ERP ASSIMILATION: AN END-USER APPROACH

Hurbean Luminita, Negovan Ana-Maria
West University of Timisoara (Faculty of Economics and Business Administration, Department of Business Information Systems), Timisoara, Romania
luminita.hurbean@feaa.uvt.ro
ana_negovan@yahoo.com

Abstract: *One premise of this paper is that ERP implementation is an "organization wide revolution" because a large number of changes happen. Unfortunately, after 20 years of experience, many implementations of ERP systems take longer and cost more than projected or even fail. As many authors stated, one major cause appears to be that organizational issues are neglected or underestimated. In this type of IT project the organizations confront with many problems because they put inadequate stress on the management of change brought about by the technology. We consider that the success of the implementation depends highly on the company's openness to change. Change is not always welcomed by end-users, so the first step is to ensure that the executive management supports the team's vision, the vendor selection and the implementation project from beginning to completion. When an ERP software provider is selected, it should display the qualities and be prepared to act as a "change agent", one who can explain short-term and long-term benefits of the proposed changes, while being sensitive to each end-user's level of change acceptance. Our study was focused on the end-users behaviour and perception.*
The paper discusses the ERP adoption based on the IT assimilation theory. The ERP lifecycle is associated with the IT assimilation steps. We propose a distribution of these steps along the lifecycle. Derived from the findings in the reviewed literature we will focus the cultural factors, in particular those related to the end-users (determined as a major impact factor in our previous study: Negovan et al., 2011). Our empirical study is centred on the end-users perspective and it tries to determine if and how their behaviour affects the achievement of the ERP assimilation steps. The paper reasons that organizations that understand the IT assimilation steps correlated to the ERP implementation critical factors are more likely to implement and use ERP successfully.

Keywords: *ERP, IT assimilation, change management, end-users, resistance to change.*

JEL classification: *L86, O32, O33*

1. Introduction

In order to respond to the imperative of reducing costs while expanding business and improving customer services, companies abandoned the legacy systems and turned to integrated systems. The end of 20th century brought Enterprise Resource Planning (ERP) – a new generation of innovation management software to support business processes, but also to move on the culture in an organization. During the 1990s costly ERP software was adopted mostly to improve and integrate many (possibly all) business processes (Jacobs et al., 2003). When the organization

began to understand the full-power that the ERP system can deliver and understand the need to extend the ERP system, it gained better business value, with tighter collaboration with customers, suppliers, and ultimately, end users (Wallace and Kremzar, 2001). At the same time, many authors (Davenport, 2000; Nah, 2001) pointed out the ease of failure, raising the need of analyzing the factors that lead to successful ERP implementations. Identifying factors leading to success or failure of ERP projects became a remarkable topic in the 2000s literature (Sumner, 2000; Bingi et al., 1999; Bahmanziari, 2004; Markus, 2000 to mention but a few). Furthermore, the technological context evolved essentially making the state of affairs even more complex and the ERP systems more innovative than ever and their assimilation more challenging. Our assumption is that implementing an ERP system is a complex process and is likely to be a radical technological innovation, necessitating not only technical expertise, but also a range of organizational adaptations in a well performed change management process.

2. ERP assimilation and change management

Implementation of an innovation is a dynamic process of adaptation. As reported in the literature, adoption of an ERP is a challenging and complex organizational learning and change management process (Kumar et al., 2000; Markus et al., 2000; Davenport, 2000; Nah et al., 2001). Therefore, the success of the implementation depends highly on the company's openness to change. Change is not always welcomed by all individuals, so the first step is to ensure that the executive management supports the team's vision, the vendor selection and the implementation project from beginning to completion. When an ERP software provider is selected, it should display the qualities and be prepared to act as a "change agent", one who has the ability to lead the company confidently and rapidly through the change process, one who can explain short-term and long-term benefits of the proposed changes, while being sensitive to each employee's level of change acceptance.

The ERP implementation's ultimate success is more than the effective IS implementation. As some authors pointed out when talking about information system success (Kwon and Zmud, 1987), the ERP system should be integrated and embedded in the organization and its culture before it can generate business value. The most noticeable aspect is related to the user acceptance. Practice revealed that one major ERP implementation problem is the lack of commitment, acceptance and readiness of users to deploy the system (mentioned as a major failure issue in many papers). The mentioned explanations include: lack of ERP product knowledge and of appropriate users' training, insufficient internal expertise, deficiency of education about the system's benefits and usefulness, lack of support documentation (Markus et al., 2000; Loh and Koh, 2004; Gargeya et al., 2005).

