Study of CSF of ERP Implementation in HE Organizations

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Abstract – **In this paper we have identified some critical implementation factors of an ERP project implementation in Higher Education (HE) Organizations and universities. The purpose of research is to make a list of the main success factors in implementing an ERP in the academic environment.**

Keywords **– ERP, Higher Education (HE) and Universities, success factors.**

I. INTRODUCTION

The educational system is now at the point where it needs to implement a software solution to integrate and increase the efficiency of the university processes.
Adopting and implementing an ERP (Enterprise Resource Planning) solution has impact on all aspects of a business, affecting activities and processes, organizational structure and the environment [1,2,3]. The adoption and implementation of an ERP involves high risks, mainly because of the huge initial investment, the frequent over budget cases (90%), the low success rate (30%), the missing of the initially proposed ROI (65-90% of the cases), partially achievement of the initially planned implementation etc.
The purpose of evaluating ERP solutions is to improve their selection, development, implementation and usage [4].
The attempt of evaluating the solutions that exists on the market and identifying the best fitted for a Romanian university was hindered by the impossibility of finding a compatible evaluation framework for this type of solution. Of course, there are some evaluation frameworks for industry ERP solutions, although this was a neglected research area. Here are some examples:
Proposes an ex ante evaluation framework of the key issues involved in the selection process of ERP software and the associated costs and benefits. The study underlines the need of a both qualitative and quantitative evaluation of ERP systems, taking into consideration its strategic impact on the competitive position of an organization. [5]
A Web based DSS to assist organizations to evaluate the success of their ERP implementation and measure the benefits obtained is proposed in [6].
The study proposes a measurement of the ERP benefits and a list of productivity indicators; - Hedman [4] proposes a practical approach of using narratives as a means of improving ERP systems as a complement to traditional evaluation methods starting from three assumptions: evaluations should make the bases for action, narratives can make evaluation more relevant, and evaluations should be made with the purpose of improving selection, implementation and use of the system; - [7] examine an attempt of incorporating intangibles into traditional cost-benefit analysis in an ERP project; Software solutions to assist the selection process, like PERFECT Fit® Software Selection Process [8], that gathers primary data to measure ERP software solutions against unique client business and technical needs.

II. CRITICAL SUCCESS FACTORS

The concept of critical success factor for an ERP system implementation is well defined in the specialty literature. Here are some of the performed studies and their main focus.
- Inter-dependencies between critical success factors [9,10] were studied by recording the relevance of the critical success factors as defined by Somers [11] in order to establish the main causes determining the failure or the success of an implementation and the confirmation of a direct relationship between critical success factors.
Relevance of critical success factors reported to the success or failure of the ERP implementation projects [12, 13].
The incidence and the impact of critical success factors during the entire implementation project from the temporal point of view [14]. The study concluded the main activities and personnel categories that have a decisive influence during the first four-five stages of the project are: the existence of a managing board formed of key users or super-users, top management support, clearly defined objectives and user training.
Quantification of relevance and incidence degree of critical success factors during each phase of the implementation project: initiation, adoption, adaptation, acceptance, reutilization, and infusion; the conclusion was that inter-

department communication and cooperation prevails as relevance degree in four of the six phases [15];

The incidence of critical success factors in ERP system multi-site implementations [16,17], presenting a high implementation difficulty level from the perspective of: business strategy, system configuration, IT platform and execution management or the incidence of critical success factors in multi-national ERP system implementations [18], confirming the critical success factors for HE Organizations and Universality. The study also approached the international software vendors' impact on multi-site ERP implementations, suggesting the positive character of their involvement, as it facilitates the establishing of precise implementation objectives, the user training and education related to the new economic processes and the forming of a competence team to ensure the project management [19].

ERP systems for higher education represent a special case of ERP implementation. Which are the characteristic elements that must be take into consideration in the analysis of critical success factors. After reading literature review it has been identified some important differences regarding: communication structure, management involvement, organization, implementation team competences, inter-department communication, user training, suppliers/ customers partnership, external consultants.

2.1. Communication structure

Unlike Universities, companies have usually clearly established formal communication structures. There is a small number of coherent groups, using clearly identified communication and reporting channels. This is the reason why the communication structure is rarely identified as a success factor by the classical corporate ERP related literature.

In HE Organizations and Universities, we find a large number of very different groups, having different objectives and interests, activating in different fields, so that communication is more difficult.

