

Critical Success Factors for Implementing Integrated ERP/CRM Systems

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Abstract: *In the era of economic globalization and technology expansion, enterprises understand that, in order to support their activities and gain larger market share, they must integrate their front-office Customer Relationship Management (CRM hereafter) and back-office Enterprise Resource Planning (ERP hereafter) systems as to give birth to new customer-centric strategies and remain competitive. Researchers' and practitioners' interest in ERP/CRM integration is increasing. There is, however, a strong debate in the research community, concerning the success and failure rate of ERP/CRM integration projects. The successful integration is elusive to many enterprises and therefore, both academics and practitioners have attempted to identify and understand the factors affecting the ERP/CRM integration process. In order to further advance research within this area, the present paper reports a comprehensive review of the literature on Critical Success Factors (CSFs hereafter) involved in ERP/CRM software integration. The findings suggest that a variety of factors have a great impact on the ERP/CRM integration projects, such as top management support and clarity of responsibilities, clear integration motivation, objectives, strategy and methods, users' appreciation on system integration, qualified project team, effective coordination between project team and ERP/CRM staff, business process reengineering, effective internal and external communication and so on. Future research should develop a model of the effectiveness of ERP/CRM integration based on empirical evidence, in order to provide a better understanding of the factors critically involved in a successful ERP/CRM integration.*

Keywords: *Critical Success Factors (CSFs), Customer Relationship Management (CRM), Enterprise Resource Planning (ERP), ES Integration, Enterprise Application Integration (EAI), Literature review*

1. INTRODUCTION

Today's rapidly changing and highly competitive business environment, in conjunction with the current economic downturn, put pressure on enterprises to adopt new management philosophies in order to meet customers' needs, improve their satisfaction and increase business performance, (Aberdeen, 2010; Chen, 2009; Schubert and Williams, 2009b; Al Mamari and Nunes, 2008; Ko et al., 2008). In a world increasingly driven by the three Cs: Customer, Competition and Change, a significant number of enterprises decide to integrate their front-office CRM and back-office ERP systems and give birth to new customer-centric strategies (Schumbert and Williams, 2010). This trend has been realized in various forms during the last years. For example, ERP vendors increased the functionality of their systems to include CRM capabilities and respectively CRM software has been augmented in an effort to include basic ERP operating effectiveness. In addition, Enterprise Application Integration (EAI hereafter) technologies help enterprises integrating their systems. However, the effort of many enterprises that have attempted to implement integrated ERP/CRM software systems, was unsuccessful and nevertheless, the goal of providing an effective integration of ERP/CRM software is still under question (Friedrich et al., 2010; Finnegan and Currie, 2009).

The successful integration of ERP and CRM software systems is a big challenge for many organizations, because if a company fails in its venture, it is very difficult to retry again (Davids, 1999). It seems, therefore, that there are some factors influencing the ERP/CRM integration success, which exist from the decision to integrate the software systems to the initial phase and quite further to ERP/CRM integrated systems implementation, (Al Mamari and Nunes, 2008). Based on an extensive search of the literature, we identify a set of CSFs that has a considerable impact on the effectiveness of ERP/CRM integration and therefore, organizations should pay significant attention to, such as top management support and clarity of responsibilities, clear integration motivation, objectives, strategy and methods, users' appreciation on system integration, qualified project team, effective coordination between project team and ERP/CRM staff, business process reengineering, effective internal and external communication, users' integration expertise, costs and financial support, internal and external pressures, readiness of enterprise, step by step integration, characteristics of integration packages and evaluation frameworks. The above mentioned factors are common across different studies, indicating a high level of agreement among researchers, (Litan et al., 2011; Gericke et al., 2010; Kamal et al., 2009 Huang and Chen, 2007; Kamal and Themistocleous,

2006; Cheng et al., 2005; Themistocleous, 2004; Themistocleous et al., 2004; Chen and Popovich, 2003; Sterba, 2003; Edwards and Newing, 2000). However, many studies are either based solely on literature reviews or they had not considered new developments impacting CRM both in the IT/IS domain and in the social environment, such as, for example, social networking.

