Enterprise Resource Planning (ERP) Implementation in the Egyptian Organizational Context

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Abstract

Enterprise **R**esource **P**lanning (**ERP**) systems are highly complex information systems. ERP implementation is a very difficult and expensive project an organization can ever take. It was reported that 75% of the ERP projects are classified as failures (Griffith, 1999). In Egypt, the success rate of implementing ERP systems is extremely lower than that in western companies. Thus, ERP implementation success in Egypt is treated as our dependent variable. This research has explanatory and predictive orientations. First, it attempts to explain the impact of a set of interrelated **C**ritical **S**uccess **F**actors (**CSF**s) and Egyptian organizational culture on implementation success. Second, it predicts ERP implementation success index following similar approach used for American Customer Satisfaction Index. A conceptual model for ERP implementation success in Egypt is developed. Then it is empirically tested with a survey study involving 45 Egyptian enterprises adopting ERP system. Collected data are analyzed using **P**artial **L**east **S**quares (**PLS**) technique of PLS-Graph. Finally, results and discussions are presented.

Keywords: *ERP implementation success, Critical Success Factors, Egyptian organizational culture, Partial Least Squares, ERP implementations success index*

I. Introduction

ERP systems may well count as "the most important development in the corporate use of information technology in 1990's" (Davenport, 1998). ERP systems are integrated, enterprise wide systems, which automate core corporate activities such as manufacturing, human resource, finance and supply chain management (Bing, 1999). It optimizes the flow of information and resources through out the entire supply chain. ERP implementations are expensive and complex undertakings, but once they are successfully implemented, significant improvements can be achieved such as easier access to reliable information, elimination of redundant data and operations, reduction of cycle times, increased efficiency hence reducing costs (Zhang, 2003). However, it was reported that three quarters of the ERP projects are considered failures and many ERP projects ended catastrophically. In Egypt, ERP implementation problems become more acute because of the challenging Egyptian culture which is entirely different from cultures where these systems are developed. Egypt's experience with manufacturing systems implementation started in 1970's when military factories first used Material Requirement Planning systems (MRP) then Manufacturing

Resource Planning systems (MRP II). Multinational companies introduced ERP to Egyptian business in early 1990's. During the last decade, foreign ERP vendors (e.g. Oracle, SAP and Baan) dominated Egypt's market.

This paper is organized as follows: in next section, literature relevant to ERP implementation success is reviewed focusing on base studies at which this research starts. Then a conceptual model for ERP implementation success in Egypt is formulated along research hypothesis. In section (III), PLS is used to model and test hypothesized relationships. The prediction method for ERP-ISI is explained in section (V). Finally, discussion about results and survey findings are presented along conclusions.

II. Literature Review

ERP Implementation

Shanks and Parr (2000) defined ERP implementation as "the process of developing the initial business case and planning the project, configuring and implementing the packaged software, and subsequent improvements to business processes". ERP implementation is considerably different from any traditional information system implementation for many reasons: (1) the integrated nature of ERP applications causes dramatic changes on work flow, organizational structure and on the way people do their jobs; (2) ERP systems are not built but adopted, this involves a mix of business process reengineering and package customization, (3) ERP implementation is not just a technical exercise but it is a socio-technical challenge as it poses new set of management procedures. In that sense, it has become clear that ERP implementation differs from traditional systems development where the key focus has shifted from a heavy emphasis on technical analysis and programming towards business process design and human elements (Gibson, 1999).

Critical Success Factors

Critical Success Factors (CSFs) approach was first used by Rockhart (1979) in IS area. It has been applied to many aspects of IS including project management, manufacturing systems implementation, reengineering, and, more recently, ERP systems implementation [(Bancroft, 1996), (Brown, 1999), (Gibson, 1999)]. Within ERP implementation context, CSFs are defined as "factors needed to ensure a successful ERP project" (Gibson, 1999). Several studies identified the critical factors needed to enable project managers and management boards to improve their ERP implementation projects. Some of these CSFs are common with other IT projects such as top management support, user's involvement and others are exclusive for ERP systems such Business Process Reengineering. However, these studies are dragged under traditional implementation research whose main aim was to investigate factors relevant to IS implementation success. Unfortunately, this vein of research, often referred to as "factor studies," has proven inadequate in terms of explaining links between the variables involved in information systems implementation. This view was supported by few researchers such as Paré and Elam (Paré, 1997), who cited two specific limitations of the approach: (1) that these studies can help us understand only part of the implementation puzzle and (2) that they can not help us explain the dynamics of the implementation process. According to Paré and Elam, researchers have: "…built models that identify a limited set of critical factors affecting IT implementation success, but [researchers] know very little about how and why the factors included in these models interact and work together to produce success or failure. As a result, [management information systems] researchers lack a full understanding of the IT implementation process that is necessary to guide practitioners to attain positive outcomes". More insights into the interrelationships of these factors will help

