A Hybrid Approach to Measure ERP Systems Implementation
Using Accountant’s Perceptions in Saudi Arabia

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Abstract: The purpose of this study was to analyze accountant’s perceptions to measure ERP system implementation using a hybrid approach. Data was collected primarily using interviews, observations and some of archival sources. A total of 38 interviews were conducted using structured survey questions containing three parts that included listing certain implementation stages as identified empirically, classifying each stage (as success, wait and see, or failure), justifying the stages perceptions classification using the most effective factors among 18th critical factors selected form the literature. An interpretative case study analysis was used to make sense of how and why accountant’s perceptions measure ERP system during the implementation stages as a result of the effect of certain critical factors. Academics as well as the practitioners can gain benefits from the hybrid approach introduced in this study to monitor, manage and control ERP implementation. This study presented valuable work that combined theoretical and empirical aspects useful to analyze the ERP implementation and accountant’s perceptions in three case studies from Saudi Arabia. Overall, this study suggested that in future research the hybrid approach can be used to investigate other single user’s perceptions or multiple user’s perceptions to measure ERP system implementation.

Key words: Accountant perceptions, case study, critical factors, ERP implementation, hybrid approach, interpretative analysis, qualitative data, Saudi Arabia, stage process

INTRODUCTION

Presently, the emerging Enterprise Resources Planning (ERP) systems represent the latest and the most ambitious information technology application for different organizations (Kanellou and Spatthis, 2013; Spatthis, 2006). It has been argued that ERP systems provide business suites capable to support all essential business processes including accounting and financial, human resources, customer and supplier relationships, asset management, manufacturing and product life-cycle and supply chain management (Wickramasinghe and Karunasekara, 2012). However, previous studies have presented mixed results regarding ERP implementations. For example: some suggested that ERP systems improved business work efficiently and significantly, increased productivity and service quality and led a reduction in operation cost as well as maximized effective decision-making (Ngai et al., 2008; Schlichter and Knaemmergaard, 2010). Other studies have claimed that ERP systems are complex, costly, time consuming as many adapters encountered many difficulties, problems and inappropriate and unexpected negative results (Ngai et al., 2008).

Despite the wide range of mixed ERP benefits and obstacles, many organizations are willing to adapt ERP systems even though some organizations are concerned due to the failure stories of some of the ERP system. Organizations such as Fox Meyer Dug, Mobile Europe, Dell computer, Nike Co, Hewlett Packard Co, Hudson Bay Co, Waste Management Co., New York City and many others have experienced either partial or complete ERP failure (Kanellou and Spatthis, 2013). It has been reported that 70% of ERP systems fail and 3/4 of them are unsuccessful, on an average 178% over budgeted, took 2.5 times longer than intended plan and delivered only 30% of promised benefits (Amid et al., 2012). Some studies claimed that failure is an integral part of ERP systems and success cannot be guaranteed even in the best situations (Liao et al., 2007). As a result, many organizations hesitate and think carefully before adapting such systems.

With such mixed results, organizations must find ways to measure the success rate of ERP systems implementation. Among different criteria, users’ perceptions are considered to be vital and important criterion to measure ERP systems implementation success. The impact of large and complex ERP implementation is expected to affect every aspect and the users’ level in the organization (Wickramasinghe and Karunasekara, 2012). However, different users group might have different and often conflicting objectives, priorities and experiences of ERP system implementation (Kanellou and Spatthis, 2013).
These different users’ objectives or experiences will highlight, reflect and represent users’ multiple perceptions (Al-Muharfi, 2003; Kwak et al., 2012; Nah et al., 2003; Subramanian and Peslak, 2010; Wickramasinghe and Karunasekara, 2012). Although some studies used single users’ perceptions to measure the ERP system implementations, others used multiple users’ perceptions (Al-Muharfi, 2003; Subramanian and Peslak, 2010; Wickramasinghe and Karunasekara, 2012).

This study is concerned about the accountants’ perceptions and will use it as a single user perception to measure ERP systems implementation. It is very important to note that accountant’s perceptions are viewed as a collective result of the entire ERP users’ perceptions (Scapens and Jazayeri, 1998). In ERP environments, accountants relay on other users data entries to be collected, entered and processed into the ERP system to produce final financial reports. Therefore, the result of accountant’s job is very much related to the collective results of previous users of ERP systems (Spathis, 2006). Consequently, accountants’ perceptions could be considered as the total reflections of all the users’ perceptions. Unfortunately, not much research has been done on the accountant’s perceptions in particular to measure ERP system implementation (Kanellou and Spathis, 2013; Kwak et al., 2012). In a serious attempt to fill-in that gap, this study will provide answers to the following question: How and why can accountants’ perceptions measure ERP implementation?

