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ERP SOLUTIONS BETWEEN SUCCESS AND FAILURE

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ABSTRACT

The paper aims at emphasizing the significant factors determining IT project success and provides useful insides regarding the factors contributing to the IT projects' failure. The paper presents theoretical considerations and approaches on IT project success and failure field and corroborates these findings with authors' research conclusions retained from an empirical study case on two real ERP implementation projects. The paper emphasizes the advantages brought by the ERP solutions reflected in the business increase and business improved organization and control. The authors focus their attention on the success factors of the project emphasizing the importance of the organization's change culture and the adequate change management process, the full commitment of the management and the need of employees' awareness of change and implication in the project. The authors' research results provide useful insides aiming at increasing the likelihood of IT projects' success. The authors consider that the lessons retained from the past mistakes, can help practitioners to gain the knowledge to avoid them in the new projects. Our research conclusions aim at helping project managers to improve the IT project risk assessment process and practitioners in their risk understanding and action.

 ERP, software implementation, risk, success factors

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INTRODUCTION

Conducting businesses in a highly volatile economic and financial environment, as the one characterizing the last years as a result of the economic crisis, is very demanding. Conserving and increasing the business level request a deep understanding and a good management of the multiple facets of business change. Nowadays, competitiveness and innovation are the success ingredients for any business. Both ingredients determine high dependence of the companies' business processes on advanced IT&C solutions. In this respect, ERP solutions are providing integration, thus ensuring the optimization of the company's processes and resources usage, an increased contribution to the company's financial benefits and business performance in general, the maintenance of the competitive advantages for the company, and even an increase in reputation and trust in the company's processes. The company's option for ERP implementation can be determined by multiple causes: business needs (e.g. minimize the inventory costs, improved management of the customers' orders, establishment of a well stated price policy, improved control over the processes), technical issues (many disparate systems unable to sustain the business growth and objectives) or a mix of the above-mentioned situations. An ERP (Enterprise Resource Planning) system stores information and manages processes from all the functional domains of an enterprise, including its ties with customers and suppliers, implementing a structure in which strategy, organization and processes are closely aligned (Koh *et al.*, 2009). The functionality of the ERP systems was gradually developed to cover the whole enterprise, including accounting, marketing, CRM (Customer Relationship Management) and BI (Business Intelligence). Today, the market leaders offer solutions customized for various industries, incorporating best practices and ensuring legal compliance (Ehie & Madsen, 2005).

The continuous increase of the ERP market reflects the companies' openness for these advanced solutions. If in 2009 and 2010 the ERP market stood at \$40.6 bn, respectively \$43bn, it is expected to grow at \$53 bn in 2015 (CRB, 2011). This is the result of the performances proven by the successful ERP implementation projects and the medium and long term strategies implemented by the ERP vendors. If not long ago ERP was seen as a solution recommended for the big and complex companies, the new strategies—as for example software-as-a-service (SaaS), platform-as-a-service (PaaS) and infrastructure-as-a-service (IaaS)—are ensuring that a larger number of companies are able to adopt ERP solutions and, resulting in an increase of the ERP market. As Mangiuc emphasizes, network connection and Internet access are ubiquitous nowadays and the new approach become accessible to a vast majority of software consumers, opened to these new web application that have already reached the maturity level and making also a step forward being opened to Enterprise 2.0 concept (Mangiuc, 2011).

ERP implementation projects are complex, demanding, expensive and also risky. Among the costs we include the software licenses, the consulting fees for the implementation, and also the significant effort needed from employees at all levels, including senior management. This effort goes toward communication, the analysis of the legacy processes and design of the new processes, configuration of the new system, the export and conversion of data from the old legacy systems, extensive testing and verification of the data and new processes, and training for the affected stakeholders—which can include customers and suppliers (Madapusi & D’Souza, 2011). These are projects impacting the company in multiple areas: processes (re-engineering of the processes), organizational structure, procedures, employees’ roles and tasks, and the company’s culture itself. All these implications have a deep impact over the company, and the important financial and human resources involved in the projects are determining multiple and interrelated risks.

An analysis of the surveys performed in the last years aiming at investigating the rate of success of IT projects emphasizes concerning results. An ERP survey issued in 2011 shows that in 2010, 61.1 % of ERP projects took longer than expected, in 74.1% of the cases costs exceeded budgets, and in 48% of the cases, projects registered benefits realization under 50% (Krigsman, 2011). The rate of the failing ERP projects remains high. This is why the authors’ research tried to identify which factors can facilitate or inhibit the success of the ERP implementation projects.

The present paper aims at synthesizing the main problems encountered during an ERP implementation and the most important benefits brought by the ERP implementation to the companies. The authors conducted their research based on a detailed literature review and documentation on real ERP projects taking part in ERP implementation teams, this experience providing useful insights for their study. The authors’ research conclusions can provide a useful insight for the Romanian IT specialists, given the shortage of Romanian literature on this topic.