project managers and other project stakeholders to predict the likelihood of project success, early enough for taking corrective action. The earlier a project manager discovers that the project is going off course, the more effectively and efficiently can adjustments be made.

Cultural Issues in ERP Implementation

Culture is defined as the set of shared beliefs within a country where a person lives (Hofstede, 1991). It imposes rules, values and practices at the organizational and individual levels. At the organizational level, culture has substantial and definite influence on organizational structure, behavior and management style (Thanasankit, 1999), (Weber, 1951)]. At the individual level, people bring to the workplace what can be regarded as cultural baggage; that they come to their jobs with specific cultural biases about how the world functions, how their job works, and how employers and employees are supposed to conduct themselves (Straub, 2001).

Developing countries face many difficulties when implementing and using western technologies, management processes, and information systems techniques imported from developed countries. This is commonly known as **I**nformation **T**echnology **T**ransfer (**ITT**) problems. Unlike traditional software development approach, which promotes building systems from scratch, ERP encapsulates reusable best business practices. Thus ERP implementation becomes more challenging in Egyptian context where national and organizational culture with different value and belief system, resulting in different management styles, might not harmonize with Western business culture embedded in the predefined standard business processes of foreign ERP packages. Thus, Egyptian organizational culture is outlined as an important determinant of ERP implementation success.

III. Research Framework

The proposed model describes ERP implementation success as in Egypt as function of interrelated CSFs and organizational culture. The model was formulated in two steps where:

- Literature relevant to IS implementation, ERP implementation, project management and Business Process reengineering was reviewed to extract a long list of all the critical factors affecting implementation success.
- This list was synthesized and operationlized through a series of interviews with key persons (i.e. project managers, consultants and vendor representatives) involved in ERP implementations in Egypt. Figure (1) illustrates the conceptual model for ERP implementation success in Egypt.

ERP Implementation Success (η_1): Dependent Variable

The definition and measurement of success are thorny matters. ERP success is a multidimensional, dynamic and relative concept. Until now there is no one generic definition for ERP success, however there are some attempts to define success in ERP literature. Based on their observations of enterprise systems projects, Tanis and Markus (2000) argued that there are three main categories of success metrics: (1) Project Metrics: Performance of the enterprise systems project team against planned schedule, budget and functional scope, (2) Early Operational Metrics: How the business operations perform in the period after the system becomes operational until "normal operation" is achieved (e.g. labor costs), and (3) Longer Term Business Results: How the organization performs at various times after normal business operation has been achieved. This involves achieving the strategic goal behind implementation (e.g. Rate on Investment (ROI)).