LITERATURE REVIEW

This section will present four parts of detailed literature review in a way to develop the study hybrid approach which will be used to provide answers to the previous research question.

1. Accountant’s perceptions of ERP systems implementation: Scholars have described the importance to study the user’s perceptions in different levels and implementation stages. In that perspective, some studies used single user’s perceptions such as information technology staff, management personnel, or system consultants. Other investigators used multiple users’ perceptions such as operational, managerial and strategic users (Moore and Benbasat, 1991; Subramanian and Peslak, 2010; Wickramasinghe and Karunasekara, 2012).

For instance, Al-Muharfi (2003) showed that top management perceived ERP implementation as success while the end users perceived it as failure. In addition to that other studies showed that users viewed ERP implementation as success in one period in time and the same user viewed it as failure in another period in time and vice versa (Al-Hinai et al., 2013; Al-Muharfi, 2005; Kwak et al., 2012; Subramanian and Peslak, 2010).

In the present study, the accountant’s perceptions in particular were chosen to indicate and measure the process and the results of ERP implementation. Although, many studies used user’s perceptions, yet there are inadequate studies that used accountant’s perceptions to measure ERP implementations (Kanellou and Spathis, 2013). This study adapted the research methodology of Newman and Robey (1992) and Robey and Newman (1996). They used a social process model to introduce three most common user’s perceptions i.e., success, wait and see and failure. They used their own interpretations to analysis the rich and detailed qualitative data gathered through many interviews using many case studies. Al-Muharfi (2010) used the same three perceptions to evaluate accountant’s participation in ERP implementation projects using punctuated equilibrium model (Newman and Noble, 1990; Newman and Robey, 1992; Robey and Newman, 1996).

To investigate the accountant’s perceptions of ERP system success, wait and see, or failure, there are three distinctive group or approaches provided in the literature: (1) One group of researchers chose to go deeply into the processes or stages of ERP systems implementation in order to explore certain outcomes (Amid et al., 2012; Ram and Corkindale, 2014), (2) Another group chose to address this issue by formulating a priori theoretical framework to test some identified critical factors (Amid et al., 2012; Mabert et al., 2003), (3) Another group adapted a hybrid approach that incorporates and joins factor and stages approaches together in one approach to gain better understanding of ERP system and user’s perceptions (Al-Hinai et al., 2013; Subramanian and Peslak, 2010). This study, however, used the accountant’s perception in a hybrid approach that was developed in this study to measure the process and the results of the ERP systems implementation. The next section will shed light on presenting the process of ERP implementation stages.

2. ERP systems implementation stages: The ERP and accountant’s perceptions are viewed under the stages approach as a narrative description of a sequence of events that unfolds over time (Van de Ven and Poole, 1995). The stages approach then tends to explain in a temporal fashion the sequences of actions, or activities that link the antecedent with outcome conditions based on a story or historical narrative (Portieland, 1999). Researchers, adopting this approach, focused on and examined the structure of dynamic activities occurring.
during the stages of ERP systems implementation (Burns, 2000). This approach is fundamental to gaining an appreciation of the dynamics and the complexity of changing accountants’ perceptions to measure ERP systems alongside the stages of the implementation process (Lyytinen and Newman, 2006).

Al-Mashari et al. (2003) introduced three stages namely setting up, implementation and evaluation of ERP system implementation. Shaul and Tauber (2012) introduced four stages model that included planning, implementation, stabilization of the ERP system into normal operation and enhancement in which the business process is continuously improved. Al-Hinai et al. (2013) suggested five stages in the lifecycle model which included initiation, adoption, adaptation, acceptance and use. Hadclara and Elragal (2012) proposed six stages that included adoption, acquisition, implementation, use and maintaining, evaluation and the retirement. As such, the lack of consensus about the number, naming and the content of these stages make it difficult to identify which one of them really reflect the most accurate stages. Al-Muharfi (2005) investigated two case studies in the petrochemical sector in the Saudi industry and presented eight stages of ERP systems implementations such as antecedent condition, planning, as is, to be, gap analysis and implementation, parallel testing and going live and continues improvements.