1. SUCCESS AND FAILURE IN ERP WORLD - THEORETICAL INSIGHTS

The modest, and as a consequence, worrying rate of success of ERP projects next to the resonant failure cases as the National Program of IT in NHS of the UK government (considered the largest public project of all time, aiming at providing electronic health records for all UK citizens) just to mention one of the most important, determined academicians and practitioners to investigate the causes of the IT project failures and identify the factors potentially conducting to the projects’ success (Kanaracus, 2011). The specialists’ expressed constantly their preoccupation in the field and also emphasized the multiple perceptions on the concepts of IT project success respectively project failure.

How can we define IT project success? In the authors' opinion, a successful project provides all the functionalities initially stated, can be used as intended, meeting planned goals, being operational at the specified time and within the approved budget. As a remark, remaining close to its budget and deadlines might be, in the authors' opinion, the most appropriate wording. The problem of budgeting and the insurmountable problem of exceeding cost threaten all complex information systems projects. In the case of complex projects unexpected problems are unavoidable, thus increasing the total costs of the project.

The literature review emphasized the distinction between project success and project management success. Arhonen and Savolainen emphasized in their study incidents belonging to the project management that impacted the project success (Arhonen & Savolainen, 2010). The most accepted criteria for IT project success are: meeting time, cost, functionality and quality goals (Savolainen *et al.*, 2012). In their detailed documented article, Savolainen and her colleagues are making reference to Papke's opinion, who considered that project success can be measured in terms of time/cost/quality, "while project success goes further, focusing on longer-term and customer-oriented results".

The literature review (Savolainen *et al.*, 2012) revealed that software product success has different meaning for the customer and the supplier. The client will always look for maximizing its benefits while the vendor will look for maximizing his profit in a short or long horizon. It means that from the vendor point of view, the project success criteria imply also customer satisfaction and the development of a good relation with the customer, a relation which should potentially provide long term benefits.

The authors identified from the literature review the most accepted definition of project failure. In this respect, Chua retained in his article several definitions (Chua, 2009):

- In Sauer's opinion (1993), the system failed if the "development of operations ceases, leaving supporters dissatisfied with the extent to which the system has served their interests";
- Standish Group (1994) defined the failed project as "a project that has been cancelled, or one that does not meet its budget, delivery, and business objectives".

Likainen *et al.* underlined that "the great effort and difficulties related to ERP implementations, as well as the associated organizational change, have given ERP adoption projects a somewhat notorious reputation" caused by the huge number of projects registering over budget and being not delivered in time, achieving only partial implementation or "being scrapped as total failures" (Laukkanen *et al.*, 2007).

In their research, Hawari and Heeks performed a detailed literature review on IS failing aiming at identifying the most significant opinions on the failure's factors. They retained several points of view (Hawari & Heeks, 2010):

- Fit between different IS factors as for example: processes, people, structure, technology;
- Fit between stakeholder group: their assumption and expectation
- Fit between the IS design and the organizational settings
- Lack of skills and technology, inadequate quality of data, insufficient financial resources, user resistance, cultural issues.

Wu and Wang conducted their research on IS success starting from the assumption that user satisfaction is a "good surrogate measure of IS success" (Wu & Wang, 2006). Their study offer "a proof-by-analysis that ultimate-user satisfaction is closely related to perceived ERP success" and emphasize the importance of three factors:

- ERP project team and service
- ERP product
- User knowledge and involvement.

As Florescu *et al.* emphasized, ERP process must be understood and treated as an enterprise "continuum" project. This implies not just significant resources, but continuous commitment to change in the ERP system and in the company's processes. (Florescu *et al.*, 2010).

The authors retained and used in their study the following factors contributing to the ERP success: management commitment, project opposition, corporate culture, planning and change management, users' training, rollout strategy. These were the main dimensions used in the analysis of the ERPs subject of our study.

Management commitment is essential, as it provides the objectives and direction, ensures the resources and is responsible for project development monitoring. The project opposition from the employees' part is, in general, the result of an inadequate communication on the project's objectives, advantages and benefits. Having no awareness on the objectives to achieve and benefits on short and long time by implementing the IS, the employees' opposition becomes almost "natural". One of the golden success factors is management commitment, and management's ability to communicate and adequately manage the change. Corporate culture describes an organization's ability to learn, its managerial style, communication quality and openness, and attitude towards risk. All these elements can facilitate (or inhibit) an organization's capacity to implement change, which is an essential factor in the implementation of an ERP system. The IT specialists agree that the behavioral and cultural change are crucial to any IT project success. This is more evident in the case of the ERP projects characterized by important changes brought in the business and decision making processes (Chou & Chang, 2008). According to Ke and Wei, ERP implementation success is positively related to a culture of

development, collaboration, participative decision-making, power sharing, and tolerance for risk and conflicts (Ke & Wei, 2007). In this respect, the authors will investigate how deep the interdependence of the project success on the organization's culture is. The project's risk management process is also an important link in the chain of change and is a determinant success factor. Appropriate risk management process and the awareness on the risks in all the implementation stages can be considered success factors too. In this respect, preparing and carrying out focused training for all the impacted employees are important steps. The training phase is one of the golden success factors so that important resources are allocated. We agree with Dorobăț and Năstase point of view emphasizing the significant role of the training: the training is not just preparing the users to adapt to the new ERP system but also helps in the organizational change process (Dorobăț & Năstase, 2011). The rollout strategy, from the risk management perspective, must provide all the scenarios needed to face the potential risks in this phase.

