# FRAMEWORK FOR THE EVALUATION OF THE ERP IMPLEMENTATION SUCCESS: CASE STUDY IN SMEs

**Houcine Chatti, Dar AL Uloom University**
**Taoufik Radouche, Dar AL Uloom University**
**Evan Asfoura, Dar AL Uloom University**

## ABSTRACT

*Given the importance of the changes to the ERP system introduced by the integration, but also the complexity of implementing this software solution, it is not surprising that the transition to an ERP is difficult and expensive, without any guaranteed return on investment. As a result, the company is faced with a paradoxical situation: on the one hand, the high earning potential from the ERP system and, on the other hand, the serious risks of failure. This research questions the determinants of success and the benefits of adopting this integration technology. To answer this question, an analysis of the literature made it possible to formulate an original research model for evaluating the success of ERP from a perspective of integrating IT applications. The model, thus proposed and compared to the SMEs context, examines, according to a systemic approach, the relationship between (1) the determinants of the success of ERP adoption, (2) the characteristics of the ERP system implementation process, and (3) the expected impacts on organizational performance. The results obtained underline the preponderance on the one hand of the quality of information, communication and user satisfaction as benefits of ERP implementation, and on the other hand of the quality of the project team, user training, the reengineering of business processes and the selection of the ERP solution and top management as key success factors for ERP projects*.

**Keywords:** ERP; Integration of IT applications; Key success factors; ERP benefits; Modeling according to the process approach.

## INTRODUCTION

The successful implementation of IT is, in general, at the origin of a large number of works published in recent decades in Journals intended for the promotion of IS research (eg MIS Quarterly, Information & Management, JISR, EJISR , DSS or SIM), and in reviews intended to study the strategic and organizational impacts of IT (eg OMEGA, Sloan Management Review, Organizational Sciences). Two theoretical approaches, the diffusion of innovation of Rogers (1995) and the theory of strategic "fit" of Henderson and Venkatraman (1993) emerge and constitute an anchor for this research intended to provide an original framework of study. The success of ERP systems within SMEs. Successive contributions (Kuan & Chau, 2001; Baile, 2003; Chatti, 2008) identify and confirm the factors that condition the success and realization of consequent benefits to the adoption and implementation of IT varied. This work provides a base of knowledge enabling two lines of research to be identified. The first, based on a taxonomic model for the assessment of MIS (eg Ecole du Minesotta), aims to detect the links existing between certain organizational, technological and/or individual determinants, and the decision of leaders or managers to accept or reject an innovation in ICT. This current presides over the emergence of research models consistent with certain behavioral and managerial mechanisms, such as that of



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acceptance (TAM). The second proposes a different approach to the evaluation of success, called "based on a transformation process", which aims to detect the multiple influences of the determinants identified on success, via an intermediate process. This current governs the study of certain impact models in relation to processes referenced in the field of IS work, such as that of innovation, integration, or technological infusion. This current opens the way to the implementation of "systemic" research models, useful for understanding the complexity of multiple causal relationships and building a structure of hypotheses on the research question. It is in this more systemic perspective that this research and its issue of evaluating success fits.

The first stream thus emphasizes explanatory variables of success, measuring characteristics specific to technological innovation, to the organization and to the IT deployment environment. The work of the second, centered on “the evaluation of transformation processes”, puts the accent on intermediate variables measuring, for example, the quality of the process of adopting an IT (such as its relative advantage, its compatibility. and its complexity), or the efficiency of the process of its integration into a business activity (Baile, 2003; Chatti, 2008). This framework, considering the simultaneous effects of innovation and ICT integration in an intermediate process of capacity transformation, appears to offer a better understanding of the characteristics of the ERP adoption process. This is retained by this work to be applied to integrated management systems, known under the name of ERP "Enterprise Resource Planning". This technology is one of the most important innovations impacting the business world, generating improvements that are both tangible and intangible in many professional environments (Laudon and Laudon, 2019).

Seen as a major technological innovation, ERP leads organizations to resolve incompatibility problems of disparate IT systems and to improve their communication (Rajagopal, 2002), both internally and externally. This innovation helps to facilitate the transition from a functional, traditional mode to one that develops a transversal vision of business processes (Tajpour et al., 2018). Laudon and Laudon (2019) explain that ICT and the "redesign" of business processes are two vital tools, which have the potential to improve business performance.

Most organizations that have acquired an ERP have done so primarily for reasons of their ability to better respond to the needs of change in their business environment (Stedman, 1998). This solution, aimed at integrating application software, is then used as a machine for transforming business processes. It is a fact that the transition to a large-scale “enterprise-wide solution” of the ERP type is no longer limited to the acquisition of hardware and software, but incorporates changes in terms of culture, skills, management and organization. Some analysts (Benoît and Benoît, 2001, Laudon and Laudon, 2019) find that the main challenge in implementing an ERP solution is change management. In other words, the real challenges of implementing an ERP are not only technical, they also involve human and organizational aspects.

Given the importance of the management system changes introduced by the integration, but also the complexity of implementing software solutions, it is not surprising that the transition to an ERP is difficult and costly in terms of time and costs money, without any guarantee of return on investment. As a result, the company is faced with a paradoxical situation: on the one hand, the high potential for profit from installing an ERP system and, on the other hand, the serious risks of failure. The broad scope of an ERP and the changes in workflows that accompany its implementation, increase both the risks and the expected benefits for the organization (Stewart et al., 2000).

In this perspective located within the paradigm of the contribution of information systems to organizational performance, the objective of this research is the post-implementation evaluation



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of the success of the adoption of ERP innovation. The issue therefore falls within the theme of the impact of IT on organizational performance. It tries to assess, on the one hand, the organizational benefits following the implementation of ERP systems and, on the other hand, to determine the key factors for the success of its adoption. This questioning is justified by three observations:

Firstly that of the dissemination of this IT in companies, both in developed countries and in emerging countries, such as Saudi Arabia: first within large organizations, often multinationals and / or large companies in the oil sector, ERP are now developing in SMEs across all industries. These offer a favorable research field to study the conditions facilitating its establishment within small structures, moreover in a socio-cultural context different from that of Anglo-Saxon, European or Asian countries.

Secondly, that of the emergence of new ERP solutions for SMEs: after focusing on large firms, publishers are now on a vast market of subcontracting/subcontracting SMEs, often having no other choice than to accept a turnkey solution. More than the technological and architectural dimensions of the integrated system, publishers are challenged by organizational and methodological concerns to deploy their offer with a certain guarantee of success. Finally,

Thirdly, Even if these technologies are useful, they are still, in the minds of the leaders, expensive and uncertain from the point of view of their profitability. The lack of tangible results can be a communication handicap, which could help to dispel certain prejudices.

## THE THEORETICAL FOUNDATIONS OF THE RESEARCH

This title aims to justify the theoretical foundations of the study and to understand the main concepts relating to the adoption and evaluation of information systems. Different theories inherent in assessing IT adoption and analyzing a variety of underlying approaches and models are developed.

First, the theory of strategic alignment of IS by Henderson and Venkatraman (1995) and the theory of diffusion of innovation by Rogers (1995) are analyzed to formalize a theoretical environment suitable for modeling the problem raised as part of this research. Secondly, three theoretical models underlying the evaluation of the adoption of IT innovations (Mckeen et al., 1997; Baile, 2003; Chaabouni, 2006) are presented as modeling tests according to an evaluation approach of success, known as “based on a transformation process”, which aims to detect the multiple influences of the determinants identified on success, via an intermediate process.

Much work in recent years has focused on the successful implementation of information systems by attempting to determine a framework for assessing the impact of information systems on business performance. They showed the interest of approaching this research problem from the angle of strategic, technological or organizational determinisms.

Evaluating the successful implementation of ERP integration technology underlies, in this study, the theories of strategic alignment of IT and diffusion of innovation. This approach thus leads to theoretically treating the evaluation process from a double deterministic perspective. The first, in relation to the effects of the implementation process, aims to establish the premises of an explanatory model of organizational performance while the second, in relation to the determinants of the process, aims to establish the premises of a model theory of the adoption of a technological innovation such as ERP.

The deterministic framework of strategic alignment (Henderson & Venkatraman, 1993), for its part, responds to a strategy of matching the use of IT to the conduct of business. According to Baile (2003), strategic alignment sheds light on the role of IT in the development of a business



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strategy and postulates the fit between the strategy and the IT infrastructure and a functional integration of the business dealing with IT. Much of the work developed on the basis of this theory to test the effect of ICT alignment on performance (Jouirou & Kalika, 2004) has shown that an approach to assess the impact of information requires consideration of the level of alignment of these systems with the organization's business strategy.

