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A Study of Post-Implementation Management Techniques of an ERP System and the Financial Perfromance

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Abstract: *This study aims to provide empirical evidence to support a cause and effect relationship of managerial actions of post-implementation stage of an ERP implementation and the financial performance of a company. Financial figures and managerial techniques data were collected from several companies who have implemented ERP systems. Regression analysis and correlation analysis has suggested that improved technical competence have increased net sales, relationships with external experts will affect earnings, return on assets and return on investment. Top management support will impact net sales and net income. Long range plans will negatively affect earnings and improved sharing of information will affect net income, return on assets, and return on investments.*

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I. Introduction

Return on investment on information technology has always been a topic of interest in business organizations. Benefits of an information system can be achieved through proper management techniques. It is hard to quantify the return on investment on information technology as the company performance can be defined in various ways, and it is difficult to measure the improvement. One way to measure the improvement of the company performance is to quantify it in financial terms, hence improved profits and financial ratios can be considered as improved company performance. This study will focus on studying of the financial performance of the company, after the implementation of an ERP project.

It is important for a company to measure the financial performance of the company after the implementation of an ERP system to assess system and do the necessary improvements. As mentioned in the study of Galy and Sauceda, (2014) small and medium enterprises implement ERP systems as wella as the multinational companies. Therefore it is important for all the businesses to measure the success of the implementation and to measure the business impact.

ERP implementation is a project with a definite start date and an end date. Implementing an ERP can take more than one year and it continues indefinitely, once it is implemented. It is inaccurate to believe that ERP project is complete when it goes live, therefore, studying in to post implementation is important to measure the true value of ERP implementation.

Research question of this study is “How the post implementation practices of ERP systems impact the financial performance of the company?” The managerial practices of the company after the implementation of ERP systems and how it impacts the financial performance of the company is studied for the better alignment of ERP performance and the goals of the company.

According to the study carried out by Bradford and Florin(2003), ERP systems have helped in stream lining processes of business organizations. Through updated information about production and customer input, ERP systems have managed to improve the productivity of the companies. Integration of business processes and enabling of information sharing has increased the operational efficiency.

The aim of the study is find out the impact for financial indicators of the company through these operational improvements. Since the business organizations are investing a considerable amount of money for ERP systems and updates, the shareholders/ owners of business organizations would be interested to know the return of their investment through a quantifiable method. In the process of quantifying the return, it is also important to find out the managerial decisions on post implementation stages, as the performance of the ERP system will depend on the decisions made by the top management.

The research paper consists of six sub-sections. The aim of the study, research question and the importance of the study are explained in the introductory chapter. The second chapter consists of a critical analysis of existing literature of the subject matter. Research method is explained in the third chapter. Analysis of the data collected is explained in the fourth chapter. Fifth chapter consists of the discussion of the findings and sixth chapter is about the conclusions arrived through the findings.

II. Literature Review

Enterprise Resource Planning

Enterprise Resource Planning is a term used to describe systems that integrate data from different departments to one system and one database. According to Law and Ngai (2007) ERP will provide a seamless integration of information flows and business processes across functional areas within a company. In the same study they have mentioned sometimes ERP systems fail even though in many businesses they have been recognized to be useful. While the benefit of adopting an ERP system results in favorable changes in business, the outcome will be often influenced by organizational antecedents that inhibit management decisions.

Performance expectations

Performance expectations of an ERP system has been categorized in to the three layers of the management pyramid in the study of Galy and Sauceda, (2014). Namely those three categories are operational, tactical or managerial, and strategic. This categorization will explain why ERP projected are implemented in business organizations.

Reduced inventory, reduced labor costs and expedited financial closings are some of the operational benefits expected from an ERP system. Supply chain efficiency, faster financial reporting, swiftness in data sharing, and improvement in data quality will be resulted by these benefits. Managerial benefits of an ERP system will include better resource management and better performance control which would be resulted through up-to date reporting capabilities and drill down capabilities of information. Strategic benefits include increase of sales through customer relationship modules and e-commerce capabilities, reduced cost under a cost-leadership strategy, and growth of business through sharing information with suppliers. Optimized business process and creation of competitive advantage can be expected from a properly implemented ERP system.