These differences might be understood with the common understanding that each ERP system implementation might differ from others which then makes the disagreement over the implementation stages remains. Therefore, this study relied on its empirical investigation to identify stages of ERP systems implementation process. It was reported that the users’ perceptions in general is not stable but flexible and changeable alongside the implementation stages and the question why (Kwak et al., 2012; Subramanian and Pesak, 2010).

3. Critical factors: One of the most popular approaches to give reasons and to explain why accountants’ perceptions change during ERP stages of implementation process is defined as the critical factors approach. The term critical factors is being used since the 1960’s to identify few critical issues or limited key areas where “things must go right” for the organization to flourish and goals to be attained (Ngai et al., 2008). The concept of critical factor promised a systematic way of identifying the key areas that require careful attention in order to give reasons to ERP implementation (Ram and Corkindale, 2014). This concept implies a link between certain identified factors which are critical to achieve desirable ERP outcome. Such a link has generated considerable interests in industry as well as in academia. The concept, however, was used exchangeable in describing success and failure. Also, if the factors enhance success, then these were labeled as the critical success factors (Dezdar and Sulaiman, 2009) or described as critical failure factors if they cause failure (Amid et al., 2012).

A number of researchers identified a variety of critical factors in relation to new system implementation such as ERP (Al-Sehali, 2000; Amid et al., 2012; Dezdar and Sulaiman, 2009; Ngai et al., 2008; Ram and Corkindale, 2014; Ram et al., 2013). The most prominent critical factors mentioned in many studies accompanied with their brief definitions are summarized below.

1. Legacy system condition: It encapsulates the existing business processes, organization structure, culture and information technology. It might also provide motives or obstacles for the change

2. Clear business vision, mission and objectives: All of these should be justified and clearly stated in the business plan which guide the direction for system implementation

3. Top management support: The role of top management in new system implementations include developing an understanding of the current and future technology capabilities and limitation, establishing reasonable goals, willing to be involved and allocating valuable resources to the project

4. Project champion: A high-level executive who has power to sponsor ERP project and champion the project throughout the organization such as cheering up project team especially during the long implementation process such as in ERP system project

5. User training and education: Everyone who is involved with ERP system needs to obtain sufficient level of training and education about how the system works and how it relates to business process. Organizations, therefore, should provide the opportunity to enhance the user’s ERP skills and knowledge

6. Vender/customer partnership: An organization could reduce the cost of the implementation and could gain other benefits such as using vender customization tools and best practice through vender/customer partnerships. Organization should also obtain ongoing support as a result of such partnerships

7. Selecting appropriate ERP package: Organization should select the ERP package that fits its business practice, processes, budget and timeliness. Gap analysis could be used to identify the differences between organizational needs and what ERP system can offer

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8. **Project management:** Effective project management allows companies to plan, coordinate and monitor various activities during different stages of the implementation. It should support formulating clear project plan that include setting up goals, objectives, strategies, scope, schedule, realistic expectations and so forth.

9. **Steering committee:** This committee enables senior management to directly monitor the project in order to ensure adequate controls and make appropriate decisions over the log process of ERP project

10. **Use of consultant:** Organization should benefit from consultant experience and comprehensive knowledge to determine which sets of ERP modules should be suitable solution to the organization or not

11. **Data validation and conversation:** Data should be validated and converted into a single and consistent formation before the use of the new ERP system

12. **Business process re-engineering:** An organization should re-engineer its business process to fit ERP system instead of trying to modify the system to fit the organization’s current business processes. In this matter, organizations should keep ERP customization at its minimal

13. **Monitoring and evaluating performance:** The ERP implementation process should be measured regularly for more efficient and effective control through user feedback to see whether intended goals and objectives have been achieved

14. **Project team competences:** The ERP project team selection and activities are crucial. Only skilled and willing users should be selected to participate in ERP system implementation. Project team should be controlled, managed, trained and educated probably to effectively and efficiently influence system implementation in a positive way

15. **Change management culture and program:** It is very important that organization identify a balance between change and resistance forces facing the implementation of ERP system. It has been argued that the more ability organizations have to adapt the change the more successful ERP system will be

16. **Interdepartmental cooperation and communication:** Effective communication and cooperation in all organization levels should be open, honest and shared in formal and informal ways

17. **National culture:** The basic values, beliefs, attitudes, norms such as politeness, generosity, tolerant others and value of past or friendship and others may have strong affect in the result of the project

