

THE INTERNATIONAL JOURNAL OF BUSINESS & MANAGEMENT

A Review of Enterprise Resource Planning Implementation Issues

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Abstract:

Enterprise Resource Planning has grown tremendously in the recent decades and it's more than mere software package. Industries irrespective of size and type are now realizing the importance of automation of their business processes and integration of the data as a single-unified and central database that is where ERP comes into picture. Even the SME's are inclining towards ERP and the numbers of which are increasing at an alarming rate, the basic idea behind this is to reap the long term benefits. ERP project if implemented judiciously may lead to success, that may result in cost reduction, reduction of inventory overheads, reduction of cycle time etc. On the Contrary, majority of ERP projects run out of schedule & budget. Therefore there are many factors that come on the way of ERP project that has to be handled sensitively for successful implementation. With this point of view the literature on ERP implementation issues such as Critical success factors, Critical failure factors and pre-implementation and post-implementation activities has been analyzed and discussed the relevance of these factors in the implementation of ERP.

Keywords: Critical success factors, Enterprise Resource Planning, Inventory, Implementation

1. Introduction

Globalization has virtually created Global village to aid the industries of different nations to compete on a common platform. Industries were in search of the appropriate tools to sustain and to prove themselves; the answer to this question is ERP. ERP systems have helped organizations to automate the business functions of the firm and to improve the data quality in terms of accuracy, reliability and relevancy. Carl Marnewick *et al.* (2005) reported that ERP is not just a software, but much more than that, also he emphasized the importance of understanding of different components of ERP as well as their integration, without which may lead to the failure of the entire project. ERP relies on data and any firm willing to undergo ERP implementation should possess the relevant data of all its functions and business processes. Hongjiang Xu *et al.* (2002) pointed out the importance of Data Quality issues in ERP project, stated that Data Quality issues were gaining importance for any organization to perform well, obtain competitive advantage or to survive in today's Global Economy. Legacy systems maintain the data of different functions of a firm separately i.e. each function of a firm possess their own data and maintain it separately, but they lack in integration of data. This deficiency of legacy systems is compensated or ERP system is an improved version of legacy system, it is indeed an improved version of legacy system as it helps in automating the business processes and it integrates the different functions thereby providing a Central database. The central database can be effectively and efficiently utilized by the firm to realize the business benefits. ERP system packages have long been associated with process change, the factors most associated with achieving the value from ERP systems were integration, process optimization and use of enterprise-systems data in decision making, Thomas.H.Davenport *et al.* (2004). Customization and business process reengineering (BPR) are the key aspects of an ERP project. Customization refers to the changes that have to be made in ERP package to suit the business processes & BPR refers to changes to be made in the business processes to fit into the ERP package. Both of these have their own role to play in ERP project, an organization opting for customization in ERP package will retain their business processes as usual, but cannot take advantage of up gradation whenever new version of package is released. Those organizations that opt for BPR can take advantage of new versions of package by upgrading the same. S.C.L.Koh *et al.* (2006) conducted a research on ERP implementation in Greek industries and his research revealed that the adoption and performance of ERP system was fragmented and differed between industries and business types, but the drivers for ERP systems were similar i.e. for improving information flow and order processing efficiency. Therefore it is clear that motive behind ERP implementation is mainly seamless flow of information that ultimately results in improving the business processes. As far as ERP modules are concerned they come in different modules such as Human Resource, Supply chain management, supplier relationship management, Customer relationship management, Accounting, Finance etc. Modules can be implemented in phased manner or all the modules at a time. It is up to the organizations to make decisions regarding mode of implementation. ERP implementation is complex in nature and requires organization wide commitment for its success, cross-functional communication is crucial during implementation process. Top

management, training, project management, selection of package etc. are crucial for success of the project. Some of the challenges associated with ERP project are accurate definition of business requirements, handling user's resistance to change, time and budget management etc. So a number of factors influence the ERP project and the same are categorized as critical success factors and critical failure factors by a good number of researchers and the same is discussed in the following sections.

