

Research Article

ERP Implementation Challenges & Critical Organizational Success Factors

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Accepted 31 July 2015, Available online 11 Aug 2015, Vol.5, No.4 (Aug 2015)

Abstract

The empirical research describes six key issues that affect the successful implementation of Enterprise Resource Planning (ERP). These issues include unclear objectives, missions and vision, lack of management commitment, lack of end user training, incompatible organization culture and inadequate management of knowledge. The other two important issues include change management and business process reengineering. The involvement and commitment of the executive forms the foundation of the success of the project. The control ensures objectives and goals of the project are formulated and communicated effectively to all stakeholders. The top management plays a vital role in reducing resistance and improving the adoption of technology. Failure to manage change is a major contributor of ERP failure. ERP implementation should be considered as an organization-wide project that advantages from the contribution of all stakeholders. The entire ERP lifecycle involve knowledge creation, storage, and sharing. Therefore, lack of an effective knowledge management can devastate the implementation of ERP. Change management needs to understand organization culture as the basis of behaviors and values among employees. The implementing team needs to create a learning organization that is open to ideas and innovation. In addition, the entire ERP project should be an organization-wide project that benefits from the positive contributions of all stakeholders.

Keywords: Enterprise Resource Planning, ERP, Implementation, Organizational, System Issues, Critical Success Factors

1. Introduction

Enterprise Resource Planning (ERP) is a software solution that assimilates business functions and data into a single system that is shared within the business. ERP originated from the manufacturing and planning systems, and it has expanded its scope to other “back-office” functions including the management of human resources, production planning and finance (Van Nieuwenhuysse *et al.*, 2011). In recent years, ERP has integrated other business functions and extensions such as supply chain management and customer relationship to achieve strategic goals.

The key objective of integrating ERP is to improve the operating efficiency of business by improving business processes and decreasing operation costs (Beheshti, 2006). ERPs allow the communication of different business departments that have diverse needs by sharing information in a single, comprehensive system. Therefore, ERP facilitates cooperation and interactions between all units and

processes of a business (Harrison, 2004). ERP plays a critical role in standardizing processes and data within business best practices. The business can streamline the flow of data between different parts of the organization by creating a one-transaction system. According to Hitt *et al.* (2002), the standardization of processes allows a greater level of interoperability that was complex and costly to achieve with most stand-alone, custom-built systems. The standardization and integration of processes coupled with effective data flow, allows in organization to centralize its administrative activities, improve its ability to deploy new information systems and reduce the cost of maintaining information systems (Siau, 2004).

These advantages and benefits of ERP have made ERP the backbone of business intelligence for businesses by giving managers an integrated view of all the processes with the organization. ERP is designed to acclimatize to new business demand with ease. A significant number of organizations and businesses have adopted ERP over the past decade, and revenue of ERP market continues to expand more rapidly (Dover, 2012).

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2. Literature Review & Discussion

2.1 Issues

Despite ERP increased growth from the late 1990s to date, there are several challenges that businesses and organizations encounter when implementing ERP. Numerous scholars have explored some of these factors. Despite the capital intensive investments and the potential benefits, not all ERP projects result into the intended outcomes. The implementation of ERP is often delayed and overrun the initial budget (Helo *et al.*, 2008). Research indicates that a large number of ERP implementations have failed to achieve the desired organization target. Most of these failures are not caused by the ERP software but the complexity and massive changes caused by ERP in an organization (Maditinos *et al.*, 2011). According to Helo *et al.* (2008), the major impediments to successful ERP implementations are not technologically related issues such as compatibility, technological complexity, and standardization, but most are organization and human related issues including as resistance to change, organizational culture and business processes. Huang *et al.* (2004) presented the top ten risks that cause ERP implementation failures. The table below shows the ten risks.

- (1) Lack of management commitment
- (2) Insufficient training with users
- (3) Ineffective communication with users
- (4) Inadequate support from the executive
- (5) Lack of effective project management methodology
- (6) Conflicts between department users
- (7) Attempt to build bridges to legacy application
- (8) Composition of the implementing project team members
- (9) Failure to redesign business processes
- (10) Misunderstanding of change requirements