18. **Saudi-related functional requirements:** It is natural for organization in different countries to have country-specific functional requirements which may arise because of certain business practices or legal requirements such as Zakat regulations

Even though critical factor studies were popular in the field of ERP implementation, but had some limitations (Robey et al., 2002). Many authors questioned the usefulness of identifying large sets of factors that could influence ERP success while many projects still fail. The current understanding of the role of critical success or failure factors are still inadequate and need more investigation (El Sawah et al., 2008; Ram and Corkindale, 2014). It has been reported that most of the factor studies usually neglect the investigation of ERP as a dynamic process, because they are not directly observed as such, yet instead common sense is used to explain a causal influence between certain critical factors and ERP outcome. Moreover, many studies adapted new approach that join ERP system implementation stages and the critical factor approach in more hybrid approach as explained as follows.

4. **Hybrid approach:** Mohr (1982) made a clear distinction between factor and stages approaches and stated that sorting the two out and keeping them separate produces clarity and the basis of progress (Al-Muhari, 2005). In critical factor approach, the accountant’s and other users change in perceptions is presented in a casually and static relationship between identified independent factors which linked with change in dependent factors. In stages process approaches however the focus on both independent and dependent factors but in sequences or stages of events to explain how these stages occur and how the activities during these stages affect the change in accountant and users perceptions’ outcome (Lyytinen et al., 2009; Robey and Newman, 1996; Sabherwal and Newman, 2003). While information technology systems research arena is the best seen as a mixture of factor and stages research, total separation between the two approaches is considered to be more a theoretical assumption than an empirical one (Langley, 1999).

Some studies attempted to combine the two approaches, for example: Sabherwal and Robey (1995) and Eisenhardt and Bourgeois III (1988) used the two approaches independently in one study at a time and then joined and combined the results of the two approaches to obtain more comprehensive understanding.
Fig. 1: A hybrid approach to analyze how and why accountants’ perceptions measure ERP system implementation

Unlike what Newman and Robey (1992) claimed that factor and stages approaches cannot be integrated rather than being complimentary to each other while outcome of one approach could be used further to elaborate the other approach (Al-Muharfi, 2005). This study, however, attempted to integrate both approaches in a hybrid approach to measure ERP system success, wait and see, or failure using accountants’ perceptions as changed and modified by the influence of certain critical factors alongside the process of ERP implementation stages (Al-Hinai et al., 2013; Haddara and Elragal, 2012; Subramanian and Pestalak, 2010; Wickramasinghe and Karunasekara, 2012; Williams et al., 2013).

Figure 1 show a hybrid approach which was formulated based on the previous research and the empirical work. As shows in Fig. 1, the first part represents the three distinctive accountants’ perceptions as identified in the literature as success, wait and see and failure. The second part aimed to identify ERP implementation stages which will be solved empirically. The third part identified eighteen critical factors as provided in the literature to give reasons and to explain changing accountants’ perceptions during ERP implementation. The fourth part in this hybrid approach integrates the three previous parts to provide a comprehensive way to answer the research main question via the use of this study hybrid approach.

**RESEARCH METHODOLOGY**

An interpretive case study approach was used to describe and explain accountants’ perceptions change during ERP system implementation stages as influenced by certain critical factors (Stockdale and Standing, 2006; Walsham, 2002). Although there is a growing body of knowledge on ERP implementation, yet a little research is accomplished on the analysis of changing accountant’s perceptions in Saudi Arabia. Yin (1994) suggested that case studies are suitable to explore new areas and issues where such studies are either rare or at early research stages such as the ERP implementation in Saudi Arabia. The choice of the case study approach in this study was mostly driven in particular by the interest of investigating ERP implementation issues in depth within their natural settings, looking for rich and detailed information (Al-Muharfi, 2005).

Due to the complexity of ERP implementation and the dynamics of changing accountant’s perceptions under investigation, there is a need to investigate more than one case study. Three case studies were carefully selected due to the following specific reasons:

- Two of the selected case studies except company c have currently completed ERP system implementation process which grantee up-to-date data collections
Fig. 2: A hybrid approach to analyze Saudi electricity company

- Many accountants who participated in the ERP system implementation project in all case studies are still working in the same positions at the time of carrying on this study.
- All case study offered full and excellent access to gather full information about ERP implementation projects.