An important role is played by promotion of trust and mutual respect, and there are recommended informing meetings and discussions with small groups of people in order to eliminate the miscommunication or even the lack of communication. Of course, these types of communication are time consuming. In the ERP projects developed in HE Organizations and Universities, the communication can have various approaches:

A strict control of the project information flows by the project team and top management in order to control the ERP project resistance. This approach can lead to negative consequences, like distrust and spreading of negative rumors about the project, or even fear or panic.

A very open attitude towards communication, pleading for the ERP project through numerous committees and meetings. These lead to a general understanding of the project objectives in the entire organization and to an increase of tolerance.

Conviction and involvement of department managers and stakeholders, so that they have the possibility to express their own vision, to agree and to sign a project support statement.

Inclusion of members of the financial department in the project team in order to ensure their involvement and support.

2.2. Management involvement

For a successful implementation of an ERP system in a HE Organizations and University, the top management support is a decisive factor. In the model presented in [11], the top management support was identified as the most important critical success factor. The top management is the one that establishes the organization agenda, influenced by the strategic objectives, responsibility to the university members, political, university power relationships and also external influences.

Examples from the specialty literature demonstrated that a low initial top management support means that the ERP implementation can be considered a failure.

The ERP project must be very well organized, requiring the constitution of a decision committee for strategic integration in the university. It must include members of administrative management structure and IT services structure, it must have a clear and comprehensive understanding of university strategic development plans and of its main objectives it must know very well the general integration plan. Dual team structure is necessary, including both IT representatives and administration representatives to ensure the project acceptance, a common problem understanding and to create a maximum synergy among performed activities. It is important to resort to external consultants for supplementary expertise in order to get recommendations, to facilitate planning and implementation, to get validations for the performed validation efforts. But the success of the implementation plan depends mostly on the support and involvement of administrative management and on the university staff effort of developing a comprehensive and complete plan. The management committee of any University should include:

Members of the executive senate board: the rector, the vice-rectors responsible for academic activity, for the administrative activity, for research activity, for information technology, the university administrative manager;

The managers of the Computer Science Department and of the Computer Network Department;

The HR Department and Financial Department managers;

The faculty deans and members of Professor's Board;
The project manager;
External consultants.

A very important role in a university ERP implementation project is the "project champion". He is the person who makes the project work, he must be chosen with much responsibility and care. In a university, the project champion could be the information technology vice-rector, assisted by an external consultant for specific integration aspects. He is on a position that allows him to support the project realization on the established time and budget.

2.3. Organization (culture)

There are many differences resulting from a HE Organizations and university organization itself compared to a company organization, differences that influence the means of ERP implementation.

For example, from the point of view of the followed strategy, in the case of companies both the general company strategy and the one related to the information system development are clearly defined. In the case of universities, with rare exceptions, there are many complex strategies, reported to many areas, but very precisely defined.

If in the case of companies the responsibilities are clearly defined and allocated, in universities there are frequent overlaps (i.e. administrative and didactic responsibilities overlaps). Because the lack of personnel or competencies, there may be un-allocated responsibilities, but generally, the responsibilities description and control are much more diffuse and vague.

Companies have established control system for activity efficiency, to help them function in a competitive environment. In the case of universities, the control systems can take various forms, often informal ones, adapted and customized according to the needs of a specific department or staff.

The work style is also different. Companies are focused on tasks and results of task performance, while universities adopt a flexible, existentialist style of work, adapted to the emerging needs and loosely coupled, with a stronger focus on individual work.

Organizational culture has a major impact over implementing an ERP system in universities. This may be explained by the crash of cultures that took place during the last 20 years. On one side, there is the belief that a HE Organizations and university culture should rely on the ideology and the values of the private sector: "The time has come to recognize that education is a business and students are customers" [20]. On the other side, many university members plead for keeping the cultural values reflected in a work style based on independence and academic autonomy.

ERP system implementation and business process reengineering can be seen as an attempt of changing the university culture at the deepest level. An important change due to the ERP implementation is a shift of power to the middle management, who can have access to business information anytime. A primary objective of an ERP project is to implement best practices where possible, while maintaining the accuracy of information and preserving good internal controls throughout the university. The organizational changes may include reclassifying positions, shifting work and/or positions from one department to another, retraining current staff, reassignment of duties and new expectations for existing staff positions. The organizational, policy or procedural changes must be discussed with all departments involved in the change process.

2.4. Implementation team competences

An ERP project involves many persons working in different HE Organizations and university departments, and also external consultants. Lack of participation in the implementation process could influence the new system acceptance by the university community and may contribute to a lack of communication between management and staff perception.

