EVALUATING ENTERPRISE RESOURCE PLANNING (ERP) POST IMPLEMENTATION PROBLEMS IN EGYPT: FINDINGS FROM CASE STUDIES OF GOVERNMENTAL, MULITNATIONAL AND PRIVATE EGYPTIAN ORGANISATIONS

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1. Introduction:

Enterprise Resource Planning (ERP) has been described as a business system supported by software that enables an organization to manage the efficient and effective use of an enterprise's materials and resources by providing an integrated system for the enterprise's needs (Beheshti, 2006; Ehie and Madsen, 2005). Despite the significant benefits that ERP systems provide, fewer than 30% of ERP projects are successfully implemented, i.e. projects completed on time and on budget with all features and functions operating as specified (Wallace and Kremzar, 2001; Iskanius, 2009). Reasons underlying unsuccessful implementation include: dealing with ERP solely as software and not as a system; the inability to adopt a new organizational policy to implement ERP or to cope with the changes created by ERP; projects going over budget; projects being terminated before the implementation begins; and failure to achieve the planned objectives (Shah et al., 2011; Zhang et al., 2003). The ERP life cycle can be divided simply into three main stages; the *pre-Implementation*; *during Implementation*; and *after Go-Live* or *post-implementation phase*. The post-implementation stage in a system's life cycle constitutes a number of processes that are critical for the system's success. Following the implementation of the system, an organization engages in a number of activities, such as post-implementation review, support and maintenance, in order to minimize the risks of failure of ERP projects (Nicolaou, 2012).

This paper aims to evaluate post-implementation problems through a questionnaire survey of Egyptian companies and detailed interviews with key personnel from three case study organizations representing government, multinational and private Egyptian companies. The remainder of this paper is organized as follows. In the next section the ERP post implementation problems are reviewed. The research methodology is presented in section 3. In section 4, a summary of the case studies' results and analysis is reported and finally, the conclusion is presented in section 5.

2. Literature review:

2.1 ERP Post Implementation

Previous ERP implementation research has focused on critical success factors for the preparation and implementation phases, mainly neglecting the post-implementation phase (Sammon and Adam, 2010). Saatcioglu (2009) showed that ERP implementation is a complex and costly task accompanied with a high failure rate. This, in turn, has led to analysis of ERP post implementation design, structure, benefits and measures of success (Zhue et al., 2010; Gallagher and Gallagher, 2012). Chian-Son Yu (2005) identified that future research needs more empirical studies on the factors influencing ERP post implementation success to be conducted in western and eastern countries.

2.2 ERP Post Implementation Problems

Despite the need for post implementation studies, Pan et al. (2010), Xue et al. (2005) and Peng and Nunes (2009) highlighted that the problems and risks occurring in the pre- and during implementation phases could badly affect the post implementation phase of ERP projects. The majority of post implementation studies in the literature have concerned implementation problems and the potential risks of the after go-live stage in large companies and in developed countries (Staehr, 2010; Nicolaou and Bhattacharya, 2005; Pan, et al., 2011; Peng, et al., 2010).

As mentioned before, there is a paucity of studies investigating the problems of ERP after the implementation phase (Peng and Nunes, 2009). Peng and Nunes (2010) identified a group of expected risks and barriers that can trigger ERP post implementation failure in China. Pan and Nunes (2009) summarized the ERP post implementation risks into three levels: operational risks, organizational risks and analytical risks. Peng and Nunes (2010) investigated the reasons behind the

failure of Chinese companies in implementing ERP during the post implementation phase. They determined that most ERP project failures are due to a lack of tangible support from top managers, lack of influence and ERP knowledge of the IT manager resulting in poor data quality, and the disparity between ERP system requirements and the users' needs. Peng and Nunes (2010), concluded that ERP failure in Chinese companies is not only related to system problems, such as software packages and IT infrastructure, but is more importantly related to business and, organizational problems, especially the human factors mentioned above.

