THE ERP SYSTEMS IMPACT ON BUSINESS PERFORMANCE

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Abstract

Enterprise Resource Planning (ERP) systems are now the prevailing business information systems platform in the enterprises worldwide. While no one questions seriously the necessity for most enterprises to implement ERP systems, many studies researching the impact ERP systems have on business performance, report contradictory results. In this paper, based on literature review and motivated by the mixed results of previous academics works, the limited research regarding the identification of what are the important dimensions of ERP systems and the unexpected rate of ERP systems failure in recent years, we try to identify relationships between ERP dimensions and particular categories of business performance. In particular, ERP system’s user information satisfaction, post-implementation review, integration and extended ERP systems, have been identified as important dimensions of ERP software having an impact on business performance. Measures of business performance fall into the financial, operating and strategic categories of benefits. Moderating variables such as the extent of business process reengineering that takes part during the ERP implementation and organizational and cultural variables are also included in our proposed research model.

Keywords: Enterprise Resource Planning, ERP systems, business performance

1 INTRODUCTION

Nowadays, the economic crisis, severe competition and tight budgets for Information Technology (IT) investment in the enterprises worldwide, put a burden on managers who have to justify every expense they make regarding technology and information technology products in particular. Thus, due its importance, the relationship between Information Systems (IS) and business performance is a research area that has been receiving a particular attention in the academic literature. However, despite the large number of papers published in journals and in conference proceedings, no definite conclusions exist and still this is a matter of controversy. Taking into account the fact that ERP research has been conducted extensively during the last twenty years, it is rather surprising the large number of ERP systems failures reported in the last years, which had a negative or even a severe consequence on the adopting organizations. This existence of negative or no relationship between IT spending and business performance, or in other words the non-delivery of benefits from IT investments, which was found by many studies, became what is widely recognized as the “IT productivity paradox”
Regarding Enterprise Resource Planning (ERP) systems, which are now the prevailing business information systems platform in most enterprises worldwide, the situation is even more confused, largely due to the nature and the characteristics of ERP systems, which make them complex and difficult to be evaluated (Stefanou, 2001).

It is true that failure in ERP projects, due mainly to the pervasive nature of the software, entails not only costs for the adopting enterprise but serious risks for the existence of the company itself. Firms that have abandoned or experienced failed ERP projects have also experienced lost revenue, wasted time and cost overruns (Bradley, 2008). But what is the outcome in situations where there is no obvious failure of the ERP system? Does it provide the solid informational foundation needed for a sustainable competitive advantage and excellence in business performance?

In following this research, we were motivated by the mixed results of previous academic works, the limited research regarding the identification of what are the important dimensions of ERP software and the unexpected rate of ERP systems failure in recent years (after 20 years of researching and implementing ERP systems) deteriorating business performance. In addition, we are based on suggestions by ERPs Post Implementation Review (PIR) theory (e.g. Nicolaou, 2004), the DeLone and McLean Model of Information Systems Success (DeLone and McLean, 1992), the Technology Acceptance Model (TAM3) (Davies, 1989, Venkatesh and Bala, 2008), and the management theory of Business Process Reengineering (BPR) (Hammer and Champy, 1993).

The research reported in this paper aims at providing an exploration of the relationship between certain individual aspects of Enterprise Resource Planning (ERP) systems and business performance in general. Although there is a large volume of research concerning the impact of ERP systems on business performance, in many cases the conclusions are mixed and in several occasions vague. It seems that the distinct dimensions of ERP software have been considered extensively in the literature (Stefanou and Athanasaki, 2012).

In the current study, following an extensive search of the literature, we initially identified several dimensions of business performance. Next, certain characteristics of ERP systems that seem to be related or having an impact on business performance identified, and, additionally, differentiate them from other business information systems. Then, we present several dimensions of business performance. Research questions concerning ERP systems and business performance are postulated.

The rest of this paper is structured as follows: The following section reviews the literature concerning ERP impact on business performance. Then, the distinct characteristics of ERP software are discussed. Finally, conclusions, potential limitations and suggestions for future research are presented.

