

Strategic success factors in ERP system implementation

Katarina Curko

Department of Business Computing,
University of Zagreb, Faculty of Economics,
J. F. Kennedy 6, Zagreb
Croatia

kcurko@efzg.hr, www.efzg.unizg.hr/kcurko

Damir Stepanic

Oracle Hrvatska
Budmanijeva 1, Zagreb
Croatia

damir.stepanic@oracle.com

Mladen Varga

Department of Business Computing,
University of Zagreb, Faculty of Economics,
J. F. Kennedy 6, Zagreb
Croatia

mvarga@efzg.hr, www.efzg.unizg.hr/mvarga

Abstract: - Different ways of approaching ERP implementation give different results. In order to successfully implement an ERP system it is necessary to properly balance critical success factors. By researching what the critical success factors in ERP implementation are, why they are critical, and to what extent they are relevant to users, consultants and suppliers, this paper seeks to identify strategic critical success factors in ERP implementation and to understand the impact of each factor on the success of ERP system introduction. This paper lists strategic critical success factors (CSF), which influence the long-term goals.

Key-Words: - ERP implementation, measuring success, cost, critical success factors, management, IT project

1 Introduction

Complex IT projects, such as developing and especially implementing ERP systems often fail.

Many studies indicate a small success rate in terms of exceeding the time limit, budget and poor functionality of the new system. Successful ERP projects bring great benefits to the company, but can also be devastating to organizations that fail to deliver. The aim of this paper is to further investigate the strategic critical factors affecting the successful ERP implementation and to determine how they can reduce the failure rate.

There is extensive literature about ERP implementation issues, however due to high failure rate new research is necessary in this area, which may lead to new discoveries and thus contribute to reducing the ERP implementation failure rate. Additionally there is a lack of illustration of unsuccessful projects in literature, which further suggests need and importance of the broader study of factors affecting the successful ERP implementation.

2 Critical success factors

Critical success factors are often used to identify and determine the key elements which are necessary for the success of business operation [17], and can also be described as a small number of easily identifiable operational goals, which are determined by industry, business, managers and environment, that ensure success for organization. Rockhart [20] explains that the formation of CSF can be considered from four viewpoints: those which are shaped by the industry, by operational strategies, by managers' perceptions and changes in environment. This paper will analyze CSF in ERP implementation from aspect of operational strategy, because vendors incorporate accumulated business practice knowledge from past implementations in many different organizations into ERP systems.

For determination of CFS it is necessary to fully understand categories of success and cost of ERP implementation.

2.1 Defining and measuring success

Defining and measuring the success of ERP projects is a difficult task, because it depends on the point of view. Project managers and ERP consultants often define success in terms of executing the project plan on time and within budget. Then, system users emphasize the importance of execution of operations without any difficulties in ERP systems and achieving business improvement [5].

An important factor in measuring success stems from the fact when success is measured. Project managers and implementers can afford observation of success in the short term, but investors and company executives have long-term perspective [5]. In success measurement it is important to adopt the goals, expectations and perceptions of those who adopt the system as a standard for defining and measuring success. In this case the criterion of people who adopt the system is used to determine the actual level of achievement. But these subjective assessments may be unreliable because they use internal measures and targets that cannot be acceptable in every organization.

Although the choice of ERP system is very important for the success of implementation, the technology itself should not overshadow the business needs. If the selection and implementation are largely driven by computer experts rather than by business experts, the company runs a pretty big risk in finding the right answer to wrong question. In fact, everything should start from setting company strategic goals, and new system expectations, or a clear definition of what a new system should do. All functional areas of the company must express their opinion in order to have a successful project. Technology experts should have a lead role in choosing the technology that should be a pillar of the project.

2.2 Cost of ERP implementation

Total Cost of Ownership (TCO) is an important factor that affects the ERP strategies and decisions. It represents the total amount of costs that occur through system lifecycle [9]. TCO is affected with:

- Company size - larger volume of business requires a scalable system, capable of supporting a large volume of transactions.
- The number of ERP users - more users means more complex operation and access to input / output devices. Moreover ERP system vendors typically sell license by number and type of user.