An effective risk management process is based on the understanding of the risks' interrelation and interdependence. This new approach was revealed by Aloini's researches, who proposed together with his colleagues two risk assessment models for ERP projects (Aloini *et al.*, 2012a; 2012b). The fundamentals of the proposed models are the Petri Net approach, and a new framework drawn based mainly on PRINCE2 guide, the Australian Standard and PMBOK guides (Aloini *et al.*, 2012b). These approaches were considered in our present research.

A synthesis of the conclusions emphasized by the research presented above reveals two important streams:

- Identifying and analyzing the critical success/failure factors;
- Defining risk management models for ERP implementation projects. This new approach underlines the necessity to understand and treat the risks taking into consideration their interrelations and determination. Treating individual risks is not effective. One risk can generate a "cascade" of risks in subsequent activities of the ERP implementation project. In their present research, the authors investigated the risks emerged in two ERP implementation projects and analyzed the interdependences between them.

2. DATA AND METHODOLOGY

The methodological approach was structured on the following layers:

- ✓ Performing a critical literature review aiming at identifying the specialists' point of view regarding the factors contributing to the success or failure of the ERP projects. From the literature review, the authors retained analysis models proposed by academicians and

practitioners in their effort of measure projects' success and risk exposure;

- ✓ Hypotheses development: based on the prior literature review the authors retained the most accepted success factors and define the hypotheses for their investigations:
 - H1: Risks emerge in all the phases of the ERP life cycle;
 - H2: Clear objectives and direction stated by the management are essential in the ERP project implementation;
 - H3: The organization's culture significantly impacts the success of an ERP implementation project;
 - H4: Planning and change management are important success factors for IS projects;
 - H5: Senior management support is essential in ERP implementation projects;
 - H6: Communication is essential, across multiple levels: between management and employees, between management and ERP provider and consultant;
 - H7: There is interdependence between risks; one risk can generate one or more risks in the same stage of ERP life cycle or in a different stage.

The hypotheses emphasized the authors' perception on the ERP success factors. There can be some debate on the content of the hypotheses the authors stated, as for example the fact that change management is part of the organization's culture. In the present research the main objective is to emphasize the most important success factors and in subsidiary to reveal the link between those factors.

- Selecting an appropriate set of case studies and performing an analysis of individual case-studies by using the key set of categories and theoretical knowledge acquired in the previous phase in order to see if the above mentioned hypothesis are valid. In the projects' selection phase, the authors stated two criteria:
 - The projects had to implement ERP software from the same vendor;
 - The projects should have registered different success experience.

Finally, we provide a synthesis of the conclusions retained in the analysis of the individual case studies.

The collection of data implied:

- ✓ Interviews with implementation team members and limited access to the project documentation in the case of Project A;
- ✓ Full access to the project documents, interviews with the project manager and active implication of the authors in some activities in the project implementation phase (migration from the legacy system, testing and end-users's training) in case of Project B.

3. BACKGROUND

3.1. Company A (Airline Services Industry)

Company A is a worldwide service provider in the airline industry, presenting in its organizational structure two headquarters (one in Europe and the second in North America) and operating offices in seven other cities located in different countries. Thus the company's activity is very diverse, offering services and consultancy. The geographical extension raised significant issues, the company having to comply with separate accounting processes and legal requirements in each of the 150 countries it serves.

The decision to implement an ERP system was determined by the need to bring the company's very diverse infrastructure under control. Notably, its accounting system was old and provided only basic functionality, making it difficult to aggregate data originating from the many countries it operates in. The old system was not process-based, which made it error-prone and difficult to control. Thus an important benefit from the ERP implementation was the introduction of formal processes—a benefit that was partially realized.

However, the overall expectations for the new system, as well as the change strategy were not properly managed. Company A's implementation team was inadequately prepared, with no clear vision for the new system; as a consequence, the proposed benefits were not realized. Large delays and budget overruns, coupled with substantial on-going maintenance costs point to the fact that the project has not reached its goals.

3.2. Company B (IT Equipment & Software Integrator, Romania)

Company B was founded in 1991 in Romania, with private capital. The company started its activity as main sales representative for a leading producer of scales and weighting equipment for both retail and manufacturing. Since its founding, Company B constantly extended its activities vertically in the retail equipment sector, by adding relevant products and services in its portfolio.