2 LITERATURE REVIEW

Business performance is a general term meaning different things to different people. Although many studies on ERP and performance focus on financial measures, there are many others that examine either non-financial benefits or operational benefits that have no immediate effect on the financial position of the firm but are rather of a more long-term character. A range of papers examine the impact of ERP systems on certain functions of the firms, especially the accounting and auditing function (see e.g. Spathis and Ananiadis, 2005; Sutton, 2006; Kanellou and Spathis, 2011; Vakalfotis et al. 2011). In this study, after an extensive literature review of ERP systems and business performance we concluded that most authors report benefits or measures of business performance which fall into one or more of these three types, namely operational/managerial, strategic, and financial.

It is however true, that many studies researching ERP systems impact on business performance reach to contradictory results. According to Beard & Sumner (2004), for example, the use of an ERP system does not reduce business costs more than if the system had not been implemented. On the other hand, Bendoly et al. (2009) argued that the correct use of information in conjunction with operational excellence and customer intimacy can lead to an increase in strategic performance, engendering business profitability.
As far as financial performance is concerned, there are many studies reporting that ERP systems influence positively the financial performance of the adopting organization and enhances its competitive advantage (e.g. Sudzina et al., 2011). Poston and Grabski (2001) found no connection between ERP and profitability when they tried to measure the profitability of an ERP adopter firm and compare it with its profitability before the adoption of the new system. Hunton et al. (2003) reported that the firms which had implemented ERP systems had better performance than non-adopter firms. However, the difference in firm performance between adopters and non-adopters is due to the fact that the performance of the former remained fixed while the performance of the latter reduced.

Velcu (2005), using financial ratios such as Return on Investment (ROI) and Return on Assets (ROA), investigated whether the successful ERP adopters have a higher financial performance compared to the less successful ERP adopters. It was assumed that a less successful adoption prevent the efficiency of assets utilization and business processes. The findings showed no significant difference in the financial performance after ERP implementation between the two groups of firms, at least as far as ROA and ROI are concerned. However, successful ERP adopters seems to have better efficiency benefits than the less successful ERP adopters, in terms of Assets Turnover and Capital Turnover, during the first two years of the ERP’s implementation.

Hendricks et al. (2007) focused their research on the financial benefits of ERP among different enterprise systems. A key conclusion is that, although the cost for ERP implementation is very high, there is no evidence for negative relationship between financial performance and ERP implementation.

Nicolaou and Bhattacharya (2008) tried to test the effect of post-implementation activities on firms that have adopted ERP systems. It was found that the quality of Post Implementation Review (PIR) influences the sustainability of financial and other performance measures. One of their research questions was if there is difference in the financial performance between firms that employ PIR Quality activities and firms that do not employ such activities. The authors concluded that PIR activities that have to do with better system implementation planning and business process effectiveness, result to a significant improvement as far as ROI, ROS, the cost of goods sold over sales ratio and the employee efficiency ratio are concerned. However, PIR activities which have to do with system fit resolution, global reach and attaining benefits, seems to have a negative effect on profitability.

Integrated as well as extended ERP systems seem to add value to adopting firms (see e.g. Themistocleous et al., 2001; Wieder et al., 2006; Maroofi, 2011; Koh et al, 2011). In a relatively recent study, it was found that firms that adopted SCM had also noticed improvements in profitability and in stock returns (Maroofi, 2011). However, as the author noticed, the methodology used was not able to examine internal firm mediating factors that may influence the financial value from enterprise systems. Chang et al (2008) have also considered competitive advantage benefits arising from ERP/SCM implementations. Apart from SCM, other add-on or integrated systems such as CRM or Business Intelligence (BI) software seem to enhance the performance of ERP systems.

