

12-2016

ERP Critical Success Factors: Importance of ERP Consultants in ERP Implementation

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ERP CRITICAL SUCCESS FACTORS:

Importance of ERP Consultants in ERP

Implementation

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GRAD 699

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ABSTRACT

Enterprise Resource Planning, ERP is one of the most popular and successful information technology solution used in many organizations to share information within different business units to enhance and maximize productivity. The system is expensive, time-consuming, and complicated to implement and manage. The difficulties of ERP implementation have resulted in high rates of unsuccessful ERP implementation according to the stories of many organizations that have implemented the solution. The failure of ERP implementation has then led to several studies to investigate the Critical Success Factors (CSFs) that could influence the ERP implementation during and after implementation phases. Some of the factors identified in most studies are; lack of organization's top management support, clear project definition, ineffective user training, lack of qualified project team, lack of effective communication, incomprehensive business plan/ unclear vision, lack of detailed project planning, and lack of effective change management process. However, very few has considered the role of consultant in ERP success. Hence, this study would analyze the importance of consultant as CSF in ERP implementation.

Keywords: ERP, Enterprise Resource Planning, ERP, ERP Implementation, CSFs, ERP Consultants,

PREFACE

The purpose of this thesis is towards the completion of my graduate studies in the field of Project Management with a concentration in Information Technology at Harrisburg University of Science and Technology. The thesis objective is to identify and analyze the critical role ERP consultant perform in in Enterprise Resource Planning (ERP) projects by specifically aligning the implementation activities with the traditional project management processes i.e. initiating, planning, executing, monitoring and controlling, and closing. However, this paper would only base compilation and analysis of previous research articles with focus ERP consultant.

I would like thank Professor Richard Kordel (D.Ed.) whom I have benefited academically from, as he supported and provided professional feedback that has contributed to this thesis foundation during my GRAD 695-90 (Research Methodology & Writing).

Most importantly I would like to give a special thanks and appreciation to my supervisor, Dr. Tom Sheives for his cooperation and leadership towards every step of this thesis paper.

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INTRODUCTION

Organizations recognized that to continue to remain competitive in today's business environment, the level of information sharing within the various departments in the organization must be improved and be connected centrally. This has been discussed by several research authors on why it's important for organizations to implement ERP. Just as defined by Davenport (2000) and Cutler (2001), "Enterprise Resource Planning is a commercial software package with the aim of information integration and information flowing through all parts of the organization including financial, accounting, human resources, supply chains management and customer service". This means that all these functional departments could share information in real-time in other improve its business performance.

Ahmad Saleh Shatat (2015), summarized that "The ERP system was first championed by ERP providers, such as SAP, Oracle, PeopleSoft, and others to eliminate what the old system challenges by providing single and integrated technological platform, and thereby assisting implementing organization in gaining a competitive advantage and thus competing globally". However, implementing ERP system would do require major changes in any organization business process as it's a complex system to implement. The system assists various functional units of an organization to have easy access to data and help make smart business decisions using the real-time exchange of information. Uchitha Jayawickrama, Shaofeng Liu, and Melanie Hudson Smit (2014) highlighted the importance of the system and said "ERP helps to increase organizational performance by lowering operational costs and maximizing revenue, enables businesses to improve customer services and supplier management. In addition, Maditinos, Chatzoudes and Tsairidis (2012) also contributed that state "ERP system provides an increase in productivity,

working quality, standardization, the efficiency of businesses, simplification for organizations and its business transactions”.

It is important to share some of the reasons why implementing organizations are investing hundreds of millions of dollars in implementing ERP projects.

Below highlights some of ERP benefits to businesses:

- Improve information efficiency within an organization
- Improves decision-making process
- Reduction of costs of inventory
- Improving operation and execution
- Rapid information responding time to customers and suppliers
- Improving on-time delivery
- Reduction of direct costs of operations

Several research studies have discussed how much losses organizations, both private and government have suffered due to inability to complete the complex project of ERP, as well as the lack of resources that are critical for project implementation. To effectively implement the ERP system, it is critical identify the factors that could contribute to the success of ERP projects such as teamwork and composition, top management support, clear project vision, consultant, etc.

However, in this paper, consultant as a success factor would be discussed on its importance and how its contributions could be critical to the success of ERP implementation. To achieve the purpose of this thesis, several research articles and journals would be analyzed with a focus on the ones that specifically discuss consultants in ERP implementation.

PROBLEM STATEMENT

Enterprise Resource Planning implementation is associated with high cost of implementation and long duration of completion. However, both the cost and duration are often compensated through high return on investment upon successful completion of the project. Large corporations adopt ERP installation in order to have a centralized system that would aid information efficiency, improve operation and execution, improve decision-making process, faster response time to suppliers and customers etc. So, data in the old system would need to be migrated into ERP system for efficient and effective business performance. According to Younossi, Arena, Roll, Jain, Sollinger (2007) “Transition of legacy data and processes can easily be underestimated and lead to cost growth. This is why it is extremely important for organizations to have conversion processes as its technical aspect requires depth understanding and experience for successful implementation.

Organizations understand that the benefits of implementing ERP are enormous to survival in today’s frequent change in market demand and that system like ERP would bring substantial benefits to their business, which would assure a great return-on-investment (ROI). However, there have been many reports of failed ERP implementation. That is why according to Bae, Ph.D. and Ashcroft, Ph.D. “The typical large company implementation cost averages \$100 million per implementation”. Hugos (2003) also summarized that “Only one of every three ERP implementations is successful”. This explains why a failed ERP project could bankrupt an organization due to its cost of implementation.

Also, the complexity of the system requires the lots of experience and technical knowledge of modern ERP systems that internal employee in most organizations do not always have, which present organizations with the only option of hiring external consultants for implementation and

training of its IT staffs through the transfer of knowledge. ERP consultants are regarded as a CSF in ERP as they possess the following crucial skills to ERP success as they possess the right knowledge, adequate experience, technical skills, understand industry best practices, and the project management skills. They are considered to be the pillar of success for the ERP projects. They are the ones who can add more value to the value chain of a business.

