Critical success factors in the implementation of (ERP) in Moroccan companies

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Abstract—**The ERP system has been the subject of a large number of academic discussions in recent times. A successful implementation of an ERP can have a very important impact on the performance of the company. The factors that are crucial for a successful implementation of an ERP system are commonly known as Critical Success Factors (hereinafter CSF). This article analyzed the CSF that has the most important role in the implementation process in Moroccan organizations in order to identify the most important CSF for the successful implementation of the ERP system. A survey was sent to 20 companies using an ERP system; managers of these companies identified the 5 CSF as the pillars of successful implementation of an ERP System. A case study was conducted with the company "SOMAPAF" which implemented the SAGE software to examine the prerequisites and consequences of the implementation of this software package and to confirm or not the result of the survey. To analyze the case of ERP implementation at SOMAPAF, data were collected from individual interviews with 20 ERP users. The majority of the interlocutors agree on the importance of the 5 CSF identified in the survey to succeed the implementation of SAGE.**

Keywords-component; ERP, Implementation, Critical Success Factors

I. INTRODUCTION

Many ERP system implementation cases have been reported, but many companies have also announced that their ERP system is a failing system. The failure of the ERP system or misuse certainly causes a huge loss for the organization and could even lead to bankruptcy [37] [4] [3]

An ERP system has many advantages. Anything can lead to increased efficiency and give a business a more competitive edge in the global economy. To do this, companies should consult with experts during the implementation process to ensure successful implementation and avoid system failures [2]

A study by McNurlin (2001) found that only 34% of firms were satisfied with their ERP system. 28% of implemented ERP systems were failures. In addition, 90% of the ERP systems implemented were late and more expensive than the companies had planned [5]

In addition, 25% of the money invested in the ERP system was considered wasted and less than 75% of the efficiency of the ERP system was used [1]

Many companies only use between 50% and 75% of the features or modules of the ERP system. Betts (2001) reported that 80% of the ERP system did not meet the expected business objectives of the system. Despite this, many companies have implemented an ERP system, but few are used effectively [7].

Kremzar & Wallace [8] (2001) consider that the implementation of an ERP system revolutionizes the functioning of a company. Therefore, management and stakeholders need to appreciate how much impact the implementation will have on the organization. They must have a complete understanding of the CSF that will help them ensure the successful implementation of the ERP system. The exact number of CSF needed to successfully implement ERP was the subject of much debate.

Willcocks [9] (1998) identified 9 CSF. Nah and Lau [10] (2001) concluded that there are 11 CSF. However, this contrasts sharply with Somers and Nelsons (2001) [11] who identified 22. Holand and Light (1999) [13] took a different approach. They classified the CSF into 2 categories: Strategic Factors and Tactical Factors. The first includes the legacy system, the ERP strategy, the corporate vision, the project plan and the support of senior management. The second includes staffing, consulting, business process change, software configuration, and customer acceptance. This study focuses on the top 5 CSF in the Moroccan context by combining the results of a survey and an implementation case study of ERP in the company SOMAPAF. It is intended to help reduce or eliminate the likelihood of system failure.

This research addresses the following question:
Which is the most important CSF that companies should consider when implementing ERP?

This research should help to identify the most important CSF that will help reduce the probability of ERP failure to encourage many companies to consider these factors in the implementation of ERP, which can help them to avoid system failure and to efficiently use the ERP system.

From a methodological point of view, our work will be presented in two parts, we will first present the concept of ERP and its implementation in general and in the Moroccan context, then explain the role of the FCS in a project of ERP implementation, followed by a study of the results of a survey that was distributed to 20 companies using an ERP system to identify the most important FCS to ensure the successful implementation of the ERP system. In the second part we will take the implementation of SAGE in the company "SOMAPAF" as a case study to examine the prerequisites and consequences of the implementation of this software package and confirm or not the result from the investigation. The analysis of this case study was based on data collected from individual interviews with 20 ERP

Note: Part of this work is inspired by the work done by "**Ahmad Saleh Shatat**" in the article **"Critical Success Factors in Enterprise Resource Planning (ERP) System Implementation: An Exploratory Study in Oman,"** due to different points in common between Omani and Moroccan environment, the objective is to rely on the methodology that he used to apply it in the Moroccan context

II. LITERATURE REVIEW

A. ERP System

ERP is an integrated system that allows the company to standardize its information system to link and automate its core processes. It provides employees with the information they need to direct and control the company's core business along the supply chain, from supply to production / operation to sales and delivery to the end customer. Employees enter information only once, which is then made available to all company systems [15].