Data was collected primarily by interviews, observations and some of archival sources. A total of 38 interviews all with accountants were conducted using structured survey questions that contained the following parts:

1. The participants were asked first to list, name and define all stages they follow during the implementation of ERP system.
2. Then the participants were asked about their own perceptions to identify each stage as success, wait and see, or failure.
3. Then, the participants were asked to justify their own stages perceptions using the most effective factors listed in the 18th critical factors identified and selected form the literature.
4. An interpretative way of analysis was used to provide a comprehensive view in a serious attempt to make sense of how and why accountant perceptions' change alongside ERP implementation stages as a result of certain critical factors affects (Stockdale and Standing, 2006)

CASE STUDIES

The following three case studies were introduced with a brief background followed by an implication of the study hybrid approach to provide answers to the study main questions.

1. Saudi Electricity Company (SEC): Saudi Electricity Company (SEC) was established as a result of the Cabinet Order No. 169 Dated 11/08/1419H. which stipulated the merger of all Saudi electricity companies in the Central, Eastern, Western and Southern Regions in addition to the ten small companies operating in the north of the Kingdom. The SEC is responsible to provide power supply to fulfill the community energy needs. The company also provides corporate with more options of different electrical service and energy in order to improve their contribution in to the Saudi economy and the growth of the nation. The company changes its information system towards SAP-ERP solution to streamline their business activities and provide accurate and real-time information for more effective decision making (this information is adapted from and available at http://www.se.com.sa).

Data in Fig. 2 shows six implementation stages accompanied with their reasons for changing accountants' perceptions of ERP system alongside the implementation process. The identification and the definition of the six stages were adapted as presented by
some senior members of the ERP project team. The interpretation approach was used to identify the most agreed upon reasons for accountant's perceptions as summarized below.

1.1 Project preparation (success): The selected team members from each SEC department evaluated the information technology market in the local market in Saudi Arabia as well as the international market. The project team with the help of the consultant selected SAP system as the best ERP systems available in the market that fits and meets most of SEC needs. Almost all participants viewed this stage as success due to the stage goal achievement. The outcome from this stage was clear and almost everybody knew what SEC was going for and what should be done in the future.

1.2 Business blueprint (success): Team leaders in this stage prepared exhaustive work plan that contains complete company requirements, detailed schedule and list of participants who will start the implementation in this stage. SEC business process requirements and design was documented in its legacy system form and in its future SAP situation. It was clear that team members understood how SAP selected and how it works. Therefore, due to the positive influence of the SEC top management and steering committee, an effective project management practice was developed to adapt and understand the importance of the new SAP system. Communication was an effective tool among team members to accept the level of management change the new SAP environment imposes. The strong partnership with SAP vendor encouraged SEC to adapt the vendor best practice in this stage in particular and the project future activities as a whole. Most participants’ perceptions were a positive one as they viewed this stage as a success due to stage performance evaluation to achieve the stage objective.

1.3 Realization (success): The main focus in this stage was on SAP system design, accounting data validation and conversion, SAP system configuration, testing of SAP system with final acceptance by SEC members. The ultimate goal in this stage was to build, configure and test SAP system for final preparation and go live with copying legacy system business process. The change was controlled and managed by the project manager who worked as the project champion. The workload was too much for team members to bear. The SAP team members' documented all this stages activities and obtained all departments leader's approval to enhance system setup and configurations. This stage was a link between business blueprint stage and the final preparation stage and almost all participants have found this stage as success.

1.4 Final preparation and go live (wait and see): The aim in this stage was to ensure that SEC was ready to use the new SAP system for preparing the final production, support systems plan and complete the cutover implementation activities. The SAP team members reviewed a checklist to verify readiness for going live with the new system. Testing process was a major issue in this stage before the project comes to the end. Accounting data was very important aspect at the company to test carefully. The SEC relied on providing electricity power to the Saudi organization and people and collect monthly bills. Minimizing the business process reengineering and adapting the SAP business process reduced the likelihoods for any accounting problems or mistakes. Through ongoing communications among SEC and SAP project members, a plan that identified cutover activities and trigger SAP project to go live time was delivered. Although this stage achieved its goals, most of the participants revealed that they were reluctant and not sure with the final project results. Therefore, this stage was interpreted as wait and see.

1.5 Continuous implementation and support (success): After successful results of SAP implementation testing and with the support of top management, SEC had clear vision to adapt SAP system in all other SEC functions and branches. The company also worked very hard to adapt an excellent level of change management through effective user training programs and continue performance evaluation. However, the general perception in the company was positive as SEC was successful continued adapting SAP system in other branches.