The success of ERP implementation can also be studied within the framework of a determinism specific to the diffusion theory of innovation (Rogers, 1995). Rogers (1983) considers diffusion as a process by which an innovation is propagated among members of a social system (a socio-rational conception). According to Pupion and Leroux (2006), the diffusion of innovation provides a framework for evaluating information systems to address the characteristics that would facilitate or hinder the adoption and diffusion of innovations. In the case of the ERP system, considered a major innovation, previous research has used the theory of the diffusion of innovation to mainly determine the conditions for its successful implementation (Pupion and Leroux, 2006).

## Theoretical Models Underlying the Assessment of It Innovation Adoption

The paradoxical relationship between information technology (IT) and organizational performance is the subject of heated debate among researchers. Indeed, the question of the links between IT adoption and business performance remains unanswered.

Widely publicized IT adoption and diffusion programs at UPS, Federal Express, Wal-Mart are associated by Laudon and Laudon (2019) with significant improvements in performance. Conversely, many firms engaged in IT projects have not made any profit and, for some, these projects have ended in failure and even in legal action (Shanks et al., 2000).

The theoretical environment for this work is thus delimited by three distinct conceptual approaches that introduce this "process" of resource transformation to model the adoption and evaluation of IT. The approaches of Mckeen et al. (1997), Baile (2003) and Chaabouni (2006) contribute to this process analysis of the evaluation of IT success. They are used in a general theoretical research model intended to understand, on the one hand, the structure of a success analysis system and, on the other hand, the existence of internal relationships. The lessons learned from this work are used in this article to formulate a theoretical scheme for evaluating the success of an ERP.

## Theoretical Framework of the Research

The process of modeling the assessment issue is carried out through three stages. In the first, a clarification of the determinants of success of an ERP implementation on the basis of a review of the literature. The next step is to determine the most important quality factors in the adoption process that are unique to ERP technology. Finally, the last allows the identification of the potential benefits of ERP implementation. The modeling effort focuses on the explanation of the effects of the diffusion of ERP innovation in terms of organizational performance, via its adoption process.

## The key success factors of ERP adoption

The identification of the background of the ERP is of great importance for the successful implementation of the ERP project. Indeed, this track record helps to give practitioners an



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indication of the path to follow and the points to which they should pay the most attention and resources in the planning of the ERP project. The literature review generally used the term "Key Success Factors" (FCS) having a positive impact on the implementation of ERP systems. We propose in what follows the prerequisites that we consider necessary to be taken into consideration by the company having decided to set up an ERP system. Although research relating to FCS of setting up an ERP, have carried out different taxonomies. The authors all agree on the importance of four dimensions that contribute to its implementation (Chaabouni, 2006): The structural dimension (creating an organizational structure appropriate to the implementation of an ERP: the reengineering of business), the cultural dimension (change in certain standards and values of the company), the strategic dimension (modify the objectives and strategies of the firm to take into account the success of the project) and the marketing dimension (study the perception of ERP users).

## The structural dimension

According to Bancroft (1996), the company needs to reorganize certain processes considered key for the organization before implementing their ERP system. The reengineering level assumes a good understanding of business processes which is an imperative in process design and system configuration. This reengineering in turn led to thinking about success factors such as the need to decide on a process change before implementation and the need for a competent project manager (Bancroft, 1996). Lequeux (1999) for his part affirms that "Far from carrying out a purely IT project, the adoption of an ERP should be an opportunity to reconsider the mechanisms and improve the flows participating in the operation of the company, even if it means consider reengineering business process or BPR "(Lequeux, 1999).

In the process of configuring the ERP system, the BPR should occur iteratively in order to take advantage of the best practices recommended by the system. Companies should be willing to accept integrated best practices, and model their business processes according to those embodied in the system (Fui-Hoon Nah et al, 2003). The software should be modified imperceptibly to minimize the possibility of errors and take advantage of the benefits of new versions.

## The cultural dimension

Organizational culture is important for the success of projects involving such organizational changes. Kampmeier (1998) finds that the main reason for failure of ERP projects is that very little attention is paid to the culture of organizations. Thus, the existing culture has very important effects on the planning, implementation and implementation processes of the project (Kampmeier, 1998). The training and involvement of users, the commitment of the general management and the quality of the project team are the main elements to consider in the change management of ERP projects (Chaabouni, 2006).

Training: The facilitating role of training in the implementation of software is well documented in the MIS literature (Nelson & Cheney, 1987). The lack of user training and the failure to understand the change in business processes by ERP systems, frequently appear to be responsible for ERP implementation problems (Somers & Nelson 2001). Companies will need to provide the opportunity to enhance the talents of their employees by providing them with training that meets both business and employee change needs (Bingi et al., 1999). Every employee, who is going to use the ERP system, needs to be trained on how to work and how to link business processes early in the implementation process.



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The involvement of users in the system implementation project is a success factor of IS projects. When users are involved in the ERP project, they can suggest modifications according to their priorities and needs and monitor the results. They can better appreciate the disadvantages and advantages of the system and make proposals for the success of the implementation of the ERP system. They are therefore more likely to accept the system (Laudon & Laudon, 2019). The degree of user involvement in the implementation of information technologies is a key success factor for change management (Rivard & Talbot, 1999).

The Top management: is recognized by many researchers as being one of the FCS of the implementation of the ERP. The project must obtain senior management approval and support (Somers & Nelson, 2001). The manager needs to publicly and explicitly identify the project as a high priority. He must commit himself with his good will and his own participation to allocate the necessary resources for the implementation of the ERP (Shanks et al., 2000). This requires not only time and appropriate resources, but also qualified personnel.

The quality of the project team: The nature of the implementation process requires a balanced project team. For the implementation of an ERP system, business analysts constitute 70% of the team. They stress the need for a balanced team with sufficient flexibility to cope with the length and complexity of the task. The typical project team is made up of business analysts, users and technical experts from inside the organization and consultants from outside. It is also desirable that the Project Team should be made up of the best full-time people. Consultants regularly complain that the people assigned to the project are unavailable full time and that they are not the best and / or the most experienced. This is not always achievable since each member of the organization has an area of work to do and freeing it up completely means the emergence of problems and additional costs for the organization. The people to be assigned to the project must have a holistic view of the company's processes, access to senior leaders and be communicators with multiple talents; technical, business and people management talents. They play an important role in the implementation since they are involved in the design of the system, its testing as well as in the training of users**.**

## The strategic dimension

The strategic dimension refers to the importance of the target organizational vision (El Amrani, 2003). As part of an ERP implementation project, the definition of a target organizational vision consists of clearly outlining the main lines of the future organization and the direction that the project stakeholders must take to achieve it. Managers must determine the contours of the project by establishing a target organizational vision (El Amrani et al, 2003). Considered to be fundamental and even an FCS of an ERP project, this variable has been ignored and underestimated by companies and little studied in the context of research into information systems (El Amrani, 2003).

The definition of this vision answers several questions: "What will be the future organization of the company with the ERP? What is the organizational scope concerned? What are the processes to be reconfigured? How to ensure the consistency of the whole? ". The answers to these questions have the merit of establishing the bases on which the implementation process will be based, identifying the main stages through which the ERP will go and defining the resources and the technical and organizational skills to be deployed. (identification of users, choice of consultants, actions to be implemented during change management, people to be trained, etc.) (Markus & Tanis, 2000). Management that does not try to establish a vision within the framework



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of this project will not only miss the potential for integration, but it risks destabilizing the organization (El Amrani, 2003).

ERP supplier selection: Companies generally try to choose the software package that best suits their process. Indeed, ERP solutions differ from one industry to another and the solution that best meets the needs defined by the company must be chosen.

For the purposes of this stage, companies first of all draw up specifications based on the analysis of needs and the offer on the ERP software market. "This stage can take up to 2 years". The evaluation of the selected software packages (preliminary study) is then carried out according to several criteria, such as the competence of the ERP supplier team and the availability of human resources necessary for the smooth running of the project. Finally, these selected software packages are the subject of a demonstration and a real test before the final decision of its acquisition. The aim of this demonstration is to show mainly if "the ERP model can correspond or not to the model of management of the company". The judicious choice of the appropriate software package is a useful element for the successful implementation of an ERP system (Chatti, 2008).

The supplier/company relationship is another critical element. Typically, companies use the service of their ERP vendors to help them set up the acquired system. In this case, companies are called upon to seek not only the solution that best meets their needs, but also to ensure the choices of the supplier with the human resources necessary for the proper conduct of the project. The quality of service, know-how, experience and availability of the integrator's team are necessary for the success of the project (Chatti, 2008).