Another categorization of the benefits is to categorize them as financial and non-financial. Ability to achieve profits is a financial benefit, expected from an ERP system. Intangible benefits such as user satisfaction customer satisfaction, and product quality are some of the non-financial benefits that can be expected from an ERP system.

Cost of ERP System

It is important to see how well the investments made in an ERP system is converted in to benefits. Therefore understanding the cost of an ERP system is vital. Expenses of implementing an ERP system will include Purchase of software and hardware, consultation fee, and network investments; according to Galy and Sauceda, (2014). In the same study they have mentioned that it was about USD 5.48 Million (LKR 975 million approximately) to implement an ERP system within 14 months.

There are evidence that ERP system implementation being unsuccessful. According to Muscatello and Parente (2006), ERP failure rates can be as high as 50%. To avoid that, ERP training should be given to employees even after “going live” stage. There should also be a “cross-functional” team to purchase ERP systems.

Mentioned in the study of Galy and Sauceda, (2014) are some of the failure case studies for ERP systems. Fox-Meyer Drug, Mobil Europe, Dell, Whirlpool, Hershey, are some of the companies discarded ERP due to failure in implementing. Nike has faced a major inventory problem due to a problem in ERP implementation. Since ERP can cost around USD 50 billion in 2015, it is important that managers carry out the implementation in a way that cost does not exceed the cost of implementation.

Post ERP-implementation stage

According to Marku, Axline and Tanis (2000),there are three stages in an ERP life cycle, namely,

- The project phase-where ERP system is rolled up
- The shakedown phase-where company will transit from “go live” to “normal operations”
- The onward and upward phase

Majority of the business benefits are derived from the third stage.

The cause and effect relationship in financial and non-financial measures must be strong to successfully implement the ERP system. This relationship must be communicated to managers, and better the link, better the financial measurements will be. It is mentioned in the study of Galy and Sauceda, (2014) that this will lead to higher commitment to achieving the financial goals. According to Wier et. Al, (2007), a manager should apply both financial and non-financial performance measures an clearly establish the cause and effect relationship, so that it will improve the company performance and the performance of an ERP system.

Financial Performance

As mentioned above, organizational performance can be measured by two performance measurements; financial and non-financial measurements. To measure financial performance most companies use profitability ratios such as Return on Assets (ROA) and Return on Investments (ROI).In addition to that Return on Sales is also used as a financial measure as mentioned in the study done by Galy and Sauceda, (2014).

According to Nicolaou and Reck (2004), ROA was impacted by the implementation of an ERP system. The study was done using 247 companies to check eight financial measures including ROA and ROI were impacted by the implementation of an ERP. However, findings suggested that year of adaptation and the year after that, financial indicators were negatively affected. However after four years financial indicators showed a favorable difference.

Technological Competence

According to the study done by Hasi baun and Dantes, (Quoted in Galy and Sauceda, 2014), 234 total of executives have mentioned that ERP implementation process is impacted by the technological infrastructure to an extent of 38% approximately. “Absorptive capacity” term is used to indicate the extent to which the business organization possesses the knowledge to exploit new IT technologies. Since ERP system should be implemented with proper hardware, software and network properties the technological knowledge will be important for successful implementation. In addition to that, the data base management system and any remaining legacy systems of the firm should be compatible with the ERP system.

Relationship with outside experts

Implementation of ERP will require relationships with external parties such as ERP vendors, Product extension vendors, experts, consultants etc. According to Markus, Axline and Tanis (2000), strong relationships with the consultants and the vendors will allow them to customize the ERP system to suit the specific business requirements. This is important to be done in the earlier stage for a successful product implementation. Therefore the success of ERP implementation will depend on the relationships with outside experts. Therefore the financial indicators will also have a direct impact through this.