2. Implementation of ERP

As discussed earlier, ERP is more than a software package and requires active involvement of every individual, who is a part of an organization for its successful implementation. ERP implementation requires adequate planning and should be viewed as a long term project. Therefore organizations must have a long term focus when considering ERP implementation, must not expect the things to happen as soon as it is implemented because the benefits can be realized in the later stages. ERP systems are generally designed and programmed by independent organizations outside the client companies; they are structured around a finite number of organizational modules resulting from best practices identified in different areas of activity, budgets are often expressed in millions of dollars and schedule stretch out over several months or even years, it has become common to observe the gap between the results and initial objectives, Oliver Francoise *et al.* (2009). So there are various ways of assessing the success of ERP project, one among these is analyzing the gaps between requirements or objectives and the results achieved. The implementation of ERP move beyond integration of business processes and functions of a firm, but also it is involved in integration with other applications. Earlier ERP systems focused only on internally oriented application that supported finance accounting, manufacturing order, HR etc, after internal operation got integrated now organizations have moved on adding supply chain with their enterprise system (ES), Thomas.H.Davenport *et al.* (2004)). Legacy systems maintain data within the functional boundaries and lack in the integration of data of different functions to form a single complete database and that is where ERP systems come for rescue. ERP systems are designed to provide "one common source" of data and are designed to replace legacy systems, replacing legacy systems means that people have to "relearn" new skills and their reluctance to do so might lead them to perceive ERP system as being difficult to use. The implementation of ERP requires a lot of process change, effective communication will lead to the development of trust and exchange of information needed for those process changes and ultimately the acceptance of solution, Kwasi *et al.* (2004). ERP implementation can be divided into three phases: Planning, implementation and post-implementation. Planning comprises of formation of project team, selection of vendor and consultant, package selection, requirements definition etc. Implementation includes decisions on number of modules to be implemented, strategy to be followed for implementation, type of end user training etc. Post-implementation activities involves establishment of user-help desk, maintenance, up gradation, assessment of success of the project etc. Esteves and Boherquez(2007) have identified the phases of ERP implementation lifecycle, they are ; adoption decision phase, acquisition phase, implementation phase, use and maintenance phase, evolution phase and retirement phase. It is evident that adoption and acquisition phases are a part of planning phase, use and maintenance and evolution phases constitute the post-implementation phase. For successful implementation of ERP organizations may require the help of external consultants and vendors. Liping Ge *et al.* (2009) from his research revealed that, for ERP implementation companies depend upon the consultants to assist them in the implementation and they choose consultants not on price but reputation and practical experience, he also described the ERP system as a highly integrated information system which manages different functions of an enterprise such as production, purchasing, engineering design, manufacturing, sales, marketing etc, stresses that once ERP project is implemented successfully then the benefits such as better customer service, better production scheduling and reduced manufacturing cost can be realized. Organizations willing to implement ERP, must be aware of capabilities in terms of HRM, finance, project management, in-house expertise etc and plan well for successful implementation to realize the business benefits as a whole.

