

## ERP Benefits and Firm Performance in Greece

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### Abstract

*In today's business environment firms must be competitive in order to survive. The ERP systems are currently becoming a necessary tool for companies to remain competitive in this business environment. The popularity of an ERP system is attributed to its ability to improve productivity, competitive advantage and customer satisfaction. Although the expectations of a firm is much more complex and depend largely on the particular circumstances of the environment in which it operates it is certain that the ERP software requires the commitment of significant resources of the company for the purchase, implementation, training, maintenance and improvement of the system. These resources, in addition to funds, include a commitment of human resources at all levels. This study compares, via an exploratory survey of 31 Greek companies, the ERP benefits of technical-led and business-led implementations. The findings of this paper confirms that both groups perceived the same ERP benefits.*

Keywords - Enterprise Resource Planning, ERP benefits, Firm performance

JEL Classification: M21, M41

### Introduction

In recent years, an increasing number of organizations are upgrading their legacy systems to ERP systems in order to enhance their competitiveness by improving their ability to generate accurate and timely information for managerial decision making. ERP systems are integrated software packages that enable companies to combine various business units of different areas such as production, sales, marketing, finance, human resources creating a tightly integrated system with flow of information across the entire business. The interest of organizations for ERP and other innovative applications such as Relationship Management (CRM), Knowledge Management, e-commerce, m-business, Warehouse Management Systems (WMS), Project Management tools has increased. The administration and the executives of a company are invited to make specific choices to serve the company's goals concerned with the internal organization and efficiency, or the external environment (market competition), with the best possible combination of investment-benefit. The ERP system has received significant attention from academic research focuses on the motivations for implementations and the factors contributing to the success and failure of ERP projects[15,1,151] and the ERP benefits[16] obtained from implementing the ERP system.

The implementation process is a very complex procedure, and needs to be checked against several success/failure factors to ensure

successful implementation, as well as to avoid implementation risks[1]. Many organizations are recognized as having successfully ERP implementation and some others abandon implementation of ERP projects or fail to achieve their intended result. Reference [6] states that awareness of cultural differences and preferences will certainly improve the assessment of ERP suitability and any subsequent implementation and suggests to developers and consultants to adapt their products and services for different cultural markets.

The most important success factors for ERP implementation include top management support, business plan and vision, effective communication [12]. Factors related to change of management systems and culture, management support, organizational structure, BPR project management, IT infrastructure, are considered reasons for ERP failures [1].

The present study explores the benefits that perceived companies with different motivations for their ERP implementation and with different degrees of success in their ERP implementation experience. In addition, implementation experiences depending on the implementation cost, time and system functionality are explored. Moreover the article reviews the literature concerning the motivations, the success measures for ERP implementations and perceived benefits.

## **Background**

An ERP system is a set of business applications or modules, which links various business units of an organization such as financial, accounting, manufacturing, and human resources into a tightly integrated single system with a common platform for flow of information across the entire [2].

There are several forces that are potentially influencing an organization's decision to adopt ERP systems. According to recent surveys the reasons motivating organizations to adopt ERP systems are technical and business reasons and can be summarized in table 1 [9,19,4]. They also suggest that there should be a relation between the reasons for adoption to the perceived benefits of ERP, by analyzing financial and non financial benefits.

A survey for Finish companies [19], indicated that the most frequent motivation for ERP adoption is to replace the old legacy system, the Y2K problem, the need for a new integrated system, and the ease of upgrading to new versions, the need for a common financial strategy and vision throughout the organization, or the need to have a common system with a newly acquired company. Another survey for Greek companies reported that the three most popular reasons for adopting ERP systems are increased demand for real-time information, information for decision making and integration of applications [14].

Reference [15] examined initial motives in the adoption of ERP in e-government, classifying them into four categories: a) technological motivations (have to do with infrastructure), b) operational motivations (concern the improvement of processes), c) performance motivations (are contingent on the will to improve results) and d) strategic motivations (are linked to a change in orientation in the design and delivery of services. According to the results, drivers behind the decision to adopt ERP are technological motivations (search for integration of IT) and performance motivations (lower maintenance and operational costs).

This paper classifies companies as technical driven and business driven companies and further explores the link between the motivations of ERP implementations and the perceived benefits of ERP, by analyzing financial as well as non-financial benefits.

