Critical Success Factors for ERP Implementations : A

Moroccan Case Study

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Abstract:

Enterprise resource planning (ERP) is an enterprise-wide information system designed to coordinate all the resources, information, and activities, it provides a unified enterprise view of the business for all functions and departments, and also an enterprise database for all business transaction, but despite all the benefits they are also seen as an expensive, profoundly complex, and notoriously difficult to implement because it is different from other IT systems. There are as many reasons for successful ERP implementations as there are for failed projects. It is really difficult to measure the success of a project of implementation because each organization can look at the success of ERP implementation differently. It is important for the organization to have as much information as possible before embarking an ERP project, and also respect some critical factor for the success of the project. Measuring and knowing the importance of each factor will help an organization to make the right decision, at the right moment. This survey examines and also tries to determine the necessary critical success factors (CSFs) in implementing Enterprise Resource Planning (ERP) systems and also try to examine the impact of this technology on the performance of the whole organization. We were able to identify six critical success factors by the survey. They are (1) Infrastructure, (2) Business process management, (3) Project management, (4) Project team, (5) Culture, communication, and change management, and (6) Training and education.

Introduction:

In a rapidly changing economic context, the main challenge facing the majority of companies remains the improvement of their competitiveness on a regional and international scale. In such an environment, the competitiveness of companies depends more and more on their flexibility and ability to innovate, both in their organizational structure, their mode of production and also in their mode of exchange with customers and suppliers. In this context, companies are increasingly looking to generate more added value, by mastering resource management and business process and also the costs, in order to achieve a competitiveness variable within companies in the short, medium and long term. Through these systems companies can control their productive systems, their commercial, financial, human and informational management. ERP system, offers a competitive advantage especially in terms on the value of the information. Currently, the majority of companies know very well the benefits of ERP within their organization, however they are still suspicious of them, and they still hesitate to adopt these systems due to their high cost and risk (Boo Young, 2007).

However, Implementing an ERP system is a major project requiring a significant level of resources, commitment and changes throughout the organization (Moon, 2007), it is not a magic solution, and its benefits are the result of an effective and supported preparation of implementation. Thus, the success or failure of an ERP project is essentially based on preparation and the adaptability of organizations with this kind of system. A study indicates that 40 percent of all ERP installations only achieve partial implementation and 20 percent of attempted ERP adoptions are scrapped as total failures (Trunick, 1999). and others study have suggested that ERP failure rate may even be greater than 50 Percent (Escalle et al., 1999), these failures are due mainly to the insufficiency and the absence of certain prerequisites necessary for the success of the implementation of the ERP.

In our previous study, we have noticed that the implementation of ERP is a critical topic for different organizations and the most widely discussed in the literature, more than 50% of the articles are dedicated to this subject, with a focus on the critical success factors of the implementation and the changes that this implies within organizations. Among these articles, some articles attempt to explain why the ERP implementation is difficult and what needs to be done to achieve desirable results, and other articles focus on generating the list of the critical success factors and conduct data analysis regarding those factors. This study will be able to ensure a continuity and will allow us to examine these systems deeply.

This survey, via questionnaire, tries to investigate and examine the different critical success factors that need to be considered to ensure the success of ERP systems. The aim of this research is to evaluate the factors that make it possible to guarantee the success of the implementation, which will then help to establish the best way to fully exploit ERP systems.

Implementation of an Enterprise resource planning:

ERP seek to integrate the complete range of business's processes and functions in order to present a holistic view of the business from a single information and IT architecture. It enables Enterprise to consolidate Planning, Production, Purchasing, Sales, Marketing into a single Management System which means that it integrates all the bases of the departments into a single database.

Implementing an ERP project is a process consisted of many phases and it's seen as an expensive and a complex project. The implementation of an ERP system differs of any traditional information system due to its integrated nature which causes dramatic changes on work flow, organizational structure and on the way people does their jobs (Samwel Matendela, Patrick Ogao, 2013), but once it's successfully implemented, significant improvements can be achieved such as easier access to reliable information, elimination of redundant data and operations, reduction of cycle times, increased efficiency hence reducing costs (Zhang et al., 2003) which mean that an ERP allow to transform the way an organization conducts business and it link its resources, utilize and allocate them in the best possible manner.