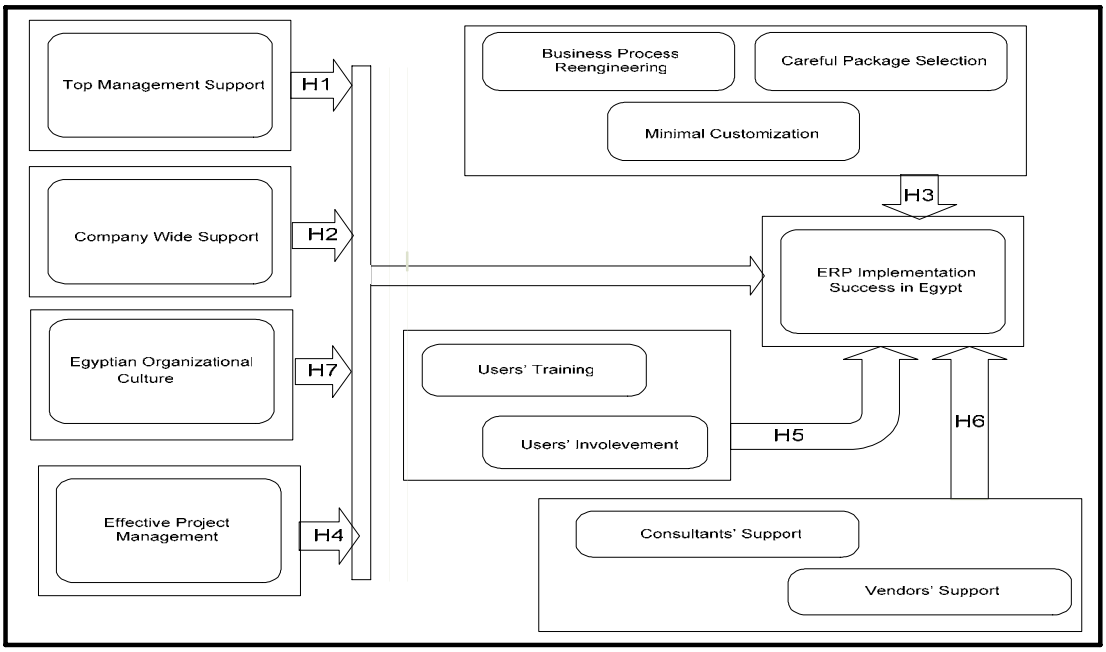


Figure (1): The conceptual model for ERP implementation in Egypt

The most famous framework to define implementation success was developed by DeLone and McLean's (Delone, 1992). The authors found that there is no 'one measure' for an information system success and thus they identified six different factors: system quality, information quality, use, user satisfaction, individual impact and organizational impact. Based on both studies, the proposed success framework is developed to address different dimensions (financial, technical, human) at different points of time (early operational metrics and long term business results). Table (1) presents the proposed success dimensions and measures.

Dimension	Measure
Business	Achieving expected strategic business goals
Organizational	The degree of integration among departments
User	• User satisfaction • Providing necessary functionality
Financial	Achieving expected payoff (Return On Investment)

Table (**1**): Proposed success dimensions and measures

CSFs and Egyptian Culture: Independent Variables

1. Organizational Fit of ERP Package (η_2)

Hong and Kim (2002) found that organizational fit of ERP system is critical in ERP system success. Organizational fit of ERP package is defined as "congruence between the original artifact of ERP and its organizational context"(Markus, 1988), To ensure a close match between the ERP package and the hosting organization, enterprises should carefully select the package that closely matches its business process. Since it is virtually impossible to get a 100% business-package match, 70% is generally considered as a good match (Bingi, 1999). To close the gap, the organization can either change the package (package adaptation) to fit its processes or change its processes to fit the package (organizational adaptation). However, customizing the business logic of an ERP package is a very risky exercise. A more sensible option is to reengineer its business processes to fit the ERP package. For this, the organizational fit of the ERP package is a multidimensional variable of three CSFs:

i. Careful package selection: Most ERP software vendors make assumptions about management philosophy and business practices. Thus, buying an enterprise application means much more than purchasing software-it means buying into the software's vendor's view of best practices for many of the company's processes. For this, the company must have a detailed requirements specification before ERP package selection.

ii. BPR: is the fundamental rethinking and radical redesign of business processes to achieve dramatic improvements in critical, contemporary measures of performance, such as cost, quality, service and speed" (Hammer, 2001). ERP systems are built on best practices that are followed in the industry. Implementing an ERP system involves reengineering the existing business processes to align the best business standards [(Bingi, 1999), Motwani, 2002)].

iii. Minimal customization: is using the vendors' code as much as possible. Taming the package causes extra additional customization costs, inability to benefit from vendor software maintenance and upgrades, and inability to benefit from the standard best practices encapsulated in the package.

Many researchers deal with each CSF separately but we combined them into the same CSF as they are highly correlated. Careful Package selection leads to minimal need for customization and more process reengineering, while the more business reengineering the organization decides to undergo, the minimal is the need for customization. In conclusion, we have the hypothesis:

H_1: Organizational fit to ERP package has a positive impact on ERP implementation success.