Hence, this study would analyze the aspects of ERP implementation that consultant specifically contributes towards implementation success.

LITERATURE REVIEW

DEFINITIONS OF ERP SYSTEMS

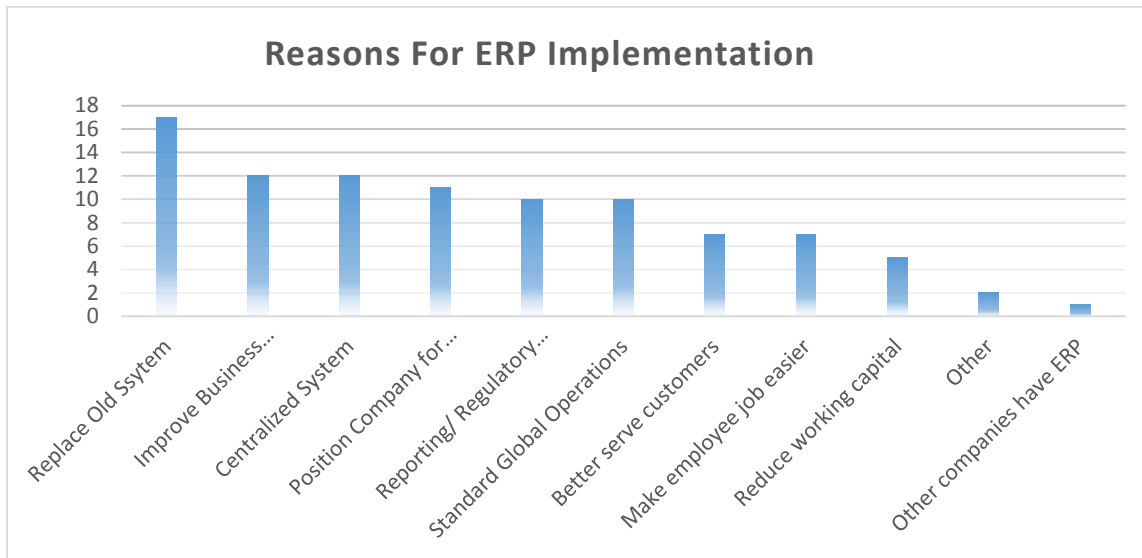
There have been several ERP definitions that have been given by different research authors. Below are sample ERP definitions:

1. According to Sushanta Sengupta (2015) who says “Enterprise Resource Planning is a corporate business analysis and planning software which is typically a module of integrated applications that a company can use to collect, store, manage and interpret data from many business activities including Production Planning, Supply chain planning, Costing, Manufacturing, Services, Marketing and Sales, Inventory Management and many other business processes”.
2. Sylvain Goyette, Luc Cassivi, Mathieu Courchesne and Elie Elia (2015) defines “ERP is a software system designed to support organizations in managing the processes or components of their businesses”.
3. Ge and VoB (2009) says ERP “It is a highly-integrated enterprise information system to manage all aspects of the business operations of an enterprise (especially regarding transactional data) including production, purchasing, engineering design, manufacturing, sales, marketing, distribution, accounting and customer service, etc.”

Many research papers have discussed the critical success factors in ERP implementation including; top management support, project champion, consultant, key user training, teamwork and composition, communication, project management, system customization, business process reengineering (BPR), change management etc. but its appears not much attention and investigation has been done as regards the importance of consultant during implementation. So, due to the

complexity of ERP projects, the project implementation usually involves many responsibilities from the consultant to ensure each phase is implemented successfully.

Panorama Consulting, a world leading independent ERP consultants in its 2015 report further categorized the primary reasons why organizations implement ERP as shown below:



The top three (3) according to the report above show that replacement of the old system, improvement of business performance, and centralization of the system for real-time information are areas consultant would be highly required on the project since it involves much of technical and project experience to successfully accomplish.

IDENTIFICATION OF CRITICAL SUCCESS FACTORS (CSFs)

There have been several research articles that have discussed the complexity and challenges of ERP project implementation. Critical Success Factors (CSFs) are areas of the ERP project which if done appropriately and as expected would yield successful project results. Ngai et al. (2008) argued that by identifying the most relevant CSFs an organization can take effective measures to eliminate or minimize the causes that are negatively affecting the ERP systems implementation.

Below highlight the critical success factors are identified in several research articles to help eliminate what could affect the success of ERP implementation.

Top Management Support

As we understand that in project management the support of top management or sponsor is crucial to the implementation of a project i.e. throughout each step till the completion of the project. This is because the active involvement of top management would help ensure the project gets the required budget, resources, to approve changes when necessary, and provide constant feedback on the project direction. Before the project begins, the implementing organization's top management or sponsor would need sign-off for a realistic ERP project charter, ensure that the team gets the resources necessary to execute the project, and setup a system that would help deal with unexpected challenges during the project implementation.

Project Manager

The traditional project management approach requires someone serving as a project manager who would always ensure the project is well-coordinated, perform the very important role of providing leadership, assigning tasks to the team, help control how the project direction, guide the entire project to completion and make sure the project deliverables are achieved.

Below are the some of the roles of the ERP consultant during implementation:

- Ability to deliver the project within the stated timeframe as signed-off in the project charter.
- To ensure that the scope of the project is maintained.
- Ability to maintain ERP project plan, with the support of the implantation consultant
- To report any changes that might arise, as well as escalate issues that could affect the project scope, time or deliverables.

- To build a strong communication relationship within the team, as well as share the status of the project with stakeholder when necessary or required.