Top management support

It is vital for top management to provide emotional support through maintaining a high level of employee morale and motivation. In fact, lack of motivation and morale has proved to be one of the main reasons for the failure of ERP. Galy and Sauceda study in 2014, has stated that the concept of a project champion is essential in ERP implementation. The leadership status of the champion such as CEo or chairman will drive the change of the organization. In the same study, they have found that the top management support on ERP implementation will have a direct relationship with Net income before extraordinary items, which is a financial indicator.

Long range plans and written objectives

Amid et Al. (2012) have found that, ERP success factors are of two types. One type is to achieve implementation goals like better decision making, reducing operational bottlenecks etc. Clear goals will be necessary for a successful implementation of an ERP. Development of a resource plan and a work plan is essential for careful monitoring and controlling of the project. Galy and Sauceda (2014) have found that having long range plans and written objectives will have a direct impact on earnings before interest and taxes.

Strategic Emphasis

According to the study done by Grabski, Leech, and Schmidt,(2011), strategic requirement identification is an essential part of an ERP implementation. Legacy systems should be changed, if a company should enjoy complete benefits of an ERP system. Therefore there should be a strategic alignment to adapt for the new systems and new processes. This study will focus on the following strategies; promotion and advertising, new product development, and channels of distribution. Galy and Sauceda (2014) have stated that there was no significant influence from strategic emphasis over ERP implementation and therefore not on financial indicators as well.

Increased sharing of information

Data sharing and integration is deemed to be a fundamental part of ERP implementation. It has been stated in the study of Galy and Sauceda (2014), this can be accomplished through a central data center for the organization. In the same study they have found that sharing information will have an impact on Net income before extraordinary items, return on assets, and return on investments.

III. Methodology

Research approach

As mentioned above this research is carried out to study how post implementation business practices will impact the financial performance of the company. Discussed in the literature review, there are already research done on this aspect and there are already established theories on this. Therefore, a deductive approach was taken to study the applicability of these previous findings to Sri Lankan context. Since it is important to find out the relationship between post implementation practices and the financial ratios, it is easier to use a quantitative method as financial ratios can be quantified. A survey method was adopted to carry out the study and the instrument of data collection was a questionnaire. Using this questionnaire data was collected from various companies who have implemented ERP.

Variables

Independent Variables

Independent variables for this study would be the post implementation business practices. As done in the study of Galy and Sauceda (2014), we categorized in to several topics. There are six independent variables in this study as mentioned in the literature review and they are given below with the indicators,

Variable	**Indicator**
Technological competence	There is technical competence to absorb ERP
Relationship with external experts	The ERP team has good relationship with external experts
Top management support	Top management provides maximum time to the project team Top management provides emotional support to project team
Long range plans and written objectives	ERP project has long term plans-measured in years
Strategic emphasis	To what extent the management has emphasized new products? To what extent does the firm has control over its distribution channels?
Increased sharing of information	To what extent has sharing of information increased due to the implementation of ERP?

Dependent Variables

As mentioned earlier the dependent variables would be the ratios which could measure the financial performance over the years. Ratios will make it easier to compare the financial performance. Therefore five financial ratios were selected as given below.

- Net sales growth (NS)-Net sales or net revenue represents the total operating revenue less discounts, allowances and returns.
- Net income before extra ordinary items (NIB)-Income after deducting operating expenses, tax, minority interest but before one-off items and common/preferred dividends.
- Earnings before interest and taxes (EBIT)-Earnings of a company before interest and income taxes.
- Return on Assets (ROA)-Income before extraordinary items/Total assets
- Return on Investments (ROI)-Income before extraordinary items/total common equity+long term debt.

The formula for the percentage change in these variables would be considered for four years. However, the base year would be one year prior to implementation.

Hypothesis

Depending on the given independent variables and dependent variables the following variables were built.

H_1-Strong technical competence in a firm adopting ERP will have a direct effect on financial performance ratios.

H_2-A good relationship with external experts or consultants will have a direct impact on financial performance ratios.

H_3-Engaged top management support measured by time, knowledge of project success and emotional support will have a direct effect on financial performance ratios.