TABLE 1  
MOTIVATIONS OF ERP IMPLEMENTATIONS

Technical reasons		Business reasons	
1.	Solve the Y2K problem	8.	Enable business growth
2.	Replace disparate systems	9.	Improve inefficient BPs
3.	Reduce software maintenance burden by outsourcing	10.	Reduce business operating and administrative expenses
4.	Eliminate redundant data entry	11.	Reduce inventory carrying costs
5.	Reduce data errors	12.	Acquire multicurrency IT support
6.	Decrease computer operating costs	13.	Eliminate delays and errors in filling customers' orders
7.	Integrate applications cross-functionally	14.	Standardize procedures across different locations

The most frequently mentioned motivations are of technological nature. The vast majority of organizations adopt an ERP system in order to replace legacy systems, to integrate their applications, to eliminate redundant data entry and reduce data errors. It is true that many organizations have several different legacy systems that have developed over the years to meet their information needs for planning and decision making. Often, there is little or no integration among departments and application programs used by separate departments do not communicate with each other. This means that data has to be entered into each separate department of the organization resulting in data redundancy and at times inaccuracy. The same data is available but in different format making it difficult and time consuming to collect information and present a coherent picture of what is happening in the business. ERP can eliminate the redundancies that occur from these outdated and separate systems. ERP systems integrate various systems into one and data is entered into the system only once. Because data is entered once, there greater chances to be more accurate. If inaccurate data is discovered, it can be corrected once instead of going through each department for every change. Different employees can access data simultaneously in ERP systems, whereas in separate legacy systems this is much less likely.

ERP system implementation is a very important process for a company with many conditions and factors potentially influencing the implementation project. There are models with 5 success factors [3]. Reference [18] suggests that companies adopt ERP systems should pay special care to particular phases of a project and the model contains 26 elements. Reference [9] identify three issues that are relevant when measuring the success of an ERP implementation:

The chartering phase comprises decisions leading up to the funding of an enterprise system with key players vendors, consultants, company executives and IT specialists.

The project phase comprises activities intended to get the system up and running in one or more organizational units with key players the project manager, project team members, internal IT specialists,

vendors, and consultants. At this phase ERP success depends on schedule, budget and system functionality. The shakedown phase is the organization's coming to grips with the enterprise system. The phase can be said to end when "normal operations" have been achieved. The project team may continue its involvement or may pass control to operational managers and end users and whatever technical support it can master.

The onward and upward phase continues from normal operation until the system is replaced with an upgrade or a different system. At this phase organization is finally able to ascertain the benefits of its investment. Key players include operational managers, end users, and IT support personnel. Vendor personnel and consultants may also be involved, particularly when deliberations about upgrades are concerned.

The measurement of success is a complicated matter. Reference [11] states that measurement depends not only on the time that ones measure it but also on the point of view from which you measure it. Success as perceived by people whose job was to implement ERP systems, end-users, customers, suppliers or investors. The success in the project phase depends on the project cost, completion time and system functionality.

This paper focuses on the ERP implementation experiences at the project phase quantifying the extent of success at this phase can influence the benefits obtained in the later stages of the ERP implementation.

Several research studies have identified various important benefits the ERP systems bring to organizations. Reference [13] stated that an ERP system integrates the majority of the business processes and allows access to the data in real time. Furthermore, ERP improves the performance level of a supply chain by helping to reduce cycle times [8]. There are also some intangible benefits that an organization may enjoy by implementing an ERP system including, better customer satisfaction, improved vendor performance, increased flexibility, reduced quality costs, improved resource utility, improved information accuracy and improved decision-making capability [17].

Reference [16] has created a framework to summarize the benefits from ERP systems and these benefits can be classified into five different dimensions: Operational benefits arise from day-to-day operational processes (e.g. cost reduction, cycle time reduction and improvement in productivity, quality as well as customer service). Managerial benefits focuses on the benefits that facilitate decision making and improve performance in operating divisions. Hence, ERP systems provide planning benefits to management. Strategic benefits arise from the ERP system's ability to provide the competitive advantage by assisting establishment of external alliances with customers and by promoting business growth, innovation and differentiation. IT infrastructure benefits result from the reduction in cost of maintaining legacy systems. Organizational benefits come from organizational learning, communication and cohesion among people. These benefits categories are a useful framework for evaluating the benefits of ERP systems. However, ERP benefits, in this framework, are not linked to the reasons for ERP implementations[10]. This paper uses the ERP scorecard in order to identify the contribution of ERP implementations. This framework introduces the ERP implementation benefits into three levels. The automate level focuses on operational benefits of ERP systems, the informate level

focuses on tactical decision making outcomes impacted by an ERP implementation, and transformate level looks at strategic impacts of ERP implementation.