The research reported in this paper aims at identifying and providing an updated classification of the major CSFs affecting ERP and CRM systems integration, based on some important pieces of previous research work within the area, in order to help both academics and practitioners gaining greater insights and overcome potential difficulties of ERP/CRM integration projects.

The rest of this paper is divided into four sections. In Section 2 we make an attempt to define some major concepts in order to gain a better understanding of ERP/CRM integration. Section 3 reviews the prior literature considering Information technology integration and especially ERP/CRM integration and identifies a set of CSFs. The fourth and final section includes a discussion of the findings and directions for future research.

2. THEORETICAL BACKGROUND

The new area of economies' integration and markets' convergence in global level prompted the enterprises to replace legacy systems and invest heavily in modern information technologies. During the last decades, the majority of enterprises around the world adopted integrated software packages, such as ERP and CRM systems, in order to ensure both their position in the market and a competitive advantage.

ERP is the acronym of the words Enterprise Resource Planning and the literature is full of relevant definitions and descriptions, but with not much differences. According to the academic community, ERP systems can be defined broadly as an integrated family of software applications that support business processes, handle the core operations of an enterprise, enable the automation of routine tasks and the reduction of operation costs, the production and share of common real-time data, and radical changes in information processing orientation aiming at achieving competitive advantage and improving business performance (Grabski et al., 2011; Kanellou and Spathis, 2011; Xiaojiing and Jihong, 2009; Baptiste, 2009; Spathis and Ananiadis, 2005; Nicolaou, 2004; Stefanou, 2002; Themistocleous et al., 2001; Kumar and Hillegersberg 2000; Nicolaou, 1999; Davenport, 1998). Further, an ERP system consists of different modules used to address the needs of several organization functions, such as accounting, finance, logistics, sales, customer service, etc (Sadagopan, 2003). The successful implementation of these modules may require extensive business process re-engineering for the company to adapt, at least partially, to certain ERP software requirements and best practices embedded in the software.

CRM has its roots in the relationship marketing discipline, which aims at building long-term, mutually satisfying relationships with customers, suppliers and distributors, (Sarmaniotis and Stefanou, 2005). However, there is no clear definition of the term and is still a matter of controversy among both academics and practitioners. For some enterprises CRM is a management strategy designed for re-establishing their connections to new and existing customers (Coltman et al., 2010), while other enterprises introduce a slight differently view, describing CRM as a technology solution which integrates customer service, marketing and sales functions of the business with suppliers, internal customers and e-customers, (Richard and Jones, 2008; Kim et al., 2003). In general, CRM can be defined as a combination of marketing methodologies, software and Internet capabilities that aims to manage and re-build stable customer relationships, promote customer loyalty and satisfaction as well as improve cost and revenue sites of the profit equation, through better customer services and products development, (Sarmaniotis and Stefanou, 2005; Stefanou et al., 2003).

The last decade, while the rise of Information technology has been the most significant subject of an enterprises' attention, *Enterprise Application Integration* (EAI hereafter) is considered to be the main driver of internal data integration. According to McKeen and Smith (2002), EAI is the use of plans, methods and tools which are designed to modernize, consolidate, integrate and coordinate computer applications with the enterprise. Mendoza et al. (2006) state that enterprises choose to integrate their applications in order to rapidly respond to market needs and improve their business performance. However, EAI is characterized as a big challenge and demands considerable time, effort and changes in the organizational structure. Therefore, enterprises should be well informed of the factors influencing the EAI, in order to achieve a good Return on Investment.

Concerning Critical Factors, they can be defined in general as characteristics conditions or variables that can have a significantly impact on a firm, if they are not managed appropriately (Rahimi and Berman, 2009; Leidecker and Bruno, 1987). More specifically, according to Eid (2007), critical factors are activities that are carried out to guarantee a successful implementation or to cause a failure in an application implementation. Therefore, critical factors can be Critical Success Factors or Critical Failure Factors.