An ERP project is a strategic development process within a company that involves different phases for its preparation and implementation. ERP systems can be complex and difficult to implement, but a structured and disciplined approach can greatly facilitate the implementation (J. Umble et al., 2003).Following, a step by step approach will simplify the process and is more likely to yield a better result. Normally, the project ERP follow 4 steps as described below:

The preliminary analysis is the step that combines the feasibility study and the data collection, it allows to evaluate the needs of the company in system, thus to determine if the investment in the implementation of an ERP is necessary, to know the utility of this one and to determine the various objectives to be reached.

Prototyping is a crucial step in an ERP project. This is the step that allows to set up a technical and functional specifications which will gather all the necessary data, all the parameters, as well as their value, determining the operation of the ERP; throughout the project from the different needs identified.

The deployment of the system involves integrating ERP and effectively implementing the solutions thathave been defined during the prototyping phase, this step can also include a data recovery step of the old system if it exists, and migration of the different data in the single database of the ERP.

The successful implementation of an ERP project requires management to plan carefully, and have all needed human and financial resources in place.

Critical success factors for ERP implementation:

CSFs play a role in today's ERP implementation; it dominates the ERP literature and primarily focused on identifying, developing, and analyzing. It has been a subject of many researches, and numerous authors have identified a variety of factors that can be considered to be critical to the success of an ERP implementation.

A CSFs has been defined as a reference to any condition or element that was deemed necessary in order for the ERP implementation to be successful (Finney et al, 2007), but we must emphasize that there is not yet a general consensus on the critical success factors of an ERP implementation. In the literature, the number of CSFs varies from nine to 16 (Arnold, 2006; Bradley, 2008; Chang et al., 2008; Ernst & Young, 2006; Holland and Light, 1999; Loh and Koh, 2004; Nah et al., 2001; Parr and Shanks, 2000a, b; Shanks et al., 2000; Sumner, 2005; Umbel et al., 2003; Ngai et al., 2008; Somers and Nelson, 2001; Zang et al., 2003; Soja, 2006).

In our Study, in order to structure all these CSFs, we tried to develop our CSF research framework based on a review of literature.

In order to provide a comprehensive understanding of the different CSFs which were chosen, we tried to describe them in this section:

Infrastructure is the adequacy of IT availability in the organization, including architecture and skills. If necessary, the infrastructure needs to be refreshed and renewed for the ERP implementation. Ghosh (2003) proposed that executives need to have a complete understanding of the technical challenges involved in adopting a new enterprise wide system and proposed that the three elements to consider are, a) network upgrade, b) hardware upgrade and c) providing global support. Also technical requirements of the implementation may change due to a new version of the software released which may create temporal complexity challenges as well.

Project management is the application of knowledge, skills, tools, and techniques to project activities to meet project requirements. It involves the use of skills and knowledge in coordinating the scheduling and monitoring of defined activities to ensure that the stated objectives of implementation projects are achieved (C. Leyh, 2016). The formal project implementation plan defines project activities, commits personnel to those activities, and promotes organizational support by organizing the implementation process (Bhatti 2002) (ALdayelet al, 2011).Furthermore, continuous project management allows focus to remain on the important aspects of the ERP implementation and ensures that timelines and schedules are met (Al-Mashari et al, 2003).

BPM management The Business Process Management is recognized as a crucial step of an ERP implementation, supposed to make possible the mapping between the company activity and the ERP standard processes, this approach is used to evaluate, improve and align business processes to an organization's overall goals and strategy. It is an approach consisting of computer modeling of the business processes of the company, in both their application and human aspect. The aim of this approach is to gain a better understanding of all the company's business processes, their progress and their interactions. It enables businesses to be more efficient and flexible to change.