Another study conducted by Lee (2008) in USA found that the main reasons underlying the difficulties of implementing ERP in USA companies refers to a lack of understanding the system from the users' side, lack of training provided to the users after the implementation, and lack of support by the system's staff during and after the go-live stage. Consequently, these reasons led employees and users to resist the system itself. Management support is considered as one of the failure factors in ERP implementation, where managers are not heavily involved in the implementation or after the go-live stage, especially in small and medium sized enterprises (Snider et al., 2009; Scherer, 2010; Muscatello, and Parente, 2008). Singh et al. (2010) found that the human risk factors in the ERP post implementation phase are the main reasons for ERP project failure. They found that the successful implementation of ERP lies in the end users. They also found that lack of communication between top management and end users leads them to fear losing their jobs which affects their use of the ERP system. According to Chang and Chou (2009), there is a gap between the training provided and the knowledge required by staff to work effectively in using ERP. They concluded that end users need continuous learning even after the go-live stage through continual training in the post implementation phase in order to ensure the efficiency of the ERP system.

Many studies used cross-sectional questionnaires, however, they did not undertake an in-depth analysis of ERP post implementation problems (Peng and Nunes, 2010; Gallagher and Gallagher, 2011; Upadhyay, 2009). Xue et al. (2005), Peng and Nunes (2009) and El Sawah et al. (2008) highlighted the need for more in-depth case studies to investigate the post implementation phase in different contexts.

2.3 ERP Post-Implementation in Egypt

Studies on ERP implementation in Egypt have focused solely on the pre-implementation and implementation phases (El Sayed, 2008; Rasmy et al., 2005). El Sawah et al. (2008) recommended the need for new research into the problems experienced during the post-implementation stage. Abdelghafar and Azim (2010) examined which factors have a significant effect on successful ERP implementation for large companies in Egypt, whilst El Regal and El Sarafi (2011) identified the important contributory factors towards the relationship between ERP and business performance. The literature review has identified that ERP implementation is accompanied with difficulties and problems, and that the majority of research has focused only on the pre- and during implementation phases. There is little research on ERP post-implementation, especially in Egypt (Abdelghafar and Azim, 2010; Peng et al., 2009; Staehr, 2010; Allen, 2008; Mullins et al., 2011), and this research paper attempts to fill this gap.

3. Framework for the research methodology:

This study uses a mixed methods research approach. The primary quantitative data sources in this study were obtained through an online questionnaire to companies in Egypt implementing ERP projects which are in the post-implementation phase. A total of 43 organisations responded from the total population of 75 (57%). It is important to note that the questionnaire was launched in December 2010 and was closed in July 2011. During this period, the economic and political status of Egypt was not stable due to the Egyptian Revolution of January 25th 2011. As a result of these circumstances, some companies halted their production and it became increasingly difficult to improve the response rate. Representing governmental, private (Egyptian) and multinational organisations, the majority of the respondents were from the private (Egyptian) sector (60%), with 26% being multinationals and 14% from the governmental sector. Three case studies were conducted to determine the main problems facing organizations in Egypt and the factors hindering the successful implementation of ERP projects. Data collected from the case studies were gathered using semi-structured interviews.

3.1 On Line Questionnaire

Based on the descriptive analysis presented by El Sayed et al. (2012), significance testing using χ^2 was performed to identify key relationships in the data. The delay in going live was found to be one of the reasons for not achieving the desired benefits of ERP ($\chi^2 = 16.099, df = 1, p-value < 0.01$). Regarding the project's budget, a statistically significant positive correlation was found between the inadequate budget and employees' skills ($\rho = 0.404$, two-tailed, $\rho < 0.01$). A strong positive correlation was found between lack of motivation and the following; the lack of employees' skills ($\rho = 0.512$, two-tailed, $\rho < 0.01$), employees' communication ($\rho = 0.416$, two-tailed, $\rho < 0.01$), and employee resistance to change ($\rho = 0.333$, two-tailed, $\rho < 0.05$).

Poor choice of ERP vendors had a strong correlation with increasing the employees' workload ($\rho = -0.375$, two-tailed, $\rho < 0.05$). A statistically significant correlation was found between effective vendor support and inadequacy of training courses provided ($\rho = -0.383$, two-tailed, $\rho < 0.05$). This refers to improving the quality and effectiveness of the training courses provided as long as there is effective support from the vendor's side. It was found that an inadequate project plan led to ineffective vendor support due to budget problems, improper choice of vendor, and poor project management to control all the deficiencies and the problems that could occur in the post implementation phase ($\rho = -0.645$, two-tailed, $\rho < 0.01$).