The risk factors indicate the numerous organizational factors such as organization fit, project management and control, skill mix, software system design and technology planning. Implementation of ERP causes organizational change and requires the engagement of senior and executive management from across the organization that can resolve conflicts. The lack of commitment of the senior management increases the risk of ERP failure. Marco-Pallares *et al.* (2008) stated that the changes in business processes can cause resistance to adopting the ERP system. ERP integrates and connects business functions within the business. Therefore, it is vital that the management and employees be committed and equips employees who are using business functions influenced by the implementation of ERP with clear and effective communication channels. Failure of the implementing team to train the end-user training increases risks creates confusion and inaccuracy and decrease the

satisfaction and credibility of the ERP system. Users' acceptance is a critical success factor for ERP system implementation. About the organizational issues, the implementation of ERP has an impact on several aspects including the individual working behaviors and organizational processes. The successful implementation requires that the intended level of usage is achieved as system usage is a measure of its acceptance by the end-users. Therefore Users' acceptance is an essential success factor for the implementation of ERP.

Dixit and Prakash (2011) highlighted some of the issues affecting the implementation of ERP among small and medium-sized companies. They identified some of the challenges as lack of awareness amongst SMEs and ERP vendors, perceptions among SME and inadequate resources. Dixit and Prakash (2011) stated that there is a low level of awareness among most SMEs for ERP vendors and applications. They believe that only large organizations should implement ERP. They classify the major factors affecting the implementation of ERP into four categories including the top management, training, software design and testing, and data collection. The core role of the top management is to provide the necessary financial support and adequate resources. IT literature indicates that for information technology projects to succeed, top management is vital. It is not different with the implementation of ERP. ERP implementation involves more than changing an organization's software. It involves repositioning the organization and transforming its business operations, processes and practices. Due to the large impact on the competitive advantage of the organization, top management should consider the strategic effect of implementing an ERP solution. This paper classifies these challenges and factors into organizational factors and system factors.

2.2 Critical Organizational Success Factors

The implementation of ERPs is an organizational-wide issue and as such is influenced by numerous organizational factors. Sternad & Bobek (2012) conducted a literature search to identify the critical organizational factors that influence the success of ERP implementation. The literature search identified fourteen factors that were mentioned more than five times in the past one decade. These factors form the basis of the exploration of the organizational factors for the implementation of ERP.

2.2.1 Clear Goals, Objectives, Scope & Planning

According to Aduri *et al.* (2003), clearly defined business, and strategic objectives are the most critical factors. Scholars agree that formulating clear vision and mission and the right strategies to achieve goals serves as a blueprint for the success of the project. Objectives, goal, and mission, give the project team the operational direction of the project. Akkermans and Van Helden (2002) stated that clear objectives and

goals form a clear –cut critical success factors but also can be problematic. According to Akkermans and Van Helden (2002), it is often difficult to define these objectives at onset of the project. In addition, having consensus among managers about setting the objectives and ways to monitor the objectives may lead to a greater level of satisfaction. Clearly defined objectives ensure the project is focused and are vital in evaluating the success of the project.

2.2.2 User Training & Education

The implementation of ERP has far-reach impacts on employees and their roles. Since ERP Influence Corporation between departments and processes, data integration ad structures, the role of users and their duties change in several ways. First, the employees should learn to cope with the new and complex system. ERPs introduce a number of functionalities and have a greater impact on business processes. The integration of these functionalities and processes alters the role of employees. As the processes, data and departments integrate employees' role and their everyday work changes. The proceeding of business processes over a logical and united database leads to increasing dependencies between departments and individuals. Considering the vastness of the impact of ERP on employees, training becomes an integral success factor. Inadequate user training and failure to understand how ERP system works are responsible for many problems ERP implementation and failures. The implementation of ERP often fails due to lack of proper training. Scholars and researchers consider user training and education as an important factor of successful ERP implementation. The key reason for education and training program is to ensure the users are comfortable with the system, and increase their expertise and knowledge. ERP concepts, system features, and hands on training are vital aspects of ERP implementation. The training needs not only to cover how to use the new system, but also the new processes and understanding the integration of those processes within the system. Lack of adequate training makes users invent their processes and ways to use the part of the system they can manipulate. Therefore, the full benefits of ERP are not realizable unless the end users have the necessary know-how to use the system. The management should develop training strategies in advance and update them continually. ERP training and education refers to the process of offering management and employing logic and overall concept of ERP systems. The content of the training program should focus on logic and concepts of ERP, features of ERP system software and hands-on training. Continuous training is critical to meet the changing needs of the business and enhance employees' skills. Although it possible to change organizational hardware and software easily, it may take months to adjust learning curves with an organization. A major challenge in ERP implementation is the selection of the adequate training for the end-user and education. It is common