## Methodology

To determine the answers to the research questions, a paper based survey was prepared and administered at organizations that had implemented an ERP system. Data collected from 31 Greek companies and managers responsible for ERP in their organizations were chosen as the target recipients as they were best placed to provide informed responses to the range of issues covered in the survey. Most of the questions asked were open-ended concerning topics as motivation for ERP implementation, ERP implementation project and ERP benefits. The questionnaire was pretested with three respondents to check its validity. A cover letter and survey questionnaire were distributed to managers responsible for ERP in the company.

Responses to the questions were measured on a 5 point Likert scale 1=very poor to 5=very good. The data was codified and analyzed using SPSS 16.0. Techniques included descriptive statistics and independent samples t-test were used.

## Variable measurement

To characterize a company as technologically-led company or business-led company the motivations of ERP adoption examined (table 1). Respondents with ERP systems were asked to score 7 motivations of two categories- business motivation and technology motivations - as the main reasons for ERP adoption and rank the implementation motivations as more critical than the others. Respondents giving high scores to technical reasons were classified as technologically-led companies and companies giving high scores to business reasons were classified as business-led companies. Table 2 presents the two implementation categories for ERP adoption.

TABLE 2  
COMPANIES CATEGORIES FOR ERP IMPLEMENTATION

Categories	Reasons
Technical-led company	Respondents score more technical reasons
Business-led company	Respondents score more business reasons

To evaluate the success of the ERP implementation projects in the project phase the respondents were asked: "In your opinion, to what extent have achieved the following: a) The budget targets b) The schedules targets c) Completed system functionality relative to original project scope".

To examine the motivations for ERP systems adoption by both technologically and business-led companies, respondents were asked: "How would you generally rate the motivations for ERP adoption?" They responded on a five-scale (1=very poor, 2=poor, 3=adequate, 4=good, 5=very good). This system rating for each category was then used to compare differences in the extend of ERP motivation between business-led companies and technologically-led companies.

To determine perceptions of the perceived benefits of ERP through the four perspectives of the BSC [4], (internal processes, customers, learning and growth, financial), the respondents were asked: "How do you rate the ERP benefits through the four perspectives of the BSC-process, customer, finance, innovation. They responded on a five-point scale (1=very poor, 2=poor, 3=adequate, 4=good, 5=very good) so that larger numerical responses represented increased extend of ERP benefits. In addition the respondents were asked to identify the ERP benefits using the following question: "Which of the following benefits perceived your company". (1)Improve process efficiency, (2) Improve tactical decision making, (3) Adapt to radical environment changes routinely, (4) Meet current need of customers more efficiently, (5) Identify and meet customer needs proactively, (6) Meet new customers needs or new need of customers, (7) Reduce cost, (8)Increase revenues, (8) Improve market value, (9) Increase productivity, (10) Make workers more effective decision makers, (11) Absorb radical change routinely. Benefits 1 to 3 were classified as process benefits, 4 to 6 as customer benefits, 7 to 9 finance benefits and 10 to 12 innovation benefits.

## Findings

The evidence collected from the survey shows that the majority of companies are technologically-led companies. Specifically, 85% of the respondents claimed technologically-led motivations for ERP adoption. The remaining 15% of the participating companies claimed business-led motivations. This means that organizations adopt ERP systems in order to integrate their applications and to replace the legacy systems and not for strategic reasons. These results reveal that Greek companies meet technical problems and inabilities in day-to-day procedures and this problem must be fixed up immediately. The majority of Greek companies are SMEs and one of the most important problem is the low level of awareness of the benefits of an end-to-end system. Awareness of the benefits an enterprise business solution could provide is the critical bridge that was missing between IT and SMEs [7]. Respondents have indicated that the most popular motivations for the implementation of ERP systems is the need to replace the legacy systems and to integrate their applications. Other factors influencing the adoption decision are to eliminate redundant data entry, to reduce data errors and to reduce software maintenance burden by outsourcing.