ERP vendors, such as SAP (System, Data Processing, Data Retrieval), Oracle and others has introduced ERP system in order to eradicate the problems of existing systems, provide a unique and integrated technology platform, thereby helping companies to gain a competitive advantage and therefore to face global competition. However, the implementation of the ERP system requires changes in the organizational culture as a whole, takes a long

time to implement, and consumes a considerable amount of money. As a result, companies need to be clear about the ERP system and how the system might affect the company before thinking about implementing the system [5].

In order to survive in the global economic environment, companies have realized that they need to improve not only their organizational efficiency but also their entire supply chain. The reason is that competition is not limited to companies, but has also spread to their supply chains. These reasons force many companies to keep abreast of and invest heavily in the development and implementation of technologies and systems such as ERP systems. [4]

An ERP system can help companies build a strong information systems infrastructure and enable management to make better decisions based on accurate, timely information. The ERP system can improve product quality and customer responsiveness, improve the sharing and quality of information between different departments of the company and exceed the limits of the company for suppliers, customers and other partners in the supply chain. Ultimately, this should improve the overall performance of firms in order to gain a competitive advantage in the global economy and improve long-term profitability [14] [15].

B. ERP System Implementation

In the early 1990s many companies around the world found that the best solution for reorganizing business processes through a uniform information system is the implementation of an ERP system [16].
Between the mid-to-late 1990s, some 30,000 companies around the world implemented an ERP system [17]. Companies around the world have spent $ 10 billion a year on ERP systems [18]. Between 1996 and 2003, the number of ERP systems increased significantly. However, in recent years, ERP systems seem to have been forgotten, which has led to a significant drop in the ERP market.

Leading companies in the IT field (eg CISCO and IBM) have successfully implemented ERP systems. These companies have experienced the expected benefits of the ERP system. Cisco's ERP system has reduced costs and significantly increased revenues. ChevronTexaco has improved its supply chain management through the implementation of an ERP system. It realizes an annual net profit of 100 million dollars. IBM's R / 3 implementation has been one of the most successful implementations [19],[37],[20][21].

However, there have been significant failures. Dell has estimated that the ERP system will not be able to cope with their sales volume. Thus, he canceled the ERP project and lost $ 115 million. Another example was FoxMeyer. The

pharmaceutical giant suffered a $ 100 million loss and went bankrupt after an unsuccessful implementation [19],[37].

Before thinking of implementing an ERP system, we must consider the very high cost and the time it will take the implementation. This reason prevents many companies from implementing an ERP system and limits the market share of ERP systems. However, in order to solve this problem, leading ERP vendors need to develop special ERP software packages to meet the need of small businesses to increase the market share of ERP systems. With this solution, small and medium enterprises can also benefit from the ERP system [22][23].

C. ERP System Implementation in Morocco

For several years, Moroccan companies have been moving towards integrated information systems solutions, for good governance of the logistics chain. In order to manage the logistics chain, these companies use generic ERP solutions, or specific SCM oriented software, yet each company is unique, and these generic software packages cannot be adapted as a standard to any particular case of the company. The setting up of an information system in an enterprise requires on the one hand a diagnosis of the state of the existing Information System, to specify and analyze the needs in terms of the objectives, and on the other hand to establish a functional model for the different components of the supply chain. This process of setting up an ERP is generally complex, most companies use external firms to support the integration project of the ERP.

In fact, given the geographical location of the country and its relationship with Europe, we find in the head of several companies trained executives in Europe, they want to apply the European model for the implementation of ERP in Morocco which has created a competitive environment among many Moroccan companies, the latter offers a significant opportunity for ERP vendors to penetrate the Moroccan market.

The information systems market in Morocco is growing steadily and is a promising market, especially with the constant implementation of ERP systems in companies of all sizes. Yet this requires more attention from researchers and professionals.