Further, as CSFs can be used to evaluate ex ante the success of ERP/CRM integration projects, a comprehensive explanation of what is considered to be successful is necessary. The majority of the literature, measures the outcome of a project, in terms of costs, expected benefits and time, in order to characterize it as successful or not, (Band, 2008). We assume that, a successful ERP/CRM integration project is an integrated software package that supports the objectives and goals of the adopting enterprise. For example, it increases business profitability and revenue, it decreases costs and it promotes customer loyalty and satisfaction.

3. REVIEW OF THE LITERATURE

As already mentioned, there are a lot of ERP/CRM integration failures. This is mainly because some significant success factors are underestimated during the implementation of integrated ERP/CRM systems. To date, a number of empirical studies have resulted in the identification of a set of drivers and factors, more general or specific, that can influence the effectiveness of an ERP/CRM integration project, (Litan et al., 2011; Gericke et al., 2010; Kamal et al., 2009; Huang and Chen, 2007; Kamal and Themistocleous, 2006; Mendoza et al., 2006; Cheng et al., 2005; Cybulski and Lukaitis, 2005; Themistocleous, 2005; Themistocleous, 2004; Chen and Popovich, 2003; Singletary and Watson, 2003; Sterba, 2003; Holley, 2002; Tan et al., 2002; Edwards and Newing, 2000). As it has been noted earlier, both ERP and CRM systems are technology based and therefore, in this section we turn to Information technology literature in order to understand the CSFs of ERP/CRM integration process. We observe that a lot of the suggested factors are interrelated and influence the integration process as a whole. Table 1 forecloses the main CSFs that have been identified in the literature and the following list describes briefly each one.

3.1. Top management support and clarity of responsibilities

A review of successful ERP/CRM integration projects has shown that top management support and clarity of responsibilities are the most critical factors required in the design, implementation and operation of such systems, as they ensure their smooth rollout. Specifically, top management, in order to guarantee the success of ERP/CRM integration and support the necessary structural and management changes in an enterprise, should approve the project, identify it as a top priority and try to ensure its financial resources. Further, clarity of responsibilities among people involved in the integration project is essential for ensuring efficient processes, (Kamal et al., 2009; Themistocleous et al., 2009; Caldeira et al., 2008; Kamal et al., 2008b; Kamal and Themistocleous, 2006; Mendoza et al., 2006; Chen and Popovich, 2003; Sterba, 2003).

3.2. Clear integration motivation, objectives, strategy and methods

The integration motivation is one of the most frequently mentioned factors in the literature. Motivation is the phase when an enterprise becomes aware of a technology and attempts to acquire relevant knowledge. One of the most fundamental elements in business performance' improvement is having clearly defined objectives and long term goals. It is often the case that well defined and deeply understood goals and visions are the ones that are translated into CSFs. In more detail, the business objectives to be reached and the justification for investment in ERP/CRM integration must be clearly stated as well as mutually agreed and understood. A careful strategy and an appropriate formulation of methods and policies throughout the firm are needed to guide ongoing organizational effort and support a systematic application integration process, (Litan et al., 2011; Gericke et al., 2010; Kamal et al., 2009; Sophonthummapharn, 2009; Kamal et al., 2008b; Huang and Chen, 2007; Sterba, 2003).

3.3. Users' appreciation on system integration

The process of getting users to accept and adopt the integrated system in their daily work processes is seen as a crucial factor making the integration project a success. A positive appreciation on ERP/CRM integration will affect both the integration process and the new system's performance (Litan et al., 2011; Gericke et al., 2010; Kamal et al., 2009; Themistocleous et al., 2009; Huang and Chen, 2007; Sterba, 2003).