Conducting post implementation audits helps to achieve the desired benefits from implementing ERP systems as it leads to the early discovery and solution of bugs and errors. A statistically significant association was found between conducting post implementation audits and the desired benefits gained from the ERP project ($\chi^2 = 5.532, df = 1, p-value < 0.05$). A statistically significant association was found between the overall success of the project and the benefits gained from the ERP project ($\chi^2 = 28.481, df = 1, p-value < 0.01$). The employees' skills and performance played an important role in the project's success as a statistically significant association was found ($\chi^2 = 25.049, df = 3, p-value < 0.01$).

The success of the project is also closely related to the adequacy of testing conducted prior to the implementation with a statistically significant association between both variables ($\chi^2 = 20.762, df = 1, p-value < 0.01$). . Adequate testing prior to the implementation leads to ERP project success and leads to a fuller realisation of an ERP project's benefits, as a statistically significant association was found between conducting adequate testing prior to the implementation and the project's benefits ($\chi^2 = 18.016, df = 1, p-value < 0.01$). Proper testing also helps the post implementation to go according to plan, as a statistically significant association was found between both variables ($\chi^2 = 11.231, df = 1, p-value < 0.01$). A positive relationship was found between quality of training and adequacy of testing ($\chi^2 = 16.052, df = 1, p-value < 0.01$), indicating that vendors who offered more training also undertook adequate and proper testing. Overall, 51% of the respondents considered the project unsuccessful, mentioning that the lack of testing before going live was a major problem. At the same time 40% of the respondents stated that the testing conducted was inadequate in that many issues were neglected and the testing schedule inappropriate.

Finally, it was concluded that the involvement of the users in the project is considered as one of the successful elements of an ERP project, where a statistically significant association between the project's success and users' involvement was found ($\chi^2 = 8.075, df = 2, p-value < 0.05$).

The questionnaire analysis has revealed a number of themes which will be investigated further through the analysis of three case studies.

3.2 Case Studies

The case studies used in this study were conducted through in-depth interviews with ERP users in different departments in three organizations to gather varied and detailed perspectives regarding ERP post implementation problems and potential solutions. Each case study in this research was conducted by interviewing three users in three different departments implementing ERP modules. As a result of the questionnaire survey's findings and the literature review mentioned in section 2.2 (Snider et al., 2009; Scherer, 2010; Muscatello and Parente, 2008; Peng and Nunes, 2010; Aslam, 2010), case studies were conducted on the following themes: *management, vendor qualifications, training provided, employees' skills, employees' resistance, the overall success, the desired objectives achieved, testing and post implementation audits. Modules' implementation problems* and *the external factors* (Sobyanina and Mockute, 2011; Otieno, 2010) were missing from the survey but added to the themes. Sub-themes also emerged following analyses of the case studies.

4. Results and Analysis

Three case studies were conducted through in-depth interviews to investigate in detail the ERP post implementation problems facing the multinational, private (Egyptian) and governmental organizations. Analysis of the themes revealed the following:

The overall success:

The three organizations were not satisfied with the benefits achieved from the project. They all agreed that it was a complex task which needed more time and effort to understand the concept and application of the new system, especially, in the governmental organization which suffered from a low level of employees' skills. Regarding the post implementation phase, they all agreed that the actual time of going-live did not match the project plan and affected the efficiency of the whole project.

Management:

Budget: The governmental organization had an appropriate budget for the project until it was affected by the Egyptian revolution and subsequent budget reductions across all government departments for new projects. Both the multinational and private cases suffered from inadequate project budgets due to poor project planning. Project planning did not consider unexpected factors such as a change in vendor, increased employee turnover and recruitment of new staff in the middle of the project which required extra training courses.

Motivation: The multinational company felt that staff motivation towards the project was poor and would only improve once the benefits became apparent. The absence of motivation contributed to an extension of the timeframe of project implementation. The private company did not offer any motivation to employees and they became unwilling to solve problems. In the governmental organization, there was considerable resistance from employees to the new system.

Top Management Support: The multinational and the private company lacked top management support in the post implementation phase. The management concern was to go-live on time, thinking that this is the end of the project. In the governmental organization, the feeling was that implementation was imposed by government and hence top management within the department were neither convinced nor aware of the project's importance, and hence offered little support.