ERP Consultants

The ERP consultant mostly works with the client's project manager to provide details procedures to activities in each project phases that would be executed, within the timeframe, and overall management of the system after implementation. According to Metrejean and Stocks (2011), they explained the reason why ERP consultant's role is significant, that "The lack of knowledgeable information technology (IT) personnel within the organization, the time-consuming process as well as its complexity make corporations seek to external consultants to assist in the ERP implementation projects". Also, Marc N. Haines and Dale L. Goodhue (2003) further summarized consultant's role that "Consultants are brought into ERP implementation projects to provide skills, knowledge, that is not available at the implementing organization".

Project Team

Project team in every project are critical to the success of the project. Their roles involve daily activities on the project, one another, identify any issue or constraints that may cause delay or affect the project completion, as well as have the required business understanding and technical skills of the project. According to Hesseler, M. and Goertz M. (2007) "The characteristics of the team members should complement each other, on their experience, their knowledge as well as their soft skills". In ERP projects, the team must comprise of individuals who understand the business requirement of the organization, the needs of the users for effective and efficient use of the system, and have depth knowledge of the technology that is being deployed such as Oracle, SAP etc.

Key User Training

Training key user during and after the implementation by the external consultant is critical to the overall success of ERP project. This is because they are the ones that would need train other employees as the new system works in other to make their job more easy, fast and efficient. According to Kumar and Ganesh (2009), knowledge transfer to ERP users is defined as: “a process of exchange of explicit or tacit knowledge between two agents, during which one agent purposefully receives and uses the knowledge provided by another”. Given the difficulty of the implementation of ERP project, it is important to conduct adequate and continuous training that would be transferred to users of the system upon completion, as well as every change in the organization business needs.

ERP Configuration

One of the advantages of implementing ERP is the ability to align the system with the organizational requirements. So, most organizations often decide the need to implement or develop a customized system that would allow their business work in a certain way. This would assure the implementing organization that its proposed newly designed system would only serve the specific business purpose. According to Ashley Davis (2005), “Customization is a code change put into place because the ERP business process does not mirror the “desired” business process”. This way the software would reflect the business need and requirements of the organization.

Business Process Reengineering

For organizations to achieve its purpose of implementing ERP as a centralized system, it must re-structure the business processes to align with how the system should work. Since the purpose of the project is to improve its information efficiency, decision making, speed-up the responds time with customers and suppliers etc. it's important to have a process that would support the business objective of ERP. Just as summarized by Hammer (1990) "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". Business Process Reengineering needs to be analyzed prior to ERP implementation to ensure all necessary business process requirements are considered in other to have a well-laid project plan before beginning implementation.

Change Management

Due to the size and complexity of ERP projects, change is often very difficult to manage. This is why change management has emerged one of the CSFs as it could cause failure to the entire ERP project if not effectively managed. Hawking et al. (2004) summarized that "Many companies struggle during the implementation phase due to the underestimation of the complexity and the lack of experience for the change process". This means that changes management procedure in the technical or business requirements should be properly outlined and documented by the project manager so as for ERP consultant to have a smooth implementation process.

Communication

According to PMBOK, project managers spends most of their time on a project 'communicating'. Many ERP implementing organizations understand the impact and the opportunities that communication bring during project implementation, thereby creating a communication plan that

would share updates on the project as well as individual tasks or responsibilities. During ERP project, it is important for project consultant, project manager to have great communication relationship with the teams and key users to aid effective information dissemination.

Therefore, understanding that ERP is an immense topic as well as discussing all the CSFs in ERP, so this study would be concentrated on the activities performed during ERP implementation by ERP consultants, through reviews and analysis of various research papers. The reviewed papers would be ERP implementation publications and proceedings in various conferences, which would be searched using the key terms like “ERP Implementation”, “Enterprise resource planning” “Critical Success Factors” or “ERP.

ANAYSIS OF RELATED ARTICLES

According to Anees Ara and Abdullah S. Al-Mudimigh (2011), “Many organizations view of ERP implementation is the aspect of effective project management planning”. Implementing ERP system in an organization requires clear vision, comprehensive project management plan that would detail the business reengineering processes and system configuration to fit the overall business requirement.

Przemysław Lech (2014) states that “Consultants are hired because the implementing organization does not have the internal knowledge and the project management skills to implement the system successfully”. Leah (2014) further mentioned that consultant may play the role of a project manager in ERP projects. Chan and Rosemann (2001) also stressed the involvement of consultant as the source of knowledge for successful ERP implementation. It is also important to note that consultant not only provides the technical aspects of the project, that they perform several other responsibilities such as training the users of the system by reducing the learning challenging on the implementing organization.

The proficiency of ERP consultants with the structure of project management makes it a crucial factor in the implementation ERP projects. This is because ERP requires the effective management of the system in order to ensure that the activities documented in the project plan is completed and performed in each phase during implementation. The complexity of ERP projects requires that a change request must be put in place by either the implementing organization or the external consultant ensure proper documentation of the project is laid-out. So, the consultant must develop a comprehensive change management plan to support and serve as a mitigation plan in order not to have a project delay towards completion of the project.

A study by Sushanta Sengupta (2015) investigated the activities performed by an ERP consultant across all the phases involved in implementation. The research focused on how the activities performed by consultants would add value to the overall system, which should be directly translated into a good financial condition of the organization. Sushanta Sengupta (2015) listed the step-by-step ERP project activity phases for ERP Implementation as Pre-selection process; Evaluation; ERP Project Planning; Re-engineering; Configuration; User Training; Testing; Pre-Go-Live Activities, and Going-Live and Post-Implementation. The author concentrated on the activities ERP consultants perform in each of the phases, starting from the pre-selection process, where some packages are eliminated due to their inappropriateness to the overall business (to reduce cost and avoid scope creep), to the post-implementation process, where issues that may arise from the newly implemented system could be fixed or corrected.

The review of the activities performed in each phase of the project revealed that CSFs such as project leader, consultants and team members are important to the ERP implementation success based on their study on two major enterprise projects.

The project activities performed by the consultant in these enterprise projects include:

- Development project management plan along with the company's project manager
- Coordinate, manage and lead the team during implementation
- Ensure transfer of knowledge to key users of the project.