Project team is one of the most critical factors is roles and responsibilities of those selected to participate in the project. In general, a project team consists of at least two persons working together for a common goal whereby each team member has defined responsibilities and functions (Humphrey et al, 1999)

Some of the ERP project team roles and responsibilities below are often utilized in order to put together the winning team who will achieve implementation success that meets the expectations and objectives set forth by company management.

Training and Education is considered actually as one of the preconditions of building a successful ERP system. Training employees is a vital part of making an ERP implementation successful; the objective of training is to provide an effective understanding of the new business processes and applications as well as the new workflows that are created by the ERP implementation (C. Leyh, 2016). By using the system effectively, the users improve their performance, and then overall performance of the organization improves. Therefore, establishing a suitable plan for the employees' training is important (Al-Mashari et al, 2003).

Culture, communication, and change management researchers agree that organizational factors, such as culture and change management, are most critical to success. ERP implementations change the way the company is organized, often acting against the prevailing company culture. The implementation is not only affected by the

existing organizational culture, it will also affect the existing culture. For these reasons, any organization planning to introduce an ERP system needs to perform a socio-technical analysis before the actual implementation (Chen, 2001). Moreover, its goal is making employees understand and want the changes. Integrating the employees early in the planning and implementation process is important to achieve this understanding (C. Leyh, 2016).

The influence of ERP on the different strategic dimensions:

ERP systems have the magic touch to dramatically enhance the performance of many companies' business operations, it will combine all computer system of all departments into a single, integrated software program that runs off a single database, so that the various departments can more easily share information and communicate with each other (C. Koch, 2006). There are many advantages to implementing an Enterprise Resource Planning (ERP) software solution. These benefits can be classified into tangible and intangible (Al-Mashari, 2003). We can touch and measure the impact of the implementation of ERP within the company on three aspects, Economic, organizational, and also human.

First, *the economic aspect* is profitability, survival, and the ability of the company to achieve the set goals. It can be measured from the variation of the activity, the profitability of the investments, the sales, and also the total quality and the competitive position of the firm. It is measured according to several criteria: productivity, the quality of products and services, and the economy of resources, competitiveness, profitability, turnover, and profit. Second, *the human aspect* is the ability of human factors to create wealth, produce added value, and contribute to business results and improvement. It is regarded as the best surrogate measure of ERP system success. It is measured according to these criteria: job satisfaction and the quality of the work climate, staff productivity, the commitment of the staff. Finally, *the organizational aspect* ERP allows organizations to be more polyvalent, while enhancing horizontal coordination and more decentralized decision-making, it improves the performance of the organizational aspect by improving the quality of the information communicated, promoting coordination, and decentralizing decisions, while facilitating control it is measured according to this criteria: access to information, reliability of information provided, coordination, decentralization of decisions, flexibility, and cooperation between different entities.

The success of ERP system should be evaluated according to its impact on the 3 strategic aspects of the company. Success can be considered to be linked to the overall performance of the firm which is the sum of the satisfactions (financial and non-financial results) created for all stakeholders and the ability of the organization to produce those satisfactions of sustainable way. The objective is to show that there is a relationship between the implementation of ERP system, and the performance of the business and the aspects that are most affected either positively or negatively.

They exist different aspects that influence on the performance of the company, and that we will have to measure in order to know well the impact of the implementation of the ERP on the organization, and thus to measure its success.

Methodology:

Our research is in the field of ERP implementation, and is conducted on Moroccan companies. We were able to select a large sample of experience from different Moroccan companies. The interest of this study is to allow a good understanding of each critical success factors for the implementation which will enable companies to properly manage their projects of implementation.

The study was conducted in three phases. At first, we tried to present the concept of ERP systems. Then we tried to identify the CSF's in the literature, and study the critical success factors were valid for implementation. We were able to establish a questionnaire with a list of questions that were designed to have the maximum of information about the profile of the organization, the way in which the ERP was implemented and finally the success rate of the implementation based on the performance.

Data are collected in a standardized form by questionnaire, and are designed to provide a 'snapshot of how things are at a specific time'. The questionnaire survey is conducted at the end of 2017 and the beginning of 2018. The questionnaire is about ERP implementation, and precisely on CSF's for implementation.