An important success factor for the project is the ability of different groups of forming a unique team, where there are not "us versus them" groups (i.e. functional vs. technique group, anyone vs. contractor, etc). Technical and functional management must establish a real working partnership.

Regarding the project team, a relatively new concept is in use: competence center. It is formed of three teams:

1. Business process team – having as main tasks:
a. Change management;
b. Continuous process improvement;
c. Operational architecture;
d. Level two user support;
2. Application development and integration team– having as main tasks:
a. System architecture;
b. Custom programming;
c. Application integration;
d. Business-to-business integration;
3. Application operation team– having as main tasks:
a. Technology architecture;
b. Configuration of multiple ERP environments (production, test, etc);
c. Maintenance and upgrades.

Traditional IT functions (PC support, networking, etc) are not included among the functions of a competence center. The key users play an important role in this model, as they are the first support line for end-users. Teams must be formed considering: main functional areas (financial, HR, rectors' office, dean's office, technical), infrastructure,

institution network, existing software services/applications, information security.

2.5. Inter-department communication

In a classic ERP project there are many parts involved: decision makers, developers, users and other persons. In the case of universities, the main involved parts are:
University senate and rector;
IT department manager;
HR manager and managers of all departments implementing ERP modules;
Dean and Professor's Board for each of the faculties.
A faulty communication between these parts is a major failure cause in implementing information systems (i.e. between IT specialists and users or IT specialists and university management) [4]. Communication is associated with other success factors like user and management involvement, project monitoring, etc.
The lack of feedback in communication, an ambiguous or unsteady communication and a lack of confidence between the involved parts can lead to an increase of communication complexity. For example, there are differences between the language used by IT specialists and the one used by HE Organizations and university management that can lead to a communication complexity increase [20].

The Critical Success Factor (CSF) approach has been founded over the last 30 years by many researchers. The most important researcher was Rockhart (1979) [21] who defined the CSF as "the limited number of areas in which results, if they are satisfactory, will ensure successful competitive performance for the organization" [22]. In ERP implementation, Gibson (1999) defined the CSFs as "factors needed to ensure a successful ERP project" [23]. In order to choose the CSFs in this paper, we examine the frequently mentioned CSFs in the previous literature review [24, 25], which provide all cited CSFs in different researches. As a result, chosen critical success factors are shown in Table-01 and Table-02.

Table-01: The CSFs for Technical prospective

No.	CSFs	Meaning
01.	Top management commitment and support	There is enough support from head engineering and commitment of resources
02.	Change management	There is a structured approach to shifting/transitioning the university from a current state to the desired future state
03.	Project management	use of skills and knowledge in coordinating the scheduling and monitoring of defined activities to ensure that project objectives of are achieved
04.	Business process reengineering and customization	There is some change in work process comes with implementing the ERP System
05.	Training	There is effective training for users
06.	ERP team composition	The team has technical personnel and manager.
07.	Clarity vision/ goals & objectives	There is a clear picture of the future state
08.	Consultant participation	There is participation of outsider/insider consultants in the ERP system.
09.	Departments(Stakeholder) participation	There is participation and communication between different stakeholders in different departments and ERP team. So, ERP facilitate communication between departments and ensure the work operating continually.
10.	ERP system selection	Selecting the appropriate ERP system that fit the needs
11.	ERP systems integration	There is good Integration between systems involved in the ERP
12.	Resources support	Support in finance, hardware and man power
13.	Scope of implementation	The scope of ERP implementation is defined (has boundaries).
14.	Choosing of the supplier & its support	Choosing based on stability and history of the supplier, the support they offer, the competence of the installers and the availability of third party additional products and potential for improvements to the selected ERP package
15.	Outsider competition	Competition with other universities in KSU and world.

Table-02: The CSFs from user prospective to measure user satisfaction

No	Category	CSFs	Meaning
01.	Technical	System use	The degree in which a person believes that using

		fullness	a particular system would enhance his or her job performance
		Training	There is effective system training for users. Training is in positive relationship with user satisfaction.
02.	Organizational	User participation	There is participation between different users and ERP team. User satisfaction is positively related to user participation.

III. CONCLUSION

ERP solutions are very complex software packages. To improve the chance of success, they must be carefully evaluated and selected, needing a proper evaluation and analysis framework. The performed analysis shows that there are a number of success factors which are to be taken into consideration when implementing an ERP in HE Organization and Universities. The above list is part of our research to establish a guideline for choosing and implementing and ERP inside universities. As a future work, we plan to create a framework for comparing current academic ERPs.

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