## The marketing dimension

The marketing dimension refers to the intention to use the ERP. The Technology Acceptance Model (TAM) postulated that the use of ICT is determined by a behavioral intention to use a system, and the latter is jointly determined by people's attitudes and perceived usefulness. System usage is a reflection of user acceptance of the technology (Venkatesh & Davis, 1999).

User acceptance of the system (Ginzberg, 1981; Parr et al., 1999) is a contributing factor the successful implementation of the system. This success is not achieved if the user rejects the new system either by refusing to use it outright or by misusing it.

## The Quality Factors of the ERP Innovation Adoption Process

These are managerial, technological and structural factors that can be controlled by the company, and whose implementation allows better allocation of resources (Chatti, 2008). Among the factors of adoption and impact on ERP success, it is usual to find factors relating to the quality of the acceptance process (in terms of adoption and use) of IT innovation. These are, in fact, factors that express the consequent effects expected from the diffusion of ERP innovation and the integration of IT into the organization's IS (Baile, 2003).

ERP innovation therefore introduces a variety of functionalities to support several kinds of management tasks and activities. Such possibilities motivate, in this sense, the decision to innovate and implement ERP technology, which results in the integration of the organization's applications.

Generally, work on ERP is related to the notion of integration of systems or business processes of the organization. The decision to integrate is the subject of a sub-process that aims as much to integrate IT applications as to reconfigure, rationalize and integrate business processes to create synergies between the resources of the organization to through the good flow of information.



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Thus, the interest of evaluating integration as a sub-process of acceptance, which in fact justifies a strategy of developing an IS (intra and/or inter organizational) and reengineering business processes, found its justification very early on in work on the strategic alignment of certain IT innovations (Venkatraman & Zaher, 1990; Bennani et al,, 2004).

In short, the implementation of the ERP is analyzed here by the process of adoption and integration. This process of evaluating the perceived effects of the ERP implementation is nothing more than a full step in the strategic planning of the organization's information systems. A stage in which the potential applications of this technology are analyzed (in terms of risk of adoption and risk of use) and given priorities (Baile, 2003). This model for evaluating the effects of ERP innovation and application integration allows, in short, to understand the functional characteristics of this ERP planning process. These effects are considered to be quality factors of an acceptance process (adoption and use) that can be explained by a variety of determinants of success.

## The ERP Benefits

Each strategic approach adopted by companies' aims to achieve a goal of profitability and more specifically to influence performance. The latter always remains very difficult to apprehend within the framework of an ERP project (Chaabouni, 2006), in fact the analysis of the impact of the deployment of ERP on the performance of an organization is often treated in the academic literature of 'in a fragmented way (Vincent and Gharbi, 2003). Studies dealing with impacts show mixed results. For example, Baile (2003) observe that ERP offers great flexibility to companies. On the other hand, Davenport (1998) concludes that these systems bring a certain rigidity since they involve an organizational discipline and an adhesion to the processes of production and exchange of standardized information. One of the possible explanations for this diversity of results is that the various studies in the field start from specific points of view: financial, organizational, social, etc. (Chaabouni, 2006). Markus and Tannis (1999) define the success resulting from the implementation of ERP according to five dimensions: technical; economic and financial, and strategic; operational and human. Chabouni (2006), for their part, defined success by four dimensions which are linked to ERP deployments: a project dimension, a technical dimension, a behavioral dimension, an organizational dimension. And Vincent and Gharbi (2004) added the societal dimension. Chaabouni (2006) retained three dimensions to assess ERP success, namely: the economic and financial dimension, the organizational dimension, and the human dimension.

## The economic and financial dimension

Many studies have attempted to analyze the financial impacts of the implementation of the ERP project (Chaaboni, 2006). Poston and Grabski (2001), for example, showed in their study that ERP considerably improves company performance by lowering costs and reducing delivery time. They also showed a considerable reduction in the ratio of employees to income following the implementation of the ERP system (Poston & Grabski, 2001). ERP systems are thus supposed to reduce operating costs, improve efficiency, productivity and profitability of the company.

Some work has focused on the financial aspects of ERP benefits. They found, among other things, that several companies entrust the responsibility of setting up and evaluating ERP to finance and / or accounting functions (Gomez et al., 2002; cited by Chaabouni, 2006). Its companies mainly rely on financial metrics, in this case, ROI, to assess the impact of ERP projects. Bradford and Roberts (2001) pointed out that 75% of companies use ROI to measure the value provided by ERP.



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## The organizational dimension

The organizational effects of ERP are numerous: ERP modify the structure of the organization by reorganizing the internal organization of the company, by modifying the nature, circulation and modes of creation of information, ERP affects the decision-making process in companies, the control processes and the culture of the organization (Gomez et al., 2002; cited by Chaabouni, 2006). ERPs are therefore likely to have organizational consequences, on the quality of information and decision-making, on the structure of the organization and on modes of communication.

Better quality of information and decision-making: According to Huber (1990), information technologies can indeed reduce the time required for decision-making, thanks to a rapid distribution of information. Huber (1990) considers that the decreasing need for formal meetings is generated, among other things, by the improvement in the availability and quality of information.

The implementation of an ERP will help improve the quality of information and decision making in the organization (Xu et al, 2002). The improvement of the quality of information and the control of information have been underlined by several works which have studied the benefits generated by ERP systems (Chaabouni, 2006).

Better communication and information sharing: Among the main advantages of ERP systems is intra and inter organization integration: "Integrated information reduces uncertainty regarding cause and effect relationships in departments and improves learning and the generation of ideas "(Chtioui, 2004).

ERP systems are considered to be a solution to the problems of information dispersion and fragmentation in companies. They use integrated client-server technology and set up large databases that drastically change the provision and flow of information in the organization. Information is accessible at all levels of the organization, in real time (Chtioui, 2004)

## The human dimension

On a social level, a great deal of research (Chaabouni, 2006) has been carried out by placing man at the center of the analysis of this socio-technical project that is ERP, by showing that the potential difficulties that may be encountered during the implementation and operation of ERP mainly stem from the integration of the human factor into the project (Vincent & Gharbi, 2004). Kidd and Richter (2001) find that the main organizational change accompanying the implementation of an ERP is the reduction of the workforce. The ERP system reduces employee intervention in entering and processing information. The implementation of the ERP will be the opportunity to again specify certain organizational choices, such as the degree of delegation, autonomy, participation in decision-making at different levels of the organization and therefore leads to satisfaction of ERP users (Boitier, 2002).

The satisfaction of ERP users: The literature in management sciences has often emphasized the importance of the satisfaction of individuals in the organization as being a determining concept for the increase of their productivity and acceptance of ICT by end users (Delone & Mclean, 1992). This dimension has been widely used in the literature as a dependent variable on the efficiency of information systems. DeLone & McLean (1992) identify a number of 33 empirical studies that evaluate the effectiveness, in terms of user satisfaction (Chatti, 2008).

## The Research Model



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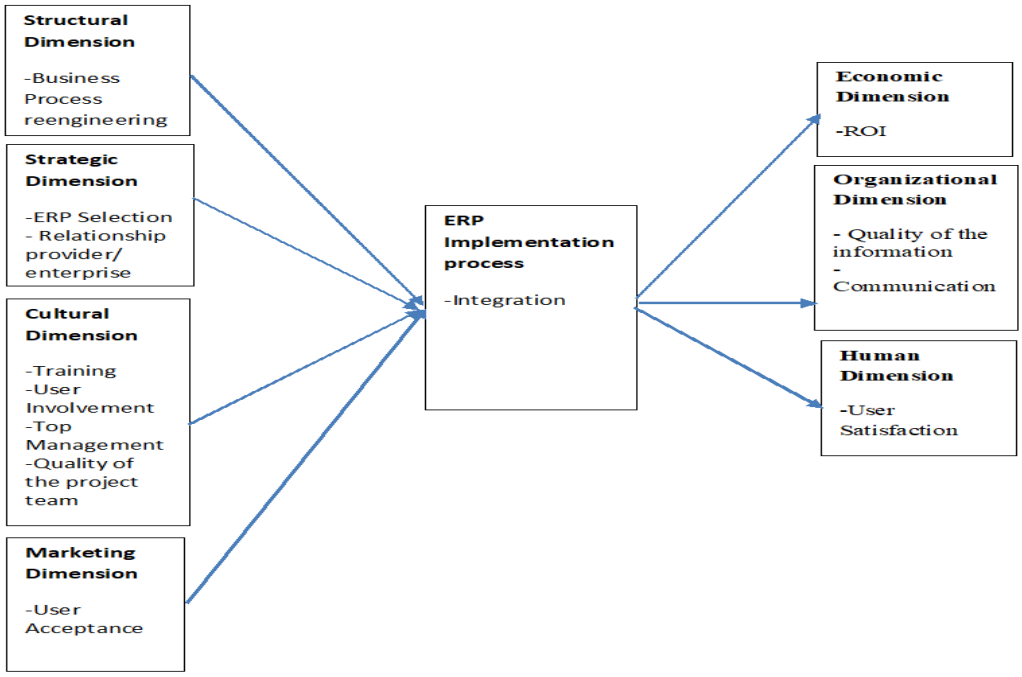
Based on these theoretical foundations, a conceptual scheme for evaluating the post-implementation success of ERP is developed. This diagram is a systemic representation of the evaluation at a given point in time of the transformation process of resources used during the implementation of IT. It postulates the existence of a theoretical structure of the concepts used, to study the causal relationships between, firstly, the identified determinants of success then, secondly, the integration of computer applications, with the success of adoption and ERP implementation. The conceptual scheme (Figure 1) presents a structure with three levels of analysis.