There is no attempt to control the result or manipulate variables; and also do not allocate participants into groups and vary the treatment received. This survey will allow us to explore the various aspects of ERP implementation, and the different critical success factors, and thus seek explanations and provide data to test hypotheses.

We distributed our survey which is structured into three parts. The first is concerned the background data on the enterprise. The second part deals with critical success factors on the implementation and adoption of an ERP system. The third part aims to evaluate the performance of the ERP on different aspects.

The questionnaire is in English and consists altogether of 45 questions: some are open-ended questions and others close-ended with multiple-choice options. The questions cover the topics such as defining the ERP implementation success, indicating the importance of critical success factors, and also evaluation of ERP implementation. The survey form was pre-tested internally before being sent out to the mailing list, and we received 24 responses from a wide variety of firms.

The Respondents

Type of the companies:

The respondents of our survey represent a variety of industries with the largest concentrations in industry and production, followed by retail. These two sectors represents more than half the total. Also the size of our respondent's firm is dominated by large and medium size. As seen in figure 3, we have tried to target several companies in different sectors. The 24 responses that we received come from 24 different companies.





In order to have more information about the company and the respondents, we tried to have information about the size of their companies and their position within their companies.

Any company 'Large, Medium, Small, or Micro' has the possibility to implement an ERP from the moment it feels the need. The table 1 shows the size of characteristics of each company.

Table 1 the market of EKr with the size characteristics of companies					
Size	Characteristics of the size	Percentage			
Large	Over 250 employees	57.1%			
Medium-sized	51-250 employees	33.3%			

Table 1 the market of E	RP with the size	characteristics of	companies
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Roles of the Respondents:

Micro-enterprise

The respondents in this survey include the top management, the middle-level management and first-line managers, and 87, 5% were involved in the implementation of ERP. The 76.5% of respondents actually are the ERP users. However, they could be the project leader, part of the management team, functional or technical specialist, or people who are partially involved on the project. The table 2 shows the respondent's position in the company and table. 3 show the respondents role in the ERP project.

Less than 10 employees

Table 2 The position of interviewee within the enterprise

Level of management in the enterprise	Percentage			
Top management	14.3%			
Middle-level management	57.1%			
First-line managers	28.6%			

Table 3 Respondents role in the ERP project

Role of the	The project	Part of the	Functional or	Partially	Not directly		
Respondents	leader	management	technical	involved	involved		
		team	specialist				
Percentage	28.6%	42.9%	14.3%	7.1%	7.1%		

This part of the survey allowed us to have a lot of information on the nature of responders and companies, and to create our own sample of respondents. The next part, we allow us to know more about the adoption of this business application software package.

9.5%

Package adoption:

In this part, we asked respondents to tell us about the ERP product chosen, and its current situation in the company, they were further asked to report the current functional areas supported through ERP systems or are under consideration. From data, more than half of the respondents report that the ERP was already installed (87%), and about 12.5% is in progress. We observe that the ERP adopted by Moroccan companies include the major vendors such as SAP, ORACLE, and SAGE. They are also some others vendors such as Amos, Navision, and Dynamics AX, and JD Edwards. The distribution of the ERP vendors is listed in the Figure. 5.

Figure. 2 The distribution of the ERP vendors



The value of software lies as much in these many functions offered, which covers most of the needs of the company, for that we have tried to know the different functional areas supported through the different ERP in the different companies. We observe, from data, that ERP systems covers functions of Accounting and finance A/F (87%), Supply chain (70%), Human Resources HR (62.5%), Marketing and sales M/S (50%), and also Others functions (43.8%).

The introduction of a new management tool in a company is often synonymous with major changes in the organization, and it is not an easy decision as far. For that we asked respondent to report for reasons and motivations for implementing ERP system in their companies. The reasons for adoption an ERP differed across respondents, reflecting the multiple factors motivating decisions. The most reasons cited by respondents for ERP implementation were:(1) To replace an old ERP or legacy system, (2) To improve business performance, (3) Make employee jobs easier, (4) Position the company for growth, (5) Better integrate systems across locations, (6) Standardize global business operations. The dominant motivation was to standardize global business operations followed by to improve business performance.