2. Al Majdouie Group: Al Majdouie is a Saudi group of companies, established in 1965, started as a land transport company and grew into variety of businesses such as logistics, automotive, manufacturing, food industry and real estate and investing. The company operates all over the Kingdom of Saudi Arabia and worldwide. It was stated in the website (https://www.zawya.com) that: “Al Majdouie Group will make use of 85 modules to support growth across all its operations, but will focus more on the automobiles and logistics lines in the initial implementation phase. The ERP solution was designed and improved to facilitate the flow of information among all divisions from materials management, production and finance, to HR, sales and marketing and to take timely right decision.
Fig. 3. A hybrid approach to analyze Al Majdouie group

Figure 3 shows the case analysis that revealed four implementation stages and the most common reasons for accountants changing perceptions during ERP implementation process to indicate ERP project success, wait and see, or failure. Due to the non-availability of information for implementation stages, the interpretation method was used to identify and define these stages. The detail of implementation stages, their explanations and accountant’s perceptions toward them are described below.

2.1 System selection (Wait and see): The need to change Al Majdouie legacy system was due to the new expansion of the company facing the new environmental changes as well as the need for information technology that can provide excellent integration among all the Al Majdouie groups. Also, with the support of the top management, a highly qualified consultant was hired to help the company to search and select new system that meets company current and future needs. The choice was placed on Oracle after possible vendors short listed and the new Oracle system was demonstrated through many vendor presentations. Although it was clear from the beginning that the company will change its business process to fit Oracle best practice, but the accounting data was one of the most important issues to be converted from the legacy system to Oracle with zero mistakes. The accounting data must be converted on timely basis from sister companies to Al Majdouie holding company to produce final financial reports. Most participants were happy and pleased with the result of selecting Oracle and this stage was viewed and interpreted as success.

2.2 Planning (Success): Because Al Majdouie group consists of so many companies with different kinds of practices such as manufacturing and retailers and operating in different kind of markets, the plan was to adapt Oracle in three phases to integrate all the groups of Al Majdouie companies. Since, phase one seems to be crucial as it will be a model for the other two phases of Oracle implementations. Therefore, it was decided to adapt the new system with minimum business reengineering activities. Oracle implementation project manager played a very important role to bring everybody including Oracle vendor in strong partnership with the project team members and activities. This stage was viewed as success and everybody was happy with its results. Oracle implementation plan was formed, agreed upon and delivered probably to participants in Oracle implementation project.

2.3 User Acceptance Testing (success) [UAT]: The actual designing and implementation started in this stage as the company developed (UAT) user acceptance testing. The project management and consultant effectively worked together with positive support from the company top management for almost two years to encourage team members to configure the new system, test it and
approved the outcome. The legacy system business process was mapped with Oracle business process and the new business process was agreed upon for implementation. To implement such processes, project team manager worked closely with the new system users and made sure that all UAT forms are complete, accurate and collected on time. Almost all participants viewed this stage as success. The ability to adapt Oracle best practice and not to copy the old legacy system with the level of company understanding and willing to do that made the change safe, easy and limited to small obstacles beside the long period this stage took.

2.4 Go live and continuous improvement (success): The long testing period and the high level of UAT approval rates provided the company strong basis to go live with the new system. The decision to go live in phase one was agreed upon by all the parties of the project such as top management, consultant, project management and users. Phase one performance evaluation encouraged the company to go for more improvements as planned to implement Oracle in phase number two and three. Accounting data process and outcome was satisfactory and no major problems happened. The company realized that in order to go for more implementations in the future phases, more user training was needed. The result of phase one implementation was satisfactory which placed this stage in the success level of the project.

3. Company C: This company is one of the largest fully integrated steel producers in kingdom of Saudi Arabia which started producing rebars and wire rods in 1983. In order to be keep the company’s credentials confidential, this company was called as company C. The company decided to change its legacy system due to many factors such as inability of the legacy system to meet the new company requirements as Saudi and international market started massive information technology systems changes. Therefore, Company C also moved for the change after an information technology department proposal highlighted the weaknesses in the company legacy system such as lack of full company department integrations, lack of maintenance and absence of technical support. The company top management then decided to change its legacy system and start looking for better possible alternatives.

Figure 4 shows the case analysis that included five different implementation stages as identified and defined based on careful interpretation to the respondents’ information during the data collection process. The reasons for changing accountant’s perceptions were provided as well. The reasons for changing accountant’s views of ERP implementation process was based on the influence of certain critical factors as summarized below.