3.4. Qualified project team

An inadequate project team has been one of the significant reasons of ERP/CRM integrations failure. In order for a project team to be characterized as qualified, it must consist of members that have both business and technical knowledge. In more detail, the success of ERP/CRM integration is related to the selection of suitable team members that must have significant skills, abilities, training and experience. So, an integration project can be completed more rapidly and more economically, (Litan et al., 2011; Gericke et al., 2010; Kamal et al., 2009; Huang and Chen, 2007; Kamal and Themistocleous, 2006; Holley, 2002).

3.5. Effective coordination between project team and ERP/CRM staff

In order to meet strategic integration goals, it is necessary that exists an effective coordination and cooperation between project team and ERP/CRM staff. An effective coordination and cooperation is one of the most challenging and difficult tasks in any ERP/CRM integration project. The coordination must be based on trust, mutual understanding and cooperative communication, (Litan et al., 2011; Gericke et al., 2010; Themistocleous et al., 2009; Sledgianowski et al., 2008; Cybulski and Lukaitis, 2005; Themistocleous, 2004).

3.6. Effective internal and external communication

Communication can be divided into 2 categories: internal and external. Internal is the communication between all management levels and all levels of employees, so as everybody to be informed for the integration and implementation of an ERP/CRM system and the changes that are going to take place in the enterprise. The internal communication is very

important as it can ensure minimum resistance to change, clarity of business goals and strong support and commitment, (Al Mamari and Nunes, 2008; Goodman and Truss, 2004). External is the communication between an enterprise and its suppliers and customers, distributors, vendors and consultants in order to be well informed of new business services, products and facilities. Exchange of effective and targeted communication within the enterprise and also among the employees and suppliers, distributors, customers, vendors and consultants, is important for determining business requirements and needs. Business requirements and needs help an enterprise to recognize milestones in an ERP/CRM integration project. Specifically, employees should be notified about the integration project plan, scope, objectives, activities and updates in advance. Newsletters, weekly and monthly meetings and other communication tools, such as advertisements must be used to keep internal and external users informed of ERP/CRM integration progress, (Litan et al., 2011; Gericke et al., 2010; Al Mamari and Nunes, 2008; Sledgianowski et al., 2008; Cybulski and Lukaitis, 2005; Goodman and Truss, 2004; Themistocleous, 2004).

3.7. Business process reengineering

Business Process reengineering (BPR) is a subject matter in which extensive research has been carried out, especially in relation to integrated ERP/CRM systems. BPR in general, seeks to achieve performance improvement by redesigning and reorganizing the business processes, (Hammer and Champy, 1993). In order enterprises to take advantage of the best practices offered by the new ERP/CRM integrated system, processes and activities have to be aligned with it. When business activities are not aligned with the procedures incorporated in ERPs, they must be radically redesigned to meet the requirements of the new system and consequently, increase business performance. Further, after the ERP/CRM project goes live, business process reengineering should continue with new updates, to take full advantage of the new system's capabilities. However, it should be noted that, adopting the new culture that an integrated system brings in an enterprise is often a big problem, (Kamal et al., 2008b; Huang and Chen, 2007; Chen and Popovich, 2003; Tan et al., 2002).

3.8. Users' integration expertise

Users' integration expertise (training, education and experience) is a necessary determinant for the best practice of the new integrated system. Since ERP/CRM integration brings changes or new processes, it is of great significance to train potential users on how the integrated system works and how the new functionality relates to the business processes. However, it is a significant challenge for an enterprise to select an appropriate plan for user training and education. The academic community points out that user must be knowledgeable about how an integrated ERP/CRM system can be adapted to every component of an enterprise. Similarly, companies that already have users with high levels of integration expertise, are more prepared to implement new technologies such as integrated ERP/CRM systems, (Gericke et al., 2010; Kamal et al., 2009; Huang and Chen, 2007; Ho and Lin, 2004; Themistocleous, 2004).