Figure. 3 Reason for implementing ERP

Data analysis of some Critical factors of success:

Critical success factors can be viewed as a small number of easily identifiable operational goals shaped by the industry, the manager, and the broader environment (K. Jia Hui, 2005). It is useful to examine the factors that

determine whether implementation will be successful to define which of them can influence, and to outline aspects which are essential to ensure that a successful ERP implementation. Many authors have identified a variety of factors that can be considered critical to the success of an ERP implementation. Some of them are described, and studied through our survey.

In this section, we will focus on three critical factors of success: (1) Project management, (2) Project team, (3) Training and Education, and we will be able to present the data received through the questionnaire.

Before presenting the three factors, we will give an overview of the importance of each critical factors of success when implementing ERP. Figure. 7 shows the report of 24 respondents on the importance of the six critical factors of success identified and defined at the beginning. We observe, from the data, that factors of Project management, Project team, and training/Education are among the most important to ensure a good implementation, and will have a positive effect to ERP implementation success.





0,00% 10,00% 20,00% 30,00% 40,00% 50,00% 60,00% 70,00% 80,00%

Project management:

Project Management involves the use of skills and knowledge in coordinating the scheduling and monitoring of defined activities to ensure that the stated objectives of implementation projects are achieved. The formal project implementation plan defines project activities, commits personnel to those activities, and promotes organizational support by organizing the implementation process (Bhatti 2002) (ALdayel and Al-Mudimigh, 2011).

Successful ERP implementation requires that the organization engage in excellent project management. This includes clear definitions of both the tasks to be performed, and the schedule of ERP project. A clear definition of this too criteria will help companies to avoid the all risks which can affect an ERP implementation. Table 4 shows the report of respondents about Project management.

Critical success factors	Suggestions	%Responses			
Critical success factors	Suggestions	1	2	3	4
Project management	-The tasks to be performed during ERP project are clearly defined	31.25	56.25	12.5	0
	-There is schedule for the ERP project and deadline	31.25	56.25	6.25	6.25
	There is clear document for theERP project	25	62.5	12.5	0

Table. 4 The report of respondents about project management

*(1) Agree, (2) Completely agree, (3) Disagree,(4) Disagree at all

Training and education:

When the ERP system is up and running it is very important that the users be capable to use it, hence they should be aware of the ERP logic and concepts and should be familiar with the system's features (Yingjie, 2005) (Jafari,

et al., 2006) Stated that there are three aspects concerning the contents of training are: Logic and concept of ERP, Features of the ERP system software, Hands-on training. Training and education will have a positive effect to ERP implementation success.

Inadequate training has been one of the significant reasons of many ERP systems failure (Gupta, 2000). This factor should not be neglected, it is the only way to make sure the business results are achieved. Training and education is important for several reasons. Training and education is necessary to ready the organization for the new system and processes, because of its positive impact in reducing fear and anxiety while increasing expertise and knowledge in the new system (Zhang et al. 2002). In addition, it shows employees that the organization is still interested in their work, which reduces anxiety regarding job security (Esteves et al, 2002). A particular challenge in ERP implementation is to select an appropriate plan for end-user training and education. Table. 5 shows the report of the respondents about training and Education

		%Responses			
Critical success factors	Suggestions	1	2	3	4
Training and education	-Specific user training needs were identified early in the implementation	43.75	25	25	6.25
	-A formal training program has been developed to meet requirements of ERP	43.75	37.5	12.5	6.25
	-Training materials have been customized for each specific job	12.5	25	50	12.5
	-All users related to ERP have been trained in basic ERP system skills	12.5	43.75	37.5	6.25
	-The time for ERP training is enough for most of the employees	18.75	18.75	43.75	18.75

Table. 5 The report of the respondents about Training and Education

*(1) Agree, (2) completely agree, (3) Disagree, (4) Disagree at all

Project team:

A successful implementation depends heavily on the team assembled to design and implement the new ERP system. One of the most critical factors is the ERP project team roles and responsibilities of those selected to participate in the project, and they should come from disciplines across the company. Identifying a dedicated project team for the ERP project will help ensure that the project goes smoothly. The Project Team is made up of those individuals who are responsible for planning and executing the project. The size of the Project Team varies with the complexity or size of a project, and the members of project team are responsible for completing tasks related to the project management. Figure. 8 shows management.