The company currently has offices in 5 major cities in Romania, as well as a 24/7 service call center, and a network of 25 service partners. One of the key assets is the company's own Research and Development department, developing value-added software applications for the retail industry, such as front/back office integration, decision support systems, warehouse applications and security solutions.

Thus, Company B's business model gradually evolved to the role of IT systems integrator for the retail industry. A typical project for Company B starts with the sale and installation of hardware for retailers (such as cash registers, fiscal printers, EFT terminals, network infrastructure and servers) and continues with the

integration of value-added components. After the implementation phase, the clients usually enter a service and support contract.

Company B has enjoyed steady, organic growth since its founding. Correspondingly, the IT infrastructure was developed to sustain the company's expanding activities. Given the organizational stress faced by a growing company, a coherent IT policy could not be enforced—which is an usual situation for companies that are rapidly expanding. Therefore, the company operated a number of poorly connected systems, and sometimes data was also stored in Excel files. The lack of data availability across departments affected the transparency of operations, but the effects cascaded into more serious consequences—such as the ability to create a sound pricing policy (which requires detailed and accurate data from all departments). In the absence of a pricing policy, profitability could only be calculated at the end of the accounting period, thus the company was unable to make informed decisions within individual projects, or when entering service contracts.

Operational difficulties were present in many departments, with the most notable being in logistics and service—which directly affected the company's relationships with the clients. Problems included numerous on-site visits, insufficient transparency in invoicing and merchandise accounting, and perceived slow reaction time for the service department. But the biggest problem consisted in the lack of structured processes, as the company was operating in a perceived permanent “fire-fighting” mode. The employees expressed that they were working under pressure, and this fact was reflected in the high turnover rates (several key managers left the company just before the ERP project started, adding to the considerable effort required in the implementation). Overall, it was perceived that a certain “limit” had been reached, and that without significant change, the company could not grow any further. In this respect, the motivation to start the project was shared among employees at all levels.

The priority of the ERP project was to bring improvements in areas which positively impacted client relationships, before focusing on the company's own processes (such as accounting, finance, reporting, business intelligence etc). Eventually, all functional areas were affected, and the whole business cycle—from client acquisition to service contract—was modeled inside the new software. Overall, the project was run within the planned schedule and budget, and most of the envisioned benefits have been realized; in conclusion, the project was successful.

4. RESEARCH FINDINGS

For the purpose of the research, the authors followed the ERP project life cycle defined by Monk and Wagner, considered as one of the most used frameworks (Aloini *et al.*, 2012a). According with the above mentioned framework, SAP implementation roadmap contains the following phases:

- *Project preparation* including sub-phases such as: defining the project scope, establishing the project team and manager, selecting the vendor, identification of the impacted business processes and based on this establishing the budget, starting the risk management process etc.
- *Implementation* including the following sub-phases: business blueprint, realization and final preparation. The authors focus more on the final preparation investigating mainly the users' training and rollout strategy.
- *Go live and support*.

The authors proceeded to the analysis of the success factors retained in the literature review, following the project phases presented above. The main findings are:

Implementation decision

In both companies, the decision to implement an ERP was taken by top management. However, in Company A the decision was imposed by top management, without proper planning for costs, lacking a clear vision regarding the desired results and without a proper risk analysis. The decision to implement an ERP solution was unilaterally taken by the CEO, rather than being based on an evaluation of value and impact for the company. When the new system was introduced, employees struggled during a very stressful and long transition period. This “heavyweight” approach was shown not to work well for medium-sized organizations by Malhotra and Temponi, who argued that as the project becomes more complex, it is increasingly difficult to manage the project strategically (Malhotra & Temponi, 2010).

In Company B the top management involved all stakeholders as much as possible before starting the project. It was clear that the company could not expand any further with its current system, so the drive to change was present.

ERP vendor selection

Company A compared multiple ERP vendors and went through numerous presentations. However, a clear set of the desired benefits was not formulated, and Company A's implementation team had little input regarding the project goals. Finally, SAP was chosen—not as a result of a competitive analysis between the vendors, but as an expressed preference from top management.

Company B did not evaluate separate vendors, as top management knew from the start that they wanted an industry-recognized solution, with a good track record. The decision to choose SAP was not only technical, but also reputational.

Implemented modules, scope

Company A's main goal was to aggregate and unify its financial reports issued in the many countries it operates, and therefore the implementation focused primarily on the accounting and financial modules. It was planned to gradually deploy

human resource management tools and advanced financial and productivity reports; this did not happen due to large delays in the first phases of the project.

Company B planned and managed the implementation of four modules: Sales and Distributions, Materials Management, Financial and Controlling, and Profitability Analysis. Thus, the whole operations cycle was changed and modeled according to the new system.

So far we have presented factors which can be grouped under a pre-implementation stage. During these phases, Motwani *et al.* have shown that the following factors are relevant: understanding of strategic goals for the ERP system, commitment by management and cultural readiness (Motwani *et al.*, 2005). Berchet & Habchi show that top management support and excellent planning are crucial for the following phases of the project (Berchet & Habchi, 2005). In this regard, we can already observe the differences between the two companies, which strongly influenced the projects during the implementation phase.