2.1 The concept of IT assimilation

Founded on this line of reasoning, the ERP implementation should be also analyzed in terms of organizational IT assimilation. Based on Merriam-Webster dictionary, one good definition for assimilation is "the process of receiving new facts or of responding to new situations in conformity with what is already available to consciousness" (http://www.merriam-webster.com/dictionary/assimilation). We consider this approach to be consistent with IT (ERP in particular) assimilation,

rather than another frequently cited definition which says that "IT assimilation is an important outcome in the efforts of firms to leverage the potential of information technologies in their business activities and strategies" (Armstrong and Sambaburthy, 1999). We also agree with Purvis et al. (2001) that consider IT assimilation as the extent to which the IT becomes routinized and embedded in the organization's business processes and value chain activities. ERP assimilation is the process which extends from the early awareness of the ERP initiative to its wide-scale organizational deployment. Fichman (2000) describes an IT assimilation process with the following stages: awareness, interest, evaluation, trial, commitment, and deployment. Another point of view (Cooper and Zmud, 1990; Gallivan, 2001) is based on the diffusion of innovation theory (Rogers, 1995) and identifies six stages of organizational IT assimilation: initiation, adoption, adaptation, acceptance, routinization and infusion.

In the first stage, the need to change emerges and an IT project – an ERP system in our case – is initiated. **Adoption** happens when a key person in a managerial position sustains and rationalizes the ERP project in terms of benefits and expected results. Here is where the change effort is engaged: priorities are realigned and necessary resources are authorized. The **adaptation** phase prepares the organization for the technological innovation and it is based on openness and determination in accepting the change. In case of ERP, this phase has two big challenges: the business processes reengineering (BPR) and the users' resistance to change. BPR is supposed to align the organization's business processes with the ERP system while pursuing to maximize the operational efficiency. In order to do the BPR, the managers should have a vision and a commitment to see the change through. A knowledge transfer from inside the organization to the vendor's analysts takes place. For that reason the users' resistance to change needs to be overcome. Two directions should be tackled: the need for change and the desire for change. Therefore, the users' training starts with their education about the need for the new system, its implications (design and definition of the new processes) and its benefits. In the final part of the ERP implementation, in the fourth stage of IT assimilation, the focus of training moves to the understanding of functionality of the software, through the transfer of knowledge and skills about the application exploitation. The **acceptance** of the users should be achieved. Tactics such as communication and participation (users' involvement) are beneficial here more than in the other stages. At the ERP's go live moment, users should be committed to the new technology, their attitude should be a fair one, and their work habits should be changed not only because they have assessed the required knowledge and skills, but they have agreed to the change. The fifth stage of **routinization** and the last one of **infusion** take part in the post-implementation time. While mastering better the new technology utilization, they transform it into routine and they shift understanding to a new level of competency.

2.2 The ERP assimilation – phases and critical factors

Considering the ERP lifecycle (see Figure 1), there is a discussion related to the connection of the IT assimilation stages with the ERP project phases.

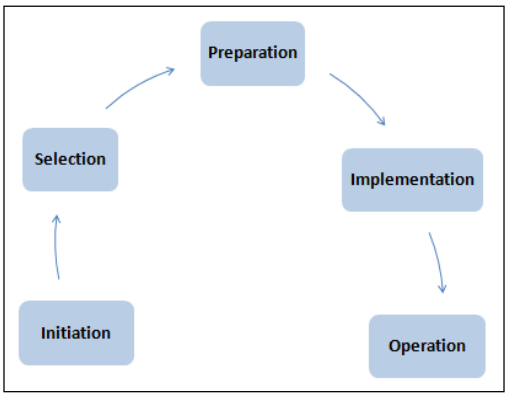
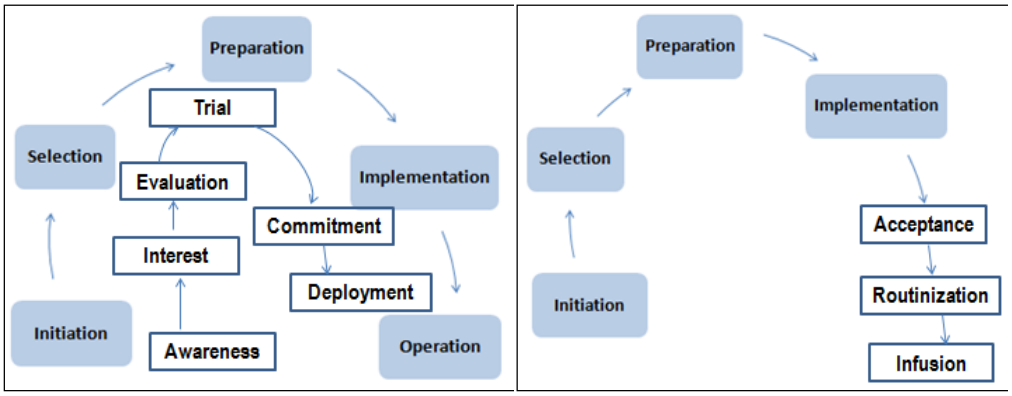