2. User's Involvement and Education (η_3)

End users are the front line soldiers of the organization who have direct contact with the ERP system. User's involvement refers to participation in the system development and implementation process by representatives of the target user groups. There are two areas of user involvement when the company decides to implement an ERP system: (1) user involvement in the stage of definition of the company's ERP system needs, and (2) user participates in the implementation of the ERP systems (Zhang, 2003). Involving users in the stage of defining organizational information system needs has several positive points. First, if users are heavily involved in defining organizational needs, they have more opportunities to mold the system according to their priorities and business requirements and more opportunities to control the outcome. Second, they are more likely to react positively to the potential ERP system because they have been active participant in the change process itself. Users should get enough training on the logic and overall concepts of ERP systems (Zhang, 2003). Three aspects concerning the content of training are: (1) Logic and concepts of ERP; (2) Features of the ERP system software; and (3) hands-on training. If the employees do not understand how the system works, they will invent their own processes using those parts of the system they are able to manipulate [3]. The hypothesis is:

H_2: Users' involvement and training has a positive impact on ERP implementation success.

3. Company Wide Commitment (ξ_1)

Since ERP systems are enterprise-wide IS that integrate information and information based processes within and across all functional areas in an organization, it’s imperative to get support from all functional segments of the organization (Sum, 1997). Every person and department is responsible/ accountable for the overall system and key users from different departments are ensured to commit to the project implementation without being called back to their prior functional job position frequently.

H3: Company wide support has a positive impact on ERP implementation success.

4. Top Management Support (ξ_3)

Research on ERP failures shows that project cancellations occur when senior management delegates progress monitoring and decisions at critical junctures of the project to technical experts (Motwani, 2002). Management backing ensures that the project will receive sufficient funding and resources to be successful. Furthermore, ERP causes radical changes in work habits and procedures which need great organizational alignment. This won't be accomplished unless top managers are tightly involved at every step implementation (Rao, 2000). Thus, we get the following hypothesis:

H_4: Top management support has a positive impact on ERP implementation success

5. Effective Project Management (η_4)

ERP systems implementation is a set of complex activities involving all business functions and often requiring between one and two years of effort. The vast combination of hardware, software and the myriad of organizational, human and financial issues make ERP projects huge and inherently complex, requiring new project management skills (Ryan, 1999). Effective project management involves having a formal implementation plan with a realistic time frame. The project should be periodically monitored by project team members who are stakeholders. Thus, we get the following hypothesis:

H_5: Effective project management has a positive impact on ERP implementation success.

6. External Support (ξ_2)

The implementation process may be supported by some factors external to the organization such as vendor's and consultants' support. Vendor support represents an important factor with any packaged software including extended technical assistance, emergency maintenance, updates, and special user training. In parallel, organizations may use consultants to facilitate the implementation process. Consultants may be involved in various stages of the implementation: performing requirements analysis, recommending a suitable solution, and managing the implementation. Organizations should optimize the use of consultants in the way that best serves the implementation process and keeps the consultants' fees minimum as possible. Thus we get the hypothesis:

H_6: External support has a positive impact on ERP implementation success.

7. Egyptian Organizational Culture (ξ_4)

Hofstede (1991) studied cultural variations extensively and developed a theoretical model which acts as a foundation for exploring the impact of cultural differences on the adoption and diffusion of IT-based innovations such as ERP systems. He argued that there are four dimensions used to identify differences between cultures. Based on Hofstede's model, Egyptian organizational culture (i.e. the way that things are done in the organization) is analyzed. The following points are identified to be associated with ERP implementation success.

i. Reliance on information: Burn, Davison and Jordan (Burn, 1997) claimed that the way in which information is accepted, is central to the way information systems are used within an organization. In Egyptian organizational culture, information is perceived to be personal asset rather than organizational resource. As a result, most Egyptian management information systems are restricted to managers. Data also reside in soft form in the minds of top managers who do not rely on information much even though information systems have been implemented. They rely more on extrapolations from experience and intuition (Zhang, 2003). Discretionary power is maintained by careful control on key information. Information is

selectively released to subordinates and co-workers instead of being widely shared across the whole organization.

ii. Design of the general structure: The general structure is represented by a basic organizational chart. Most Egyptian organizations have functional oriented structure. They are built over solid, rigid and isolated organizational boundaries. More emphasis is put on in-group relationships built over long time. The in-group relationships are stable and difficult for outsiders' access. Thus, cooperation across different functional areas entailed by ERP is less likely to be achieved.