Implementation partner

In their simplified model of IS project success factors, Tsai *et al.* have shown that the choice of the implementation partner (consultant), as well as the quality of service that they provide has been shown to have a direct influence over the success of the project (Tsai *et al.*, 2011). Company A relied on a team of 10 consultants from a large, well-known multinational IT company. During the more intense periods, the consultant team grew to 25 members, substantially increasing the implementation cost.

Company B relied on a local partner with good experience in SAP projects. The team consisted of four consultants (one for each module) and an experienced team leader, with good knowledge in both IT and finance. Coming from a smaller company, the consultants proved to be more flexible, while the costs were held under control.

Internal implementation team

The decision to implement an ERP in Company A was taken by top management, with little input from other management levels and employees. The internal implementation team was formed with little preparation; as a consequence the team had little knowledge of the project's requirements or a coherent vision of how the company could be transformed.

The team in Company B consisted of the department managers responsible for each software module. They had good knowledge of their domains and knew the limitations of the old systems, so there was a clear vision of the project. Because they would become direct owners of the new system, the implementation team had a strong incentive to contribute to the project's success.

Management commitment

Management commitment is one of the most important success factors in IS projects, and its influence cannot be understated. While in both companies the CEOs were strongly committed to the project, there were major differences in management style. Company A's CEO exerted an autocratic leadership style, imposing decisions but offering little perceived support. In Company B, the CEO led the project firmly but proved openness for dialogue and conflict resolution.

Project opposition

In the case of complex projects significantly impacting the company's organization structures, processes and employees' tasks and responsibilities, the employees manifest a clear resistance to change. This is why the management's role in supporting change is crucial ensuring the awareness of the need of change at all levels (stakeholders). In this respect the authors considered relevant to focus on the situation in both analyzed projects because of the two opposite attitudes.

Due to the autocratic leadership style in Company A, there was no apparent opposition, as the employees did not perceive their opinions would be considered. However, there was a "silent" opposition to change, as the employees felt disconnected from the project, with little incentive to contribute. Thus, instead of re-engineering the processes, there was a drive to customize the new system around the old processes.

Like any company implementing an ERP system, Company B had its share of difficulties and conflicts, mainly stemming from changes in roles and organizational structure. Many job descriptions changed, so employees had to adapt to performing tasks differently, or taking on new responsibilities. For example, hundreds of invoices for service contracts had to be manually issued every month. The new system generates the invoices automatically, and the person who performed this task has taken on new responsibilities—requiring training and adaptation to the new tasks. All departments were re-structured and there was considerable effort needed to implement the changes.

Corporate culture

In their investigation, the authors started from Ke and Wei point of view emphasizing that the ERP implementation success is positively related to a culture of development, collaboration, participative decision-making, power sharing, and tolerance for risk and conflicts (Ke & Wei, 2007). Along these lines, there were great differences between the companies studied.

In Company A, the top management was keen to realize the goal of implementing an ERP, paying insufficient attention to how the organization reacted and without a clear vision and scope. In the words of a middle manager, *"the decision was pushed from the top and hammered onto the employees, who struggled to understand the new system. The middle management and employees carried out all the work, with*

little collaboration from top management". In company B, the need to change was felt throughout the organization, and the decision to implement an ERP system was well understood. The management fostered an open communication climate, listening to feedback from employees, and encouraging ownership of the new system.

An ERP project involves many risks, testing an organization's ability to resolve conflicts and adapt to change. In Company A, the decision to implement the system can be described as aggressive, because there was little concern for risk prior to implementation. Later in the project, the plans changed often, causing confusion and inducing further delays. Company B had a more moderate approach to risk, as the management strived to identify risks in advance, by consulting with the stakeholders.

Another differentiation factor was management's vision for the new system. Company A lacked a clear understanding of the project's goals, and thus top management could not communicate and foster a culture conducive to the project's success. The project represented another goal to be attained. In Company B, the management regarded the project as a core asset and took responsibility for its success.

Planning and change management

In Company A, due to the autocratic style of leadership and the "top-down" management culture, the planning phase was hurried and thus improperly executed. The decision factors and the implementation team had insufficient information about ERP systems in general, and did not perform a proper requirement analysis to determine clear goals for the project. Thus, the necessary organizational changes were not identified ahead of implementation, and could not be communicated in order to prepare the organization for the required structural changes. The project met with silent resistance from the employees, who were surprised by decisions which they did not understand.

In Company B the implementation teams planned carefully, and kept all stakeholders informed about the expected impact of the project. There was considerable effort invested in the planning phase, while paying attention to the go-live phase, which was critical because all new components had to work together; an extensive roll-back plan was created and tested in case the new system did not perform.

User training

Both companies adopted a "train the trainer" policy, but there was little user involvement before the rollout in Company A. The employees felt that "the implementation teams worked in obscurity". After the rollout, the end-users felt overwhelmed and many found they were unprepared to use the new system.