An entry level, characterizing the resources or key success factors (FCS) that were mobilized during the pre-implementation phase of an ERP. These resources are likely to affect the implementation of the ERP (ie its adoption and integration into the existing IS) as much as the performance expected from its use (post implementation). This level of conceptual analysis therefore highlights the facilitating factors of a complex IT acceptance process, which aims to efficiently transform the resources mobilized into perceptible management results.

An intermediate level includes the factors that describe the ERP implementation, in other words, the factors that formalize the complex process of IT integration. These are factors that express the effects of the decision to integrate, through perceptions (in terms of success or failure) of the exercise of planning and implementing the technology (Chatti, 2008). The model uses this, the mentioned process (integration), as "Quality factor of the implementation process".

An output level describing the success of ERP adoption, in terms of factors that describe the effects of the ERP adoption process on results. These factors reflect the impacts of ERP (of its adoption and integration), in terms of the benefits induced by the ERP implementation.



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## FIGURE 1: RESEARCH MODEL

The model obtained (Figure 1) presents two kinds of causal relationships between the variables of the three conceptual levels: direct and/or indirect dependency relationships. This paper is limited to studying the existence of two direct causal relationships, the subject of premises, on the one hand, between levels 1 and 2 (P1) and 2 and 3 (P2):

*P1: The key success factors of an ERP implementation directly and positively influence the integration of applications.*

*P2: The integration of applications directly and positively influences the benefits of ERP implementation*

## RESEARCH METHODOLOGY

The starting point for this research is an exploratory study, because the research subject is relatively little systematically (Mabert et al., 2003) in the literature. The methodological aim is thus part of a Grounded Theory Method (GTM) type approach, developed by Glaser and Strauss (1967), 40 years ago, and advocated as a response to a "rigid positivism" by Suddaby (2006). In the Saoudi context, this subject has never been the subject of empirical work, publication of results, or major conceptual and theoretical developments. The method therefore finds its contribution here not only through its possibilities to identify conceptual foundations on the social phenomenon studied, but also, as Fendt and Sachs (2008) note, on its capacity to develop a “permanent comparison” and a “sampling” “theoretical”, during a progressive data collection and subject to the construction of the model or a theoretical contribution.

Due to the specificity of the situation and the research object relating to the implementation of an ERP software package, different from other technological solutions, it is also difficult to completely trust the results of the work dealing with the adoption of IT. ERP systems are indeed considered both a major technological innovation and a complex reengineering machine having a very significant impact on the development and transformation of the company. In this context, the diagnosis and the conceptual evaluation of a theoretical model go through a confrontation between, on the one hand, the experience and experiences of business cases and, on the other hand, the exploitation theoretical knowledge on the concepts manipulated. This empirical approach is made by going back and forth with the field of research. It supports an exploratory approach that is abductive, evolving and appropriation of the observations and data collected to the concepts being manipulated.

Directly appealing to quantitative methods, without resorting to exploratory analysis, to test models that are developed solely from the literature cannot promote the reliability and updating of the results generated by this research; IT is characterized by a short lifecycle where yesterday's technology becomes obsolete today.

In this research work, the qualitative data collection technique was chosen; personal focused, non-directive and semi-directive interviews were conducted. The choice of this type of interview seems to achieve the best "fit" between the degree of freedom left to the respondent, on the one hand, and the degree of depth of the information requested, on the other hand.

The questions asked are of two distinct types. Two open-ended (non-directive) questions aim to obtain as freely as possible information on the most important critical success factors and the benefits of ERP implementation. Through these two open-ended questions, we try to find "... some indication of the respondent's level of information about what is central in their mind ..."



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(Powney & Watts, 1987). Underlying open-ended questions (semi-directive), aimed at obtaining information on categories of benefits and critical success factors, were developed on the basis of the items and constructs identified from the literature (Shang & Seddon, 2000). The analysis then had to review all the trends (constructs or variables) arising from the various underlying questions and then compare them with the constructs emerging from the main questions (catalysts or controls) in order to deduce the most significant variables to remember.

For these variables to be retained definitively, it is sufficient that they are mentioned by more than 50% of the interviewees at the level of the main question and also appear in an advanced position in the classification produced on the basis of this question.

Given that the research design is a multi-site design, the analysis approach consists, first of all, of a separate study of each case separately and, secondly, of inter-site analysis. This approach is based on the recommendations of Yin (1994) and Huberman and Miles (1991) (cited by chatti, 2008), intended to establish a validation of research premises, based on a cross-sectional study of the results drawn from an analysis of 10 interviews with experts and professionals. A global analysis and a general conclusion.

The research field is made up of two stakeholders in ERP projects, namely five suppliers of ERP systems and five industrial companies having had to implement at least four to six modules of an ERP software package, in the past two years. The specialists interviewed have experience of consulting several calls for tenders, participating in many ERP projects, and have sufficiently experienced the effects on the organization of this IT. Thus, the main interlocutors, constituting the "theoretical sample" of the analysis, are the project managers and general management executives who are very involved in the implementation of the system and the monitoring of its operation. So the expertise of the interviewees helps, in the socio-cultural context of Saudi Arabian companies, to give a specific representation of the knowledge relating to the adoption of ERP systems and their success. This representation is confronted with a permanent comparison of the concepts and manipulated research variables.

## RESULTS AND DISCUSSION

The following work aims to validate the main FCS of ERP projects, the quality factors of the ERP implementation process, and the benefits or advantages provided by these integrated software packages which were identified by the literature review, and this, in the context of Saudi companies.

### Key Success Factors

The analysis of the data resulting from the interviews with the managers of five ERP solution providers and five companies, made it possible to identify the following key success factors.

### Business process reengineering

The data analysis allows to recognize that the reengineering of business processes can be considered as a success factor of ERP projects. It plays a decisive role in obtaining the benefits projected by companies that have adopted an ERP system.

The analysis showed that the implementation of an ERP is generally preceded by an identification and modeling of the main business processes of the organization. According to



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respondents, "diagnosis often requires visualization of existing processes." This visualization supports the implementation of the ERP, by identifying the processes to keep, to reject and those to improve to increase the performance of the business. These processes can sometimes be modeled using software tools, such as: "Process Editor", "Visio", or by a modeling tool incorporated into the ERP system. The parties involved in this operation can be the project team (client and integrator), process managers, key users, consultants from "Earnest & Young" or "Price Water House" firms.

The analysis showed almost unanimity of respondents regarding the review of business processes before implementation. According to respondents, the objective of this reconfiguration is to meet the solution desired by the customer and to improve the performance of business processes. Usually it is "unorganized, unclear, problematic processes" that will be subject to review. This is most often done in parallel with the installation of the system, using the service of the integrator or consultants.

The analysis also highlighted the revision of the content of the functions as a serious element in the success of the implementation of an ERP. 80% of the companies and 80% of the providers questioned listed this response element. According to respondents, the implementation is "an opportunity to revise the content of the duties of company employees." It is considered "a consequence of the implementation, which requires the removal, modification and / or addition of certain tasks".

One of the problems associated with the implementation of software packages is the incompatibility of its characteristics with the information needs and with the business processes of the organization (Janson & Subramanian, 1996). To realize the maximum benefits provided by the ERP system, it is imperative that business processes are aligned with the system. Both the reengineering literature (Hammer & Champy, 1993) and the ERP literature suggest that an ERP system alone cannot improve organizational performance, unless the organization restructures its business processes (Bingi et al. al., 1999). According to Willcocks and sykes (2000), the reengineering that drives the choice of technology is a factor that can contribute to the success of ERP implementation.

## User training

The analysis of the questions showed unanimity within and between the parties interviewed on the importance of user training in this type of project. According to respondents, the participation of users in training sessions is necessary for the efficient operation of the software. This training is generally provided by company staff (executives, super users) and more specifically by the project team and/or rarely by the staff of the integrator or supplier. It is often carried out on all the functionalities and modules to be implemented "in order to be able to appreciate the functional links generated by the integration".