Finally, the author highlights the importance CSFs like 'having a clear vision' by briefing the consultants on the company's business process/requirements and culture in order to meet their expectations and achieve the specific expected business needs.

Sheida Soltani, Naemeh Elhhani and Aryati Bakri (2013) explored the impact of ERP project consultant's in ERP during implementation and its effects on project partners such as the team members and key users. Their research investigates how effective participation of project teams, consultants, the project manager could impact positively on key user's knowledge of the system. This means for implementing organizations to have well-trained ERP users that could effectively and efficiently manage the system in order to exploit its benefits, the project manager should document and assign the sole responsibility of training to the consultant. The study examined several ERP implementing organizations in Iran and analyze their ERP project experiences. The CSFs top management supports e.g. executive managers, departmental heads etc. in these organizations assisted in the collection of information from users by ensuring that the developed questionnaire was distributed across all ERP users. The author stated that total of 500 questionnaires was shared amongst the users in these corporations but 276 were returned. However, out of the 249 that were returned, 249 was used for analysis due to its completeness.

Sheida Soltani, Naemeh Elhhani and Aryati Bakri (2013) says the questionnaires was focused on five (5) main areas. Three amongst it are CSFs i.e. Consultant, User Training, and Project Team member and two other are the 'Success Rate of ERP Project' and 'Demographic information'.

A measuring scales was used to determine the effects of these focused areas in the questionnaires. For consultant's participation, user training and team member expertise were all measured using a 5-point scale from strongly disagree to strongly agree i.e. the 'strongly agree' to represent the highest being 5-point etc. while the ERP implementation success used a 5point measuring scale but its ranges from 'almost never' to 'almost always'. Upon detailed analysis and documentation of the interviews, the result showed that consultants' role in ERP implementation is very significant and has a direct impact on its success. The result shows that consultants contribute to the development of skills and the knowledge that ERP users need to effectively manage the enterprise. It also reveals that ERP consultants with appropriate skills for the project, understanding of the client's business requirements, would need to be trusted by both the CIOs of the implementing organizations and its users. This according to the authors would influence the success of ERP implementation. Finally, the results show that consultants are responsible for training internal business users during and after implementation. The knowledge of ERP gained by the team members and the ERP users would effectively help them to ensure that the enterprise is managed appropriately and the software is effectively used to achieve its business need.

There are research articles that have discussed the need to have a well-documented project management plan that would lay the steps and processes during ERP implementation. An investigation on the importance of consultants' as a project manager in ERP was conducted by Anees Ara and Abdullah S. Al-Mudimigh (2011). The authors discussed the role consultants as ERP project manager perform towards implementation success. Just as in many projects, the project manager serves as one of the CSFs in ERP as the right person who understands the concept of evaluating a project, planning, following through a process and finalizing a project. They also highlight the qualities of an ERP consultant with project management skills based on the code of

ethics of Project Management Institutes (PMI) makes it an important role in ERP project success. The result of their investigation reveal the critical important of project management due to its size, difficulty in the planning of ERP project, customization, and configuration of the system, migration of the old-system to the newly designed system, initiating a test solution, and go-live upon project success. In general, the result shows that project management is crucial to the success of any ERP project.

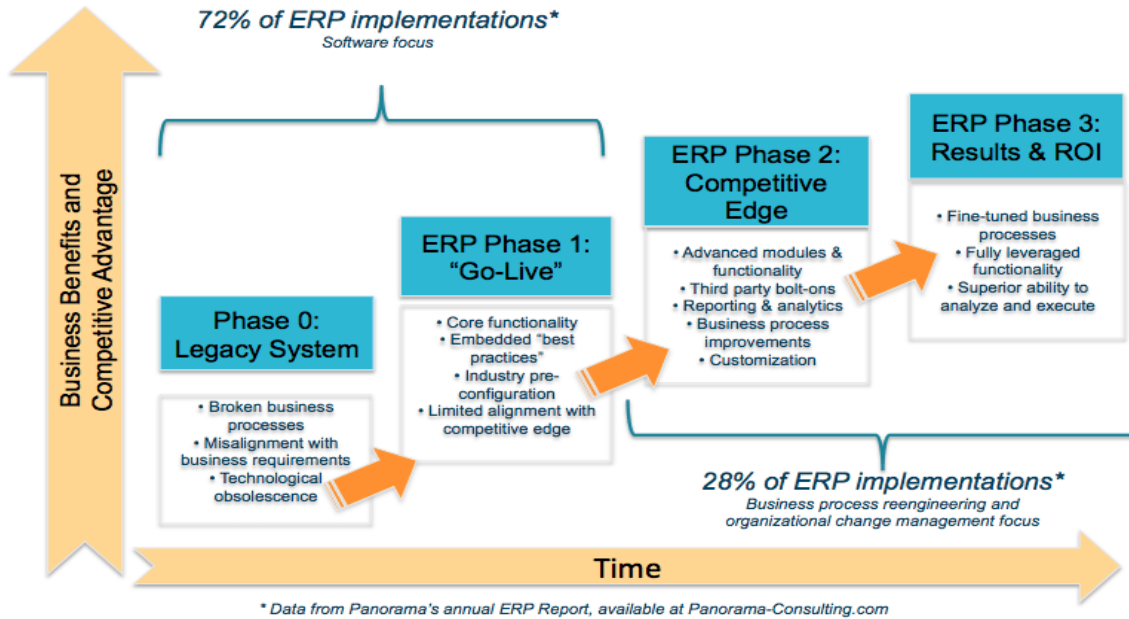
According to Gartner Institute, Gartner Group, (www.gartner.com); “The characteristics of a successful project consultant are flexibility, discipline, ability to learn quickly, good decision maker, ERP expert, having business experience, political clout, good formal education, well liked, and motivates staff”. These qualities possessed by ERP consultants would help lead the team effectively in other to have a clear project scope, develop a detailed project management plan with the support of the project manager, outlining the scope, time, processes, etc., select the appropriate and skilled team, manage the potential risk that might be facing the outcome of the project, etc.