Studies on ERP systems do not only focus on financial benefits. Organizational, operational and managerial benefits resulting from ERP adoption have been reported by many researchers (see e.g. Loo et al., 2013; Madapusi and D’Souza, 2012; Stefanou and Revanoglou, 2006). In their study, Stefanou and Revanoglou (2006) found that an SAP implementation in a general hospital resulted in improvement in information quality which can lead to better decision making and improvements in health care, reduction of the ambiguity about order information, automated generation of the list of requirements, accurate billing and therefore no loss of income, real-time updating of patient records, existence of available information regarding the type and the quantity of ordered-granted medicines for each patient, and follow-up of suspended orders. In another study, Loo et al. (2013), focusing on the impact of ERP adoption by small and medium firms on the organizational benefits, concluded that all of the SMEs that implemented an ERP-system in the last three years needed less than three years for organizational benefits to start materializing.

The literature review presented above show contrasting findings and calls for more research. In our opinion, certain important dimensions of ERP systems have not been examined extensively and exclusively considered as having an impact on firm performance. Thus, in the following section we
present a research model which includes these characteristics of ERP systems and moderating variables that have an impact on the relationship between ERP characteristics and certain types of business performance.

3  ERP AND BUSINESS PERFORMANCE: A RESEARCH MODEL

In the previous section the relationships between the ERP systems and its impact on the business performance was discussed. However, no definite conclusions exist and this may be explained by the fact that there are many environmental moderating variables that influence dramatically these relationships. For example, discussing ERP impact on costs, there is evidence that long-term cost reductions may occur, but currently there is no clear evidence that companies can achieve a competitive advantage through cost reductions induced by the ERP system alone. Stefanou (2001) has suggested that cost reductions would be a source of competitive advantage, although these reductions do not derive from the use of the ERP system per se, but they follow the re-organization and re-engineering of business processes as a result of implementing the ERP system. This is so because in most cases, enterprises have to adapt their processes to the software’s best practices, rather the other way round, due to the extreme complexity of the software and the serious risks involved in ERP implementations (Davenport, 1998). Therefore, the extent and the effectiveness of BPR during ERP implementation seem as having an impact on the relationships between the variables presented in the model in figure 1.

Organizational, cultural and other related variables may also have a strong influence on the relationships depicted in our research model. For example, Velcu (2007) separated ERP adopters into those which have a technologically-led motivation and those which have a business-led motivation. The former improved service time in accounting tasks, they have a faster response to business change and have financial benefits in terms of other improved efficiencies. The latter perceive economies of scale, lower headcount costs and lower selling, general and administrative costs.

It is clear from the literature review presented above that there are many moderating variables that influence the relationships between the ERP dimensions and the types of business performance. These can be categorized in two main categories; implementation-type variables, such as top management support and organizational and cultural variables, such as organizational learning. Therefore, the research model takes the form depicted in figure 1.
4 CONCLUSIONS

Despite a large body of research on the impact of ERP systems on business performance, no definite conclusions can be made. Many studies, as it was shown in this paper, report confusing and contradictory results which makes difficult to offer any practical advice for managers considering ERP implementations or having important implications for theory making purposes.

In our view, this can be attributed, partly at least, to the fact that certain important dimensions of ERP systems, which also distinguish them from other information systems, have not been considered extensively and exclusively as having an impact on firm performance. There are also many moderating variables that influence the relationship between certain dimensions of ERP systems and the various categories of business performance reported in the literature. Considering the above, we propose a research model of ERP characteristics, such as ERP user information satisfaction, (see e.g. DeLone and McLean, 1992; Wu and Wang, 2007; Seddon et al., 2008) the extent of the post implementation review of the ERP system, the degree of ERP system’s integration across business processes and the extended functionality of ERP software following the implementation of add-on systems such as Supplier Relationship Management and Customer Relationship Management systems, having an impact on certain measures of business performance. These measures fall broadly into three distinct categories of business performance, namely operational/managerial, strategic, and financial.

Empirical research is certainly needed to test the model. Future research could focus on the identification of the relevant strength of the relationships between ERP dimensions and the distinct categories of business performance identified, taking into account the effect of the moderated ERP implementation and organizational variables.

Figure 1. Research Model.
References