iii. Design of Lateral links: The design of lateral links shows the overall process and communication linkages among different units. This does not only involve strict vertical linkages (e.g. managers to subordinates) but also lateral linkages. Unfortunately, Egyptian organizations are loosely linked. The haphazard flow of documents and information among functional departments hinders the process of ERP.

iv. Centralization of decisions: Egyptian organizations are managed in a highly hierarchical, authoritarian and centralized manner relative to their Anglo-American counterparts. This restricts the need for information exchange among managers. Thus, ERP is used to reinforce hierarchical (vertical) control instead of peer-to-peer (horizontal) communication and cross functional integration which is the distinguishing characteristic of ERP.

v. High Context communication: Egyptian employees have highly collective nature. This predisposes culture against computer based communications because these media mutate the group effect. Workers in collectivistic nature favor high personal meetings and phone calls on IT communication technologies.

Finally, we conclude the hypothesis:

H_7: Egyptian organizational culture has a negative impact on ERP implementation success.

IV. Research Methodology

To test the proposed research model empirically, a cross sectional survey was conducted. Survey is one of the most prevalent research methodology used in information system (IS) research [(Vogel, 1984), (Pinsonneault,1994)]. The benefit of using surveys is that the researcher can easily cover large populations quickly at a relatively low cost. The surveyed sample included 45 Egyptian ERP adopters using five different foreign ERP products. One questionnaire was sent to each ERP adopter. The respondents may include IT managers, project managers and system administrators as they are identified as the most appropriate informants for this study.

Questionnaire Development

Special emphasis was given for this measurement development to obtain a reliable and valid scale. The adopted process was similar to that proposed by Churchill (1979). Figure (2) illustrates the adopted scale development paradigm.

