

Enterprise Resource Planning And Business Process Management - A Marriage Of Convenience?

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ABSTRACT

This paper investigates the impact of the simultaneous utilization of Business Process Management (BPM) procedures on the payoff period of an investment in an Enterprise Resource Planning (ERP) system. ERP has been put into operation in 400 of the Fortune 500 companies at an average cost \$15 million. Indeed, some implementations have had price tags as high as \$300 million. Most companies evaluate such expenditures by looking at the return on investment (ROI), so it is important to identify factors that might speed up the payoff on an investment in an ERP system. It is hypothesized that the simultaneous implementation of BPM techniques can accelerate the payoff on a firm's investment in such a system. This paper examines this hypothesis by developing a multiple regression model where the percent investment returned, time since implementation, and number of departments where BPM was put into service are the variables of interest. Using data from a sample of firms where ERP was put into operation, it is concluded that time, and not the simultaneous implementation of BPM, has the most impact on ROI. It is further concluded that more extensive data should be collected to test this hypothesis with more accuracy.

Keywords: Enterprise Resource Planning, Business Process Management

INTRODUCTION

SearchCIO.com (2007) defines Enterprise Resource Planning (ERP) as “an industry term for the broad set of activities supported by multi-module application software that helps a manufacturer or other business manage the important parts of its business, including product planning, parts purchasing, maintaining inventories, interacting with suppliers, providing customer service, and tracking orders. ERP can also include application modules for the finance and human resources aspects of a business. Typically, an ERP system uses or is integrated with a relational database system. The deployment of an ERP system can involve considerable business process analysis, employee retraining, and new work procedures.”

According to a 2002 study by META Group, ERP systems supplied by Oracle, SAP, J.D. Edwards, PeopleSoft, and Baan are in approximately 400 of the Fortune 500 level companies in North America (www.sysoptima.com, 2005). These systems were introduced and implemented to integrate all formerly standalone systems supporting individual departments and functions across an enterprise into a single system. ERP systems combine a variety of business functional areas such as finance, human resources, manufacturing and distribution into one integrated platform. The primary reason that companies purchase and implement ERP systems is to gain efficiencies, increase productivity, and reduce cost.

A 2002 META Group study showed the total cost of ownership (which includes the costs of packaged software, hardware, professional services and internal costs) for an ERP implementation averaged \$15 million, with

implementations ranging from \$500 thousand to \$300 million (www.sysoptima.com, 2005). The implementation of an ERP system has software costs, hardware costs, and the costs of professional services. The software costs for the implementation are generally based on the scope of the implementation (i.e., the number of modules and functions being addressed), the complexity of the software, and ERP supplier pricing. On average companies should plan on spending a few million dollars for a perpetual license.

Hardware costs vary from company to company. The main driver for hardware is the requirement for items such as database server clusters, application servers, and web servers. Due to the storage requirements of most ERP systems, many companies will implement a storage area network, if they do not already have one. The cost for the hardware will range from half million dollars to several million depending on the requirements.

Finally, professional and consulting services typically account for the largest expenditure during the implementation. Professional services are generally used for the system customization, integration with other internal systems, data conversion, testing, and training. Companies that provide the ERP systems, such as SAP and PeopleSoft, often provide the majority of such professional services.

DISCUSSION

ERP systems have received much attention in recent operations management literature. They are viewed as the latest development in an important line of Material Requirements Planning systems that produced important breakthroughs in the 1970s and 1980s (Heizer and Render, 2007). It is hoped that the costs of an ERP system will be offset by the increased productivity and corresponding cost reductions resulting from putting it into operation. It is typical for an ERP system implementation to be coupled with additional initiatives. The most common initiative seems to be Business Process Management (BPM). It is interesting to speculate as to whether ERP implementations with BPM are marriages of convenience or produce a more fruitful synergistic relationship. Some operations managers have often suggested the latter, although hard data is difficult to find. Thus, the important questions to be examined are how quickly does the cost reduction associated with bringing an ERP system into service offset the costs of implementation, and furthermore if this offset is accelerated by the simultaneous utilization of the procedures associated with BPM.

According to SearchCIO.com (2007), BPM is "a systematic approach to improving an organization's business processes." SearchCIO.com (2007) further defines a business process as "a set of coordinated tasks and activities, conducted by both people and equipment that will lead to accomplishing a specific organizational goal". BPM activities seek to make business processes more effective, efficient and capable of adapting to an ever-changing environment. Another term that is frequently used for BPM is Business Process Re-engineering (BPR).