Company B involved the end-users during implementation, attempting to foster ownership and adoption of the new system, minimizing the “surprise” factor. During go-live, a support team from the implementation partner was present on-site for a week, supporting the transition to the new system.

Rollout strategy

Company A decided to implement the new system gradually, running both systems in parallel. However, the results from new system failed to match the ones from the old system, so the transition period took more than one year—a period in which the amount of work had to be duplicated on both systems.

Company B planned and tested before the transition, as its rollout strategy was a “clean-cut” to the new system. Production data from the old system was used to test the new system until the results matched. Also, a fallback plan was devised in case the new system did not perform properly.

The projects’ effects

Project costs

ERP implementation costs range between 1-3% of yearly turnover and last on average between 1 to 3 years (Kimberling, 2011). In Company A, the project has cost 7% of yearly turnover, and as of March 2013 was still not complete. There were large budget overruns, associated mainly with consulting and programming fees required to customize the new system. In accordance with Chou and Chang, these customization efforts did help to integrate data across resulting in better information dissemination, coordination improvement and ultimately resulting in task efficiency (Chou & Chang, 2008)—as we found out in our interviews. However, these efforts were unscheduled and consequently unbudgeted, causing cost overruns. Once again, we relate back to insufficient planning at the start of the project.

In Company B, the project cost was 2.5% of the average yearly turnover over the implementation period, which is in line with other projects of this type. Customization was avoided, as the company re-engineered its processes in line with the workflows from the SAP software, which were seen as industry best practice. During implementation the teams strived to adhere to the original plan, minimizing additional costs.

Project duration

Company A started the project in 2009, looking to finish within two years. However, the implementation was delayed due to improper planning and training. The envisioned rollout for all locations (across 7 countries) is in year 2014.

Company B started the project in 2008, with an estimated launch date in early 2010. The go-live was delayed until mid-2010, mainly due to changes in the implementation partner's team. Overall, the project was reasonably within the proposed timeframe.

Achievement of targeted benefits

Company A realized its proposed benefits only partially, with massive budget overruns, delays and effort on the part of the employees. During the initial 3 years of the project, only the accounting and financial module was implemented, and only in the two headquarter offices. Most of the realized benefits were intangible, such as transparency, structured processes and central availability of data. These benefits are difficult to measure financially.

Company B managed to achieve most of its proposed goals; notably, its turnover doubled after the ERP implementation, while its number of employees remained at the same level. Numerous processes gained in speed. Inventory settlement was reduced from seven days to one day; the generation of invoices was automated—thus saving several man-days every month, and there were improvements in the service department, which were also reflected in customer questionnaires. The management opined that the company has become a more robust and adaptable organization.

As found by Kanellou and Spathis, increased availability and transparency of data, as well as information flexibility is a widely-cited benefit among most companies implementing an ERP rather than cost and/or personnel reduction (Kanellou & Spathis, 2011). Both companies we studied quoted these two factors as valuable benefits of the ERP system.

Unrealized benefits

In Company A, the severe delays in the deployment of the accounting and financials module meant that the rest of the modules (human resources and advanced financial reporting) were postponed and eventually left out. Some managers complained that despite the fact that the ERP now stores much of the organization's data, some calculations still have to be done in Excel spreadsheets, since the necessary interfaces are not implemented. Because the project's budgets have been spent on unplanned contingency actions, many worthwhile suggestions and improvement ideas from the employees cannot be integrated in the new system.

While Company B realized most of its proposed benefits, it encountered difficulties integrating SAP's customer relationship management (CRM) module with its software infrastructure and new workflows. Even if this module was not part of the initial deployment plan, Company B hoped it would integrate within its infrastructure, but instead had to abandon it after the results were unsatisfactory. Also, some processes could not be automated according to SAP's workflows and

must still be done manually, causing frustration for the process owners. The management is aware of these drawbacks and has budgeted additional resources to address the problems.

Particularities of ERP projects' risk assessment

Conducting an ERP implementation project is a demanding task requiring competent project management, with the mention that the quality of the project management itself is not the only "ingredient" ensuring the project success. The project management implies numerous tasks. The authors will focus their presentation on risk assessment. According to the literature, there is an imperious need to identify the projects' risks wherever they could appear. This means that risks can be identified in any of the ERP life cycle (project preparation, implementation – with all its phases, and go live). More than that, risks evidenced in one phase of the ERP live cycle can determine other risks in the subsequent phases. For example, a risk produced during the project preparation phase will determine other risks in implementation and go live phases. In addition to time-related risks, Hakim and Hakim identify cross-sectional risks (Hakim & Hakim, 2010). In their proposed framework, they recommended that risk be managed according to six categories: organizational, technical, project management, system, user, and technology.

Based on Aloini's risk management models (Aloini et al, 2012a; 2012b), the authors carried on the research aiming at emphasizing the risks identified in the analyzed projects and their interrelations. This paragraph presents, in brief, the conclusions retained from the analysis of Project A, which, based on the most accepted criteria, can be classified as a failed project.