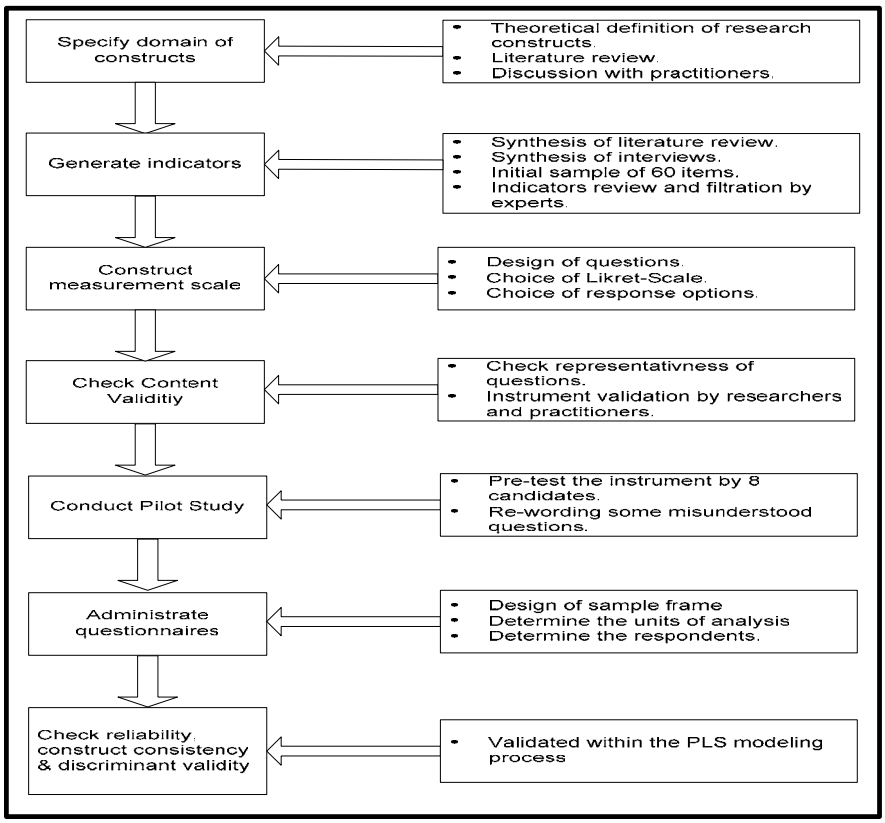


Figure (2): The adopted measurement development paradigm

V. Partial Least Squares

Partial Least Squares (PLS) latent path modeling technique is used to model causal links and test hypothesized relationships. PLS is a non-parametric estimation procedure (Wold, 1982). Its conceptual core is an iterative combination of principal components analysis relating measures to constructs, and path analysis capturing the structural model of constructs. The structural model represents the direct and indirect causal relationships among constructs. The measurement model relates constructs to their observed variables. A detailed description of the PLS model is provided by Wold (1982) and Lohmöller (1989). PLS have advantages over other Structural Equation Modeling (SEM) tools, such as LISREL, in that it can be used with smaller sample sizes and for its predictive orientation (Chin, 2000). Developing the best fit PLS model is equivalent to reaching the best fit measurement and structural models. PLS graph (version 3.0) was used to estimate loading and paths coefficients (Chin, 2004). In evaluating the measurement model, item loadings of 0.7 or higher are considered acceptable. All items show very acceptable reliability except that for two items with loadings approximately 0.65. Hulland(1999). stated that in practice it is common to find at least several instrument items in the estimated model have loadings below 0.7, particularly when new items or newly developed scales are employed. Discriminant validity was assured by examining the cross loadings (factor loadings) of the measures [(Chin, 2000), (Hulland, 1999)]. The measures should not load higher on another construct than the one it is intended to measure. Internal consistency of constructs was assured by calculating the two measures composite reliability and the Average Extracted Variance (AVE). Composite scale reliability ranged from 0.86 and 0.97 exceeding the cutoff value of 0.7 suggested by Nunally and Bernstein (1994). AVE ranged between 0.59 and 0.91exceeding the 0.5 threshold proposed by Fornell and Larker (1981). The structural model is evaluated by testing the significance of the path coefficients. Some paths turned up to be insignificant at 95% confidence level. Insignificance of paths is caused by multi-co linearity which is expected as all CSFs are

highly correlated. Figure (**A**) in the appendix visualizes the significant and insignificant paths in the structural model. A simplified PLS model is fitted after dropping insignificant paths. The final form of the structural model is specified in terms of PLS equations as follows:

$$\begin{bmatrix}\eta_1\\ \eta_2\\ \eta_3\\ \eta_4\end{bmatrix}=\begin{bmatrix}0 & \beta_{12} & 0 & \beta_{14}\\ 0 & 0 & 0 & 0\\ 0 & 0 & 0 & 0\\ 0 & 0 & 0 & 0\end{bmatrix}\begin{bmatrix}\eta_1\\ \eta_2\\ \eta_3\\ \eta_4\end{bmatrix}+\begin{bmatrix}\gamma_{11} & 0 & \gamma_{13} & \gamma_{14}\\ 0 & 0 & \gamma_{23} & 0\\ 0 & 0 & \gamma_{33} & \gamma_{34}\\ 0 & 0 & \gamma_{43} & 0\end{bmatrix}\begin{bmatrix}\xi_1\\ \xi_2\\ \xi_3\\ \xi_4\end{bmatrix}+\begin{bmatrix}\upsilon_1\\ \upsilon_2\\ \upsilon_3\\ \upsilon_4\end{bmatrix}$$ gi

ven that

$$Cov(\eta_i,\upsilon_j)=0 \qquad \forall i,j=1,2,3,4$$

VI. ERP Implementation Success Index

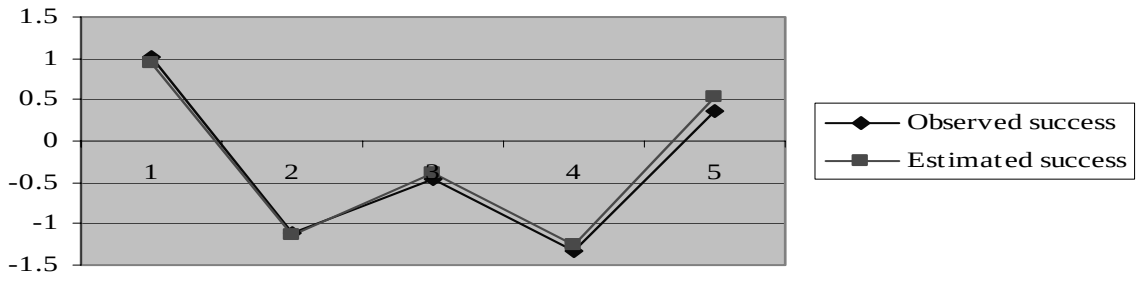
Before predicting ERP-ISI, the estimated model should be validated to evaluate its accuracy. The model is validated using data left out from the fitting procedure of the PLS. Figure (3) shows how well the predicted success is so close to the actual observed success. Next, following the same approach for ASCI, we explain how to estimate the expected ERP-ISI for a given implementation case. Based on Fornell (1996), the general form of the ERP-ISI is proposed as follows:

