may support towards the improvement of the ERP systems. The positive factors include:

- Headway made by few departments by implementing ERP and student information system
- Enthusiasm to adopt e-working practices at departments/units/ centres
- There is a realization that more formalized oversight of IT is required and it needs to be a shared
- Good support from ABU top management to have best technology that help university to achieve their vision.

Research works have been conducted in ERP implementation such as Ramayah and Annamalai [6] that examined the benefits of two enterprises resource planning (ERP) packages namely SAP and Oracle. King [7] mentioned that the majority firms of any significant size are in some stages of implementing enterprise resources planning (ERP) systems or other similar multifunctional enterprise systems. Some are in the early stages of the process, where others have successfully implemented ERP and are tying these systems in supply-chain management and customer relationship management systems to have integrated systems. Voordijk et al. [8] held a study about large engineering consultancy firms in the Netherlands that have implemented ERP systems. Its purpose was to shed light on the changing role of information technology (IT) in these firms after implementing ERP. They used empirical case study research methodology, which was conducted by analyzing ERP implementations in ten Dutch-based engineering consultancy firms. Grossman & Walsh [9] mentioned a lot of recommendations to ERP implementation as a huge mission full with risk. In this article a lot of practical advices for minimizing the risks. It looks at the technical, operational, and legal aspects of ensuring an acceptable ERP deployment. Along with the promise of having the latest technology that represented the best practices of many companies' prior to implementations of ERP systems, the software could be implemented in a shortened timeframe with less risk.

Organizational readiness for change is a multi-level, multi-faceted construct. As an organization-level construct, readiness for change refers to organizational members' shared resolve to implement a change (change commitment) and shared belief in their collective capability to do so (change efficacy). Organizational readiness for change varies as a function of how much organizational members value the change and how favorably they appraise three key determinants of implementation capability: task demands, resource availability, and situational factors. When organizational readiness for change is high, organizational members are more likely to initiate change, exert greater effort, exhibit greater persistence, and display more cooperative behavior. The result is more effective implementation [10].

This paper investigates the correlation between the organizational readiness in ABU and the respective CSFs. Furthermore, the investigation also considers some suggestions to improve the ABU's ERP systems and roadmap towards the self –development strategy and reduce vendor-dependency.

2.   RESEARCH METHOD

2.1.   Research hypotheses and the Conceptual model
2.1.1.   ORGD vs PM

The OGRD for ERP employment within an organization is essential for early identification of probable problems that may affect the implementation outcome [11]. Tesch, et al., [12] emphasize the need to understand an organization's readiness before starting the project work. An organization that is ready for ERP implementation will have the PM capabilities and skills necessary to systematically manage the project to delivery. Such an organization will have established PM capabilities to plan execute and control project work. It is expected that OGRD will contribute significantly to the success of a number of project related activities. Hence, the following hypothesis is constructed.

HI: OGRD is positively and significantly associated (correlated) with the success of PM.

2.1.2. ORGD vs BPR

A BPR exercise includes restructuring and redesigning the business processes of an organization to bring them into line with what are judged good-practice processes. De Soysa and Nanayakkara [13] note that BPR is an important component of the organization aware dimension of the overall organizational ERP readiness framework. Capaldo and Rippa [14] find out the BPR is to be one of the dimensions for OGRD for the implementation of ERP.

An organization that displays OGRD has the human resources and structural capabilities necessary to undertake various BPR related activities; including identifying any gaps between the existing business processes and routines, and the best-practice processes defined in generic ERP systems. This will help in estimating the efforts that may be required to re-engineer the existing processes, and the capabilities available within the organization to deal with undertaking a BPR exercise. These capabilities may include process-mapping, process redesign and process documentation, among others. An OGRD exercise will also provide the organization with a broad understanding of the level and degree of required customization of an ERP system. Further, it will alert the organization to whether some processes cannot be modified due to particular business needs, such as the need to achieve competitive advantage. Overall. This demonstrates that OGRD could play a greater role in influencing the outcome of a BPR exercise. Thus, it is good to hypothesize the following.

H2: OGRD is positively and significantly associated (correlated) with the success of BPR.

2.1.3. ORGD vs SI

ERP systems are modular in structure and require inter-module interfacing and integration to work seamlessly. In addition, the strategic nature of ERP often necessitates its integration with systems outside its own platform. These could be the systems of partner(s), supplier(s), customer(s) and/or regulatory agencies. As a result, SI is one of the key strategies for successful ERP implementation [14],[15].