- Functionality - the depth and breadth of functionality that will be supported by the system usually depends on the number of implemented modules.

Aberdeen Group conducted analysis in 2006 [1], within 1100 enterprises of various sizes, about total cost of implementation. Based on this study they perceived three different elements of the total costs associated with ERP implementation: the amount spent on software, the amount spent on external services and internal costs.

Purchase of ERP software usually includes the cost of licensing which regulates the use of software. Typical price for a license depends on the number of end users and the number of implemented modules. Suppliers further complicate calculations allowing volume discounts that reduce the cost per module or per user. An ERP system also requires data storage and is also necessary to license a database. The cost of licenses for the database is usually based on the number of users who will enter the system or the number of processors.

Any implementation phase may involve the engagement of external resources including consultants, implementation specialists and project managers. Service costs are difficult to estimate, and usually represent the largest item in the ERP implementation budget. Although many project planners approximate these costs using the ratio of cost to the license cost of deployment, it should be noted that the implementation costs have more to do with the complexity of business processes that are being implemented, than the number of licensed users.

Certain software products can have an implementation ratio of 2:1, meaning that for every unit consumed on the software the user is planning to spend two units on the implementation costs. Often the ratio cost of services and software costs indicate the system flexibility and complexity of implementing advanced functionality.

Internal costs vary between companies and projects, so it is difficult to assess this component. The biggest factor of the internal cost is productivity loss of project team members, which, in addition to their regular duties, are involved in the implementation. Most project team members spend 100% of their time on project tasks in the most intensive phases of the project.

To estimate the internal costs, calculations can be made by Full Time Equivalent (FTE) that is needed for the project. FTE is calculated by multiplying the percentage of project members' time dedicated to the project with the length of their involvement in the project and with the total number of team

members. The costs of staff training are often underestimated, although these are very high costs and organizations often makes mistakes forgetting that workers must adapt to new software and new processes. To use the software properly, persons that educate employees must have extensive knowledge on how processes run in other companies and how these processes are performed prior to the introduction of ERP systems. Therefore, the IT department and business together should ensure quality user training.

Finally, expenditure does not end when system is in production. Maintenance costs of hardware upgrade, the need for additional configuration and system support must also be taken into account. As well as implementation costs, maintenance and support can also be calculated as a percentage of the license cost. Many software vendors charge a periodic maintenance and support costs to cover occasional consulting, technical support, correction of bugs and upgrade to new versions.

A particular problem is the hidden cost of implementing ERP systems. One hidden cost is related to expanding the scope of the project. Data conversion costs are also hidden costs. Before the conversion of data from legacy systems, they must be cleaned. Data cleansing may require re-examination in order to align the necessary modification of the process.

Creating precise ERP implementation budget requires detail project team analysis from during the planning stage of ERP life cycle.

2.3 Definition and classification of critical success factors

Various CSF of ERP implementation and their different classifications of importance are cited in literature. Several authors have written about the successes and failures of ERP implementation, but mainly focus on narrow areas such as business strategy, technology or adaptation of the organization [16].

We studied the critical success factors cited by different authors [2, 11, 13, 15]. Despite the diversity, the literature provides some critical success factors, which are commonly stated by the authors. After studying the various critical factors cited by various authors and based on our own experience we defined a group of factors which we consider important and associated with successful implementation of ERP systems.

By analysis, some factors are grouped into one factor because the authors believe that they are closely linked together. For example, the factor

project sponsor has been placed under the factor top management support. Top management support is a broad term that includes all the activities from the support, approval, identification of project priorities and allocating resources. Another example is placing user education under change management program, because it includes components from recognizing the need for change to the education and training of end users and IT service.