TABLE 3: IMPLEMENTATION EXPERIENCES

Project Phase	Cost	Time	Functionality
Mean	4,48	2,61	4,42
Std Dev	0,51	1,26	0,62
Min/Max	4/5	1/5	4/5
N	31	31	31

Survey results indicated that the companies had different implementation scales and experiences. The findings in Table 3 indicate that the companies had more or less successful implementation experiences depending on the implementation cost, time and system functionality. It is observed a very high satisfaction with the budgeted costs with mean rating between "good" and "very good" which means that the majority of the organizations implemented the ERP package within the established budget. However, there is noticeably less satisfaction with the implementation duration. The

respondents declare that the implementation of the ERP software wasn't on time while the mean rating are between "poor" and "adequate". There is still high satisfaction with the functionality of the system relative to original project scope. Successful implementation means that the company implement the ERP software on time and within the established budget. Also, the key users of each business process train the end-users, and involve them in the implementation project. In conclusion, it is recorded a high satisfaction with the cost schedule and budget of implementation and less satisfaction with the implementation duration. This may due to the fact that employees at companies under investigation were not so technologically skilled and mature enough to accept all these changes, so the time required for the implementation to be much higher.

Next are considered the ERP benefits through the four perspectives of BSC: internal process, customers, financial and learning and growth. These benefits are considered by comparing technically-led companies and with those of business-led companies. The findings are summarized in Table 4.

The findings in table 4 represent an interesting pattern. The mean rating in all areas for the business-led companies and technical-led was greater than "adequate" for the four perspectives of ERP benefits. Moreover, survey results indicated that business-led companies report higher ratings than technical-led companies. However, while business-led implementations report higher ratings than technical-led implementations for the four perspectives of ERP benefits, these differences are not significant. Specifically, independent samples T-test was run in order to find out if there were statistically significant differences between the two groups, but the t-test did not reveal any significant differences between the two groups. This means that both technological and business-led implementations perceived the same ERP benefits. This happens because companies that had technical reasons to adopt ERP system perceived indirect financial benefits. For examples selling prices may be calculated more accurately and this has an effect on profit margins and the reduction of mistakes in the invoiced prices results to the improvements in revenues. Moreover, a technical-led company improves the inventory levels and this has indirect effects on revenues such as higher inventory turnover. Additionally, technologically-led implementations may lead to improved service time in accounting tasks and improved access to information, thus improving customer service.

TABLE 4  
ERP BENEFITS

	Process benefits	Customer benefits	Finance benefits	Innovation benefits
Technically-led companies	3.25	3.55	3.50	3.10
Business-led companies	3.27	3.73	4.64	3.55
t	-0.058	-0.702	-4.429	-1.677
Significance	0.851	0.587	0.577	0.807

The majority of technologically and business-led companies reported benefits that automated and streamlined business processes such as error reductions, faster processing and reduction in processing time (Table 5). A high percentage of technologically and business-led

companies reported an improvement of tactical decision making such as improved work scheduling, work assignment, access to information, quality of management and improved control.

Another important category of ERP benefits for both technologically and business-led companies, related with customer benefits is to meet customer need more effectively. This can happen if a company check and detect those needs that are directly impacted by the automation of the process [4]. Improved response time, reduced customer complains, reduced errors are some of the perceived ERP benefits that are classified as customer benefits.

Through the results of Table 4, business-led companies perceived higher ratings of finance benefits that come from the ROI improvement by reducing costs. Specifically, 70% of the respondents mention the cost reduction as one of the most important finance benefits. The reduction of cost includes lower labor cost and lower inventory-carrying cost.

Based on interview data (table 5), the vast majority of respondents strive for improving process efficiency (88%). Efficiency of a process can be measured in terms of error reduction, faster processing, consistent data, reduction in processing time, increase in throughput [4].

The internal efficiency benefits come from improvement in process efficiency, improvement in tactical decision making and adaptation to the radical environment changes in a routine manner [4]. Benefits were perceived in terms of reduction in input resources.

TABLE 5  
ERP BENEFITS

Benefits	Percentage
Improve process efficiency	88%
Improve tactical decision making	87%
Meet current need of customers more efficiently	86%
Identify and meet customer needs proactively	86%
Reduce cost	70%
Increase revenues	33%
Increase productivity	25%
Make workers more effective decision makers	24%
Adapt to radical environment changes routinely	9%
Absorb radical change routinely	8%
Meet new customers needs or new need of customers	8%
Improve market value	5%

## Conclusions

The purpose of this study was to explore the benefits that Greek companies perceived implementing ERP systems with different motivations and implementation experiences. The findings for ERP motivations indicted that the majority of companies are technologically-led companies. Specifically, 85% of the respondents claimed technologically-led motivations for ERP adoption. The remaining 15% of the participating companies claimed business-led motivations. This means that organizations in Greece adopt ERP systems to in order to integrate their applications and to replace the legacy systems and not for strategic reasons.