Furthermore, De Soysa and Nanayakkara [13] discovered that integrated resource management and data integrity to be important dimensions for organizational ERP readiness. Being organizationally ready entails having a good understanding of the number of legacy systems that will be closed or continued, due to the functional support (or lack thereof) of the to-be-implemented ERP system [14]. It also helps in gaining an understanding of the possible level of integration of ERP with partner business systems in the value chain. An understanding of staff proficiency in handling complex and sophisticated integration activities helps in devising appropriate plans for building capabilities to handle SI for successful ERP implementation. Based on the literature evidences and the previous discussions, it is meaningful to hypothesize:

H3: OGRD is positively and significantly associated (correlated) with the success of SI.

2.1.4. ORGD vs TED

Misra [16] emphasizes that an understanding of OGRD enables organizations to capture their users' training needs. Being ready can help organizations to gain a better understanding of the skill levels of their staff, and of the availability and adequacy of human resource skills and capabilities [17],[18]. It also helps in recognizing the available training facilities, trainer capabilities and training requirements for implementing a complex system like ERP. If required, organizations will be able to create plans for seeking trainers and consultancy services to provide an appropriate level of training to prospective ERP users. Organizations will then be able to make reasonably rational budget and timeframe estimates for the development of the training capabilities required to help users learn the ERP system. Hence, we contend that OGRD is helpful for providing an appraisal of the human and infrastructure capabilities that may be required to conduct TED successfully, and hence develop the following hypothesis.

H4: OGRD is positively and significantly associated (correlated) with the success of TED.

The proposed model was built based on the assumptions of the associated hypotheses: H1, H2, H3, and H4 as shown in Figure 1.
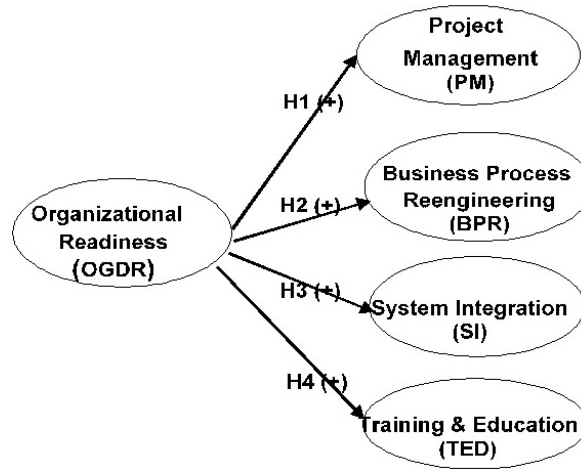
Figure 1. The conceptual ORGD - ERP model

2.2. Instrument development and data collection

A questionnaire with five-point Likert-type scale ranging from "strongly disagree" (1) to "strongly agree" (5) was used to collect data. The questionnaire was adapted from Ram et al., [1], five constructs: OGRD, PM, BPR, SI, and TED with their respected items were surveyed. The questionnaire was validated by experts, then translated to Arabic version forth and back and checked to be in the same levels.

The survey instrument was pre-tested in two phases, initially with academics. The feedback and comments received from both sets of respondents were incorporated to improve format, presentation, content clarity and questionnaire length. SPSS software was used with data and reliability were firstly checked, they were with good values. Demographic data are: End-users, Experts, and Developers.

3. RESULTS AND ANALYSIS

The distribution of respondents and respondent statistics is shown in Figure 2 and Table 1, respectively.

Figure 2. Respondent distribution
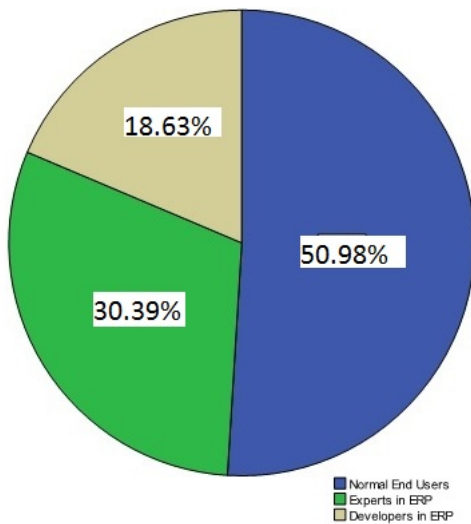
Tabel 1. Respondent statistics