2.1. Challenges and Risks in ERP implementation

ERP projects seems to be a complex one, that requires involvement of expert from different streams which includes process experts, consultants, vendors, project team, steering committee and so on. Many parameters come into picture across the organization during the implementation process; therefore organizations interested in implementing ERP must be ready to accept the challenges and risks that come on the way of implementation process. ERP implementation poses a great challenge on adopting organizations to foster a culture conducive to its success, Weiling ke *et al.* (2008). Many of the organizations can't cope with schedule and cost in the ERP project, as many of these projects run out of schedule and budget planned. The risks associated with ERP project may be of financial, human resource, project team, package selection, requirements definition etc. Yahia Zare Mehrjerdi(2010) has identified the risk associated with ERP implementation as; investment on software, maintenance cost, skilled employee, ERP system misfit, user resistance to change, poor knowledge transfer, poor top-management support, poor quality of testing, high turnover rate of project team members. So these factors need serious attention, failures of which result in serious consequences. Investment on software may have its own implications in due course of time, in case if a wrong package is selected. Maintenance cost needs to be included as a part of budget, as it may require some up gradation and establishment of user-help desk once the implementation is over. The ERP system so selected must fit with organization requirements, in the other case it may drag the implementation process or may result in the failure of the project. User resistance to change and poor knowledge transfer can be a potential risk, if not handled judiciously, the best way to do is to train the employees on ERP system operation and make them aware of the way it is going to change the way they carry out their work and potential benefits of using ERP system. Project team members are a part of implementation team which also includes vendors, steering committee, process experts, consultants, department heads etc. It is the duty of top-management to ensure co-ordination and co-operation from departments to project team members during implementation in order to reduce or eliminate the turnover rate during the implementation process. Adel.M.Aladwani (2001) pointed out the ways of handling the users resistance to change, he says to

overcome the users resistance to change, top-management has to study the structure and the needs of users and causes of potential resistance among them, deal the situation by using appropriate strategies and techniques in order to introduce ERP successfully, evaluate the status of change management efforts. Most of the times users resistance do exist because they are not willing to learn new skills and may also have the false perception that new system may snatch them their jobs, top-management commitment is required to communicate and deliver the right things to the employees to make them convinced about the new system, thereby eliminating the false perceptions. Chain-Son Yu (2005) revealed the importance of end-user training, emphasized that this training should go across the organization, stresses that training should be more focused on computer/system operation rather than ERP concept and spirit. Amin Hakim *et al.* (2010) proposed the decision making model that helped in the decision making process involved in the acceptance of ERP implementation from three perspectives-Strategic, Tactical and Executive ,each having its own modeling stages: further he categorized the risks as organizational, technical skill risks, technology risks, project management risks and system risks. This classification definitely helps to distinguish between the risks, so the resistance to change by the users, top-management etc, may be put under organizational risk. Similarly package selection, vendor and consultant selection, hardware and software infrastructure may be put under technology risks. Researchers not only categorized the risks but also have prioritized the risk factors, Shi-Ming Haung *et al.* (2004) used the Delphi method to identify the risk factors and made use of HP based framework to analyze and then prioritize ERP project risk factors, he identified 28 potential risk factors based on their attributes and the categories were; organizational fit, skill mix, project management and control, software system design, user involvement, technology planning ,these risk factors were used to construct framework of risk assessment .It is evident from the studies of different researchers that the risk irrespective of its nature and magnitude has a role to play in the implementation process, therefore the organizations that have an inclination towards ERP project, needs to make a pre-assessment of the risks so that they can minimize the same during the implementation process.

3. Pre-implementation and Post-implementation Phases of ERP Project

Many of the authors have not distinguished between pre and post implementation phases from the core implementation phase, but there exist a scope to distinguish the two phases from core implementation phase of ERP implementation. Pre-implementation phase is basically a planning process that occurs before implementing ERP, whereas Post-implementation phase involves assessment and evaluation of ERP project and also maintenance activities forms a part of this phase. Pre-implementation phase focus on planning with respect to the aspects such as budget, selection of package and vendor, project team formation etc. all of these do influence ERP implementation. Therefore thorough planning with respect to the above mentioned factors are crucial for successful implementation of ERP. On the contrary, the Post-implementation phase involves the activities such as maintenance, up gradation of package, help-desks formation; all these activities require a helping hand and co-operation of vendors and consultants. It is in this phase the success or failure of ERP project is assessed, this is the reason why this phase is known as evaluation phase of ERP project. Therefore these two phases has a role to play when ERP project as a whole is considered. These two phases are discussed in detail in the following sections.