for executives and the top management to underestimate the level of education and training due to the associated cost. Dezdar & Ainin (2011) collected empirical data from Iraq's companies implementing ERP. The aim of the study was to examine organizational factors that may influence ERP implementation. They stated that ERP is a complex system that needs adequate training and education to enable end-users to use it effectively and efficiently. In addition, end-user training and education enhances the level of knowledge and proficiency, thus improving individual performance and consecutively the performance of the organization. According to Nah *et al.* (2003), sufficient training has the potential to improve the profitability of ERP systems while lack of training acts as a major hindrance. The organization can use the training and education programs to build an attitude toward the system. It may also help ERP users to adjust effectively to the organizational change taking place within the organization. End-user training increases the chances of ERP system use and success. Somers and Nelson (2004) concluded that implementing ERP without adequate training may have drastic undesirable consequences. Schaffer and Scherer (2000) stated that end users need to be trained how to input data and information, and have to learn the new processes behind the system. Dorobat and Nastase (2012) compiled a list of critical success factors that affect ERP implementation training phase. The list of factors includes top management support, project management, training curriculum, user training commitment, personnel skills and competencies and training budget. According to Dorobat and Nastase (2012), ERP implementation requires enormous training requirements that are expensive. The training program can constitute 10% to 20% of the total ERP implementation project (Dorobat & Nastase, 2012). Therefore, the commitment of the top management and executives is vital in sustaining the ERP training program. Scholars agree on the importance of starting a training program with detailed users training requirement analysis. The aim of the analysis is to understand the present level of knowledge, how to deliver information, number of users to be trained and the courses or content of the curriculum. On the onset of the project, employees may require a large volume of training and support to make them comfortable with the ERP command language and a new business processes. Employees and other trainees need to feel the training is relevant to their current and future jobs.

Therefore, it is fundamental to inform employees the essence and benefits of the training. The success of the training program depends on its ability to deliver training and knowledge at the individuals' level. In an organization, ERP training needs to be delivered to the managerial personnel, key end-users, general end-users and the trainers. Esteves *et al.* (2002) underscores the importance of synchronizing ERP training with the overall implementation of the project. ERP training should be scheduled to minimize

problems from the time lag between the training and the start of ERP. Training expenses are a major concern in most ERP projects. Training expenses are high due a number of factors. First, the users have to learn a new set of business processes and not just how to interact with the interface. Secondly, new employees require extra training and support. Finally, the training costs correlate with the level of competencies of employees.

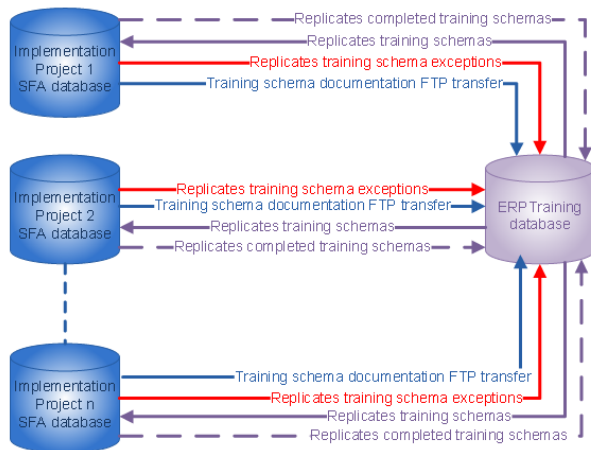


Figure 1: A Simplified view of the ERP Training System Framework

Training needs changes during the implementation processes and is diversified. Therefore, using only one training method may be ineffective.

2.2.3 Knowledge Management

Another issue closely related to user training is knowledge management. Knowledge management denotes a class of IT-based information system that is developed in order to support knowledge creation, storage and retrieval, transfer of information and application of information. The role of knowledge management in ERP implementation encompasses methods for creating, organizing, storing and transferring knowledge about the core processes of the organization. Knowledge management and ERP are synergistic solutions and are complementary to each other. The use of knowledge management in the implementation of ERP facilitates effective product and services innovation thus increasing the potential of ERP (Lekenes & Munkvold, 2006). Lekenes & Munkvold (2006) stated that for organizations to benefit from Knowledge Management related to ERP, the different actors within the organization needs to adopt different strategies depending on their role in ERP implementation process. The actors need to source knowledge efficiently. Mismatch between the capacity to transfer and absorb knowledge makes it difficult for ERP project to achieve the desired results. Vandaie (2008) identified two critical areas of concern regarding the management of knowledge during the implementation of ERP. These areas of concern include the management of tactic knowledge and process-