The facilitating role of training in software implementation is well documented in the MIS literature (Nelson & Cheney, 1987). The lack of user training and the failure of ERP systems to understand business process change often appear to be responsible for ERP implementation problems (Somers & Nelson, 2001). Companies will need to provide the opportunity to enhance the talents of their employees by providing them with training that meets both business and employee change needs (Bingi et al., 1999). Every employee, who is going to use the ERP system, needs to be trained on how to work and how to link business processes early in the implementation process.



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The lack of user training frequently appears to be responsible for ERP implementation problems (Somers & Nelson, 2001). The exploratory analysis showed that the participation of users in training sessions is necessary for the efficient operation of the software. It is often carried out on all the functionalities and modules to be implemented.

## Top management

The analysis showed the importance of the role of top management in the success of ERP projects. Interviewees agree on the need for senior management involvement in the ERP project. The benchmarking shows a concordance of views between ERP vendors and business managers.

"Important, primordial, strategic, philosophical, stimulating, driving force", these are terms that often come up in the words of respondents to describe the role of general management in the process of implementing an ERP system. For the respondents, it is the management which mobilizes the necessary resources (human, material, financial) and which ensures the permanent monitoring of the progress of the project. It also intervenes in the event of resistance to change or in the event of conflict and/or blockage.

Senior management's commitment to disseminating organizational innovations is well documented in the literature (Jarvenpa & Ives, 1991). At the start of the project, no factor predicted success as much as support from senior management (Bingi et al., 1999). Research on project failure shows that project-level problems arise when older people delegate control, project decisions to technical experts (EwusiMensah & Przanyski, 1991). Senior management support is important in the successful implementation of a large-scale personalized system (Ginzberg, 1981).

## The quality of the project team

Analysis of the data collected shows that the quality of the project team is an important factor in the successful implementation of an ERP system. Examination of the summary table of the characteristics of the project team makes it possible to recognize that the team responsible for the implementation is composed, in most cases, of company executives; IT specialist and manager (80% of respondents), ERP supplier staff (80% of respondents), consultant (70% of respondents), super user "Key users" (50% of respondents), who have some control work and business processes and rarely new staff recruited during the project (30% of respondents). The composition of the team shows that there is a combination of both the technical aspect and the management aspect, both necessary, for this type of project. The choice of a balanced team is thus emphasized by the respondents to meet the technical and business requirements of the project.

This project team is generally composed, as almost all of the respondents indicate, of members with at least a few years' experience (three to five years) and a good professional qualification. The members "are well experienced", and "they have great qualifications, they are in most cases engineers and managers". The majority of team members have a university education. Professional experiences and qualifications are quite an important characteristic of the members of the project team.

Most (80%) of respondents pointed out that in the majority of cases, team members cannot be assigned to the project full time. According to several respondents, the time that company personnel assigned to the project team can devote can reach 50% to 70% of their overall time. The assigned personnel have responsibilities and obligations regarding the day-to-day operation of their service. The full-time assignment of project team members is a characteristic of the project team.



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The analysis also highlights the training of team members as an important characteristic. Respondents from all categories are unanimous on this point. "To master the potential of the product", training sessions are organized for the benefit of the members of the project team by the personnel of the supplier. This is a step described as "essential" by ERP suppliers and companies that have adopted the software, to successfully implement the system. It seems that training team members is a key element for the project team.

Finally, respondents unanimously underline the value of the presence of a project manager during ERP implementation. For them, the implementation team usually has a project manager with "technical skills" and business skills. For the purposes of the project, computer skills and knowledge of "procedures, user and management expectations" and "company management rules" are necessary for the smooth running of the project. The project manager is qualified by the respondents as "leader, leader of men, authoritarian without being authoritarian, charismatic personality, good interlocutor, communicator, conflict manager, good decision maker and person. who has a sense of consensus ". The presence of a project manager in the team is a very important characteristic of the project team.

In short, a quality project team is a balanced, experienced team made up of qualified people who have been trained and who have a project manager. The success of the ERP implementation is linked to the knowledge, talents, abilities and experiences of the project team as well as to the selection of the appropriate members, who will have to be, not only, technologically competent, but also who understand the company and its business requirements (Somers & Nelson, 2001). The talent or skill and knowledge of the project team is as important as the use of consultants to provide expertise in fields where the project team lacks knowledge (Somers & Nelson, 2001).

The analysis showed that a quality project team is a balanced, experienced team made up of qualified people, who have been trained and have a project manager. Two important dimensions emerge from this analysis, which characterize this concept, namely: the composition and competence of the project team.

## Selecting the ERP solution

According to our interviewees, the development of a detailed project plan is a task where the intervention of the integrator is major. It is thanks to his experience, his knowledge of the implementation of the ERP system that the integrator is supposed to provide a detailed action plan, with corrections suggested by the company concerned. 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 completion of the project in its various stages. This integrator-company collaboration will lead to the constitution of a detailed project plan optimized in terms of resources and tasks, but can be modified during the implementation process Thus, the data collected makes it possible to recognize that the selection of the software package is considered as a key factor for the success of ERP projects. Indeed:

The analysis showed that selecting the right software package is a key success factor cited by respondents. This factor is cited by 60% of the companies and 40% of the “providers” interviewed, thus occupying the 5th position in the general ranking of the factors identified.

According to respondents, evaluating the ERP solutions offered on the market is an essential step in the process of adopting ERP innovation. This step aims to choose the software package that best adapts to the business processes of the company. ERP solutions differ from one



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industry to another and it is important to choose the solution that best meets the needs defined by the company.

For the purposes of this step, companies first proceed to the development of specifications based on the analysis of needs and the offer on the ERP software market. "This step can take up to 1.5 years." The evaluation of the selected software packages (preliminary study) is then carried out according to several criteria, such as: the competence of the ERP supplier's team and the availability of human resources necessary for the smooth running of the project. Finally, these selected software packages are the subject of a demonstration and a real test before the final decision of its acquisition. The main objective of this demonstration is to show whether "the ERP model can correspond to the business model of the company or not".

Choosing the appropriate ERP, which matches the information needs of the organization and its processes, is essential to ensure minimum modification, implementation and successful use (Janson & Subamanian, 1996). Choosing the wrong software package can mean committing to an architecture and applications that do not fit the organization's strategic goals or its business processes (Somers & Nelson, 2001). The careful choice of the right software package can be considered a useful element in the successful implementation of an ERP system.

The analysis revealed another critical element, namely: the supplier/company relationship. This factor is cited by 60% of those interviewed. According to respondents, the presence of a "serious and trusting relationship between the purchaser and the ERP supplier" is recommended for the successful conduct of the project. Companies demand "from the ERP supplier, in particular, the human resources necessary for the smooth running of the project". They insist on the "competence and availability of the integrating team".

The integrator / company relationship is vital for the success of ERP projects (Somers & Nelson, 2001). Research has shown that a better “fit” between the vendors of the software packages and the users of the organization is positively associated with the success of the implementation of the software (Janson & Subamanian, 1996) and that organizations should try to maximize their efficiency compatibility with their sellers (Thong et al., 1994). Willcocks and Sykes (2000) identified the supplier partner as a key factor necessary for the success of the ERP.

Generally, Saoudi companies call on the service of their ERP suppliers to help them in setting up the acquired system. In this case, they are called upon to seek not only the software package that best suits their needs, but also to ensure the choice of the supplier with the human resources necessary for the proper conduct of the project. The companies interviewed realized, in fact, that the quality of service, know-how, experience and availability of the integrator's team are necessary for the success of the project.

## User acceptance

The analysis minimizes the role of users in the ERP implementation. None of the interviewees mentioned user involvement as a key success factor. According to the respondents, the users "do not have an essential role in the implementation", they "do not intervene in the implementation", they "have a role only after implementation" in "the optimization or the 'improved use of the system'. Their contributions are limited to providing the project team with the information or clarifications necessary for "needs analysis and configuration" tasks. "They have a specific role in certain business aspects". "They are asked to be motivated, convinced, involved and to carry out the team's orders according to the rules of the art."



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Moreover, the analysis showed that users do not readily accept the ERP system at the start of the project. Only one vendor mentioned that user acceptance of the system is a requirement for using the ERP system.

According to respondents, "users only think about their interests, they are not very convinced of the value of ERP, since the old system is easier to use." Interviewees find that "the difficulties and complexities of the system (functionality) make users afraid to use it. Talent and skill level come into play at this point". One respondent stated that "users do not readily accept the ERP system because of the phobia of the new ...". The users are, in fact, reluctant to face the changes brought about by the new system".