$$ERP-ISI=\frac{E(ERPsuccess)-\min(ERPsuccess)}{\max(ERPsuccess)-\min(ERPsuccess)}\times 100$$

where ERP Success is the latent variable for ERP Implementation Success, and E[.], min[.],and max[.] denote the expected, the minimum, and the maximum value of ERP Success respectively. The minimum and maximum values are determined by those of the corresponding manifest variables:

$Min(ERP\ success)=\sum_{j=1}^{k}w_j Min(y_j)$ and $Max(ERP\ success)=\sum_{j=1}^{k}w_j Max(y_j)$ where $y_j's$ are the measurement variables of the latent ERP implementation Success, $w_j's$ are their corresponding weights, and k is the number of measurement variables. ERP-ISI is calculated survey sample in order to gain insights about the success rate of ERP implementations in Egypt. As a result, exactly 50% (i.e. whose ERP-ISI below 50%) of participating enterprises are considered failure according to the success metrics adopted in this research.

Figure (3): Observed versus estimated success



VII. Results and Discussion

Our results demonstrate that ERP implementation success is a function of a set of interrelated CSFs and Egyptian organizational culture. While CSFs positively reinforce implementation

success, Egyptian organizational culture hinders its progress. Most of the research hypotheses are supported by the returned empirical data.

Organizational fit to ERP package is proven to be the most important determinant of ERP implementation success. Although Top management support was always the major success factor in the implementation of large customized systems (Ginzberg, 1981), the organizational fit to ERP has been superior in the implementation of packaged systems such as ERP. This seems to be in line with previous studies [(Zhang, 2003), (Kyung-Kwon, 2002), (Terence Sin-Leung, 2003)]. Indirectly, Top management support positively affects implementation through improving the organizational fit to the package and keeping eye on effective project management. Top management can improve the organizational fit to the package by encouraging BPR efforts entailed by ERP. Many of ERP failures in Egypt are caused when top managers use ERP to automate their existing processes instead of restructuring them. Management should conduct periodic meetings with the project team to revise the project plan, double-check performance measures and track carefully any deviations. This involves timely provision of comprehensive control information at each stage in the implementation process. Effective project management and Company wide support are found to have moderate influence on implementation success in Egypt. In light of survey findings, this may be explained by the wrong usage of ERP systems as departmental instead of a company wide IS. In such wrong mode of system operation, company wide does not show a very significant effect on implementation success. Top Management commitment in the project shows a very high effect on user's training and involvement in the project. When it is clear that a particular IT project has the interest, the support, and the commitment of the organization's senior management, everyone involved in the project will have a sharper focus. This effect becomes more significant in hierarchical, authoritarian and centralized Egyptian organizations. External support including vendor and consultants support do not show any effect on the implementation success in Egypt. This supports the findings of the conducted survey about the problems facing implementers. Vendors often jeopardize their package's capabilities leading to implementation failure or over expected results. Consultants' fees are a real burden on budget and they exert little effort in transferring enough knowledge to enable the organization to become self-sufficient after implementation. There is usually a mis-coordination between external parties such as vendors, partners and consultants leading to no active role in the implementation. Surprisingly, User's involvement and training are not found to have direct influence on the implementation success. The tentative explanation may be due to the centralized nature of Egyptian organizations which blocks the effective role of users in implementation. This may also reveal deficiency in the set of questions measuring this construct. Finally, empirical data revealed the negative impact of Egyptian organizational culture on implementation success. Successful ERP implementation in Egyptian enterprises faces major challenges such as centralized decision making, hierarchical structure, loose lateral links, and ill-defined documentation cycle. Moreover, Egyptian Culture negatively affects users' acceptance and involvement in IT projects.