Fiona Fui-Hoon Nah and Santiago Delgado (2006) investigated the Critical Success Factors for ERP implementation. The authors identified seven different ERP CSFs in their research; project management; project champion; top management support; teamwork and composition; system configuration; business; plan and clear vision; communication; and change management. Their study adopted Markus, M.L. and C. Tanis (2000) ERP model to analyze the impact of CSFs in implementing ERP project.

The Markus, M.L. and C. Tanis (2000) ERP phases are:

1. ERP Chartering phase
2. ERP Project Phase
3. ERP Shakedown Phase

4. Onward & Upward Project Phase



In the chartering phase, the authors highlighted that major concentration is on developing a business case to justify the implementation of the project, as well as focusing on any constraints that might face its success. In this phase, CSFs like top management support, choosing the right project manager, consultant, selection of a right vendor, having a clear business goal etc. is required. The next is the ERP project phase, where the migration and redesigning of the system are done. In this phase, the newly designed system is configured to fit the business requirements, undergo testing, and provide adequate training to the users of the system. In this phase, the CSFs like project management, change management, establishing effective communication, putting the right team together, business process reengineering etc. are addressed for successful project execution. In the shakedown phase, any errors or problem related to the system is identified and fixed before rolling-out the system for use. In this phase, one of the CSFs that would be analyzed

is the 'key user training' to ensure users are well-trained on the newly system. The post-activities such as maintenance and continuous improvement of the system are done in the onward and upward phase.

According to the authors, the results of their study reveal that for ERP projects to be successful, effective project management approach is critical to the success of the project as it would aid an ERP implementing organization to define its goal, and clearly states its precise project scope even before the commencement of the project. The result further emphasizes the importance of project management as a guide to manage of change request by the consultant. This is because of the complexity of ERP that requires a careful and detailed procedure to manage change in other to avoid "scope creep". Finally, the results show that CSFs such as teamwork, project consultants, project leader, and ERP vendor requires effective coordination, management, and teamwork throughout the project, with detailed responsibilities as stated in the project management plan.

The study would investigate consultant as a project manager, and of course a success factor in executing ERP projects. The technology, project management process and the needs of team members to effective perform their duties would be addressed, in other for the project consultant to achieve the strategic business objective of the organization ERP implementation.

ERP IMPLEMENTATION CASE STUDY

The management of the case company recognizes the need for a modern ERP system after twenty years of using old systems for its business processes, the company realized change was necessary to be implemented that would primarily focus and reflects the needs of its customers towards continuous business improvement and customer satisfaction. This was as a result of the old systems being too complicated and expensive to manage, doesn't give the accurate information required

that could help in making the right decision in a timely manner. In addition, the old systems do not help in creating effective communication channels with its suppliers, vendors, and even customers, either directly or online. Finally, the system was not effective and efficient in its support of the business process of the organization, as well as competing with the fast and continuous change in both the business and technology world.

Initiation

The initial phase is where the business requirement is documented. The consultant in this phase engages in communication with the implementing organization such that s/he builds trust. This way the implementing company noticed the consultant is vastly knowledgeable in ERP through its communication with the consultant. Also, the consultant ensures a high accessibility towards the organization and its implementing team. This is a very important aspect of the project between the consultant and company to ensure good communication flow as the project implementation begins.

Pre-Study Phase

In this phase, the consultant's role in the implementation becomes clear on the process and the steps in the planning of the project. This is as a result of the consultant working together with the project manager to develop the project management plan which would detail the activities that would be performed throughout the project. This phase of the case company, the roles, and responsibilities of team members was outlined in-line with the scope of the project. The detailed business model was developed, like a prototype to ensure all business requirement is documented.

Implementation phase

This phase is where the customization of the system to align with the business needs and the requirement is performed. The consultant leads the implementation team in this phase to ensure the system does all that have been included in the project management plan, as well cover what the scope of the project is agreed upon. The consultant was responsible for data migration from the old system into the new system, as well as to conduct test phase upon completion. This phase must be correctly executed, in accordance with what the new system must do upon project completion.

Go-Live Phase

This is the phase where all implementation and configuration is fully ready to use. The internal employees that would be using this system were given accesses and training on the effective use of the system. According to the author, the case company reported few issues in the first week of go-live, mostly which were easily corrected and documented.

According to Metrejean and Stocks (2011) who states that “The lack of knowledgeable information technology (IT) personnel within the organization, the time-consuming process as well as its complexity make corporations seek to external consultants to assist in the ERP implementation projects”. So, consultant’s activities in the case study were to lead the project team alongside with the internal project manager to migrate data from the old system into the modern ERP system, as well as train the users on its functionality and how effective and efficient it would help improve business processes. The customization of the system to suit the business needs and requirements of the company was the consultant’s most practical responsibility across the phases of the project.

Given the tasks and responsibilities of the consultant, there are responsibilities expected of the implementing organization in other for the consultant to be effectively utilized. To effectively manage a consultant during implementation, the company must choose a project manager that would work alongside with the consultant to ensure all aspects of the business requirement is designed and fit into the new system. Both the reviewed articles and the case study shows that even while consultants were used in the same project, there was still a reported project failure.

So, based on the results of the reviewed papers on ERP consultants, this paper would seek to present more articles on activities of ERP consultants. In the following sections, the selected research methodology chosen to prepare the compilation will be explained.

METHODOLOGY

The reviewed literature and case studies have highlighted several research discussions as related to the importance of ERP consultant during implementation. For the purpose of this study, twenty-five (25) previous research articles would be further reviewed and analyze, using key words referencing to ERP Consultant.

To achieve the purpose of the thesis, the research approach, the articles would be analyzed by combining the information that would be gathered from different research articles.