However, the intervention of top management causes users to start accepting the system after some time. " "Users start to like and defend the system, almost after a few months." "Even though they tend to stick with old practices despite everything, the system does not give them the opportunity." This resistance at the outset is sometimes dealt with "by the management of the change, whether it be by consultants, consulting firms (Ernest Young) or others" and by the intervention of general management. One respondent sums up this idea by saying that "acceptance depends on the work and preparation done previously and not on the user".

## To conclude

The exploratory analysis thus confirmed the results of numerous theoretical works by highlighting the presence of several success factors relating to ERP projects. However, the analysis of the data resulting from the question of control revealed the quality of the project team, the training of users, the commitment of general management, the reengineering of business processes, the selection of the solution. ERP, as the most important success factors of ERP projects in a Saudi context. These factors are mentioned by at least 80% of respondents. They are considered central by the respondents. The exploratory analysis also shed light on several characteristics of the ERP implementation team. All of these distinctive features are grouped into two distinct measurement variables of the "quality of the project team" concept: "composition of the project team" and "capacity of the project team".

## Factors Relating to the Quality of Implementation Process

Analysis of the data shows that application integration is an important factor in the process of adopting ERP systems.

## Integration of application

The scoping study indicated that integration is cited in several forms, such as: improving "communication and information consolidation", "visibility within the company" and " integration between services".

The literature notes that ERP systems facilitate integration by enabling effective and efficient communication across functions, as well as a better understanding of business processes that transgress the various functions of the organization. The literature clearly shows that integration is central to ERP and its success (Singlatery, 2003).

## To conclude



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The exploratory analysis highlighted improved application integration as an important factor in the ERP adoption process. According to Singlatery (2003), the literature does not offer much work that explicitly and precisely addresses the evaluation of the concept of integration. Through a qualitative study (the analysis of interviews with 51 IT practitioners), followed by a quantitative one with a sample of 399 companies, Singletary (2003) identified three variables in particular to measure integration applications. These variables are:

The "system operation" reflects the functional characteristics of integrated systems technology (ERP).

“Data manipulation” reflects functionality related to the way the system handles data.

"Application interconnectivity" reflects the fundamental concepts that allow applications to work together, manage data and provide the functionality of an integrated system.

These measurement variables can be assimilated to properties that characterize the relationship between the components to be integrated and explain how the applications are integrated (Singletary, 2003).

## ERP Benefits

A review of data from interviews with managers from five ERP solution providers and five companies revealed several potential benefits.

## Financial performance

Interviewees believe that the assessment of financial gains directly due to ERP is not straightforward. “Return on investment is rarely measured, it's hard to estimate. But on the other hand we can sometimes estimate the reduction in time and certain costs”. One respondent affirmed that “the ERP project is only profitable by the only savings on the means and the personnel. ERP can reduce costs as a result of process reorganization and certain tasks”.

Examination of the benefits cited, highlights cost containment as a potential advantage of ERP systems. All the companies surveyed and 40% of the suppliers stressed that this investment is an opportunity to improve cost control. According to the interviewees, the system has significantly improved cost control. With better management and control of information, the system has created, "a certain ease and reliability in the calculation of technical costs, supply costs, commercial costs, tool consumption costs ...". One respondent affirmed, in this sense, that real-time cost control allowed, among other things, "better monitoring of the rate of waste and a reduction in waste".

## Quality of the information

The quality of information is considered to be the main benefit provided by ERP systems (Davenport, 1998; Andreas, 2004). Previous work has shown, in fact, that among the most important reasons why organizations adopt an ERP system is its ability to facilitate the exchange of information (Piturro, 1999), to solve the problems of fragmentation of the information (Davenport, 1998) and its ability to incorporate the information needs of all functional units of the organization into a single system (Andreas, 2004). The analysis showed, in this sense, that statements such as “availability, reliability, security and access in real time” to information often come up in the responses of the interviewees to describe the improvement of information management and control with the ERP system. The interviewees also consider the quality of



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information as the source of several other benefits, such as: improved decision-making, control, performance, productivity, management of resources and production.

Analysis of the data showed that respondents are unanimous on the quality of the information as an advantage provided by the ERP system. Remarks such as “better availability, reliability and access (in real time) to information, or uniformity, security and control of information”, often come up in the answers of the people interviewed on the evaluation of the benefits coming from the use of the ERP system. One of the respondents affirmed, for example, that after implementation of the software package "... companies have instant access, multi-user and authorized persons, to data updated in real time ...". By acquiring an ERP solution, business leaders are, in effect, seeking to solve "problems relating to the fluidity, availability and credibility of information. They try to limit the number of speakers and remove the dependency of people to access information. They want the removal of personal links in the company and achieve full transparency of information".

## Communication

The analysis of the benefits mentioned by the respondents, presents the improvement of communication as a benefit provided by ERP systems. All of the interviewees stressed that this investment is an opportunity to improve communication. This profit occupies the first position in the profit classification.

Respondents say that implementing an ERP system can improve "communication across the enterprise." For them, the system allowed a certain speed of communication through for example "messaging, workflows, etc." ". One of the interviewees noted that “communication is automatic; the system creates a purchase request, it sends the request for approval to the hierarchical superior, before it is transmitted, then to the general management for downstream and to the supply department for placing of order ". Much of this increased improvement in communication and information consolidation is due to interoperability between applications.

"According to stakeholders, it appears that integration is the source of this improved communication. The analysis of the benefits cited by respondents presents the development of a common language as a benefit provided by ERP systems. This benefit is mentioned by all of the people interviewed. According to respondents, the implementation of an ERP system has standardized nomenclatures and standardized documents. For those interviewed, an integrated system is synonymous with “the same for everyone”; “Same order form, same exit form, same invoice…” The employees speak the same language; "Same designation, same codification, same edition format ..." and share the same concepts; "Notion of production order, notion of cost price, notion of information sharing ..." Respondents consider that the system has enabled the development of a common language, notably thanks to the standardization of work methods, tasks, and business processes.

## User satisfaction

Similarly, the analysis revealed, initially, a certain unanimity among the interviewees on user satisfaction as being a benefit of the ERP implementation. According to the interviewees, users are generally satisfied after some time with experimenting with the system and its effective operation. One respondent said that "users are not satisfied with the system until six months after it has been put into operation." This can be explained, on the one hand, by their resistance shown at the start of the project, and by the fact that the information provided by the system does not fully



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meet the needs of the users, on the other hand. Indeed, "at first, users do not find that the information provided meets their needs, it is only after the fact that they realize the relevance of the information provided by the system." For some respondents, "it is only after some time of using the system that users begin to realize that the information provided by the system is of good quality." For them, user satisfaction usually comes in the ex-workstation phase of ERP implementation. Nonetheless, respondents say that user satisfaction is not complete as they continue to use manual data entry techniques, prepare reports using Excel spreadsheets and maintain old work practices.

## To conclude

Exploratory analysis of the data collected on ERP benefits confirmed the presence of several organizational and human benefits. The analysis of the interviews resulting from the control question highlighted the quality of information and the improvement of communication and user satisfaction as the three most important advantages provided by the ERP system. These three advantages are mentioned by more than 80% of respondents. They are considered central by the respondents.

Several studies have highlighted the relationship between IT adoption on the one hand and the quality of information, communication and user satisfaction on the other hand (Shang & Seddon, 2000). Organizations typically adopt IT in an effort to improve the quality of information generated by their existing system and to strengthen their control over internal operations (Oliver & Romm, 2002). The need for better information can thus be seen as the root cause of the need for data and systems integration (Oliver and Romm, 2002).

The exploratory analysis revealed four indicators or variables to measure the concept of "information quality", namely: "availability", "security", "reliability" and "access" to information

## The Research Model after Analsis

For the consolidation of the conceptual model retained at the end of the theoretical analysis, the exploratory approach is adopted in this research to identify new elements other than those identified from the literature and/or to specify, relativize and even eliminate a number of elements that we would have tended to consider as central or fundamental. The research model constituted a well-defined working structure around which the interview protocol is organized. Questions are asked about critical success factors and ERP implementation results. The field in this stage is made up of two stakeholders in ERP projects: suppliers of ERP systems and companies that have opted for this type of system. The data is collected through focused personal interviews, non-directive and semi-directive. The content of the data collected from the conducted interviews is analyzed using the technique of content analysis. The analysis of this summary of qualitative data allowed us to identify several types of benefits and categories of key success factors.