Analyzing the findings presented in the paragraphs *Implementation decision* and *ERP vendor selection*, we identify several critical risks: the inadequate selection of the software package (R1), ineffective strategic thinking and planning (R2), ineffective communication (R3). The selection of SAP was more a volition expressed by the management, rather than a result of a real decision making process based on facts and analysis. This risk will determine the mismatch between the software package and the specific business processes in Company A. This emphasizes another risk factor: inadequate business process re-engineering. According to the literature and the authors' own experience in ERP implementation, the real benefits of this software package are not achieved in the absence of a well-designed process re-engineering effort. The inadequate software selection is the result of an insufficient effort on defining vision and scope. It is important to emphasize that the risks R1 and R2 appeared in the project preparation phase, and their impact (determining other risks) is visible in the implementation and go live phases. In this respect, hypotheses 1 and 7 are validated.

Ineffective communication was manifested, in case of project A, starting with the scope and objectives and continuing with the rest of the activities performed in

different phases. The inadequate communication with the ERP provider and the implementation consultant determined the unclear vision and scope of the project, generating multiple changes in the project schedule during implementation, limited operational benefits, significant delays and an exceed budget. The inadequate communication was manifested inside the company. The employees were not prepared for such a large and complex project whose need was not properly explained. That explained the “silent resistance” to the project and the employees’ lack of enthusiasm. In the authors’ opinion, R3 was determined not just by R2 but also by inadequate change management (R4) risk factors. R4 clarifies multiple aspects in the project development: shortage of vision, the frailty in the software package selection, inadequate skills at the level of the implementation teams (selected employees), the lack of concern in the explication of the need of change etc. In this respect, hypothesis 2 and 6 are validated.

In the project business blueprint sub-phase (the first one in the implementation phase), the project plan is established, and the key-users are identified. The analysis of the project in Company A emphasized another risk factor: the improper skills proved by the company’s employees nominated in the implementation teams. According to good project management practice, the careful selection of the implementation team members is crucial. It was not the case in project A. The shortage of experience and skills, the inability to take decisions (determined by their position inside the company and their insufficient knowledge) created artificial obstacles in the project development.

Another important risk factor is the user’s training. This activity is integrated in the final preparation sub-phase (the last in the implementation phase). The risk factor impact was evident in the go live phase of company A when the end-users were overwhelmed and unprepared to perform properly their tasks in the new system.

The authors’ research results emphasize that risks emerged in all the phases and sub-phases of the ERP implementation life cycle. Most relevant findings retained in the article are linked with the project preparation and implementation (realization and final preparation sub-phases), thus, hypothesis H1 is validated. The failure to state clear objectives and direction is one of the factors affecting the project success in case of company A. Hypothesis H2 is validated. The impact of the companies’ culture over the performance of the project was reflected in all the phases of the live cycle. The issues emphasizing an unconsolidated culture in case of company A are: the risk awareness, the quality of the change management process, the resources allocated for the project (see the competence of the team members) etc. Hypothesis H3 is validated. The planning and change management paragraph emphasized the processes’ differences registered in company A and company B, impacting significantly the projects’ development. Hypothesis 4 is validated. As the planning and change management process, in its fundamentals, is part of the organization’s culture, this issue confirms once more hypothesis H3.

The top and executive management in company B proved permanent support for the project: realistic expectations, detailed vision, clear objectives, implication in all the phases of the project, allocating all the needed resources, granting authority and responsibility to the most appropriate and knowledgeable persons, and devoting time to the project. The management monitored in detail the project progress, facilitated the solving problems process, and stimulating an emulation attitude inside the company that facilitated the project implementation. On the contrary, the top management in company A proved less implication, letting the implementation team to solve almost all the problems, communicating less effectively with the employees. In company A the reporting process ensured the most information the top management requested. The different supporting attitude made the difference between company A and company B and conducted to the different results in the two analyzed projects. Hypothesis H5 is validated.

The appendix A contains a synthesis of the conclusions retained, conclusions that validates the initial hypothesis.

CONCLUSIONS

To survive and mostly to grow in a dynamic, unstable and unpredictable economic and financial environment, the companies need to adopt new business models and the IT&C technologies able to support them and ensure competitive advantages and efficient use of the resources. ERP solutions are the top software packages the companies can opt for. This is the reason why the authors' research focused on this topic, which is of large interest in nowadays. The authors' research aimed to emphasize the pitfalls in the ERP implementation projects and the risk factors that have to be managed for achieving project success.

In the authors' opinion, IT success depends largely on people—wherever they are placed in the company's hierarchy. A company's ability to change represents a significant factor towards the success of IT projects. People beliefs, attitudes and skills, lack of motivation and awareness related to change showed by Company A's employees determined their resistance to change. The organization's leaders ability to manage change, and foster adequate communication inside the company and between the client company and the information system vendor, the management commitment and type (collaborative or autocratic) - all represent important factors in staying on the sharp blade of the sword determining the success or failure of the project. We cannot neglect the technology barriers and shortage of resources which are also important challenging factors conducting to the projects' success.