In this way, we identified five strategic factors that are critical for the successful implementation of ERP systems: clear business plan and vision, powerful and constant top management support, efficient project management, generally accepted change management program and appropriate implementation strategy.

3 Strategic factors of ERP system implementation

We are listing, by criteria of importance, strategic factors which are influencing long-term, strategic business objectives, and are critical to the success of ERP implementation: business plan and vision, top management support, project management, change management program and implementation strategy.

3.1 Business plan & vision

There should be a clear business plan and vision behind ERP implementation project. Project goal is not only implementing ERP system but achieving specific business objectives. While continually improving ERP implementation process, organizations should establish long term vision [22]. Holland & Light [15] put emphasis on need for clear goals and benefits that are easy to recognize and measure, and Shanks [24] argues that goals should be clearly defined and understandable. Rosario [21] emphasizes the importance of having a business plan, and Wee [26] states that the business plan must be a general overview of the strategic and tangible benefits, resources, cost, risk and time frame. These goals are necessary in order to be tracked and measured during implementation cycle. Changes in business process that are aligned with future vision and organization strategy should serve as justification for investment in ERP systems [12].

3.2 Top management support

Like many authors, we also recognized top management support as one of the most important critical success factor of ERP implementation. In

order to be successful, project must have top management support [6, 23, 25]. Top management must publicly recognize ERP implementation project as top priority, be personally involved in project, and in that way increase commitment of all employees [23]. This insures greater commitment on all organization levels, which is key factor of ERP implementation success [6]. It is not good enough that top management is personally engaged in project, but they also have to allocate valuable resources for the implementation project [15]. This includes not only the provision of adequate number of resources and time to complete the work, but essential personnel. Some companies place the responsibility for ERP implementation in the hands of the technical department and thus make a vital mistake that often results in project failure. Thus, we can only conclude that the involvement of the IT department in ERP implementation is not enough, but the main initiative should come from top management, and IT specialists and top management need to collaborate and establish a partnership in order to have successful ERP implementation project. It is also necessary that the project has a sponsor from top management level, which is capable of implementing organizational changes whenever is necessary. Project sponsor is critical for achieving consensus and monitoring the entire life cycle of ERP system implementation [21]. Somebody has to act as a system advocate throughout the organization, and that has to be a high-level sponsor who has the power to set goals and justify the change [12, 24, 25]. For big and costly projects sponsor should be a strong individual with a high position in the hierarchy that will act as promoter of the system. In addition, sponsor leadership skills play a key role in the implementation success, because sponsor must be able to resolve conflicts, deal with resistance, and manage changes. Complexity of ERP projects often force employees to have additional working hours, besides their regular duties and that may lead to stress and lower their morale. So the role of sponsor is to promote ERP implementation project through entire organization and increase morale and commitment of all team members.

3.3 Project management

Individual or group should be given the authority to manage the project [21], because ERP implementation projects are usually estimated by level of achieving planned budget and time. Project manager is the individual who acts as a leader and communicates and manages a clear vision of the

goals and objectives, and manages the process so that appropriate timing, resources and sequencing tasks produce agreed-on deliverables within scope and budget [19]. Jiang et al [18] suggest that a competent project manager is the second most important factor in the implementation of information systems. Mousseau [19] argues that ERP project managers must be credible in technical and business knowledge, stay calm under stress, make effective decisions, demonstrate good people skills in dealing with various factions and coaching own team members. They also have to manage expectations of managers and end-users properly and promote the project's benefits to the entire organization and create positive perceptions of the project [19]. Project scope definition is crucial for the success of ERP implementation [22], and several authors have pointed out that the scope of the project in terms of number of systems that are implemented, involvement of business units and the necessary modification of business processes, should be clearly defined and controlled [15, 21, 23].