H_4-Long-range plans and written objectives will have a positive direct effect on financial performance ratios.

H_5-Knowledge of the strategic emphasis of a company will have a direct effect on financial performance ratios.

H_6-The increased sharing of information between departments resulting from ERP will have a direct effect on financial performance ratios.

Population and Sample

Sample includes 50 companies who implemented ERP in the period of 2007-2010. Time periods was chosen to ensure that all the companies have available financial figures for four years after implementation. Questionnaires were sent the companies and responses were collected through emails, since it was easier to collect data through email. Financial figures were also collected through the questionnaires as some companies didn't have published annual reports. Companies were chosen to represent blue-chip companies and medium enterprises to ensure that unbiased general conclusions are made at the end of this study.

Data Collection

Questions in the questionnaire ascertained formality of ERP plans into the future. All questions used a five point Likert scale, ranging from strongly disagrees to strongly agrees or from no extent to a greater extent. There were other questions involved as number of employees and number of PCs in the business organization.

Analytical tools

SPSS was used to analyze data and factor analysis and a descriptive analysis was done after cleaning the gathered data. Tests such as co-linearity, regression, correlation, mean etc. was run to understand the impact of the business practices after the implementation of an ERP to the financial performance. Financial ratios were calculated if they were not available readily in the annual reports.

IV. Analysis

Most of the companies had over one million Rupee net sales on the implementation year of ERP in this sample of 50 companies it was around 40%. However, in Galy and Sauceda (2014), the sample consisted of approximately 47% of large companies with over 1 billion dollar sales. In the same study 38% of the companies had below thousand employees. However, in this sample around 42% of the sample had 500-100 employees. 39% of the companies in the sample had 500-1000 computers in their organizations.

The regression for net sales is around 0.546, which indicates that the independent variables explain more than 50% of the variance in net sales. Technical competence showed a strong positive relationship with net sales.

Net income before extra ordinary items (NIB) indicated a regression of 0.379. Support from top management and increased sharing of information creates a positive change NIB.

Regression for EBIT is statistically significant and the independent variables explain the variances of EBIT up to 36%. In the study of Galy and Sauceda (2014), it was around 46%. Possession of long term written plans will impact negatively to EBIT. Longer the time period, negative the EBIT was. However, strong relationships with outside experts results in a positive change in EBIT.

The regression for ROA is 0.58 which is statistically significant. A strong relationship with external experts and increased information sharing due to ERP will increase ROA in the company.

Regression for ROI is 0.545, which is statistically significant. Following the pattern of ROA, improved sharing of information will bring a positive change in ROI.

V. Discussion

Technological competence has a significant positive impact on net sales. In the study of Galy and Sauceda (2014), similar pattern was shown between net sales and technological competence. However, having a strong technological competence doesn't impact other financial ratios significantly. H_1 can be accepted as net sales were directly impacted by having a strong technological competence.

Relationships with outside experts will have a significant positive impact on EBIT, and ROA. Therefore, H_2 can be accepted. Gale and Sauceda found that in addition to the above mentioned financial ratios, ROI was also significantly impacted by strong external relationships with experts and consultants.

Top management knowledge on project succession has a significant positive impact on net sales and net income before extra ordinary items. To management's emotional support will only have a significant positive impact for Net Sales. This follows the finding of Galy and Sauceda (2014). Therefore H_3 & H_5 can be accepted.

Having long range plans will have a significant negative impact on Earnings before interest and tax. This finding will lead to rejection of H_4. Increased sharing of information will have a significant positive impact on Net income before extraordinary items, Return on Assets and Return on Investment.H_6 can be accepted.

This study analyzed the likelihood of financial benefits of organization which displayed the mentioned managerial techniques. Financial ratios can signal successful implementation of an ERP system. However, financial ratios will be influenced by different managerial techniques. It indicates that in different levels of management pyramid, different expectations are kept on the ERP system. While ROI and ROA increase requests sharing of information, increase in sales will require other aspects of the ERP system.

In a summary it can be declared that to measure the success of ERP, success of both sided of the profit equation should be measured, which included revenue and cost on a long-range plan. The managerial techniques required to increase sales and reduce cost are different.