Number of Respondent (N)	Valid	102
	Missing	0
Mean		1.68
Std. Error of Mean		.077
Median		1.00
Mode		1
Minimum		1
Maximum		3
Sum		171

3.1. Results

Table 1 shows the respondent statistics. The Cronbach's Alpha test is 0.947 which means that the data provides high reliability (the Cronbach's Alpha >>> 0.7). Table 2 displays the statistics of all items of the structures, while Table 3 exhibits the reliability level of the collected data. This realibility will be shown or taken in total for the computed means of the constructs variables.

Table 2. Item-total statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
PM1	64.91	213.665	.611	.946
PM2	64.83	210.239	.701	.944
PM3	64.94	211.244	.741	.944
PM4	65.04	207.107	.794	.943
PM5	65.10	211.733	.603	.946
PM6	65.13	206.706	.735	.944
BPR1	65.04	212.315	.710	.944
BPR2	65.18	209.672	.764	.943
BPR3	65.05	209.829	.745	.944
SI1	65.19	210.767	.684	.944
SI2	65.13	210.053	.721	.944
SI3	65.05	209.354	.754	.943
TED1	65.25	207.875	.739	.944
TED2	64.71	213.477	.564	.946
TED3	64.68	214.815	.525	.947
TED4	64.88	212.639	.605	.946
OGRD1	65.25	211.217	.671	.945
OGRD2	65.31	211.208	.647	.945
OGRD3	65.30	211.659	.655	.945
OGRD4	65.17	213.606	.494	.948

Table 3. Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	Number of Items
.890	.891	5

The PM construct respondents gave an agreement with about 70% same was the following constructs: BPR, SI, TED, OGRD, as 68%; 67%; 72%; 64%, respectively (See Table 4).

Table 4. Item-total statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted	Mean	Std. Deviation	N
PM construct	13.5654	9.720	.747	.590	.863	3.4886	.90143	102
BPR construct	13.6716	9.406	.831	.711	.844	3.3824	.88924	102
SI construct	13.6944	9.385	.779	.634	.855	3.3595	.93659	102
TED Construct	13.4534	9.983	.661	.486	.882	3.6005	.92961	102
OGRD Construct	13.8309	9.943	.650	.438	.885	3.2230	.94849	102

According to Table 5 we conclude that H1: There was a positively moderate association between PM and OGDR and it is significance (sig < 0.05), so accept H1.

Table 5. PM- ORGD Correlation

			PM construct	OGRD Construct
Spearman's rho	PM construct	Correlation Coefficient	1.000	.585**
		Sig. (2-tailed)	.	.000
		N	102	102
	OGRD Construct	Correlation Coefficient	.585**	1.000
		Sig. (2-tailed)	.000	.
		N	102	102

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

Referring to Table 6 we conclude that H2: There was a positively moderate association between BPR and OGDR (sig < 0.05), so accept H2.

Table 6. BPR- ORGD Correlation

			OGRD Construct	BPR construct
Spearman's rho	OGRD Construct	Correlation Coefficient	1.000	.573**
		Sig. (2-tailed)	.	.000
		N	102	102
	BPR construct	Correlation Coefficient	.573**	1.000
		Sig. (2-tailed)	.000	.
		N	102	102

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

Referring to Table 7 we conclude that H3: There was a positive moderate association between SI and OGDR, (sig < 0.05), so accept H3.

Table 7. SI- ORGD Correlation

			OGRD Construct	SI construct
Spearman's rho	OGRD Construct	Correlation Coefficient	1.000	.651**
		Sig. (2-tailed)	.	.000
		N	102	102
	SI construct	Correlation Coefficient	.651**	1.000
		Sig. (2-tailed)	.000	.
		N	102	102

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

Referring to Table 8 we may conclude that H4: There was a Positive moderate association between TED and OGDR, (sig < 0.05), so accept H4.