3.1. Pre-implementation Phase of ERP Project

Pre-implementation phase of ERP project is referred as planning phase by some of the authors; this phase mainly involves activities such as project team formation, requirements definition, package selection etc. Kornbichler *et al.* (2009) reported that the key activities in a planning as building a business case for enterprise system, securing a software package, identifying a project manager and approving a budget and a project schedule. Mapping of process into the ERP system is a critical phase of implementation, the participation of both project experts and IT experts is crucial. The customization of ERP package will reduce or sometimes avoid business process reengineering (BPR) resulting in best practices and thereby minimizing the complications of the project. J.W.Ross (1999) refers process change to be a key decision during planning stage of an ERP project. Planning phase is mostly concerned with selecting ERP system, scoping the project, formulating the system architecture, development of business case, identification of a project manager and approval of budget and schedule, G.Shanks *et al.* (2000). Therefore it is clear that pre-implementation activities have a vital role to play in the implementation process, so it is essential to carry out these activities carefully and judiciously. Researchers have also identified different strategies to be adopted to ensure smooth implementation of ERP.

Purnendu Mandal *et al.* (2003) listed out some of the Pre-implementation strategies which are as follows:

- Incorporate the risk and quality management plans in the change management plan.
- Breakdown the project into natural phases or sub-systems for modular planning and for development of cross-functional communication.
- Consider a phased approach for gradual implementation rather than radical approach.
- Use appropriate planning styles for different tasks for tangible tasks, iterative plans for evolving tasks and personal communication plans for management.
- Prepare plans for recruitment, selection and training of necessary personnel for project team.

So planning has to take across the organization at different organizational level and also crossing the functional boundaries. Cross –functional communication is necessary to share their data regarding their business processes, to ensure smooth implementation. An ERP project in any organization is initiated with planning phase that has its impact throughout, thus it calls for a thorough understanding of business processes that reflects requirements definition thereby reducing the complications of the project.

3.2. Post-implementation phase of ERP project

Post-implementation phase include activities such as maintenance, up gradation, establishing of user manuals etc, even more important is assessment of status of the project i.e. to assess whether the requirements of the organization is met by ERP systems or not. The vendors and consultants have a critical role in this phase along with the implementation team. J.W. Ross (1999) pointed out that during the stabilization period, the project team should clean up the process and the data and the performance of the system should be improved, after the stabilization continuous improvement is needed that means the functionality should be increased and the other improvements should be implemented by the project team. The discrepancies in the ERP system will come into light only in the post-implementation phase, the vendors and the consultants must train the employees regarding the system so that they become capable of handling the problems as and when they occur. The characteristic activities in the stabilization/improvement phase includes bug fixing and rework, system performance tuning, retraining, staffing up to handle temporary inefficiencies, continuous business improvement, additional user skill building and post-implementation benefit assessment; this is the phase in which error of prior phases are felt in the form of reduced productivity or business disruption, but it also possible that new error in this phase too occur, M.L.Markus.C.Tanis,(2000). It is clear that post-implementation phase involves the evaluation of feasibility and effectiveness of ERP project. Purnendu mandal *et al.* (2003) listed out the post-implementation activities that are critical for acceptance (adoption) of ERP system, Post project evaluation strategy could be followed in measuring the effectiveness of an ERP system, where questions such as listed below could be used for further improvement;

- Whether the objectives of ERP system were realized fully.
- Whether the scheme options were considered adequately.
- Whether the estimates and project information were accurate.
- Whether or not agreed practices and techniques were compiled with.
- Any other factors were considered appropriate.

Therefore any firm willing to go for ERP project should have post-implementation evaluation strategy in its place, to address the various issues that may come across once the implementation is over, it is duty of top-management to ensure complete co-operation and participation not only during the implementation but even in the post-implementation phase.

4. Critical Success Factors and Critical Failure Factors of ERP Implementation

Critical success factors and Critical failure factors have a role to play in ERP project, researchers have identified both these factors and the same are discussed in the chapters to follow. Critical success factors are those which ensure the success of ERP project, if the same are addressed judiciously. On the other hand the critical failure factors are those which that may lead to the failure of the project if not properly addressed and focused during the time of implementation ,both these factors may come from different segments of the organization, such as production, finance, human resource, customer etc. It is up to the Organization to identify and tackle as and when they arise.

