International Journal of Innovative Technology and Exploring Engineering (IJITEE)
ISSN: 2278-3075 (Online), Volume-4 Issue-7, December 2014

Ex-Post Investigation of ERP Business Value in an Indian Organization

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Abstract- Due to huge amount of investment and collective efforts to implement and run ERP system , the primary question to ERP systems business value has been a key concern. The present case study reports the effect of Enterprise Resource Planning (ERP) and its impact on the performance of organization. The SAP-LAP has been employed to better understanding of the integration of the system. The single indian case study was used for this investigation. Before investigation, the performance indicators of the organization were identified by conducting interviews with the managers. This study provides an opportunity to adopt the better approach in implementation of the ERP systems in similar type of organizations.
Keywords: ERP, SAP-LAP, Business Value, Organization.

I. INTRODUCTION

A 360-degree view of business and providing the information as and when needed attracted Enterprise Resource Planning (ERP) implementation in many organizations. ERP implementation and its success remains one of the most significant challenges for Information Systems (IS) practitioners in the past decade (Karimi, J. et al., 2007). ERP implementations are characterized by high level of costs and complexity. So, it is vital to investigate empirically the "business values" generated by ERP in real life of organizations adopting them. The study takes lead from the work done on process based approach for ex-post investigation of ERP (Uwizeyemungu, et al., 2010). It uses important indicators of business value realization through three distinct foci of IS application viz., efficiency, effectiveness and new business effect from ERP implementation and usage as relevant in an Indian manufacturing organization (Kanungo, S., 1999). The present study attempts to apply the qualitative tools for investigating business value of ERP in use.

II. LITERATURE REVIEWED

Recently, there is growing research interest in business value…. generated by e-business systems and ERP (Soto-Acosta and P. Merono-Cerdan, 2008; Hendrick et al.,2006; Nicolaoo and Bhattacharya,2004; Zhu and Kraemer, 2005). The work mainly address three fundamental questions: Is an ERP system of any value to an organization? What values an ERP system brings to an organization? How do we measure the value of an ERP system? The business values added by ERP are multifaceted viz. operational, financial, user satisfaction, market reactions and so on and so for. The Value could be evaluated in terms of cost saving, ROI, assets turnover, return on assets etc.

Manuscript published on 30 December 2014.
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Some articles address relationships between different measurements while other focus on longitudinal study of the ERP systems on company performance (Moon Y.B., 2007). Bendoly et al., 2009 employed data envelopment analysis (DEA) using data collected from Enterprise Resource Planning (ERP) system adopters at two different points in time in order to calculate a measure of efficient information use. This information efficiency metric was validated as a strong predictor of Compustat profitability. Additional analyses suggested that the most efficient users of information tend to emphasize information related to operational excellence. Yen et al., 2004 showed that ERP use has a great impact on the transformation of an organization. The work related to the performance indicators based business value as ERP impact in an organization in Indian scenario found very little. It was decided to take lead from the work of Uwizeyemungu, et al., 2010 and considering the performance indicators and effect of ERP implementation as relevant to the case of Indian organization in hand to apply to assess the business value of ERP.

III. METHOD

The present work is based on a single case analysis method. The case study plays an important role in IS evaluation to understand complex links within the parameter of evaluation. The process of business value yields by ERP systems is quite complex and that is why a large number of single case method have been attempted in past. (Chand et al., 2005 & Yusuf et al., 2004). The study applied SAP-LAP analysis (Sushil, 2000) for better understanding of complex interplay of the issue involved in addition to the tool to observe business value as ex-post investigation of ERP. The researchers studied the work with help of the implementation partners and have been involved in process to understand the insights. A questionnaire comprising open ended and close ended questions was prepared for collecting responses. The three rounds of interviews were conducted with five individuals involved in the projects and occupying key positions in the organization, for around one hour each. The performance indicators identified includes productivity quotient, human resource rotation, order entry, percentage of products returned, shipping lags, late deliveries, inventory management, production cycle time verses predefined standard cycle time, management quotient, numbers of accidents, percentages of rejection, percentages of complaints, machine stoppage, machine throughput, labor improvements, new technology machine need, inventory turnover, raw material need, number of employee need, number of new products launched and order flexibility.