Table 8. TED- ORGD Correlation

			OGRD Construct	TED Construct
Spearman's rho	OGRD Construct	Correlation Coefficient	1.000	.493**
		Sig. (2-tailed)	.	.000
		N	102	102
	TED Construct	Correlation Coefficient	.493**	1.000
		Sig. (2-tailed)	.000	.
		N	102	102

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

3.2. Analsyis

Overall, the results show that OGRD is significantly and positively associated with the four investigated CSFs. The findings extend knowledge of the relationship among factors antecedent to different stages of ERP systems development [1]. Therefore, an understanding of OGRD at the adoption stage of an ERP system project is important because it influences both the adoption of ERP and the factors that themselves influence implementation. We discuss the detail findings in the following sub-sections.

3.2.1. Effect of OGRD on PM

The results indicate that OGRD is important for achieving the success of project-related work as it helps in better planning and control achieved through regular status meetings and realistic deadline for project work.

Albaha unversity IT Center management should assess a number of factors in order to understand the ORGD for PM. The factors include: information collection on in-house chage manaement procedures; organizational process assets for the management of risk, human resources, procurement and all stakeholders; the availibiity of previous project documents for reference in future projects; procedures and guidlines for preparing the business case of ERP projects; and the availability of PM software.

3.2.2. Effect of OGRD on BPR

The findings suggest that the university has to take advantage of the expertise and skills available within the university to prepare a BPR exercise. It will in turn help the university gains an understanding of the type and level of resources that need to be constructed in order to run the BPR.

3.2.3. Effect of OGRD on SI

The results say indirectly that possessing internal skills and resources is important to ensure SI activities are run easily. Consequently, the university should focus on the availability of a skilled workforce to support integrated interfaces. Albaha University is likely still rely on external support to maintain their integrated systems.

Albaha University IT center management should evaluate a number of factors, including: the experience and skill set of IT staff, particularly in SI; the availability of legacy in-house systems, and information about the systems that will continue to be used as well as the systems that are to be decommissioned; third-party information systems that need to be interfaced/ integrated with ERP; procedure and regulations for checking data integrity; and the availability of service providers and consultancy firms who can be engaged for SI tasks, whenever required. The evaluation will help to understand well ORGD for SI.

3.2.4. Effect of OGRD on TED

The study colcudes that the university should develop their staff skills, and foster a learning and sharing culture, for the effective management of training programs. The development of internal skills to achieve success in ERP prjects is also recommended, due to the fact that some organizational process may need unique training.

To understand OGRD for TED programmes, Albaha University management should assess a number of factors, including: the availability of trainers and their skill sets; the availability of training facilities; the allocated or required budget for training programmes; the availability of training materials from previous projects and the usefulness of any materials; the availability of an action plan for providing training to various levels of user; and a plan for evaluating the effectiveness of training programmes and feedback collection

4.   CONCLUSION

The analysis of the results in this work confirmed with the results of work by Ram [1] that is the ORGD influences the success of ERP implementation. Alabaha University management need to study the university's organizational readiness to measure the technological, human, and infrastructure capabilities in designing and implementing ERP systems. The four significance critical success factors: PM, BPR, SI, and TED are recommended to be adopted to assure the smooth adoption of ERP at Albaha University.

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BIOGRAPHIES OF AUTHORS

Moh'D Suliman Shakkah received BTMs. degree from Yarmouk University in 1998, M. Information Technology in 2007 from USM University, and Dr. Information Technology (IS support decision) in 2012 from UUM University. Currently, he is an assistant professor at College of Administrative and Financial, Albaha University, Saudi Arabia. His research interests include developing smart IS Tools, ERP systems, Adoption and transferring Technology in developing counties, Recommendation systems support decisions.

Khaled Alaqeel received B.Sc. in MIS degree from Baha College Of Science, Saudi Arabia in 2011, and M.A. in Business Administration with concentration in E-Business, from AlBaha University, Saudi Arabia in 2014. Currently, he is a Commercial Observation Manager at the Ministry of Commerce and Industry in AlKarj branch Saudi Arabia. His research interests include E-management, Business development, and E-commerce.

Ali Alfageeh received B.Sc. degree from King Khalid University in 2006. Currently, he is a system analysis at IT Center, Albaha University.

Rahmat Budiarto received B.Sc. degree from Bandung Institute of Technology in 1986, M.Eng, and Dr.Eng in Computer Science from Nagoya Institute of Technology in 1995 and 1998 respectively. Currently, he is a professor at College of Computer Science and IT, Albaha University, Saudi Arabia. His research interests include enterprise systems, IPv6, network security, Wireless sensor networks and smart networks.