3.1 System selection (Success): A consultant was hired by the company to look for a new and better system with
a clear vision supported by the top management to overcome the legacy system. Similar views were expressed by the project team. In the process of looking for the new systems, company C rated its requirements as 'mandatory', 'highly desirable' or 'nice to have'. Among so many system providers, the team project short listed all possible vendors into only four. The company then sent a report to all four providers with the company’s requirements and asked them to label such requirements as 'available integrated', 'available but not integrated', 'available soon', or 'could be customized'. After attending several presentations by the four vendors, the company top management decided to go for SAP as the best option for the company based on project team management support. Most participants viewed this stage as success. The project achieved its goal to select a new system that can overcome the legacy system weaknesses, provides more functions integration and can support future improvements.

3.2 Planning (Success): SAP implementation team and consultant worked together to develop a plan for long and complex implementation. The plan was to implement the new SAP system step by step starting by General Ledger (GL) in the Financial Module (FI) followed by Sales and Distribution Module (SD) and so forth. Each department in the company must be represented in the implementation project by two to four employees. However, due to non-availability of qualified staff about the importance of the new SAP systems, it was a good opportunity for many departmental heads to get rid of bad and unqualified employees for this coming two years. Most of the project participants found this stage as success because of achieving the goal of developing a clear vision to plan the implementation. Despite bad team selection which was not realized at the planning time, this stage was viewed as success.

3.3 Mapping (Failure): The company used gap analysis to design a new business process for company. The objective of this approach to document current company business process as is and then mapped it with SAP suggested business processes. Unfortunately, the company decided to customize almost all SAP business process to fit what company’s user used to do in the legacy system environment. The result of the mapping process formed the new business process to be implemented in SAP new environment. Most of project team members did not have clear vision of what SAP system is going to be and how they should design the new system. In addition to that, top management, steering committee, project team members and project consultant did not actually realize that the SAP system differs from the old information technology system and could provide best practice which might bring positive changes to the company. Almost most of the participants viewed this stage as wait and see.

3.4 Testing and going live (Failure): Because of top management pressure, the project team rushed to test and go live with the GL module. After going live with the GL, the company was tricked with the success of the GL module. This module consists of company’s account chart only with debit and credit which almost is the same in any information technology system. The true result was presented in the SD module implementation. The customization level in this module was huge and the testing period was relatively short because of the increasing pressure of the top management and steering committee of the company. The go live decision was taken by the project management and the consultant. After six month of actual operations, the sales revenue was not recorded and the company’s overall income result was a loss. To management then decided to stop using the new SAP system and go back to the legacy system. After long period of investigations, the company found out that the SD module was not connected properly to the GL module which did not allow sales revenue to be recorded and mapped with the company expenses which was recorded properly. Almost all participants viewed this stage as a huge failure because of the loss to the company. Everybody in the company started doubting SAP system ability and usefulness.

3.5 Re-planning (Wait and see): The top management of the company interfered again and canceled the consultant contract and worked directly with SAP provider only. The project team manager and the members were reselected to include only excellent and most qualified employees. Unfortunately, the company did not change its customization approach which led to change SAP system business processes to fit the company legacy business process. The company also changed its incremental implementation approach to go for big bang implementation because of time shortage and cost over expectation. The project new manager was enthusiastic and played an important role to encourage old and new team members to work very hard to lead this project for success. Most of the participants were reluctant and did not show any sign of determination for success. Because, most of the participants did not know what to come next which viewed this stage of implementation as wait and see.
3.6 Mapping (Success): All the team members met in a big room to design and implement SAP system which increased the level of communications among project team members directly under the new project management, top management and steering committee support. Documentation process was taken for almost nine months with the objective of analyzing the gap between current business processes and SAP business process. The aim was to provide mapped business processes that reflect mostly the old legacy business process in the company. The project team members had a task to train other system users in the company into how to use SAP system. This process resulted in full integration of all the departments of the company through SAP system. This stage was viewed as success by almost all participants as business processes to be implemented in the new SAP system became ready.