VI. Conclusion

In conclusion, this study has contributed to the literature on ERP systems and its successful implementation. To derive financial benefits from an ERP system, different managerial practices are required.

Using financial data, the required IS managerial practice can be forecasted using the findings of this study. Additional studies using the financial data will enable managers of business organizations to maximize ERP use. Higher commitment can be expected by building a strong cause and effect relationship between managerial practices and financial returns.

As the investment in ERP is vast, further research in this subject is recommended. Companies should analyze the inherent risk before investing in an ERP system. ERP will not result in an immediate return upon investment. ROA and ROI calculations would not justify the investment immediately after the investment. Therefore, to justify the investment it should at least be analyzed for four years after implementation and the mentioned management techniques should be considered.

This study is limited to financial data which is longitudinal. Only one questionnaire was sent to one company, therefore a wholesome viewpoint was doubtful. The study is also limited to one year’s perception on attitudes and perceptions.

This study can be extended to analyze non-financial data as well.

References

[1]. Amid, A., Moalagh, A., Ravasan,Z., (2012) 'Identification and classification of ERP critical failure factors in Iranian industries', *Information Systems,* 37(3), pp. 227-237 [Online]. Available at: (Accessed:).

[2]. Bradford M., Florin J., (2003) 'Examining the role of innovation diffusion factors on the implementation success of enterprise resource planning systems', *International Journal of Accounting Information Systems* , 4(), pp. 205-225 [Online]. Available at: *https://pdf.sciencedirectassets.com/* (Accessed: 16th June, 2019).

[3]. Galy, E., Sauceda, M J (2014) 'Post-implementation practices of ERP systems and their relationship to financial performance', *Information & Management,* 51(), pp. 310-319 [Online]. Available at: *http://dx.doi.org/10.1016/j.im.2014.02.002* (Accessed: 16th June 2019).

[4]. Grabski, S.V., Leech, S.A. & Schmidt, P.J. 2011, "A Review of ERP Research: A Future Agenda for Accounting Information Systems", *Journal of Information Systems,* vol. 25, no. 1, pp. 37-78.

[5]. Law,C.C.H., Ngai,E.W.T (2007) 'ERP systems adoption: An exploratory study of the organizational factors and impacts of ERP success', *Information & Management,* 44(), pp. 418-432 [Online]. Available at: *https://pdf.sciencedirectassets.com* (Accessed: 16th June,2019).

[6]. Markus, M.L., Axline, S., Petrie, D. & Tanis, S.C. 2000, "Learning from adopters' experiences with ERP: problems encountered and success achieved", *Journal of Information Technology,* vol. 15, no. 4, pp. 245-265.

[7]. Muscatello, J.R. & Parente, D.H. 2006, "Enterprise Resource Planning (ERP): A Postimplementation Cross-Case Analysis", *Information Resources Management Journal,* vol. 19, no. 3, pp. 61-62,66-68,73-80.

[8]. Nicolaou, A.I. & Reck, J.L. 2004, "Firm Performance Effects in Relation to the Implementation and Use of Enterprise Resource Planning Systems/Discussion of: Firm Performance Effects in Relation to the Implementation and Use of Enterprise Resource Planning Systems/Reply to Discussion of: Firm Performance Effects in Relation to the Implementation and Use of Enterprise Resource Planning Systems", *Journal of Information Systems,* vol. 18, no. 2, pp. 79-105+.

[9]. Wier,B., Hunton J., HassaElnabby, H. R., (2007) 'Enterprise resource planning systems and non-financial performance incentives: the joint impact on corporate performance', *International Journal of Accounting Information Systems,* 8(3), pp. 165-190 [Online]. Available at: *ttps://reader.elsevier.com/reader/sd/pii/S1467089507000292?token=2CB78921A1546B22F6382B101FE9A32C966E0300BE727C47248E26CD7DC64587581BD196AF8A3B07EAF6FAD59B26586C*(Accessed: 19th June,2019).

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