The Moroccan market is growing and represents an opportunity for national and international ERP suppliers. It is still in the development stage for this reason that the state encourages Moroccan and foreign entrepreneurs to invest in these types of projects.

In fact, there are a fairly reasonable number of Moroccan companies that have implemented and use an ERP system.

On the other hand, there are also many other companies that are reluctant to adopt an ERP system. This may be due to failures of ERP systems in many international and local companies (SAP Forum, 2013).

A case study conducted on the company SOMAPAF examined 5 CSF for the implementation of the ERP system i.e. Branch Involvement, Process Reengineering, User Training, User Involvement, Business Plan and Vision. The results of the study show a positive impact of the ERP system on SOMAPAF. He has made significant changes to the way the business does business.

D. CSFs in ERP System Implementation

The majority of publications on the ERP system focused on two main areas. The first evaluates the relevance of ERP software, vendors and consultants. The second area examined the FSCs that affect the success of ERP implementation, such as teamwork and ERP composition, management support, business plan and vision, effective communication and project management [7].

The implementation of an ERP system is usually a new big project, which companies will never have had experience with before. Therefore, prior to the implementation of ERP, companies need to understand their own skills such as their ability to use the system effectively, to maintain and to take advantage of system development and innovation opportunities [24].

Companies must begin with the necessary changes in their own business processes required in the implementation of ERP process and can eventually improve the entire supply chain, gaining a competitive advantage in the market. Implementation was one of the most critical issues for industrial companies in literature [25]

Nah and Lau [10] (2001) concluded that critical factors for successful ERP implementation include teamwork and ERP composition, management support, business plan and vision, effective communication, Project Management, Culture, Business Process Reengineering (BPR) and Minimal Customization, Software Development, Testing and Troubleshooting, and Performance Monitoring and Evaluation.

According to Loonam and McDonagh [5] (2005), if companies decide to implement ERP systems, they have to go through three stages:

1. Pre-implementation stage: where companies need to decide why they want to implement ERP systems, what they expect from this system, what they need to prepare before launching the ERP implementation and what are

the CSF (as the support of the management) it could help them to succeed in their implementation.

2. Implementation Stage: This requires the company to anticipate and prepare for future challenges and issues during the implementation phase. Organizational and technical issues typically arise during implementation.

3. Post-Implementation Stage: At this point, companies need to keep up to date with the latest technologies to cope with any new technology.

The replacement of a traditional business process (relatively stable) with a new management mode through the implementation of a new information system such as an ERP system and the abandonment of the existing system to execute new business processes is considered a very difficult decision to make that can lead to a system failure, which in turn can lead to insolvency. Although there are success stories with ERP systems, there are also some cases of failure for some companies [19].

Because of these failures, many companies are still undecided by making a huge investment, paying a large sum of money and investing in a long time for the implementation of this new system. In fact, these failures prevent many companies from implementing an ERP system because they are afraid of having the same experience of bankruptcy [26][27].

Actually, many companies have been dissatisfied with their ERP system, and in some cases the system has failed. Trunick [28] (1999) noted that only 40% of implemented ERP systems show only part of its total effectiveness and that 20% of implemented ERP systems have been considered a complete failure. The failure rate of ERP systems can exceed 50%. 60 to 90% of the ERP systems implemented were not as efficient as the companies had planned.

Several CSF have been identified through extensive review and analysis of the literature.

The table below presents the main factors in order of importance according to the researchers.

TABLE I.   CSFs STUDIES

CSF	Level of Importance	Reference
Top Management Support	High	[11] (Nelson, 2001)
Business Process Reengineering	High	[29] Al-Mashari, 2003
User Training	High	[29] Al-Mashari, 2003
User involvement	High	[32] [33]Hong and Kim (2002); Malbert and al.(2003);
Business Plan & Vision	Medium	[29] Al-Mashari, 2003
Change Readiness & Culture	Medium	[34]Sum and al. (1997)
Clear Goals and Objectives	Medium	[35]Bingi and al. (1999
Monitoring & Evaluation of Performance	Medium	[36][11]Loh and Koh (2004); Somers and Nelson
Strategic IT Planning	Medium	[36]Wei and Wang (2004);
Teamwork and Composition	Medium	[27]Zhang and al., (2002)

III.   METHODOLOGY & ANALISIS

In order to design the survey for this research, a set of measurements and elements were made. The articles were collected and adapted from different sources. The study used a variety of measures in CSFs in the implementation of ERP. The CSF measurement contained 30 items distributed among the 10 CSFs. A five-point Likert scale from 1 = strongly disagree to 5 = strongly agree to be used for all the elements mentioned above. The survey was distributed to 30 companies of different sizes using an ERP system. Only 20 usable.