4.1. Critical Success Factors of ERP Implementation

Studies have been conducted specifically for identifying the Critical success factors (CSF) of ERP implementation, Claude doom *et al.* (2010) concluded from his study that majority of the CSF that were valid for large companies were also applicable to SME's and the important CSF for SME's identified by him were: clear vision of strategic goals of ERP implementation, senior management support, active user involvement , a suitable corporate culture that is open to change, internal communication on ERP project both before and during the project, proper management of ERP supplier, a formalized project approach and methodology, focus on user requirements, use of external consultants, user training both on technical aspects and on business, oriented towards practice, proper project planning and phasing. So it can be understood from the study that size of the organization hardly matters as far as critical success factors are concerned, it is needless to say that organization should develop a culture that is conducive to change, communication, project management, training , consultants support is crucial for success of the project. Gede Rasben *et al.* (2010) conducted a study to measure the key success factors that lead to successful implementation of ERP to gain competitive advantage, the results of the study indicated that organization maturity level does not automatically drive the ERP implementation and there was no pattern of relationship between Organization maturity level and ERP implementation success. So many factors do come into picture in the implementation process, this paper focused on identifying the relationship between only two factors. Shahin dezdar *et al.* (2011) used questionnaire survey method, the questionnaire was distributed to the selected managers of the companies implementing ERP system in Iran and results indicated top management support was crucial for successful implementation of ERP and also emphasized that training must be given to the users regarding the system. Jafari *et al.* (2006) identified the critical success factors through a process that involved identification and synthesis of those critical requirements for implementation that have been recommended by practitioners and academicians through a review of literature and identified ten factors that were critical for ERP implementation success: top management support, clear goals and objectives, communication, effective project management, business process reengineering, data accuracy and integrity, suitability of software and hardware, vendor support, education and training and user involvement. These factors can also be categorized as Organizational, technical, people, business, technological based on their nature. Fiona Fui-Hoon Nah *et al.* (2001) from his research identified 11 critical success factors for ERP implementation success: ERP teamwork and composition, change management program, top management support, business plan and vision ,BPR with minimum customization, project management, monitoring and evaluation of performance, effective communication, software development, testing and troubleshooting, project champion, appropriate business and IT legacy systems. Monitoring and evaluation is the duty of project team, communication is the important criteria for management and they have to exercise this duty

with full will and also cross-functional communication is helpful in exchanging the ideas, testing and troubleshooting is a part of post-implementation phase. Kong Jia Hui (2005) identified critical success factors for successful implementation of ERP based on literature review and developed research model with the assumption that there is a relative importance (RI) among CSF and they are: business process reengineering management, change readiness, software competence and IT skills, departmental communication, top management support, hardware and equipments, ERP training and education, ERP project management, cultural adaptability. Change readiness is change with respect to people and technology, as ERP requires people to relearn new skills and adapt to new technology, ERP requires a cultural change and this change has to take place organization wide. Rubaai Ahmad A (2009) identified 12 critical success factors for ERP implementation and pointed out that the top management and support as well as change management were most widely cited factors of ERP implementation success and also proposed that to successfully implement ERP system an appropriate project management structure and methodology should be in place along with these factors business process reengineering and customization, user training and cross-functional team to take care of the problem that might arise in different areas, vision and planning, consultant selection and relationship, effective communication plan, ERP system selection, ERP system integration and post-implementation evaluation measures. Top management may aid in project management by providing the resources in form of human resource, time, money etc. all of which have a vital role to play in the project. Vendors and consultants may assist the company in selecting appropriate package, integration, Abeer.I.Aldayal *et al.* (2011) conducted a study to investigate the critical success factors of ERP implementation in higher education in Saudi Arabia and proposed that the most important CSF from technical point of view were project management and ERP system selection and other effective CSF of ERP implementation were : Department (Stake holder) participation, BPR and customization, top management commitment and support, ERP team composition, ERP system integration, choosing of supplier and its support, scope of implementation and consultant participation. Hong Seng Woo (2007) conducted a case study and through interviews and examination of company documentation, he provided a set of critical success factors for that company: Top management support, project team, project management, process change, education and training, communication. He stressed that management must be committed and provide support throughout the implementation process, emphasized the need of cross functional team that is composed of consultants that might provide a helping hand. He also proposed that a good project manager should led the project management so that he can produce plans, schedules, control procedures etc. in place because these are key to project management, to structure the company to suit the requirements, to provide training that results in fulfilling the user as well as company needs and communication should be on regular basis and that is accessible. From the discussions it is clear that critical success factors have a vital role to play in ERP project, these emerge from different corners of the organization. So ERP project is an organization wide challenge, emphasis should be on selling ERP message to everyone connected with the organization.