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The effects through processes of ERP as observed by Metals's included….organizational processes improvements, customer satisfaction, resource integration (efficiency); scheduling effectiveness, information quality, data visibility (effectiveness); and, customization (new businesses). The relationship between ERP effects and performance indicators was established and impact of each effect on its corresponding indicator was rated during interviews.

IV. COMPANY BACKGROUND

The Metals* group is in power & mining sector from last 14 years having presence in four states of India. The group has gone for Microsoft based ERP solution and had completed the ERP installation by the end of 2008. The functional modules implemented include accounting, financial reporting, logistics (purchasing, shipping), manufacturing process management, inventory management, supply chain management (SCM), sales and marketing management.

V. ANALYSIS AND DISCUSSIONS

SAP LAP Analysis

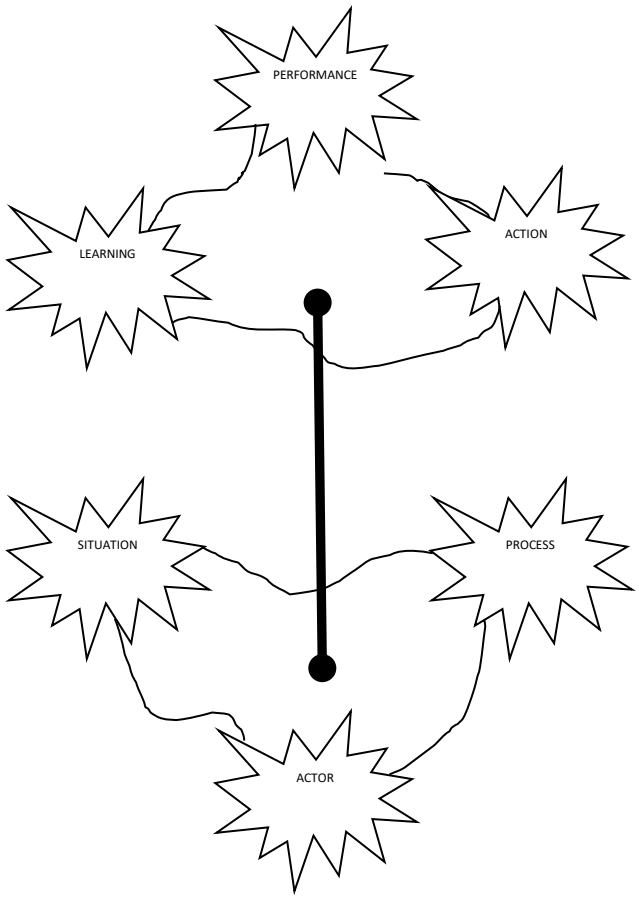

Figure 1: SAP LAP Analysis Framework (Sushil 2001)

Situation

The company was having legacy system in operation. The policy of the processes was not defined. The information was scattered. There was no centralized source of information. The information access was a problem. The different departments were working in isolated manner as there was no integration of processes. The multiple location issue was making situation worse. The decision making was effected which resulted in business growth. From the external angle, there was no visibility of customer order status. In some cases, the information given to customers was found incorrect. There was no exact information of inventory. The services are also badly affected due to this situation. The sales and purchase orders were not defined properly. The connectivity with vendors was also missing.

Actors

There were two types of actors involved in this case. They were decision influencer and decision makers. The decision influencers were mainly information Technology (IT) administrators. The decision makers were the executive board of the company, which had invested power in, primarily Deputy General Manager (DGM) (Finance) and Manager (Accounts & ERP).

Processes

The processes included four major categories. The financial processes included voucher management, balance-sheet, trail balance, profit & loss account, taxation account, statutory reports, excise duty report, tax deduction at source reports, and, payroll; Sales & purchase processes included inventory management, rejection report, returning report, gate entry and pass reports; production processes included production planning, bill of material, material planning, availability of stock, on time production & delivery, and, scrap maintenance; Warehouse processes included warehouse management, rack & bin management.