based nature of organization knowledge. ERP implementation is knowledge-intensive, and the fact of the entire project relies on knowledgeable employees and effective management of knowledge during ERP lifecycle. ERP offers centralized databases and integrated business processes across organizational functions that take the company to converge its information. The convergence of information requires the broader knowledge of organization's processes among the end users. The view of the employees changes from task-focused to process-focused and as such employees need to understand how their tasks fit the overall process and their contribution to the success of the process. A key implication of the knowledge-based perspective of the organization is that the significance of sharing information along the process line increases. Knowledge sharing in ERP exists along various lines of interactions among employees, ERP team, external consultants and management in different levels of engagement. There are different lines of knowledge sharing within ERP projects. The first line of knowledge sharing involves knowledge sharing amongst ERP team members. ERP team is in charge of implementing the project. In most instances, the composition of this team comprises of representatives from different departments. Representatives from the different departments come with different form of knowledge that needs to be shared for the successful planning and implementation of ERP project. The second line of knowledge sharing involves communication between the team members and end users of the project. Sharing of knowledge at this level entails informing the end users on the use of the system and as such it is influenced by the ability of the organization to manage change. Hence, it is critical for the management to integrate this level of information sharing within change management initiatives. The third line of information and knowledge sharing involves the implementing team and external consultants or vendors of the system.

The question of whether knowledge management is complementary or contradictory to ERP implementation remains subject to debate. However, several scholars including Vandaie (2008) and Leknes & Munkvold (2006) believe that knowledge management complements ERP.

The aim of implementing ERP is to increase an organization's efficiency by improving information processing ability. The systematization and centralization of processes enhances the capability of the organization. On the other hand, the aim of knowledge management is to mobilize knowledge through effective and organized knowledge repositories of knowledge and practices of creating and sharing information. Therefore, most organizations use knowledge management techniques throughout ERP implementation. The availability of knowledge management systems to provide accurate and timely information helps an organization to adopt easily. The various stages of ERP lifecycle require knowledge that

is hard to capture that cannot be organized using informal knowledge management means. The major concern of tactic enterprise system management is because process knowledge is routinized to make employees subconsciously perform the various tasks. When employees are included in the ERP team, the need to share knowledge and information surfaces.

2.2.4 Senior Management Commitment

According to Green, top management includes CEO and all CEO's subordinates who are responsible for organizational policies. In most instances, the top management is represented in the project by the steering committee and the project sponsor. Esteves *et al.* (2002) stated that sustained management support relates with "sustained management commitment at the top and middle levels during ERP implementation in terms of involvement and willingness to allocate resources. Management support and commitment are vital for accomplishing project goals and objectives and aligning the strategic goals of the organization. Top management support is essential throughout the implementation of the project and the management needs to be committed with its willingness and involvement to allocate critical resources toward the implementation phase. The executive have the overall responsibility for accepting and approving ERP project initiatives including funding prioritization. Therefore, active participation by the top management is essential to the adequate resourcing of ERP project, fast-tracking decisions and promoting the acceptance of the project within the organization. Another key aspect is the recognition from the executive that ERP implementation requires the use of the best and brightest employees for a considerable amount of time. Therefore, the top management need to help identify individuals required to implement the change and organize them into an effective multidisciplinary team. Top management commitment involves identifying the project as a top priority. Some of the aspects of commitment include doing what is necessary during the implementation phase to make sure all processes and steps are clear. Commitment is a pact that freely assumed, visible and expected to be kept by all parties. Dong (2000) identified two types of top management commitment. They include a commitment to resources and commitment to manage change. Commitment of the top management to providing resources is critical in facilitating the implementation process. The key determinants of commitment include project determinants, social and psychological determinants, and structural determinants. Meyer and Allen (2002) identified three types of commitments. The first type of commitment is the affective commitment that refers to the staff commitments to, identification with and involvement in the project. The second form of commitment is normative that reflects a sense of obligation to continue membership with the organization. The third form is continuance

commitment that entails awareness of the costs related to leaving the organization.

Top management affects employees' commitment to ERP through effective internal communication about the importance of ERP. The responsibilities of top management in ERP include communicating the company's strategy to employees, demonstrating a commitment, and identifying rational objectives for the ERP project. Studies indicate that top management support during the entire ERP project is essential, and it is vital for a business to achieve objectives. Senior level sponsorship, support, championship and participation influence ERP success. ERP does not only involve changes in hardware and software, but also change in business processes.