The results from the questionnaires showed that:

- Most companies that responded to the questionnaire have been using ERP for at least two years
- The companies questioned are satisfied with the use of their ERP
- For the Factor "Top Management Support" :
  - Small and medium size companies insist that the Top management must support the successful implementation of an ERP system

  - Large companies specify that it is the business management and not the general management that must provide support and facilitate the work

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for the technical direction to successfully implement an ERP system

⇨ This difference is explained by the fact that large companies have a complex hierarchy, whereas small and medium-sized enterprises have a simple hierarchy that has no notion of business management.

- The companies that directly called on the solution's publisher to implement their ERP system spent more money than those who used IT services companies, but gained in terms of system stability.

- Most companies have signed third-party application maintenance contracts (with the solution publisher or IT services companies) for a period of two to three years after the implementation phase.

TABLE II.   CSFs RANK

CSF	Level of Importance
(Top or Business) Management Support	4.01
Business Process Reengineering	4.01
User Training	4.02
User involvement	3.98
Business Plan & Vision	3.90

Note: A five-point Likert rating scale ranging from 1 = strongly disagree to 5 = strongly agree was used to measure all elements of the CSF in this study.

Table 2 shows the top five CSF ranked by managers as the most important among the 10 factors identified by the literature. The 20 managers agreed on 5 factors as the top 5 critical factors that helped them to successfully implement the ERP system within their organizations.

- (Top or Business) Management Support: is considered by many researchers to be one of the most important FSCs for the implementation of ERP. The general management needs to give the implementation project a high priority. It must engage with its goodwill and own participation to allocate the necessary resources for the implementation of the ERP [38]. Al-Mashari and al. [28] stated that management support and commitment should not stop at the initiation and facilitation stage, but should extend to the full implementation of the ERP system.

- Business Process Reengineering (BPR): The BPR is a prerequisite for the adoption of the ERP. Before implementing an ERP system, companies need to reorganize certain processes deemed key to the organization. The level of reengineering requires a good understanding of the business processes that is imperative to process design; this reengineering has led to think of success factors such as the need to decide on a process change before implementation. Lequeux [39] states that "far from conducting a pure IT project, the adoption of an ERP must be an opportunity to reconsider the mechanisms and improve the flows involved in the operation of the company, even if it means to consider reengineering business processes or BPR ".

- User Training: Many researchers have emphasized the need to include user training as a one of the critical aspect of implementation. Appropriate training should be provided to users of the new system to ensure they understand how the system works and how it can help them accomplish their daily tasks [40].

- User Involvement: The degree of user involvement in the implementation of an ERP system is an essential factor that will help users to accept the change. This attitude will lead to the determination of system requirements (with user participation) and thus creates a positive attitude towards the ERP system [41].

- Business Plan & Vision: Leaders need to determine the contours of the project by establishing a clear vision of the future organization of the enterprise with the new system, considered as critical to the success of an ERP project, this factor has been ignored and underestimated by companies and little research in information systems research.

IV.   PRACTICAL CASE STUDY

A.   Choosing a Case Study

The case study helps:

- Undertake an in-depth observation of the use of the ERP in the different functions, and better understand the prerequisites for the implementation of the ERP, as well as its impact on the organization.

- Confirm or contradict the outcome of the impact of the CSF surveyed in the implementation of ERP

The case studied is the company "SOMAPAF"

"SOMAPAF" is a medium-sized company specialized in Import-export, school supplies and luggage, office and

stationery, school notebooks. The SAGE 100 ERP software has been running for three years. The modules selected for the "SOMAPAF" activity are general accounting, inventory management, sales management and purchasing management.