Figure 1. ERP project stages

Some authors (like Bajwa et al, 2004) are correlating the stages from the beginning (Figure 2a), while others (Cooper and Zmud, 1990) are placing the IT assimilation steps in the last part of the ERP project, continuing in the post-implementation phase (Figure 2b).



a b

Figure 2. ERP project stages and IT assimilation steps

In our opinion, in the case of ERP assimilation, the picture from Figure 2b should be amended by introducing the opening steps in the first part of the project and by moving the acceptance step before the go live moment, continuing in the post-implementation phase with routinization and infusion (see Figure 3).

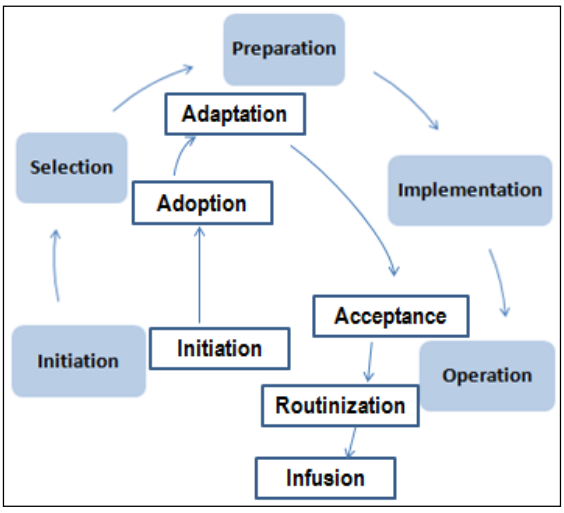


Figure 3. ERP project stages and IT assimilation steps during the entire ERP lifecycle

The ERP implementation is a project orchestrated by three parties: the client organization, the vendor, and an organization aiding the implementation (the consultant). In small and medium-sized projects the vendor is also carrying on the implementation. Generally, the vendor carries the burden of the ERP project success, everyone expecting him to have all the necessary knowledge and skills to conduct and control it. Experience shows that with all the expertise in the world, great reputation and credibility, the ERP project might fail. The explanation is quite simple: business-related outcomes are only partially related to the system implementation itself or, in other words, because of the knowledge gap. In the literature review on factors that potentially affect ERP implementation we found some studies about knowledge integration/diffusion. They all explore the process of knowledge integration and they agree on the difficulties and importance of integrating the knowledge of all parties that take part in the implementation (Sumner, 2000; Soh et al., 2000) and some of them identify impediments which prevent participants from transferring their knowledge successfully (Huang et al., 2001). Far less discussed is the importance of the knowledge held by the beneficiary. It is commonly recognized that the client has the best knowledge of its particular business processes, organizational issues, as well as the competitive situation. We believe that the knowledge transfer takes place both ways in the interaction between the users and the implementation team.

A significant factor for the ERP assimilation, revealed in each and every paper on ERP implementation analysis is users' resistance to change, derived from the organizational change and related to the organizational culture. Some cultures are more conductive to change than others, since a culture where everyone works together is likely to stimulate change more successively than one that is characterized by internal strife (Harwood, 2003). The group of people that form an organization share "philosophies, ideologies, values, beliefs, expectations, attitudes, and norms" that keeps them together (Kilmann et al., 1996). But culture can change, or hopefully, it evolves over time to an improved state. Top

management team promotes a vision and leads or indulges the cultural change. In an ERP implementation, their involvement and sustained support through all the phases help ensuring change management and eliminating resistance to change (Nah et al., 2003; Somers and Nelson, 2004; Al-Mashari et al., 2003; Dezdar et al., 2011). Maditinos et al (2012) consider that top management should ensure user support in order to achieve a successful ERP implementation. They identified several ways to obtain such an outcome, as follows: users should be able to express their point of view on the necessity to implement the solution, users should be able to express their opinion about the specification of the future system, users should be able to actively participate in the implementation process and users should be rewarded if the ERP system will be used with success.