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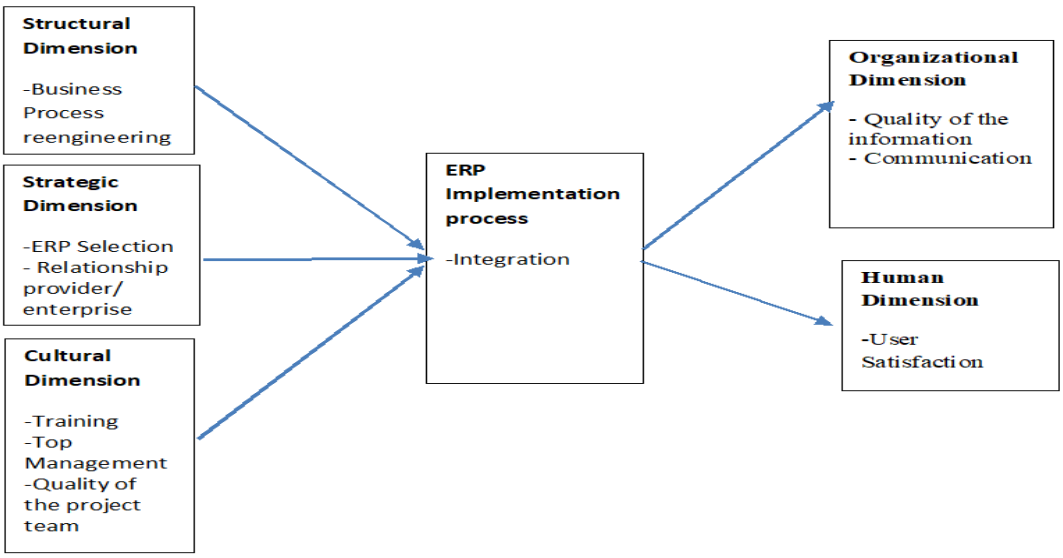


**FIGURE 2**

**RESEARCH MODEL AFTER ANALYSIS**

## CONCLUSION

This research work aims to provide elements of understanding of the successful implementation of ERP systems in an emerging country context where SMEs constitute the bulk of the economic fabric.

To answer this problem, a theoretical research framework was developed by exploiting the theories and models that deal with the success of information systems. Two main theories have been used: strategic alignment (Henderson & Venkatraman, 1993) and the diffusion of innovation (Rogers, 2003). Different models inherent in the adoption and evaluation of IT are also used (Mckeen et al., 1997; Baile, 2003, Chaabouni, 2006) to define the theoretical model of this research.

The objective of this model is to examine the effect of the relationship between the determinants of success and the characteristics of innovation as well as the integration of IT applications on the success of ERP adoption. He is confronted with the Saudi context by analyzing the experience of five ERP vendors and five companies that have implemented such systems.

The experience feedback presented in this work made it possible to consolidate the conceptual model retained at the end of the theoretical analysis (Figure 2). The results of the exploratory study made it possible to specify, relativize and even eliminate a number of elements that we would have tended to consider as central or fundamental.

## RESEARCH CONTRIBUTIONS

The research contributions are theoretical, methodological and practical:

### Theoretical contributions



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The theoretical contributions are at two levels: first the validation of the convergence of the theories mobilized for this study, then the modeling of an IT integration perspective.

The validation of the complementarity of the theories mobilized for this research. For the purposes of modeling ERP success, the theoretical framework of the research was based mainly on two theoretical approaches: the theory of diffusion of innovation (Rogers, 1995) and that of strategic alignment (Henderson & Venkatraman, 1993). On the basis of these theories used, a generic research model for the evaluation of the impacts of ERP, using a determinism based on a closed system approach, was developed. The formulation of this model can be considered as one of the main contributions of this research. Because: (1) it corresponds to the expectations expressed by several practitioners (ERP suppliers, consultants, etc.) and researchers concerning the study of the effects and determinants of success of this integration technology (Singletary, 2003) and (2) it mobilizes specific research variables intended to enrich the spectrum of research work on ERP in an emerging country context.

While helping to validate certain theoretical and conceptual results of previous work, this work contributes to a better understanding of the success of adoption of ERP systems in an emerging country, by proposing a model for evaluating ERP success, from a perspective of IT integration, similar, in this way, to the necessary governance of ERP on the strategic objectives of the companies studied. This modeling constitutes one of the main contributions of research because it mobilizes specific research variables that can enrich the modeling of this type of problem. Few studies have, in fact, examined the benefits of ERP implementation from this perspective (Barki & Pinsonneault, 2003). ERP strategies from the perspective of integration (Barki & Pinsonneault, 2003), while seeking better performance of the integrated system.

## Methodological Contributions

The methodological contributions of this research work lie mainly in the exploratory study of the research. The exploratory methodology rather pursues an objective of understanding the observed reality than an objective of explanation by means of a model and variables. It is often associated with a qualitative data collection method, aiming, by analyzing the actions, interactions and arguments of the actors, to follow a principle of capturing the diversity of the materials collected rather than their strict statistical representativeness (Eskilsson et al., 2003).

## Practical and Managerial Contributions

The operational benefits of this research work concern the development of companies. These are beneficial both for those who have already adopted an ERP system, but also for those who plan to acquire and implement such a tool. For the first category, an ERP project success evaluation framework is developed. This framework makes it possible to justify this investment by evaluating its impact. For the second category, it is a question of formulating a coherent ERP appropriation framework based on the experience of the former, and of taking advantage of it (on the basis of the results of this work). Indeed, companies can hope for an improvement in their performance and benefit from an ERP implementation, knowing that the achievement of this objective is conditioned by a certain number of key success factors which determine the benefits of implementing an ERP implementation. These key success factors are identified in this work, so as to contribute to better planning and better management of this type of project. These contributions provide the possibility, among other things, of proposing means of action (direct and indirect) relating to the determining factors of ERP success.



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## The Limits of Research

The proposed research model does not fully justify the choice of variables, given the immensity of the field of investigation. The systemic and globalizing approach adopted to model ERP success discards some in order to conceptualize certain relationships that have appeared opportune to analyze the results and compare them to the realities in the field. Considering only specific dimensions (Chaabouni, 2006) made it possible to lighten the stages of the exploratory study, and to understand phenomena that are difficult to identify in the field.

## Research Avenues

In addition to a confirmatory study which seems necessary to quantitatively test the different dependency relationships established by the final research model. Another line of research that it seems opportune to pursue is the study of the effect of the quality of information on certain ERP benefits. The scoping study reported that the majority of ERP benefits derive from the quality of the information. She indicated that based on the information provided, the system can, for example, significantly improve cost control, decision making, etc.

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## REFERENCES

Andreas, I. N. (2004). Firm Performance Effects in Relation to the Implementation and Use of Enterprise Resource Planning. *Journal of Information Systems*, 18(2), 79-105.

Baile, S. (2003). L'évaluation du success de l'EDI dans les PME : un modèle intégrateur. *Annales des télécommunications*, 58(1-2), 297-328.

Bancroft, N. (1996). *Implementing SAP R/3*, Manning Publications, Greenwich.

Barki, H., & Pinsonneault, A. (2003). The Construct of Organizational Integration: A Research Framework and Its Application to Enterprise Systems Research. *Cahier du GReSI* pp. 03-04.

Bennani, A., Beldi, A. & Baile, S. (2004). Dix ans de recherche en alignement stratégique : 1993-2003. *Actes du 9ème Colloque AIM*, INT, Evry, Juin.

Benoît, G., & Benoit, G. (2001). *The Winds of Change*. CMA Management, Hamilton.

Bingi, P., Sharma, M. K., & Godla, J. K. (1999). CriTIal issues affecting an ERP implementation. *Information Systems Management,* 3, 7-14.

Boitier, M. (2002). L'influnce des technologies de l'information et de la communication sur la fonction de

Bradford, M., & Roberts, D. (2001). Does your ERP system measure up? *Strategic Finance, 83*(3), 30-34.

Chaabouni, A. (2006). Implantation d'un ERP: antécédents et conséquences. *Proceedings of XVème Conférence Internationale de Management Stratégique*, Annecy/Genève, pp. 13-16.

Chatti, H. (2008). *Les déterminants du succès d'une implantation d'un ERP dans le contexte tunisien*. Thèse de Doctorat en Sciences de Gestion, CRG-IAE, Université de Toulouse 1, Juillet.

Chtioui, T. (2004). ERP: les effets d'une normalisations des processus de gestion, *25 ème congrès de conférence AIMS*, 1-24.

Davenport, T. (1998). *Putting the Enterprise Into the Enterprise System. Harvard Business Review*, *76*(4), 121-131.

DeLone, W. H., & McLean, E. R. (1992). The Quest for the Dependent Variable. *Information Systems Research*, *3*(1), 60-95.

El Amrani, R. (2003). Target organizational vision as a success factor for an ERP project: the SAP case at the Consto company. *Proceedings of 8th AIM conférence, Grenoble*.