DATA COLLECTION

The procedure to collect data for this study would follow four specific (4) steps:

Step 1: Decide the Level of Analysis

This stage would detail the search criteria for the analysis. In some cases, a single phrase could be used to search for the content of data for a given article, while other would use multiple search options. Just as stated by Berg (2004) states that “The first step of the content analysis is to determine at what level a sample will be chosen and what units will be analyzed”. For this paper, the data obtained from the review of the literature involve search of several ERP journal, including:

- International Journal of Computer Applications
- International Journal of Computer Science

- Journal of Systems and Information
- International Journal of Human-Computer Interaction
- Journal of Systems and Information Technology
- Electronic Journal of Information Systems Evaluation
- Journal of Management Information Systems.
- IEEE Journals.

Finally, this investigation would only be restricted to journals that search via google scholar.

The research articles that were reviewed were chosen based on the search result as shown in the table below:

Journal Searches	Searched Phras(es)
ERP Implementations	Enterprise System “AND” Implementation
ERP Implementation Phases	Enterprise Planning “AND” Implementation Phases
Enterprise Resource Planning	ERP, ERP adoption, ERP implementation
Critical Success Factors in ERP	ERP “AND” Success Factors
Consultants and Enterprise Resource Planning (ERP) systems	Consultants “AND” ERP
ERP Consultant Role	ERP “AND” Consultant “AND” Role
Consultant Value Additive to ERP Projects	ERP “AND” Consultant “AND” Value
ERP success	ERP “AND” Success

The emphasis of this study has centered on just ERP, due to the uniqueness of the system, and not IS systems like Datawarehouse, etc.

Step 2: Comparing Articles that Address the Problem Statement

This stage would discuss twenty-five research articles on ERP consultants for analysis. This analysis would include ones already discussed in the literature review, as each one has a unique contribution to this paper. The specific role or involvement of consultants in each article would be documented and analyzed to identify the common traits during implementation.

Step 3: Compile the Data in Articles that support the Thesis

To ensure data collected during the review of the literature are valid and consistent, all research articles would be read multiple times placing emphasis on the search criteria in the table above, and respective citations would be documented in the reference section of the paper. The data collection would not be limited to the roles performed by consultant only, but to any form contribution to ERP projects, as detailed analysis need to cover all aspects.

Step 4: Analyze the Results

The stage involves analyzing the researcher's area of concentration as regards ERP consultant related articles, as well as the number of times the activities performed by consultants in the articles were cited. The result would be discussed in the next chapter.

RESULTS

A total of 25 research papers were reviewed and 15 were considered to be relevant to the purpose of this thesis. This stage would highlight the findings in these reviewed articles and analyze the important contribution of consultant in ERP.

ANALYSIS ERP CONSULTANT LITERATURE

The research articles discussed in the literature review section provided an understanding of the activities performed by consultants in ERP phases. However, further analysis conducted through the compilation of articles reveal the various aspects of ERP implementation that consultant provides strong involvement towards implementation success. The results of this analysis also reveal how much of investigation on case studies is yet to be done by researchers on the detailed activities that must be completed by the consultant during implementation.

As a result, this paper has been successfully able to gather information from articles to discuss and analyze the involvement of consultant in ERP projects. Several of the ERP articles was identified to concentrate on the reasons why consultants are brought on the project in the first place but didn't discuss what specific tasks consultant should do during implementation. For instance, authors like Wachnik (2013), and Xu and Ma (2008), Ko et al. (2005), Lech (2011), have centered their research on the transfer of knowledge from ERP consultant to the users in the organizations. They emphasize the need for users in implementing organization to have the required skills and knowledge of the system. Marc N. Haines and Dale L. Goodhue (2000) also

discussed on why organizations must focus on the specific knowledge of ERP modules implemented after implementation has been completed by the consultant. Kirsch (1996) in its study discuss the need for implementing organization to have some knowledge of ERP in other to manage and control activities perform by the consultant during implementation.

Table: Frequency analysis of ERP Consultant in research articles

Consultant Contribution to Enterprise Resource Planning	Frequency
To provide organization's project team with necessary ERP skills	18
To manage the entire ERP implementation from project initiation to closing.	15
To serve as a consulting partner in analyzing the ERP project	11
To assist organization in selecting the appropriate ERP solution	5
To support organization during Business Process Re-engineering (BPR)	4
To implement necessary changes to help turn-around ERP project during implementation challenges.	4
Others	2

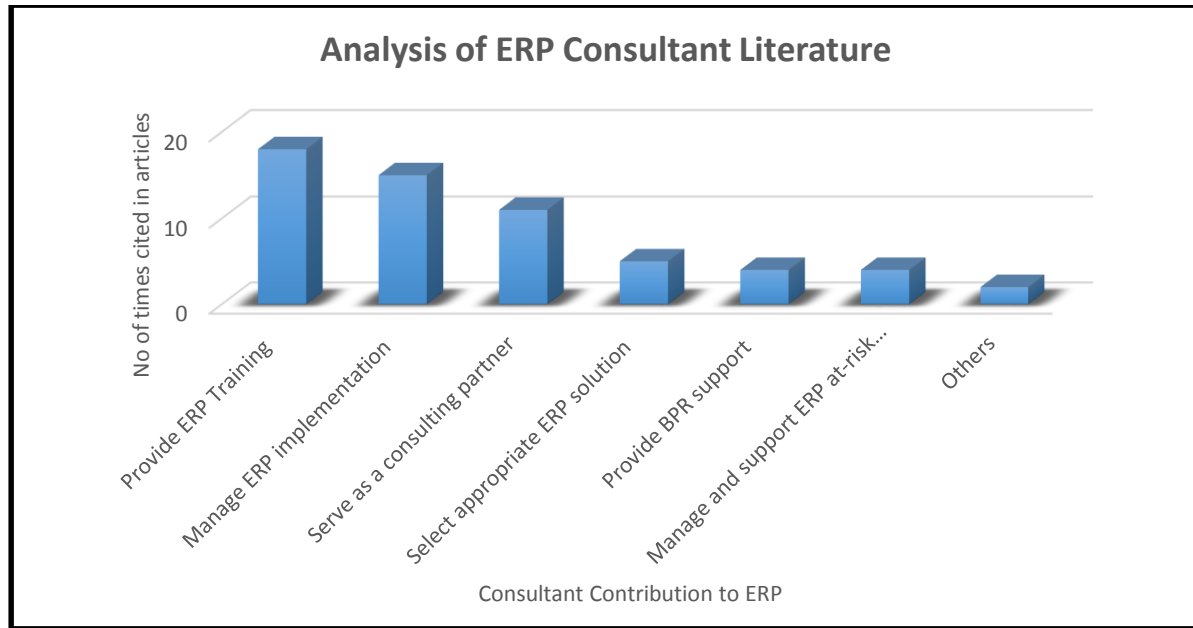
Chang et al. (2013) discussed the implementation role of a consultant in configuring ERP system, while Przemysław Leah (2014) explained why an organization must be provided with the required knowledge by the ERP consultant in other to carry-out their tasks effectively and efficiently utilize the system for its business requirement. Leah (2014) classify the role of a consultant as that of ERP project manager that is responsible for managing the entire project, as well as a trainer during the post-implementation phase of the project. Sheida Soltani, Naeimeh Elkhani, and Aryati Bakri