3. ERP assimilation – a survey in a Romanian public university

Based on the literature review and on the ERP assimilation steps as illustrated in Figure 3, we will analyze the ERP assimilation from the end-user perspective. The survey was conducted in a Romanian University, a public organization, which finished the implementation of an integrated information system 18 months ago (October 2011). The users belonged to the administrative staff (secretary position); they are using the same module of software, so they have the same experience of adopting a new technology. In a total number of 57 users with similar positions in different faculties, we have questioned 20 users, in three different faculties.

Table 1. Evaluation of the ERP assimilation steps in the studied organization

Assimilation steps	Factors	Evaluation criteria	Result
Initiation	X	X	X
Adoption	Organizational culture IT education &knowledge	Openness to change Top management commitment	Not succeed
Adaptation	Change management	Top management commitment Level of knowledge before implementation	Partially achieved
Acceptance	Users' resistance to change	Knowledge transfer	Partially achieved
Routinization	Users' digital competencies	Level of knowledge after implementation Users' satisfaction	Achieved
Infusion	X	X	X

As described in Table 1, our survey focused some factors we considered relevant from the end-users' point of view. For each factor we had some evaluation criteria (covered by the questions in the survey). The last column established the result for each step of the assimilation process.

The adoption step (Q1, Q2). We aimed to find out whether the end-users were asked if they would agree or disagree with the implementation of the new system, and the

results were astonishing: only 5% of our population was informed of the changes to come and their opinion requested. The decision was taken at the management level. At the time users were officially announced about the new project, their opinion was negative, unenthusiastic, and even pessimistic: almost 60% thought it was definitely another software application they will have to learn, and only 20% considered it the best IT solution of the department they worked in.

The adaptation step (Q5, Q3). Considering the results of our study we can assert that top management didn't ask the end-users about their opinion about the new ERP system and didn't create and maintain communication channels with them. 80% of the interviewed end- users indicated us that the dean or vice dean and the IT manager didn't help them at all to understand or use the new system. They consider to be supported the most by the internal consultants (85%) and their chief secretary (40%) and they were really counting on each other while 55% declare to understand the new system from the other colleagues.

A factor with positive effect in this step of ERP assimilation is a good level of knowledge, the end-users should be at least PC literate. In the studied organization, based on the results determined, we found that end-users have high levels of knowledge of using specialized office software, like MS Office Word and MS Office Excel, and their PC skills are more than above average, while 55% declare to have an excellent knowledge level.

The acceptance step (Q6). In this project, the end-users interacted with the ERP vendor consultants and the internal consultants. They revealed us that the vendor consultants didn't help them neither understand how the system works or how they can use it. Over 65% of the end-users felt that external expertise didn't act as allies in this rough road to assimilate the ERP system. On the other hand, over 90% of the end-users believe that the internal expertise was exploited to its maximum. The internal consultants were always present when they needed to understand how the system work in order to fulfil their task and when they needed support on how to use it in their daily job routine. Likewise, the support in using the new system should have been granted by the direct hierarchical manager, in our case the chief secretary (35%) or by the colleagues with similar position. Again 55% of the responses indicate that they count on their colleagues support and only 15% declare they did not ask questions to their co-workers.

The routinization step (Q7, Q4). The new system was assimilated, even though the users still have a disapproving belief with 10% considering that that system needs to be replaced. 60% of the users that considered in the beginning that the new ERP was just another software application to learn are thinking now that it is a solution that can be successfully used, but still needs some changes to be made in order to be the perfect software for their needs. Moreover, the percentage of those who assumed that the new information system is the best solution has increased by 10%, reaching now 30% of the interviewed population. 35% of interviewed users considered their digital competencies improved, while the rest considered they remained at the same level – a positive situation overall.

To sum up, the new ERP system was assimilated in the end, but the process took longer than anticipated and it had difficult instants, especially in the first part of the project. If the perception of the users would have been different, they would have accepted the change naturally, they would have been open to communicate with the vendor's consultants and, of course, open to learn.

4. Conclusions

ERP implementation is a major change process that includes all areas of an organization, and the most important aspect is the human resource. Change isn't always desired by all the people in the organization, but it is important that executive management to be involved in this process from beginning until the final stages. The top management has to have the ability to explain the benefits of such a solution and to support an easier transition from the existing system to the new ERP based information system.

Our case study had a happy end eventually, but a lot of time and money could be saved with a different approach of each ERP assimilation step. The users' adversity discontinued the activities and obstructed the knowledge transfer to the vendors' consultants who were confronted with strong disagreement and even hostility. We could not establish which the exact determiners for their behaviour were, and this might constitute an objective for further research, along with a correlation analysis within the sample. However, we know that they reside in the organizational culture, a wide-ranging factor with the highest influence in what seems to be a technological project.

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