**Citation Information:** Chatti, H., Radouche, T., & Asfoura, E. (2021). Framework for the evaluation of the ERP implementation success: Case study in SMEs. *Journal of Management Information and Decision Sciences, 24*(4), 1-25.

Eskilsson, H., Nystrom, C., & Windler, M. (2003). *ERP Systems Effects: a Comparison of Theory and Practice*. Master Thesis in Business Administration, School of Economics and Commercial Law, GOTEBERG University. Retrieved from http://www.industrie.gouv.fr /observat/bilans/pdf/ chap2_tout.pdf, 12/04/2004.

EwusiMensah, K., & Przanyski, Z. H. (1991). On information systems project abandonment: an exploratory stydy of organizationnal practices. *MIS Quarterly, 15*(1), 67-85.

Fendt, J., & Sachs, W. (2008). Grounded Theory Method in Management Research - Users' Perspectives. *Organizational Research Methods*, *11*(3), 430-455.

Fui-Hoon Nah, F., Zuckweiler, K. M., & Lee-Shang Lau, J. (2003). ERP Implementation: Chief Information Officers' Perceptions of Critical Success Factors. International Journal of Human–Computer Interaction, 16(1), 5-22.

Ginzberg, M. J. (1981). Early diagnosis of MIS Implementation Failure: Promising results and unanswered Questions. M*anagement Science*, *27*(4), 459-476.

Glaser, B. G., & Strauss, A. L. (1967). *The Discovery of Grounded Theory: Strategies for Qualitative Research*. New-York: De Gruyter.

Gomez M-L., Frot, B., & Duwer, A. (2002). Quels effets organisationnels pour les ERP, *Actes de.*

Hammer, M., & Champy, J. (1993). *Le reengineering : réinventer l'entreprise pour une amélioration spectaculaire de ses performances.* Paris, Dunod.

Henderson, J., & Venkatraman, N. (1993). Strategic Alignment: Leveraging information technology for transforming organizations. *IBM Systems Journal, 32*, 4-16.

Huber, G. P. (1990). A Theory of the Effects of Advanced Information Technologies on Organizational Design, Intelligence, and Decision Making. *International Journal of Accounting Information Systems*, *2*, 271-294.

Janson, M. A., & Subramanian, A. (1996). Packaged software: Selection and Implementation Policies. *INFOR: Information Systems and Operational Research*, *34*(2), 133-151.

Jarvenpaa, S. L., & Ives, B. (1991). Executive Involvement and Participation in the Management of Information Technology. *MIS Quarterly*, *15*(2), 205-227.

Jouirou, N., & Kalika, M. (2004). Strategic alignment: determinant of performance (empirical study on SMEs). *Proceedings of 9ème Congrès de l'AIM*, Evry.

Kampmeier, C. (1998). Organizational culture and leadership. Journal of Management Consulting, 10(2).

Kidd, J., & Richter, F.-J. (2001). The hollowing out of the workforce: What potential for organizationallearning? *Human Systems Management*, *20*, 7-18.

Kuan, K. K. Y., & Chau, P. Y. K. (2001). A Perception-Based Model for EDI Adoption in Small Business using a Technology-Organisation-Environment Framework. *Information & Management*, *38*(8), 507-521.

Laudon, K. C., & Laudon, J. P. (2019). *Management Information Systems: Managing the Digital Firm*. Pearson Education, Inc.

Lequeux, J. L. (1999). *Manager avec les ERP, progiciels de gestion intégrés et interne*, Les Editions *l'AFC*, 1-16.

Mabert, V. A., Soni, A., & Venkataramanan, M. A. (2003). The impact of Organization Size on Enterprise Resource Planning (ERP) Implementations in the US Manufacturing Sector. *Omega*, *31*(3), 235-248.

Markus, M. L., & Tanis, C. (2000). *The Enterprise System Experience: From Adoption to Success.* In: Zmud, R. W. (ed.) *Framing the Domains of IT Management: Projecting the Future through the Past*. Pinnaflex Educational Resources Inc., Cincinnati, pp. 173–207.

McKeen, J.D**.**, Smith, H.A. et Parent, M., (1997), *Assessing the Value of IT: The Leverage Effect*, in the 4th European Conference on Information Technology, Cork, Ireland, June 21-13.

Nelson, R. R., & Cheney, P. H. (1987). Training end users: an exploratory study. *MIS Quarterly*, *11*(4), 547-559.

Oliver, D., & Romm, C. (2002). Justifying Enterprise Resource Planning Adoption. *Journal of Information Technology*, 17, 199-213.

Parr, A. N., Shanks, G., & Darke, P. (1999). The identification of necessary factors for successful implementation of ERP systems. In: Ngwenyama, O., Introna, L. D., Myers, M. D., & DeCross, J. I. (Eds.) *New information technologies in organisational process*. Boston: Kluwer Academic Publishers, pp. 99-119.

Piturro, M. (1999). How midsize companies are buying ERP. *Journal of Accountancy*, 41-48.

Poston, P., & Grabski, S. (2001). Financial impacts of enterprise resource planning implementations. *International Journal of Accounting Information Systems*, *2*, 271-294.

Powney, J., & Watts, M. (1987). *Interviewing in Educational Research*, London, Routeledge.

Pupion P. C., & Leroux, E., (2006). Diffusion des ERP et comportements mimétiques. *Proceedings of 15ème Conférence Internationale de Management Stratégique (AIMS),* Annecy-Genève.

Rajagopal, P. S. (2002). An Innovation Diffusion View of Implementation of ERP Systems and Development of a Research Model. *Information & Management, 40*(2), 87-114.



**Citation Information:** Chatti, H., Radouche, T., & Asfoura, E. (2021). Framework for the evaluation of the ERP implementation success: Case study in SMEs. *Journal of Management Information and Decision Sciences, 24*(4), 1-25.

Rivard, S., & Talbot, J. (1999). *Le développement des systèmes d'information – Une méthode intégrée à la transformation des processus*, PUQ.

Rogers, E. M. (1983). *Diffusion of innovations*. New York: Free Press.

Rogers, E. M. (1995). *Diffusion of innovations*. New York: Free Press.

Rogers, E. M. (2003). *Diffusion of innovations.* New York, Free Press (5th Ed).

Shang, S., & Seddon, P. B. (2000). A Comprehenive Framework for Classifying the Bneefits of ERP Systems. *Proceedings of the 2000 Americas Conference on IS, Long Beach California*, pp. 1005-1014.

Shanks, G., Parr, A., Hu, B., Corbitt, B., Thanasankit, T., & Seddon, P. (2000). Differences in critical success factors in ERP systems implementation in Australia and China: a cultural analysis. *In proceedings of the European Conference on Information systems* (in press).

Singletary, L. (2003). *Empirical Study of Attributes and Perceived Benefits of Applications Integration for Enterprise Systems. Ph.D* Thesis submitted to Louisiana State University.

Somers T. M., & Nelson K. (2001). The Impact of Critical Success Factors across the Stages of Enterprise Resource Planning Implementations Computer Science. *Proceedings of the 34th Annual Hawaii International Conference on System Sciences.*

Stedman, C. (1998). *Business application rollouts still difficult*. Computerworld, Framingham.

Stewart, G., Milford, M., Jewels, T., Hunter, T., & Hunter, B. (2000). Organizational readiness for ERP implementation. In Proceedings of the Americas Conference on Information Systems pp. 966-971.

Suddaby, R. (2006). From the Editors: What Grounded Theory is not. *Academy of Management Journal*, *49*(4), 633-642.

Thong, J. Y. L., Yap, C-S., & Raman, K. S. (1994). Engagement of External Expertise in Information Systems Implementation. *Journal of management Information Systems*, *11*(2), 209-231.

Venkatesh, V., & Davis, F. D. (2000). A Theoritical Extension of the Technology Acceptance Model: Four Longitudinal Field Studies. *Management Science*, *46*(2), 186-204.

Venkatraman, N., & Zaheer, A. (1990). Electronic Integration and Strategic Advantage: A Quasi-Experimental Study in the Insurance Industry. *Information Systems Research*, *1*(4), 377-393.

Vincent, B., & Gharbi, S. (2004). Impact du déploiement de SAP R/3 sur la performance globale d'une entreprise et facteurs clés de succès: proposition d'un tableau de bord et application dans le secteur de l'industrie pharmaceutique. *Journée de recherche à l'IAE de Montpelier*, *2004*, 1-27.

Willcocks, L. P., & Sykes, R. (2000), *"Enterprise resource planning: the role of the CIO and it function in ERP. Communications of the ACM*, *43*(4), 33-38.

Xu, H., Horn Nord, J., Brown, N., & Darly Nord, G. (2002). Data quality issues in implementing an ERP. *Industrial Management & Data systems*, *102*(1), 47-58.



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