The team members get selected by matching individual characteristics (training, rank, experience) to generically functional roles and known project requirements. The composition of the team must reflect the full range of

performance requirements in order to properly carry out the various tasks of the project. Through the data received, we could have an idea about the composition of the projects team, in the following Table. 6 shows the composition of the project team.

Composition of the Project team	Suggestions	%Responses				
		0%	25%	50%	75%	100%
	- Technical IT experts	0	56.25	12.5	12.5	12.5
	-Business Analysts	6.25	50	25	6.25	0
	-Users	0	81.25	12.5	6.25	0
	-External consultants	6.25	56.25	12.5	12.5	12.5
	-Others	6.25	6.25	0	12.5	0

Table. 6 The composition of the project team

The majority of respondents reported that the team project has been created specifically for this project about 75% of respondents, but about 68% confirms that team members were not focusing full time on project. However, it was noted through the responses that the team's authority remains somewhat limited, 50% confirmed that decisions are made by management, while 18.3% are allowed to make urgent decisions.

The impact of ERP systems:

The implementation of ERPs in companies has led to a change in "information" consumption mode, by allocating more speed, flexibility and transparency, which allows a change in the access to information mode. The desire to integrate these systems is accompanied by an expectation in terms of improvements in their performance, and also aims to achieve a profitability goal and more specifically to influence the performance.

In order to highlight the link between the implementation of ERP and the performance, we have tried to study the impact that ERP can have on companies. The impact of ERP implementation can take very different forms from one context to another, and it influences several dimensions of the company: economic, human, organizational, and it varies according to the company and its environment.

The integration of these systems within companies generate impacts on the financial, organizational and human aspects of the companies.

Figure. 6 The impact of ERP implementation



The academic community divides and opposes the positive, negative, or null effects of technology and ERPs on business performance.

As far as our research is concerned, we have focused more on the positive effects that have been generated after the implementation of ERPs within companies. We will not go into the details, but we will show through the data received which aspect is most affected by the implementation of the ERP.

From the data, we can notice that two aspects have been positively influenced by the implementation of the ERP: Organizational aspect (69%), and Human aspect (31%). the result is not so surprising, since the implementation of an ERP opens new perspectives, and facilitates the transition to more polyvalent organizations that rely on horizontal coordination and more decentralized decision-making processes, on the other hand it contributes to the improvement of staff knowledge. Indeed, the influence on both human and organizational aspects can be shown in the short term. Also, ERP systems are expected to reduce costs by improving efficiency, productivity and hence profitability. Referring to the above it can be seen that the ERP improves the economic performance, but the results are generated in the long term.

Conclusion:

The objective of this work was to know the perception of Moroccan companies about the CSF considered very important for the implementation of ERP systems, and also to know the impact of ERP implementation on business performance. Initially, we were able to select six CSF and, among these, three were treated in this article through the data received from the questionnaire.

To carry out our investigation, we made a questionnaire; it allowed us to collect data from the different participants of different Moroccan companies from different sectors about their perception in terms of importance of these six CSFs .The questionnaire was sent to almost 100 emails, of which 24 were completed. It is important to notify that the respondents belong to the Moroccan companies, and most of them were involved and participated in different phase of the project of ERP implementation. Our survey is distributed in several waves. The first is at the end of 2017 and the additional waves are planned. The survey is also divided into three parts. The first one allows to have the maximum of information on the companies. The second part sought some critical success factors on the ERP implementation. The third part is the part where we try to evaluate the implementation of the ERP by measuring the performance of the company. This paper is a presentation of the data collected through the questionnaire to provides a snapshot. Thus, and after the end of the data collection phase, we will be able to continue our research by analyzing and exploring the data.

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