The companies must understand the importance of promoting a standard change method in order to ensure an adequate project management. In this respect, the standard change method has to be included in the training program for future leaders aiming at acquiring the knowledge and best practices promoted inside the

company (IBM, 2008). In the project, management risk assessment has an important role. It is not enough to identify risks, but understand them in their interrelation and determination. Designing the roadmap of the potential risks in an ERP implementation project provides an accurate understanding of the exposure and offers the information needed to mitigate the risks.

The post-implementation analysis is very important providing significant information regarding the errors registered during the implementation process. The experience gained from previous projects and learning from the past mistakes will help the practitioners to avoid similar errors in future. Drawing the roadmap of the potential risks, performing adequate risk management process and considering as flag alerts the success factors recognized by specialists can be considered “success ingredients” increasing the likelihood of the ERP success rate and the companies’ trust in this software packages.

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APPENDIX A – Comparison of ERP implementation projects

Item	Company A	Company B
ERP vendor selection	Multiple vendors compared, but set of planned features unclear. Finally, SAP was chosen.	SAP was chosen without a competitive bid.
Modules implemented	A single module (Financial & Controlling)	Four modules (Sales and Distribution, Materials Management, Financial & Controlling, Profitability Analysis)
Implementation partner	A team of 10 consultants from a large international IT company	A team of 5 experts from a local consulting company
Internal implementation team	The team was unprepared for implementation, without clear guidelines	Each department manager responsible for the relevant module
Management type	The decision to implement the ERP was “pushed” from the top, with little concern for risks, costs or results. Employees struggled during an extremely stressful transition period.	Although the decision was primarily made by top management, strong employee involvement and communication helped overcome implementation challenges.
Management commitment	Management was committed, but did not provide proper support during implementation.	Management was committed, responsible and supportive.
Project opposition	Due to the autocratic management style, nobody expressed opposition (but manifested resistance to change)	The conflicts were resolved through dialogue and management support; suggestions were welcome from all stakeholders
Planning and change management	Insufficient requirement analysis before project start led to unclear goals. There was no clear strategy for change management, as there was little incentive for change.	Changes in processes and organizational structure were agreed and planned ahead of implementation
Total cost as percentage of yearly turnover	7%	2.5%
Budget overruns	Substantial budget overruns, due to the attempt to customize the new software to support the old processes (instead of improving the existing processes).	Only moderate and tolerable budget overruns, the processes were modeled according to SAP recommendations – which were seen as a benefit.
Project duration	Started 2009, estimated end in 2014 for implementation in all locations.	November 2008 – May 2010.

Item	Company A	Company B
Implementation delays	Massive delays due to unclear vision, improper planning and insufficient training.	Minor delays due to the implementation partner.
Geographic implementation area	All offices, in multiple countries.	All offices at national level
Targeted benefits achieved	Only partially, with huge efforts, cost overruns and very late.	Yes, with important productivity gains reflected in cost reductions, speed of processes and information availability.
Corporate culture contribution	Due to low adoption within employees, there was little incentive to contribute to the project.	Resistance to change was overcome through communication and employee involvement, fostering ownership.
Training	There was little end-user training and improper communication—the implementation teams worked in obscurity. When the system was finally introduced, the end-users were overwhelmed.	The approach taken was “train the trainer”, but end-users were permanently involved. During roll-out, a dedicated support team from the implementation partner was present on-site.
Rollout strategy	The new system was run in parallel with the old system for 1 year during rollout at the two headquarters.	Clean-cut rollout, with extensive testing taking place before go-live date.
Project risks	The risks were not properly managed; it was hoped that they would be mitigated during the transition period. As an example, poor employee training led to confusion and caused great difficulties. One manager expressed that the project was a “major shock” to the organization.	The risks implied by the clean-cut rollout strategy included a possible negative impact on the company’s processes. These risks were mitigated by extensive testing before rollout.
Realized benefits	Transparency, structured processes, aggregated data, enlarged set of reports.	Turnover doubled with the same number of employees. There were numerous cost reductions, speed-up of process (billing, logistics, inventory), pricing policy, planning ability, more robust and adaptable organization.

ERP solutions between success and failure

Item	Company A	Company B
Unrealized benefits / drawbacks	Some software modules were left out. A permanent team of 10 people is necessary to support the new software, generating substantial additional costs. Although there are many ideas for possible improvements, there is no budget to support implementation.	The SAP CRM module could not be implemented due to incompatibilities with other software components.
Was the project successful?	No; the project did not meet time and budget. Costs exceed the benefits so far. However, some benefits will be realized when the project is implemented in all locations.	Yes. Although a clear & complete financial measurement is difficult, it is obvious that the company and its stakeholders benefited from the project.