4.2. Critical Failure Factors of ERP Implementation

Critical failure factors seem to act as barriers or obstacles for ERP implementation, so if not addressed in time may lead to the failure of the project. Research has been carried out to identify these factors and to take care of the same. Michael D. Okrent *et al.* emphasized the need for change management and its implications; he refers that change management help to assess the human barriers that may come across the way of implementation, says one way to overcome this barrier is communication, stresses that regular communication provides a clear picture of the status of project to the employees, revealed the importance of continuous improvement program to be implemented to further improve the process. A.Mamoh *et al.* (2010) identified 9 factors which were critical in the failure of ERP implementation: Excessive customization, dilemma of internal integration, poor of understanding business implications and requirements, lack of change management, poor data quality, and misalignment of IT with business, hidden cost, limited training, and lack of top management support. Excessive customization may have its own consequences; it may results in adding new bugs or up gradation of the package may become complicated and sometimes impossible. Hands on training will provide a clear understanding of the new system and lack of training may also result in user's resistance to change. Zhenu *et al.* (2001) pointed out that when considered from organizational view point, factors such as low IT maturity, small firm size, lack of process management, BPR may hamper ERP adoption. IT maturity refers to exposure of the employees to IT, without which ERP adoption may become difficult, small firm size may hamper ERP adoption because of lack of resources to support ERP project and BPR may take its own time which may hamper ERP adoption. As such many of the risk factors may come into picture during the course of ERP project; the top management should be supportive and committed for successful ERP implementation

5. Conclusion

It is evident from discussions of various authors that ERP implementation projects have fine-tuned the way of running the business, it has acted as a paradigm shift for the firms that have successfully implemented ERP. It has marked a new dimension in the era of globalization; it should be viewed from long term focus wherein the benefits can be realized in the later stages of the project. ERP project is not free from hurdles or obstacles, but these have to be tackled judiciously for success of the projects, many of ERP projects run out of schedule and budget. Therefore ERP calls for an appropriate planning strategy throughout the project in all the phases, especially in the pre-implementation phase. ERP project is organization wide challenge and should include everyone connected with the organization, ERP message should be sold to everyone for its success. ERP project has been utilized by the organization to reap the business benefits such as improving profit and market share, enhancing customer service, reducing inventory and scrap, reducing the cycle time. Top management support, commitment and communication are crucial throughout the project. End users training regarding the new system will reduce their resistance to change and help them to adapt to the new system. Minimum customization and BPR will ensure smooth implementation.

The planning and evaluation phases is to be emphasized as these phases have a major role to play in the success of the project, these phases should be viewed separately from the core implementation phase. ERP forms a central database and the information required can be easily accessed, it results in seamless flow of information and also automates the processes which save time. Therefore for the ERP implementation success the factors such as organizational, people, technical, technological, strategic etc. needs to be given due importance throughout the ERP project.

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