All proposed changes must be assessed against the business benefits and, if possible, implemented at a later stage. In addition, a request to expand the scope must be evaluated in terms of time and additional costs resulting from the proposed changes [25]. It is also necessary to define project milestones with a clear and realistic delivery dates and the escalation of issues and conflicts should be managed [21]. Unrealistic deadlines and budget, the departure of personnel, lack of motivation and effort and lack of measurement are some of the key issues that are discussed in the literature, and if we want to have a successful project we have to manage them effectively [7, 8].

3.4 Change management program

With structural changes that include people, organization and cultural change, must be managed [21]. It is very important to recognize need for change, because the greater the need for change, the more likely that the top management and shareholders will support the implementation of ERP systems [12]. User resistance is connected with almost every change, especially with the change of a large information system like ERP [14]. Main concern is that their work will be eliminated or altered from the common way they have been used doing it, and they can become less productive when transferred from previous positions [4]. Appleton [3] also noted when the organization moves toward a complex information system (e.g. ERP), changes

in employee relations are probable. Some employees will need to build new working relationships, a new exchange of information between departments and take on additional responsibilities. This can lead to resistance, confusion and fear. Therefore, successful implementation requires managers who possess good communication and team building skills [3]. It is highly recommended to involve users in the design and implementation of new business processes and ERP systems. Formal education and training are necessary to help users understand how the ERP system will affect their work [15]. In that way there will be higher degree of project acceptance in organization. Companies usually underestimate the need for formal education and in that way through underestimating internal costs they are affecting ERP implementation budget. User involvement from the beginning of the implementation process is also recognized as a key activity for acquiring customers for the project [10]. Users must have a role in the project activities like ERP selection, suggestion for technical approach proposed by the designers of the system and in the management and control activates. Accordingly, many companies develop formal communication plans and issue regular status reports in order to achieve a greater level of acceptance of the ERP project [10]. In the case of ERP selection, users can help in determining what is the efficiency achieved in the provision of services. Such participation and involvement of users is important to ensure that customer needs are met, and allows the project team to address their concerns and avoid resistance.

3.5 Implementation strategy

There are two main ways of implementing ERP systems: Phased approach and Big Bang [9]. Phased approach is slower way of implementation in which the ERP system is introduced by function (module by module) or by geographic areas. Big Bang approach is more aggressive way in which implementation of the entire scope of the project is addressed through the entire company at once. Additionally, roll-out implementation strategy can be combined with these implementation strategies by increasing or reducing the functional scope. Selection of an implementation strategy will determine time and resources or people and money. Size and goal will also affect the choice of implementation strategy. There are many other cases that may affect the choice of the right strategies such as merger or split of the company, the new legislation, improvement of software

functionalities of the current system, the need for reengineering business processes and reduce costs within the company's programming, etc.

5 Conclusion

Successful implementation of ERP system encompasses many different tasks. It is very difficult to focus equally on all factors affecting the implementation of ERP systems. Goal of this paper is to recognize the importance of individual factors, their impact on implementation success, and how to allocate limited resources on the critical factors.

This paper presents five strategic critical success factors for implementing ERP systems, which are influence the long-term goals.

Implementation of ERP system must have a clearly defined business plan and vision. The business plan must contain a review of strategic and specific benefits, costs, resources and time frame, while the vision must be clearly identified and linked to business needs.

The ERP implementation project must have strong support from top management, who must be prepared to allocate resources for the project.

A good project management is essential, because success in implementing ERP systems is usually based on the realization of the planned time and budget. The project must be well managed and guided, and project scope should be clearly defined and controlled.

It is necessary to manage the structural changes that include people, organization and a cultural change. It is also very important to involve users in the design and implementation of new business processes and to organize education and training so that employees can recognize how ERP system will affect their jobs.

Applying appropriate strategies reduces implementation risks, because strategies and methodologies incorporate experience of all those who participated in the ERP implementation projects.

Successful ERP implementation is not complete with the new system in production, because organization should perform continuous process optimization, improvement and maintenance of the system to adapt to the ever changing needs of the business.

Finally, goal of the project is not only installing the ERP system, but achieving specific business objectives.

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