3.7 Testing and parallel run (Success): After completing SAP implementation, the company entered eight months of parallel run testing that compared the legacy business process and the outcome with the new SAP system processes and outcomes. With more similarities between legacy and new system, the more SAP implementation was considered as success. This stage was problematic because the similarities between the two systems means that there was nothing new happened in the company by SAP implementation but nobody actually realized that. Most of the participants however did not like this stage anyway and many of them expressed strong disagreement as they have to do everything almost twice. The project manager effectively attempted to minimize such complaints and pushed SAP system to go live as planned. Even though this stage took relatively longer period than expected, but this stage was considered as success by many participants.

3.8 Going live and continuous improvement (Wait and see): After long period of testing, top management agreed to setup a date for going live with the new SAP system. Going live in the company means switching off the legacy system and rely on SAP system only. After going live, the company did not experience any major problems except some small problems called as teething problems. These problems were solved with the passage of time and did not cause any problem for the failure of the new system. The level of success and satisfaction with SAP results made the company to upgrade the system. Unfortunately, due to the customization of old SAP system version and with many obstacles, the company approach to customize SAP system stopped and adapted the SAP business process and a change in the company’s business process started to be followed. The company till the present time enjoys huge system benefits as they viewed the system as success as SAP system became the only system for the company.

DISCUSSION AND CONCLUSION

Even though some study claimed that process approach should not be joined with factor approach, this study proved that joining both approaches in a hybrid approach is helpful to understand such a complex project implementation such as ERP system. This research supported a hybrid approach that joined the factor and process approaches. While factor approach provided reasons for changing accountant’s perceptions towards ERP implementation, the process approach provided evidence into how such reasons change overtime and alongside the implementation process. Therefore, joining the two approaches provided more understanding and explanation to ERP implementation. The hybrid approach provided more dynamic and energy to study complex situation.

The three cases analysis revealed some similarities and some differences that should be more explained. The analysis of the three stages revealed that ERP implementation stages are not stable and there are no ideal stages that must be adapted. Moreover, this study supported the idea that each company should adapt the implementation stages that fit their environments. The analysis revealed that ERP implementation stages identification and definition will remain an empirical one. The three cases analyses have used users, in this research case, accountant’s perceptions to be a valid measure for ERP implementation process and outcome. Similarly, the three cases analysis showed three types of accountant perceptions as success, wait and see and failure. These three perceptions are dynamic as they changed over the period of the implementation stages as they are influenced by certain critical factors. Accountant’s perceptions were interpreted as success, wait and see and failure based on the level of goal achievement in each implementation stage. In case study number 3, the Company C analysis revealed that using accountant’s perceptions was problematic. In the mapping stages, accountants viewed this stage as success as they achieved the stage objective to customize SAP system to fit current business process. This objective was not ideal, so the company decided to adapt SAP business process and minimize system customizations. Therefore user’s perceptions will not be always reflecting the correct direction of the implementation process or the correct outcome. Despite
that, users’ perceptions still was a very helpful measurement for system implementation process and outcome as such perception reflected the planned and intended activities regardless their validity as correct or incorrect.

The three cases analysis revealed different ERP implementation stages in numbers and names. The first case provided five stages that included project preparation, business blueprint, realization, final preparation and go live, continuous implementation and support. The second case analysis showed four stages that labeled as system selection, planning, user acceptance testing and go live and continuous improvement. The last case revealed five stages that named as system selection, planning, mapping, testing and parallel run, going live and continuous improvement. Although these three cases revealed different stages of implementation, such stages share similar activities that include selecting the new system, planning, mapping or gap analysis to design what process to be implemented, testing, finally go live and continuous improvements.

The case analysis also revealed that the critical factors are dynamic and are not statics. Many critical factors such as “top management support”, “team selection”, business reengineering” and “communications” and other showed different influence on accountants’ perceptions. Therefore, critical factors could influence success as they could influence failure as ERP implementation activities are changed from time to time or from stage to stage. Surprisingly, some critical factors identified in the literature did not show any influence in the three cases studies under investigations. Some critical factors such as “Saudi culture” and “Saudi special requirements” did not show any influence on changing accountant’s perceptions. This result might be supported by the global and international usage of ERP systems which minimize and probable not elimination the influence of local environments.

This research is limited only to the case study approach with some limitations. The study did not aim to generalize its results to other cases that might have different conditions. The study was also limited by the level of data collected from the study participant and the ability to interpret such data. However, academic as well as practitioner can benefit from the hybrid approach introduced in this study to monitor and control the implementation process and outcome. Future research could use the hybrid approach to investigate other single user’s perceptions and use multiple user’s perceptions to measure ERP system implementation process and outcome.

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