2.2.5 Change Management

ERP systems change the way organizations do business, and the way employees work. The job profile of employees will automatically change. Some jobs will no longer to necessary while new jobs may be created. In addition, the way in which the organization functions will change, the planning, forecasting and decision-making capabilities will improve while information integration and automation of processes will occur. Managing these changes is complex and if not done properly can lead to ERP failure. The key challenge of ERP implementation is how an organization manages the various elements of changes in the organization to achieve the desired changes. ERP imposes new logic on the organization, and this may cause several cultural conflicts. Cultural changes are the most sophisticated types of changes to identify and manage because culture is complex to grasp. The organizational culture reflects the implicit beliefs, values and assumptions about the behaviors believed to lead to success. During the implementation of ERP, the prevailing culture may antagonize the desired forms of control and organizational structures essential for implementing optimal processes. According to Sia *et al.* (2002), ERP may enforce additional management power and control rather than introduce organizational empowerment. Employees may resist the internal power structures introduced by the system. Therefore, ERP can be used as a change agent or a means of advancing a specific political purpose within the organization. A large number of ERP fail to achieve the desired benefits, probably because organizations underestimate the effort involved in change management. Organizational change is a concept used to ensure that a complex change gets the right results, within the desired timeframe and right costs. Resistance to change makes up the greatest challenge facing ERP implementation. The existing organizational structure and processes in most organizations are not compatible with information provided by ERP systems because every ERP imposes its logic on an organization's strategy and culture. These numerous changes may affect

significantly organizational structures, policies, employees, processes and cause resistance, redundancies, and confusion.

Meyer & Allen (1991) identified some of the factors facilitating change management. These factors include effective management of human resources, adaptive and flexible structure, and familiarity with technology, knowledge transfer, and stronger communication skills. In terms of human resources, the successful implementation of ERP relies on greater education and training, positive motivation and attitudes, and commitment toward innovation. The organizational structure needs to be adaptive and flexible and should facilitate strong communication mechanisms and networks within the organization. The decision-making process should be broad and strategic instead of narrowly defined operational and technical goals. The implementing team should ensure earlier involvement of the operational workforce, top management support and commitment and cooperation among organizational units.

Ahmed *et al.* (2006) explored the impact of resistance to change on the implementation of ERP, and the role of change management can moderate the implementation of ERP. They stated that six key reasons responsible for resisting change. The first reason is the nature of change. When employees are not made aware of the nature of change, the level of resistance is likely to be very high. The second reason is that the change is prone to a number of interpretations, and some employees may read mischief from the organizational efforts to implement ERP. The people affected by the change have additional pressure on them to make it. In addition, employees resist change when such change ignores the existing institutions. According to Kim *et al.* (2005), conflict of interest, inadequate human resources commitment, failure to reengineer processes and lack of organizational change management are the major impediment. Resistance to change is a manifestation of cultural values and strengths. Kim *et al.* (2005) stated that managing resistance to change is similar to changing organizational culture. Therefore, effective change management initiatives are vital for the implementation of ERP and business processes reengineering. Without appropriate and effective change management processes, organizations may be unable to adapt to the new ERP and to maximize performance gains. Many ERP failures may be due to lack of focus on "soft issues" including business processes and management of changes. Recognizing the need for change is critical as stronger the need for change, the more likelihood the top management and stakeholders will support the change. Stratman and Roth (2002) noted that the early involvement in the planning, design and implementation, and extensive top-down and cross-functional communication help in creating enthusiasm for the implementation of ERP among employees. Resistance to change may also be a result of lack of skills or failure to understand the

changes. Al Nafjan & Almodmaj (2005) concluded that ERP implementation is less about the technology or system and more about the people. Resistance to change may take numerous forms. Therefore, top management should take the initiative to deal with the problem proactively instead of reactively.

Dahl (2010) identified three key aspects important for building organizational change management. First, the organization needs to recognize the inseparability of project management and change management. Secondly, the organization needs to create change management awareness and competence. Finally, the organization should integrate activities to turn employee competence into organizational change management potential.