3.9. Costs and financial support

Cost can be seen as a key component and many enterprises perform a cost benefit analysis before taking any important decision regarding the investment in the integration of IT technologies. The availability of financial resources to enhance or build organizational IT infrastructure is one of the strongest predictors of innovation, (Mohr, 1969). For integrating ERP/CRM systems, financial support is indispensable for procuring and developing adequate levels of hardware and software, and training end-users as needed. So, higher levels of financial support may influence positively EAI adoption, (Kamal and Themistocleous, 2009; Kamal et al., 2009; Kamal and Themistocleous, 2006; Mantzana and Themistocleous, 2005; Themistocleous, 2004; Singletary and Watson, 2003).

3.10. Benefits and Barriers

According to the research community, the benefits and barriers an ERP/CRM integration causes to an enterprise cover organizational, operational, managerial and technical levels. These benefits and barriers are major determinants of new technologies and should be identified and become a focus of concern during the integration process, (Kamal et al., 2009; Kamal and Themistocleous, 2006; Mantzana and Themistocleous, 2005; Themistocleous, 2004).

3.11. Internal and External pressures

A range of previous research studies concedes that internal and external pressures are key components in initiating the ERP/CRM integration in an enterprise. Internal pressures can cover technical and managerial pressures, cost pressures etc., while external pressures can cover the multiple enterprises' actors such as vendors, customers, suppliers, distributors etc., (Kamal and Themistocleous, 2009; Kamal et al., 2009; Kamal and Themistocleous, 2006; Mantzana and Themistocleous, 2005; Themistocleous, 2004; Khoubati et al., 2003).

3.12. Characteristics of integrated packages and Evaluation frameworks

IT characteristics have a strong impact on their adoption and integration process. These include for example, IT infrastructure and sophistication. More specifically, IT infrastructure is considered as an essential requirement for ERP/CRM integration and refers to the level of IT resources and personnel IT knowledge of an enterprise. In addition, IT sophistication is related to the level of technical expertise an enterprise has and influences significantly the ERP/CRM

integration process. It should be noted that a variety of EAI packages exist in the integration marketplace. A lot of academics have proposed interesting frameworks for evaluating these packages. These frameworks can be used as decision-making tools to support the adoption and implementation of EAI, (Litan et al., 2011; Gericke et al., 2010; Kamal et al. 2009; Huang and Chen, 2007; Kamal and Themistocleous, 2006; Mendoza et al., 2006; Mantzana and Themistocleous, 2005; Wortmann, 2005; Themistocleous, 2004; Sterba, 2003).

3.13. Readiness of enterprise

Readiness of enterprise is a factor widely recognized in the literature to have a critical impact on ERP/CRM integration and is strongly associated to other critical factors such as education, training and expertise, (Themistocleous et al., 2009; Mantzana and Themistocleous, 2005; Themistocleous, 2004; Sterba, 2003).

3.14. Step by step integration

In order for an ERP/CRM integration to be successful, step by step integration is needed. The choice of the appropriate packages involves important decisions regarding budgets, timeframes, goals and deliverables. To ensure the project completion according with the plan, close monitoring and controlling of both time and costs are key determinants, (Huang and Chen, 2007).

3.15. Data security and privacy

Data security and privacy have always been important, as enterprises' data may contain some of the most important organizational information such as the credits history, debts (if any) details, funding etc. Access to such information must be controlled, especially in terms of integrated systems, because disclosure to irrelevant users may cause problems to both employees and customers' privacy, (Gericke et al., 2010; Kamal et al., 2009; Mendoza et al., 2006; Wortmann, 2005).

3.16. Principles and Guidelines

In order to ensure the success of ERP/CRM integration, the use of Principles and Guidelines is essential and it has been reported in some important pieces of previous research works, (Gericke et al., 2010; Wortmann, 2005).

Table 1: Critical success factors for implementing integrated ERP/CRM systems.