In order to analyze the case of ERP implementation at SOMAPAF, data was collected from individual interviews with 20 ERP users.

B. Analysis of the Impact of CSF on the Implementation of ERP at SOMAPAF

1) Top Management Support

Since SOMAPAF is a medium-sized company, it does not have a business management structure in its structure, so it is the general management that follows the implementation project in coordination with the technical team.

(15) Interviewees insisted that the leader has a very important role in the successful implementation of the ERP and that he must provide support.

The general management considers that its role is the setting of the project objectives, but the project managers see that this is not enough: the general management must understand the difficulties of the establishment of the ERP and facilitate the allocation of resources necessary to ensure a good progress of the project.

The misunderstanding comes from the fact that the general management sees the ERP as a computer project whose implementation does not concern it.

2) Business Process Reengineering

According to the project manager "A BPR is first about observing and analyzing the company's existing data, structures and processes, then restructuring and redesigning them. Through this re-design of the information system, a manual of procedures will be developed.

One of the integration consultants advised SOMAPAF to minimize system customizations at the expense of changes in business processes.

Thanks to this operation the integrator would not have to understand the existing of the company in terms of process. Rather, he will be required to focus his efforts and skills to bring the standards of the SAGE modules closer to the "SOMAPAF" procedures.

3) User Training

The (20) agreed on the importance of investing in training to ensure the skills and ability of people to use the ERP system effectively.

If users do not have the skills to control the system, even if it is perfect, they will not be able to produce better information. Insufficient training will cause serious damage and have an adverse impact on the organization [31]

4) User Involvement

The implication of the user is the most ignored factor in the implementation of ERP, knowing that the success of the implementation is based on the acceptance or not of the use of the new solution by these users, Generally, employees are resistant to change and do not want to leave their comfort zones, they prefer to use a tool that exists and that they meet all or part of their current need to leave on a new environment that does not master it.

Most of the interviewees consider the involvement of employees in the implementation of ERP as a very important factor and that involving these users by representing the positive impact on their work with the new solution, and informing them of training plans, this resistance will turn into help in the successful implementation of the new solution.

5) Business Plan & Vision

(17) Interviews agreed that having a vision and developing a business plan by integrating the integrator intervention is very important to the success of the ERP project. With his experience and knowledge of SAGE implementation, the integrator will present a detailed action plan, which will then be completed by the SOMAPAF project managers.

This schedule includes the management of the tasks to be performed, the time allocated to each of these tasks, the human resources allocated, and the financial resources allocated to the accomplishment of the project in its various stages.

According to most interviews, the integrator-enterprise collaboration will lead to the creation of a detailed project plan that is optimized in terms of resources and tasks, but which will be modified during implementation.

V. CONCLUSION

A successful implementation of an ERP system does not guarantee absolute stability of the system, but continuous efforts are required after commissioning the ERP system in order to take full advantage of the system. In fact, the journey of the ERP system begins after the implementation phase.

In the first part of the study, it was concluded that 5 CSF should be considered during the implementation of ERP as the most important factors among the 10 factors identified by the literature. These factors are (Top or Business) Management Support, Process Reengineering, User Training, User Involvement, Business Plan and Vision. These 5 critical factors can help companies successfully implement the ERP system.

In the second part and in order to confirm the importance of the CSF mentioned above, a study was made with SOMAPAF, having implemented SAGE 100, we met 20 interlocutors during interviews. These were mainly ERP users at all levels of the company.

The analysis of the results revealed to us that the majority of the interlocutors agree on the importance of the CSF mentioned previously to succeed the implementation of SAGE. However, the majority of the respondents consider that the training and the implication of the users were generally insufficient and underestimated by the managers of SOMAPAF.

It is important to mention that certain limits are attributed to our research. At the theoretical level, the literature has cited a very large number of prerequisites necessary for the implementation of the ERP, but for the sake of simplification, we quoted factors that we deem necessary to successfully implement an ERP.

Some paths for future research to explore. Mainly analyze the post-implementation phase of an ERP System and know how to continue to develop business processes and ERP systems in order to take advantage of all their promises, and to refine how ERP systems are used in everyday activities

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