This paper will examine ERP implementations to determine if the payoff is accelerated by the simultaneous implementation of BPM. It seems plausible that the success of an ERP implementation may be enhanced by the utilization of sound business processes, or that ERP and BPM will have complementary roles in reducing costs and increasing productivity.

METHODOLOGY

Null Hypothesis: There is no relationship between the percent of the ERP investment returned and the number of departments where BPM was implemented.

Alternative Hypothesis: There is a relationship between the percent of the ERP investment returned and the number of departments where BPM was implemented.

A survey was given to CFOs and / or controllers of a sample of 32 firms where an ERP system was implemented. The implementations included customer relationship, financial, human resource and supply chain management systems. The survey asked the percent of the ERP investment paid off, the time (in years) since implementation, and the number of departments that put BPM into service.

The preliminary analysis showed one outlier, and this observation was dropped, leaving a sample of size 31. The descriptive statistics can be found in Table 1.

Table 1: Descriptive Statistics

Variable	Mean	Std. Dev.	Maximum	Minimum
percent ERP investment returned	40.65	43.51	100	0
time since implementation (in years)	5.65	2.85	10	1
number of departments where BPM put into service	3.23	1.43	5	0

A multiple regression equation was estimated using the sample data. The dependent variable was the percent of the ERP investment returned, and the two independent variables were the time since implementation (in years) and the number of departments where BPM was put into operation. The number of departments where BPM has been put into service can be used to assess the extent to which BPM has been implemented in a company. Where firms have employed BPM in a several departments, it is assumed that the commitment to BPM is more extensive than where it has not been used, or has only been used in one or two departments.

RESULTS

The results of the multiple regression can be found in Tables 2 and 3. Table 2 shows the results of the global test, which provides an overall evaluation of the regression model. The five percent level of significance was used. Since computed F of 6.85 is greater than critical F of 3.34, it can be concluded that the regression equation has significant explanatory power. This could also be confirmed by noting that the p-value of 0.004 is considerably smaller than the chosen level of significance of 0.05.

Table 2: Global Test Results

DF Numerator	DF Denominator	Computed F	Critical F	P-value
2	28	6.85	3.34	0.004

Table 3 shows the parameter estimates, along with the computed value of t for each parameter estimated. This table is of particular importance, because it allows for the testing of the hypothesis of interest.

Table 3: Multiple Regression Results

Variable	Coefficient	Computed T	Critical T	P-value
Constant	-6.52	-0.33	± 2.08	0.747
time since implementation (in years)	8.81	3.68	± 2.08	0.001
number of departments where BPM put into service	-0.79	-0.17	± 2.08	0.869

The regression results suggest that the constant is not significantly different from zero. Furthermore, the time since implementation has a significant positive impact on the percent of the investment in ERP returned. It is estimated that 8.81% of the implementation costs are returned each year, holding all other variables constant. Finally, the sample evidence indicates that the number of departments where BPM was put into operation does not play a role in determining the percent of the investment in ERP that is returned. In other words, based on the sample evidence the appropriate decision is to fail to reject the null hypothesis of interest.

Adjusted r^2 for this model is 28%, so 28% of the variation in the percent of the investment returned in the ERP system is explained by the model, leaving 62% of the variation in this variable unexplained. This unexplained variation could be reduced by finding other independent variables for inclusion in the model.

CONCLUSIONS

Based upon this research, the hypothesis that BPM acts as a driver for accelerating ROI for ERP implementations cannot be supported. It is a concern that the data collected in this study is somewhat limited. Therefore, this study should be considered a pilot study with the results not to be considered as robust and the last word on this important research question. What appears to be a “marriage of convenience” between ERP implementations with BPM may still prove to be synergistic in nature.

RECOMMENDATIONS

Future research should be focused on both securing a larger sample and finding additional variables for inclusion in the multiple regression equation. As more companies have deployed ERP systems in the past few years, it should now be easier to secure such a data set.

It is also recommended that companies planning to put an ERP system into operation should consider their goals for the implementation. These companies should also consider reengineering any current business processes to fit the systems process, rather than modifying the system to accommodate their current business process. According to many sources, the biggest reason for budget overruns on ERP implementations is customizing the ERP system to match current business processes.

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