VIII. Conclusion

This research focuses on ERP implementation in Egyptian context. More specifically, we developed and empirically tested a model that investigates ERP implementation success as a function of interrelated CSFs extracted from literature and Egyptian organizational culture. Using the developed model, ERP implementation success index is predicted for a given ERP implementation case. The study resulted in important theoretical and practical contributions. On the theoretical side, the study attempts to bridge the gap in the literature about the interactions among CSFs which may reinforce implementation's success. A causal model, which depicts the relationship among different CSFs, is presented. Moreover, despite the

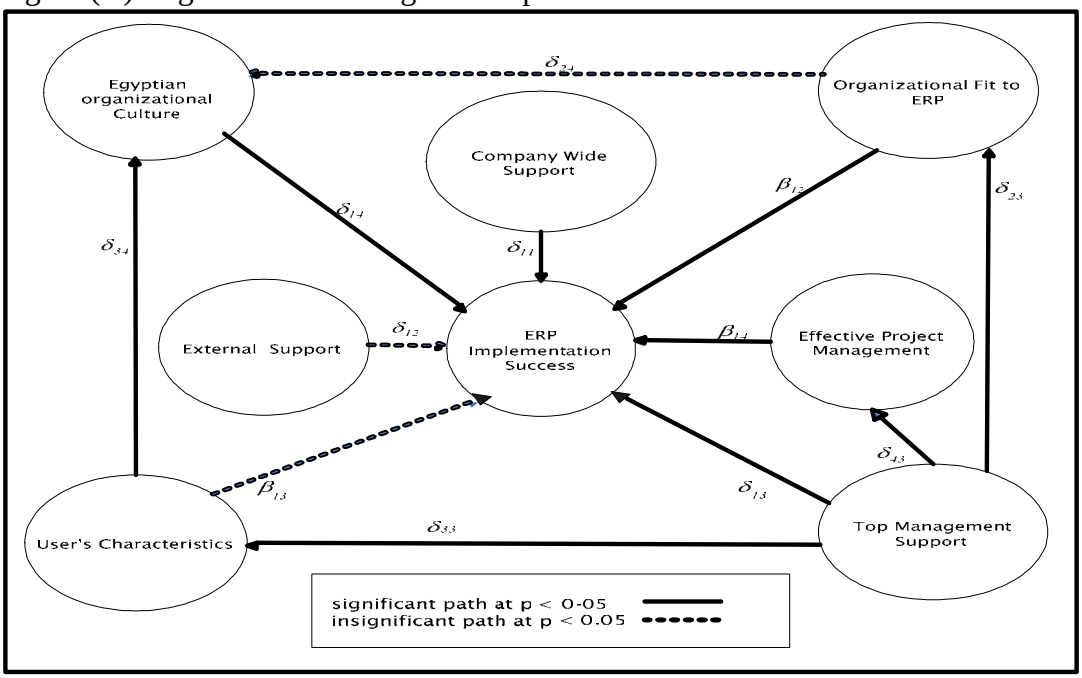
growing importance of IS in developing countries, it is perhaps surprising that the literature to date is relatively sparse. All analogue researches aimed to study IS in USA, Europe and even Asia without concerning Africa and Middle East countries. More specific, no previous research studied ERP implementation in Egypt. This research will thus add to the growing body of knowledge on ERP implementations, an explanatory study of ERP Egyptian implementations. This may act as a starting point for Egyptian researches in this area or as help for those interested in cross cultural issues of complex IS implementation such as ERP.

On the practical side, this research improves understanding for Egyptian organizations on how to implement large IS such as ERP within the challenging organizational culture. In essence, the paper recognizes critical issues that must be carefully considered to ensure a happy ending implementation. Moreover, it pays attention of hosting enterprises especially multinational corporations, vendors and consultants to carefully consider cultural issues when planning for ERP implementation. Finally, the study presents a self-assessment tool for ERP implementers in Egypt. The proposed tool is targeted to serve those who passed or still in the implementation experience.

However, due to the small surveyed sample size, there are some limitations in the generalization of the research results to a larger population. Another bias lies in the sample selection method as only one questionnaire was sent to each company, thus the person who answered the questionnaire may not be representative for all users in the company. Finally, further research is required to address the mentioned limitations. It is recommended to conduct in-depth case studies to gain more insights about ERP implementation in Egypt. Combining detailed case study and a large survey would be an ideal method for researchers in the ERP field. Moreover, other soft modeling techniques such as Neuro-fuzzy and Bayesian Belief Network (BBN) can be used to model causal relationships.

IX. Appendix

Figure (A): Significant and insignificant path coefficients



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