Change management strategy: Change management strategies were not employed in any of the case study organizations when implementing ERP. The interviewees from the governmental organization were not aware of such strategies, whilst those from the private (Egyptian) and multinational had experience of change management from previous employment and felt that this would have helped to solve conflicts between modules and improve communication between departments.

Backup plan: The three cases lacked back-up plans in case of unexpected changes. After the Egyptian revolution, they were all greatly affected by the strikes, production stoppage and the increase in employee turnover.

Technical aspects:

Evaluation of the modules' benefits achieved: Regarding the multinational company, the benefits achieved were not as expected; they are still working with both the old and the new systems simultaneously and there was a delay in entering operations' data into the system. Such operations increase the employees' work load and result in inaccurate reporting of data. Regarding the private company, they were not satisfied with the modules' performance as they achieved only 60% of the desired objectives. In the governmental organization, the modules did not achieve the desired objectives. They are still facing difficulties in understanding the solution itself due to the training problems and the lack of users' qualifications.

Conflicts between modules implemented: The multinational company faced a conflict between the finance module and the production planning module in terms of the material costs. Material costs were updated manually leading to incorrect data entry in the production planning process which has a knock-on effect for the materials' management module. In the governmental organization, the improper integration between materials' management and account payables (A/P) led to conflict between both modules resulting in the absence of inventory control. Consequently, the HR module faced problems in terms of incorrect transactions in A/P due to the misconfiguration.

Integration: The modules' problems and conflicts mentioned above were due to poor integration undertaken by the vendor. In the governmental organization, the integration was very difficult because they have a huge number of users and processes. Besides, the users faced a problem to understand the logic behind ERP systems in terms of changes in processes and increased complexity which led to employees' resistance.

Modules Implementation: The three cases agreed that modules were implemented in a parallel way, i.e., all the modules were implemented at the same time which presented a problem in terms of poor integration and lack of users' communication. They recommended that module implementation should be sequential, i.e., module by module or two by two depending on the organization's priority. Experience gained from implementation of one module can then be transferred into the implementation of another module creating greater stability and efficiency for the organization as a whole.

Training:

Training provided during the implementation and after the go-live phase: The three cases did not receive any training after the go-live phase. The common problem found in the three cases was that training provided before the go-live phase was poor and inadequate for the new system. Consequently, users faced a lot of problems in the post implementation phase and they were in need of continuous training. This problem was very obvious in the governmental organization due to the low level of employees' skills and the low educational levels observed. The employees needed the training to be repeated many times which led the company to retain the vendor in order to support the system for two years after the go-live phase. In the multinational and private company, the employees still lack confidence in using the system.

Quality of the training materials provided: In the governmental organization, the training materials were in English and users found it complex and difficult to understand due to their poor English language skills. There was conflict between users and the vendor in terms of the language issue, but after a lot of complaints, the vendor had to translate the material into Arabic. However, the users still struggled to understand the training materials due to the complexity of the system. The private company had the same problems except in the production planning module, as most of the department staff was involved in the project from the preparation phase. In the multinational company, they were not satisfied with the training provided as the training materials were very broad, and the cases used in the training were standard cases and did not fit with the business requirements.

Business Users' Involvement: The three cases had a common issue that not all parties in the organization were involved in the preparation phase. They commented that such involvement will reduce conflicts between departments as well as avoiding the integration problem and generating lines of communication between the users themselves. Besides, it will give them the chance to be aware of all the issues related to the module they are working on and to the other modules.

Employees:

Skills Problem: In the governmental company, they were facing a major problem in terms of the low level of employees' computer and language skills, and indeed, the very low educational level of the employees. As governmental organizations in Egypt, they offer the lowest salaries in the Egyptian market, and they have the poorest employment conditions. They faced many problems in preparing users to deal with the new system especially relating to IT competency of users. In the multinational and the private company, lack of ERP business knowledge due to poor training provision was the most important issue, although there were additional problems in the materials' management module owing to the lower level of education of warehouse employees.

Employees Resistance: Due to the low salaries offered in the governmental organization and the absence of any motivation and incentives, the employees' resistance to the project was higher than the two other cases.