2.2.6 Organizational Culture

Successful implementation of ERP in most organizations is affected by the organizational culture. Organization culture causes approximately half of ERP failures because managers underestimate the efforts necessary to manage the wide range of changes involved in the implementation of ERP effectively. Zaglago *et al.* (2013) explored the impact of culture in the implementation of ERP. According to the study, the environment in which ERP systems are developed, selected and implemented constitutes a cultural or social context. The social context includes different stakeholders, vendors, project team, and the users of the system. Each of these parties involved in the implementation process have different cultural values and assumptions toward ERP implementation. Organization culture is a pattern of shared assumptions that the group learns as it evolve and solve its external problems and internal integration. The implementation of ERP often necessitates changes in business processes and the culture of the organization. Organization culture is fundamental during the implementation process and the successful adoption of ERP. Organization culture plays a critical role in enforcing rules, values, processes and practices with the organization at both individual and organization level. Zaglago *et al.* (2013) stated that ERP perspective is process-based rather than function-based. Therefore, it may introduce disruptive organizational changes. According to Nordheim (2009), ERP imposes rigid workflow norms and practices upon workplaces. It demands changes to organizational culture. An open and creative culture recognizes employees as the main source of ideas and their role in the delivery of performance that results into a stable environment that reinforces employees' loyalty. On contrary, unsupportive organization culture that does not support organization learning and sharing of information discourages employees from contributing and discussing factors that may lead to the failure of the program. The proximity of an organization toward learning facilitates the process of change. An organization culture that promotes learning

encourages involvement and adaptation. A management team that accepts new concepts readily and adapt to new tools as they become available is able to drive implementation of new organization-wide system more effectively, as opposed to management team that prefers to maintain status quo.

2.2.7 Business Re-Engineering

Business process reengineering (BPR) is that basic and fundamental rethinking and radical redesign of business processes to attain dramatic improvements in vital, contemporary initiatives of performance such as cost, quality of services and speed of delivery. Business reengineering involve overhaul of organizational structures, management systems, job descriptions, skill development, training and the use of ERP. Implementation of BPR reengineering impacts every aspect of an organization. A successful BPR can lead to performance improvement, increase in profit, reduction in costs and improved productivity of the company. Numerous studies have investigated the impact or effects of BPR on the success of ERP implementation. Erkan (2009) investigated the effects of BPR on ERP implementation and supply chain performance. The study indicates the critical role of BPR on the success of ERP implementation. ERP systems review guideline ("Enterprise resource planning (erp) systems review", 2003) described BPR and ERP as independent initiatives. However, these initiatives are dependent can be implemented concurrently.

Lack of alignment of ERP system and business processes is a major issue in the implementation of ERP. In order to reduce the risk associated with failure to realign ERP systems and business processes, most organizations reengineer their business. Rethinking and radical redesign of business processes enables an organization's operational processes to be systematically aligned with ERPs and allows an organization to obtain better.

Conclusions

ERP provides an effective strategy to gain competitive advantage. As organizations worldwide continue to implement ERP, there is a great need to identify the key issues that affect the success of ERP projects. Evidence from empirical research indicates the significance of organizational factors as facilitators or hindrances to ERP implementation. Some of the identified issues include the composition of a representative and knowledgeable implementation team. The team should include members from across the organization including the top management. The inclusion of inter-department members facilitates knowledge sharing and reduces the rate of resistance from end users. The involvement and commitment of the top management forms the foundation of the success of the project. The management ensures objectives and goals of the project are formulated and

communicated effectively to all stakeholders. The top management also plays a vital role in ensuring the project has the necessary resources. Organizations needs to perceive ERP implementation as more than just the integration of software's and hardware and view it's a change process that affects employees and other stakeholders. The success of ERP largely relies on effective change management. Effective change management is vital in reducing resistance and improving the adoption of technology. Failure to manage change is a major contributor of ERP failure. The top management and the implementing team need to initiative change management initiatives using various change manager theories. They can improve motivation and innovation within the organization through various motivation theories. Change management needs to understand organization culture as the basis of behaviors and values among employees. The implementing team need to create a learning organization that is open to ideas and innovation. Implementing ERP alter complete an organization culture and without a smooth and effective transition, the organization risk failing to reap the maximum benefits of ERP. ERP implementation goes hand-in-hand with business process reengineering. Business process reengineering ensures the new ERP fits into the new model of business processes. An organization should ensure that its processes and ERP are complementary and support the organization achieves competitive advantage. ERP facilitates the integration and convergence of information within an organization. The entire ERP lifecycle involve knowledge creation, storage and sharing. Therefore, lack of an effective knowledge management can devastate the implementation of ERP. The implementing team should create communication channels to facilitate sharing of information and knowledge. Finally, ERP implementation should be considered as an organization-wide project that benefits from the contribution of all stakeholders.

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