Critical Implementation Factors in Higher Education ERPs

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Abstract: - In this paper we have analyzed some critical implementation factors of an ERP project implementation in universities. Taking into consideration that for industry implementations there are already many performed studies we started by considering university implementations as a particular case for the industry ones. Starting from this, we have identified differences, particular elements and situations for the case of universities. The results of this study will be used in developing an evaluation framework of ERP solutions for higher education management.

Key-Words: - university management, ERP systems, critical success factors, higher education

1 Introduction
The Romanian 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.

Identifying the most important specific aspects related to the implementation of university governance systems in Romanian, and generally speaking Eastern European, universities is the focus of our current research. Local universities have different processes from their Western counterparts and that is why implementations of solutions developed in Western countries had limited success.

At this moment, in the Romanian universities almost every faculty or department has its own software applications, developed in-house, applications that use various operation systems, tools, databases and protocols [9]. All these generate important disadvantages that put pressure on local universities to migrate toward ERP (Enterprise Resource Planning) systems [5].

The attempt of evaluating the solutions that exist on the market and identifying the best fitted for a Romanian university was hindered by the difficulty of finding a compatible evaluation framework for this type of solution. Of course, there are plenty of evaluation frameworks for industry ERP solutions, i.e. Enterprise Resource Planning (ERP) Evaluation Center [24].

In our research we have evaluated the main studies regarding industry ERP implementations and confronted them to the realities of the Romanian universities. Our team have identified the main critical success factors and analyzed the differences, particular elements and situations for the case of universities. All these elements determine the occurrence of new aspects and approaches that often make impossible the use of the common industry methods and practices.

2 Critical success factors
The success or the failure of an implementation project depends on who and how defines it [23]. So, it is important to define the notion of success for an ERP system implementation [2]. The success of an ERP implementation project is represented by the project delivery on time and on budget [10][11], while for the organization that adopts the ERP system the success is represented by significant improvements of its business processes [6], [20]. Agarwal and Rathod have identified two perspectives on the success of an ERP implementation: an internal one, related to the duration, costs and scope of the implementation, and an external one, oriented towards increasing the client satisfaction and system quality [1].

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 [3], [8] were studied by recording the relevance of the critical success factors as defined by Somers [18] 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 [14], [22].
- The incidence and the impact of critical success factors during the entire implementation project from the temporal point of view [19]. 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, routinization, and infusion; the conclusion was that inter-department communication and cooperation prevails as relevance degree in four of the six phases [16];

- The incidence of critical success factors in ERP system multi-site implementations [11][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 [13], confirming the critical success factors 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 [15].

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 in this case? We have identified some important differences regarding: communication structure, management involvement, organization, implementation team competences, inter-department communication, user training, suppliers/customers partnership, external consultants. Because of limited space reasons, we will present here only the particularities related to the first five aspects.

### 2.1 Communication structure

Companies have usually clearly established formal communication structures. There is a small number of coherent groups, using clearly identified communication and reporting channels.

In 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 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 university, the top management support is a decisive factor. In the model presented in [18], 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
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. Project champions are managers with vision, courage and tenacity who actively and firmly promote, support and encourage the project. They must also have special human qualities, like creativity and energy and must give life to the project [12].

In a Romanian 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 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 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” [21]. 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 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 Romanian 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) [7]. Communication is associated with other success factors like user and management involvement, project monitoring, etc. The next figure presents a schematic representation of the main communication channels into a university. Horizontal communication appears inside each rectangle and between rectangles on the same level (informal communication between users of various modules) while vertical communication appears between levels.

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 university management that can lead to a communication complexity increase [4]. The studied factors do not work in isolation, without one factor affecting another and vice versa. Figure 2 shows how these factors interrelate and directly or indirectly influence each other, leading to successful implementation of a Higher Education ERP project.

Figure 1. University communication channels

Figure 2. Inter-relationships of critical success factors in Higher Education ERP projects
3 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, in the case of universities, a special attention should be paid to organization and human factors, which are significantly different from companies.

The results of this study is going to be used in elaboration of an evaluation framework of ERP solutions for university management that will be than applied to some market leader solutions in order to discover the best fitted one for the Romanian universities.

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