(2013) concluded in its findings that ERP implementation success should be attributed to how well the users are skills and knowledgeable in the use of ERP, while A. Wong, et al (2005) summarized that the effective participation of a consultant during implementation would positively influence the relationship with system users, and result to willingness to learn the new system.

Z. Zhang, et al. (2005), E.T.G. Wang, and J.H.F. Chen (2006) and R. Sharma, and P. Yetton (2007) concluded that effective user training would result in ERP satisfaction by the implementing organization. K. Reimers (2002) in its article on Implementing ERP systems in China discussed how implementation process can be impacted by activities of consultants as they assist the organization in selecting the appropriate ERP solution, conduct requirement analysis, and perform system configuration. Przemysław Lech (2014) discuss consultant role in each phase of ERP project using analysis of large project documentation of an Enterprise System, but none of these articles or case studies discuss the complete implementation of a system using technical procedures.

Finally, Metrejean and Stocks (2011), concluded based on their research findings that the during the implementation process of ERP, consultants are perceived as the most productive in the configuration phase of the project. The primary form investigation used in the reviewed articles was researched surveys, questionnaires, case study, and observation.

The chart below represents the analysis of ERP consultant in the fifteen (15) reviewed the literature and case studies based on the searched criteria identified in the methodology section.



Several of the reviewed literature used an interview from implementing organization and its users to analyze the impact of the consultants during implementation. James Jiang, Gary Klein (2013), Przemysław Lech (2014), and Eric T.G. Wang, Jessica H.F. Chen (2013) used a semi-structured interview with implementing organizations to investigate procedures of consultants when implementing ERP. The objective of their research was clear, but the articles only address the implementation process of the project and not the exact steps consultant took in implementing the project.

Another key observation in the reviewed literature was that most implementing organization do not have processes in place to manage project implementation. This results to consultant managing the entire implementation process, which could be difficult to integrate the entire business requirements if there are no proper project charter that documents the high-level requirements.

Finally, even though there are many articles that have discussed the responsibilities of consultants in ERP, it was observed that not much of research have been done on the how the role

of a consultant can assure ERP success. Furthermore, many of the fifteen-reviewed literature focused on the transfer of knowledge from consultant to users, consultant implementation phases and consultant as an implementation partner, but none did investigate the entire consultant role towards achieving a specific project success.

DISCUSSION

The compilations and analysis of the research articles have presented significant observations and findings of the key roles, impacts, contributions, as well as the activities performed by consultants during ERP implementation. For instance, the articles analyzed in the result section show that the most significant consultant's contributions in ERP implementation are:

1. To provide organization's project team with necessary ERP skills
2. To manage the entire ERP implementation from project initiation to closing.

The reasons for the use of consultants is discussed in each of the articles. Helo et al. (2008), and Chris Westrup and Frank Knight (2015) discussed the benefits associated with using consultants during ERP implementation. One of the issues reported in their research was aligning the organization business needs and requirements to the designed system, due to the size and complexity of large ERP project. Sheida Soltani, Naeimeh Elkhani, and Aryati Bakri (2013) in their research paper on "How Consultant Participation Lead to ERP Implementation Satisfaction" summarize that "The consultant is expected to effectively transfer ERP knowledge to users of the organization in order to improve their knowledge of the system". Their research result was consistent with many research papers such as Wei-Hsi Hung, Chin-Fu Ho, Jau-Jeng Jou, and Kao-Hui Kung (2011), Lida Xu, Chengen Wang, Xiaochuan Luo, and Zhongzhi Shi (2006), Dong-Gil Ko; Laurie J Kirsch; William R King (2005) on the aspect of knowledge transfer from consultant to users of an implementing organization.

Also, the impacts of consultants on ERP project outcome was investigated by Marc N. Haines and Dale L. Goodhue (2000), and Ruey-Shun Chen, Chia-Ming Sun, Marilyn M. Helms, and Wen-Jang (Kenny) Jih (2008). Their research discussed how consultants could contribute

towards achieving project success. Also, because ERP consultants have specialized set of skills and knowledge to implement different modules in ERP project, Przemysław Lech (2014) in its investigation on “ERP Implementation”, with focused on the role of consultants in each project phase. The research was detailed in its analysis of each step during implementation, however, the Leah (2014) acknowledged that the implementation of a large enterprise requires consultants with different ERP knowledge to work together to achieve project success. So, projects that involve consultants working on different modules, an effective coordination is required in other to achieve project success. The coordination and cooperation amongst consultants on ERP project were examined by Jamie, Chang, Eric, Wang, James, Jiang, Gary, Klein (2013), Susan Clemmons, Steven John Simon (2001). Their research focused on the control mechanisms needed for ensuring coordination among ERP consultants responsible for different modules in other to achieve ERP implementation goals of the organization. The reviewed case studies revealed that ERP consultants play significant roles in ERP implementation programs that could determine the success or failure of the project.