CRITICAL FACTORS SUGGESTED IN THE LITERATURE	MENTIONED BY
Top management support and clarity of responsibilities	Kamal et al., (2009); Themistocleous et al., (2009); Caldeira et al., (2008); Kamal et al., (2008b); Kamal and Themistocleous, (2006); Mendoza et al., (2006); Chen and Popovich, (2003); Sterba, (2003)
Clear integration motivation, objectives, strategy and methods	Litan et al., (2011); Gericke et al., (2010); Kamal et al., (2009); Kamal et al., (2008b); Huang and Chen, (2007); Sterba, (2003)
Users' appreciation on system integration	Gericke et al., (2010); Themistocleous et al., (2009); Huang and Chen, (2007); Kamal and Themistocleous, (2006); Singletary and Watson, (2003)
Qualified project team	Litan et al., (2011); Gericke et al., (2010); Kamal et al., (2009); Huang and Chen, (2007); Kamal and Themistocleous, (2006); Holley, (2002)
Effective coordination between project team and ERP/CRM staff	Litan et al., (2011); Gericke et al., (2010); Themistocleous et al., (2009); Sledgianowski et al., (2008); Cybulski and Lukaitis, (2005); Themistocleous (2004)
Effective internal and external communication	Litan et al., (2011); Gericke et al., (2010); Al Mamari and Nunes, (2008); Sledgianowski et al., (2008); Cybulski and Lukaitis, (2005); Goodman and Truss, (2004); Themistocleous, (2004)
Business process reengineering	Kamal et al., (2008b); Huang and Chen, (2007); Chen and Popovich, (2003); Tan et al., (2002)
Users' integration expertise	Gericke et al., (2010); Kamal et al., (2009); Huang and Chen, (2007); Themistocleous, (2004)
Costs and financial support	Kamal and Themistocleous, (2009); Kamal et al., (2009); Kamal and Themistocleous, (2006); Mantzana and Themistocleous, (2005); Themistocleous, (2004); Singletary and Watson, (2003)
IT Benefits and Barriers	Kamal et al., (2009); Kamal and Themistocleous, (2006); Mantzana and Themistocleous, (2005); Themistocleous, (2004)
Internal and External pressures	Kamal and Themistocleous, (2009); Kamal et al. (2009); Kamal and Themistocleous (2006); Mantzana and Themistocleous, (2005); Themistocleous, (2004); Khoubati et al. (2003)
Characteristics of integrated packages and Evaluation framework	Litan et al., (2011); Gericke et al., (2010); Kamal et al. (2009); Huang and Chen, (2007); Kamal and Themistocleous (2006); Mendoza et al., (2006); Mantzana and Themistocleous, (2005); Wortmann, (2005); Themistocleous, (2004); Sterba, (2003)
Readiness of enterprise	Themistocleous et al., (2009); Mantzana and Themistocleous (2005); Themistocleous, (2004); Sterba, (2003)
Step by step integration	Huang and Chen (2007)
Data security and privacy	Gericke et al., (2010); Kamal et al., (2009); Mendoza et al., (2006); Wortmann, (2005)
Principles and Guidelines	Gericke et al., (2010); Wortmann, (2005)

4. CONCLUSIONS

Extant literature has identified several CSFs for ERP/CRM integration, a fact that should be taken into account by managers designing integration projects. Conclusions are made that previous research has primarily pointed to the importance of CSFs that could be characterized mainly as a) Technological (i.e. characteristics of integrated packages, evaluation frameworks, data security and privacy, IT expected benefits and barriers, step by step integration), b) Human (i.e. top management support, users' appreciation on system integration, existence of a qualified project team, effective coordination between project team and ERP/CRM staff, effective internal and external communication, users' integration expertise) and c) Organizational (i.e. clear integration motivation, objectives, strategy and methods, business process reengineering, costs and financial support, internal and external pressures, readiness of enterprise, business Principles and Guidelines). The above categories of CSFs could contribute to enterprises both in the stage of decision making and integration of their front-office CRM and back-office ERP. Future research could investigate the factors outlined in this paper and propose a model of the effectiveness of ERP/CRM integration based on empirical evidence, in order to report those factors that have the greatest impact on a successful ERP/CRM integration. Further, future researchers could concentrate on identifying any other success factors for implementing integrated ERP/CRM systems and finding suitable instruments for measuring their importance.

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