Both technologically and business-led companies had successful implementation experiences. The findings indicated a very high

satisfaction with the budgeted costs and the functionality of the system relative to original project scope but less satisfaction with the implementation duration.

No significant differences noticed between the aforementioned groups comparing the four perspectives of ERP benefits of internal process, customers, financial and learning and growth. Both company groups reported benefits that automated and streamlined business processes such as error reductions, faster processing and reduction in processing time. A high percentage of technologically and business-led companies reported an improvement of tactical decision making such as improved work scheduling and assignment. Business-led companies perceived higher ratings of finance benefits that may come from the ROI improvement by reducing costs. It is very important to be mentioned that technical-led companies perceived indirect financial benefits.

## References

1. Al-Mashari M., and Zairi, M.,1999, "BPR implementation process: an analysis of key success and failure factors", Business Process Management Journal, Vol. 5 No.1, pp.87-112.
2. Beheshti, H. M., 2006, "What managers should know about ERP/ERP/ERP" Management Research News, vol. 29, no. 4, pp. 184-193.
3. Brown, C.V. and Vessey, I., 2003, "Managing the next wave of enterprise systems:Leveraging lessons from ERP, MIS quarterly executive, pp. 65-67.
4. Chand,D., Hachey, G., Hunton, J., Owosho, V., and Vasudevan,S., 2005, "A balanced scorecard based framework for assessing the strategic impacts of ERP systems", Computers in Industry, vol. 56, pp. 558-572.
5. Davenport, T.H., 2000, Mission Critical: Realizing the Promise of Enterprise Systems, Harvard Business School Press, Boston, MA.
6. Davison, R., 2002, "Cultural Complications of ERP", Communications of the ACM, Vol. 45, No. 7, pp.109-111.
7. Esteves, J., 2009, "A benefits realisation road-map framework for ERP usage in small and medium-sized enterprises", Journal of Enterprise Information Management, Vol.22 No.1/2, pp. 25-35.
8. Gardiner, S.C., Hanna, J.B. and LaTour, M.S. 2002, 'ERP and the re-engineering of industrial marketing processes: a prescriptive overview for the new-age marketing manager'. Industrial Marketing Management, 31: 357-365.
9. Markus M.L. and Tanis C., 2000, "The enterprise system experience-From adoption to success". Framing the Domains of IT Management: Projecting the Future Through the Past, Pinnaflex Resources, Inc, Cincinnati, OH, pp.173-207.
10. Markus, M.L., and Tanis, C., 2000, "The enterprise systems experience-from adoption to success, in:R.W. Zmud (Ed.), Framing the Domains of IT Research: Glimpsing the Future Through the Past, Pinnaflex Educational Resources Inc., Cincinnati, OH, pp. 173-207.
11. Markus, M.L., Axline, S., Petrie, D., and Tanis, C., 2000, "Learning from adopter's experiences with ERP: problems encountered and success achieved", Journal of Information Technology, vo. 15, pp. 245-265.
12. Nah, F.F., and Lau, J.L., 2001, "Critical factors for successful implementation of enterprise systems", Business Process Management Journal, Vol.7 No 3, pp.285-296.
13. O'Leary, D. Enterprise Resource Planning Systems: Systems, Life Cycle, Electronic Commerce, and Risk. New York: Cambridge University Press, 2000.

14. Poulymenakou, A.K., and Borotis,S.A.,2005, "Adoption of enterprise resource planning systems in Greece", P. Bozanis and E.N. Houstis (Eds), LNCS 3746, pp.559.
15. Raymond, L., Uwizeyemungu, S., Bergeron, F., 2005, "ERP adoption for e-government: an analysis of motivations", eGovernment Workshop '05 (eGOV05) Brunel University.
16. Shang, s. and Seddon, P. B., 2002, "Assessing and managing the benefits of enterprise systems: the business manager's perspective", Info Systems J, vol. 12, pp. 271-299.
17. Siriginidi, S.R., 'Enterprise resource planning in re-engineering business', Business Process Management Journal, 6(5): 376-91,2000.
18. Soja, P., 2004 "Success factors across ERP implementation phases: Learning from practice".
19. Velcu O., 2007, "Exploring the effects of ERP systems on organizational performance. Evidence from Finish companies", Industrial Management & data systems, vol. 107, no. 9, pp. 1316-1334.