The overall ERP project success would be determined by the ERP users in their ability to use the system based on its user requirements to perform its intended tasks. To understand the satisfaction of ERP users on consultant’s contribution during implementation, a research was conducted by Wen-Hsien Tsai, Thomas W. Lin, Shu-Ping Chen, Shih-Jieh Hung (2007), Dolmetsch et al. (1998) and Piturro (1999) Kole (1983), Lapierre (1998), and Gable (1991). The review of their case studies revealed that consultant ERP implementation experience, consultant domain knowledge, and ERP implementation approaches achieve higher levels of user’s satisfaction. The ERP implementation approach by consultant and vendor were also compared in a research by J. Y. L. Thong, C.S. Yap. and K.S. Raman (1994) on the topic titled “Engagement

of External Expertise in ERP Implementation” that show that implementation of ERP system could also be more successful in a situation where consultant from the same vendor company provides the consultancy service during implementation.

The relationship between implementing organization and ERP consultants is identified to be one of the critical factors to implementation success. Princely Ifinedo (2007), in its research on consultant engagement in ERP projects, with the primary focus of the activities and commitments of ERP consultant on the project. The studies show it is importance for consultants to fully engage in the ERP project from beginning as lack of commitment or lack of strong relationship with the other implementation team could result to project failure, going by the huge responsibilities expected of a consultant on the project. Ada Wong, Harry Scarbrough, Patrick Chau (2013) discussed a failed ERP implementation project due to lack of consultant commitment in a multinational company. The result was consistent with Guy G. Gable (1991), Guy G. Gable, Judy E. Scott, and Tom D. Davenport (1998) that the importance of consultant is crucial to the success of ERP projects. Ufuk Cebeci (2009), E. Ertugrul Karsak and C. Okan O. Zogul (2007), Harun Resit Yazgan, Semra Boran, Kerim Goztepe (2009), and Chun-Chin Wei, Chen-Fu Chien, Mao-Jiun J. Wang (2004) in their research discussed how implementing organizations rely heavily on consultant in selecting the appropriate package for implementation due to their experience and expertise in specific industry.

Finally, as discussed in the literature section, one main reason for implementing ERP is to effectively and efficiently improve operational activities in an organization. In this regard, Sushanta Sengupta (2015) discussed how ERP implementation would add values to the implementing organization. The research centered on the role consultant perform, as its knowledge in ERP domain could make departments such as operations, finance, Human Resource, Customer

Relationship management, supply chain areas a lean one, which would translate to a lean organization as well. The research used two large company case studies to examine consultants impact, and the result revealed that during implementation a wrong decision could lead a complete project failure. That is why a consultant is solely reliable and responsible in providing the right decision based on their experience and project knowledge.

CONCLUSION AND RECOMMENDATION

This thesis discussed the importance of consultant as a success factor in ERP implementation. The results of this study are interpreted in light of its findings and observations. According to Dezdar and Ainin (2011) in their analysis which concluded that “ERP implementation processes have mostly been studied in different studies where the most of them look at success factors for the implementation”. However, this thesis has focused on the various roles that consultants contributes to the implementation of ERP. This thesis answers the research questions as stated in the problem statement section to address the importance of consultants in ERP implementation, and why how consultant’s involvement or contribution could impact on the implementation outcome.

The articles reviewed in this study discussed the activities performed by consultants in various industries, SMEs to large corporations, private to public organizations, and in different geographical region. The results proved that consultants in ERP implementation provide the most significant contributions towards ERP implementation success. In each of the research articles discussed, consultant’s role and activities have been identified, as its roles in ERP implementation projects cannot be ignored. The study also highlights the key roles and activities of ERP consultants through evidence-based research by various researchers, as well as analysis of other articles. However, the focus has often been on few specific aspect of ERP consultant roles and contributions in ERP implementation. For example, the transfer of knowledge from the consultant to the ERP users were discussed and cited more than any consultant roles in ERP implementation. Also, while some articles discuss the participation of consultant in the implementation process, the analyzed articles have provided very little information in their case studies on the discuss the actions required to successfully manage and implement ERP module or projects. Though this could

actually be attributed to the fact that ERP is a broad topic, with different modules ranging from Financials, Customer relationship management, Logistics, Sales, HR, etc., there is little or no research that comprises of all the specific roles or activities of ERP consultants during implementation. That is why Eric T.G. Wang, Jessica H.F. Chen (2005) emphasized on the appropriate selection of quality consultants with the right skills or knowledge of module(s) to be carefully done in order to implement and manage ERP projects.

The implementation process of ERP according to the review of the research articles including Wood and Caldas (2001) is argued to be a difficult process that its structure cannot be easily explained, therefore, this study would recommend that future research on ERP consultant and implementation process should be discussed more broadly and not just a particular aspect. Also, to achieve success on large ERP implementation, the study agrees with the findings research of Jamie Chang, Chung-Li, Eric Wang, Chung-Li, Gary Klein, James Jiang (2013) on the control mechanism of ERP consultants. This study suggests more emphasis should be placed on the control mechanisms on consultant-assisted ERP projects in order to ensure coordination among ERP consultants working on different modules.

In view of the limitations, there are aspects that researchers should discuss more in order to increase the rate of ERP success. First, it's important for organization to involve consultants from the beginning of ERP project. i.e. from a selection of a solution to post-implementation phase. Secondly, the use of project managers by the implementing organization should be encouraged and discuss in order to effectively aligning the strategic business goal with the system. Finally, implementing organizations should ensure internal employees that would be selected and placed alongside with the project manager should be savvy in IT in order to fully grasp the implementation of the system by the consultant.

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