Vendor:

Vendors' Qualifications: In the private company, the vendor's qualifications were not satisfactory. The company chose the vendor on the basis of cost not experience and qualifications and support in the post implementation phase was insufficient. In the multinational company, the vendor stayed only two months after going live and left the project with unsolved problems and a freelance consultant had to be employed to support the project. The governmental organization used IT staff, well experienced in ERP systems, from a company called Trans IT Company. They were mainly used to support the

system and the employees as the users lacked proficient computer and language skills. At the same time, the project's objectives were not achieved, which led the vendor to stay longer than the agreed support period after the go-live phase in order to conduct trials to solve the problems found.

Regular meetings between vendor and the users: In the multinational company, there were regular meetings between the vendors and the users. However, the users were in most cases not committed to such meetings due to the increase in work load created. In the governmental organization, there are still regular meetings with the vendor because there are many issues to overcome.

Proper Testing and Post Audit: The three cases commented that testing was not performed rigorously prior to implementation. In the multinational company, the scenarios tested did not fit the business requirements. In the private company, testing was poorly planned and they went live without proper testing. In the governmental organization, five tests were eventually conducted owing to the discovery of unsolved problems during the testing phase and due to vendor's lack of awareness of the processes of the whole organization. Training of staff took place at the same time as the testing of the system resulting in the users becoming confused. Only the private company conducted a post implementation audit, and this was with the finance department. No post implementation audits were performed in the other two organizations

Communication:

Lack of communication between employees: The three cases faced communication problems between employees and departments as the system was not properly integrated and a change management strategy was not applied. In addition, they claimed that such conflict was mainly due to the non involvement of all parties in the project from the preparation phase. Early involvement of users may result in better communication between them, especially those located in different departments.

Lack of communication between vendors and employees: This was most pronounced in the governmental organization where the low level of IT skills and English language proficiency amongst employees led to difficulties in communication between vendor and user.

External Factors:

The governmental organization was more adversely affected by the Egyptian revolution than the two other cases. There were many strikes, with employees in search of higher salaries, resulting in the post implementation operations being stopped for security reasons. Political changes in the particular ministry led to pressures on the project's budget and delays for the go-live time. In the multinational organization, production was stopped for a period of time, resulting in lost revenue. Despite the cessation in the post implementation operation, vendor fees still had to be paid according to the terms of contract with the multinational organization. The private company was not affected by the Egyptian revolution as they went live before the event, but production was halted for a short period of time and financial losses did accrue.

5. Conclusion:

This study investigates the main ERP post implementation problems which affect the efficiency of ERP projects in Egypt. The investigation was mainly conducted to clarify the main reasons hindering ERP projects' successes in Egypt through the use of three case studies representing governmental, multinational and private (Egyptian) organizations in Egypt. *Training, support and communication* are the most common problems facing the different business sectors in Egypt in the ERP *post implementation phase*. It can be concluded that, in order to have a successful ERP implementation in Egypt or similar developing countries, it is important to have **Training courses** and awareness sessions along the whole ERP life cycle and especially in the after go-live phase. **Training materials** should fit the business environment and be customized to the organization's requirements and needs. ***Early involvement of most of the project team***, from the beginning of the project till the post implementation phase, allows a fuller understanding of the system and monitoring of the vendor's performance. **Employee skills** play an important role in the success of any project. Employees should be well trained in using the system and be fully aware of the system's advantages and capabilities. Better trained and skilled staff with full awareness and knowledge of ERP systems and their effects on the business will assist the project in fulfilling its objectives and to be successful. There should be a well planned and accurate **budget** covering all the costs needed in terms of training certificates, employees' motivations, system upgrades in the post implementation phase, and any

costs due to recruitment and training of new staff to replace those leaving and to cope with potential increases in turnover. **Top management support** is considered an important factor in the success of the ERP post implementation phase as they should be involved in every single issue and be committed to the periodical meetings with employees and vendors to monitor the project. Each department should create a dedicated team to follow up and monitor the project's performance and these teams should communicate their findings to senior management on a regular basis. **Change management strategy** should be applied as it helps users to identify the responsibilities of all involved and the existence of a change management team would enable discussion of problems and identification of potential solutions. Finally, it would be preferable to have **third party involvement** to monitor the process and conduct a post implementation audit to ensure that the results match business requirements. It is important to put into consideration the effect of **the external environment** on the project's performance when developing the project plan.

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