Learning

The key issues related to situation, actors and processes included the limitations of legacy systems, imperfect judgment in sales, purchase and production, rate of change of technology, advent of new technology and integration of multi location systems.

Action

The organization made comparison of different ERP solution and implemented ERP with help of ERP implementation partner while integration of all twelve locations.

Performance

Once ERP was in place the sales department frequency was raised. The customer services, store and quotation management improved. The comparison of quotations was easy. The testing procedures became simplified. The labor effective searches for the materials from warehouse saved lot of time. The time utilization improved. The generation of statutory reports became handy. There was improvement in vendor services, production management, bill of material management, scrap management, production planning and sales forecasting. It was easy to define the actual costing for the products. In addition to SAP-LAP analysis, another qualitative tool as in previous research work was used to access organizational performance in terms of some numbers. With the help of keys managers at Metals firstly, effects of ERP and performance indicators were selected and then for each ERP effect performance indicators were identified.

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Table 1

ERP effects and their impact on Metals's performance indicators

		PI affected	i	p	q	p_i*q_i
	Organizational processes improvements	Productivity quotient Human resources rotation	1 2	5 3	2 2	10 6
	Customer satisfaction	Productivity quotient Order entry Percentage of product returns	3 4 5	4 4 3	3 2 1	12 8 3
	Resources integration	Productivity	6	5	2	10
	Scheduling Effectiveness	Shipping lags Late deliveries Inventory management Production cycle time versus predefined standard cycle time	7 8 9 10	5 5 5 5	2 2 2 2	10 10 10 10
	Information quality	Production level Inventory level Management level	11 12 13	4 4 4	3 2 3	12 8 12
	Data visibility	Number of accidents Percentage of rejects Percentage of complaint Machine stoppage Machine throughput Labor improvement New technology machine needed Inventory turnover Inventory levels Raw Material needed No. of employee needed	14 15 16 17 18 19 20 21 22 23 24	5 4 4 5 5 4 3 4 4 5 3	1 2 2 2 2 3 2 2 3 0 0	5 8 8 10 10 12 6 8 12 0 0
	Customization	Number of new products launched Order Entry	25 26	3 3	2 1	6 4
	$\sum(p_i*q_i)$					210

p= importance of PI;(1=unimportant to 5= very important), q= How much PIs impact induced by the ERP effect (none=0,weak=1,average=2,strong=3)

The effect of ERP and their impact on Metals's performance indicator is given in Table 1. In the table , importance is allotted to each PI in column heading p_i (1= unimportant to 5=important) and q_i = degree of PIs impact induced by the ERP effect (0=none, 1=weak, 2=average, 3=strong, minus sign can be used for negative impact). Thereafter, the product $p_i * q_i$ can be calculated for each pair of ERP effect and performance indicator. In this case study for twenty six such pairs, the summation of p_i*q_i was found 210. Suppose $q_i = 3$ is the ideal that the ERP effects induce the largest positive impact on each of the PIs. Then ideal score will be 324. So, the ERP effects on the Metals's Organizational performance would be given by the 210/324. The organizational performance is 64.81% of the largest positive impact PIs. This was observed as average contribution of the ERP system.

VI. CONCLUSION

The competitive scenario and shaky world economy have put pressure on the organizations to improve their service quality and minimize their operating cost in a globalized market. This led the organizations to adopt the ERP to improve their performance in terms of efficiency and effectiveness. It is critical to align ERP with organizational vision. The ERP modules or applications implemented must be aligned with the firm's strategy. Ragowsky et al., 2005 developed model included the moderating effects of organizational characteristics on the relation between ERP applications and their value addition to company's core processes. The ex-post evaluation of ERP helps to adopt better approach for meeting the expectations from ERP implementations in the organization. This is possible once the decisions to make change in approaches to use ERP systems to fullest extent. The study provides the opportunity to associate the various effects of its ERP to various performance indicators. This study contributes to expand the knowledge and deeper understanding of the ERP implementation evaluation on organizational performance.
However, there are some limitations in the present study. Firstly, one case study approach leads to reduce generalizations of the findings. Further a large longitudinal study with an extensive survey comprising more effects of ERP and comprehensive list of performance indicators may lead to generalize the results.

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