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A STUDY ON THE EFFECT OF ENTERPRISE RESOURCE PLANNING (ERP) ON INTERNAL PROCESS OF AN ORGANISATION

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Abstract *ERP (Enterprise Resource Planning) systems are configurable information system packages that integrate several business functions into a single system with a shared database. It contains selectable software modules that address a wide range of operational activities in the firm, such as accounting and finance, human resources, manufacturing, sales, and distribution. Enterprise systems represent an important technology investment option for operations managers, and have been acclaimed in the practitioner and academic literature for their potential to improve business performance. This study is an attempt to understand the effect of ERP on internal processes of an organisation. Paired T-test was used to compare the perception of users of ERP before and after ERP installation.*

Keywords: *ERP, Organisation, Internal Processes*

1. Introduction

Enterprise systems provide a backbone of information, communication, and control for a company (Buckhout, Frey, and Nemec, 1999), and embody the current best business practices for organisational processes (Esteves and Pastor, 2000). ERP system can be defined as a single integrated and packaged business information system. The aim of an ERP system is to seamlessly integrate and manage the different business processes and information flows within an enterprise (Boudreau M.C., 2003; Ragowsky A. and Gefen D., 2008; Yeh J.Y., 2006). ERP systems are software packages that manage and integrate all the enterprise's data, and provide information based on this data on a real-time basis. ERP is a method for effective planning and control of all resources needed to take, make, ship and account for customer orders in a manufacturing, distribution or service company (Sheikh, 2003).

2. Literature Review

The implementation of an ERP system is shown to promote operational, managerial, and strategic benefits (Kennerley and Neely, 2001; Al-Mashari *et al.*, 2003). Similarly, Shang and Seddon (2000) propose a consolidated framework of five benefit dimensions of ERP systems: operational benefits includes cost reduction, cycle time reduction, productivity improvement, quality improvement, customer services improvement; managerial benefits includes better resource management, improved decision making and planning, performance improvement etc. ; strategic benefits includes support business growth, build business innovations, build cost leadership, generate product differentiation etc.; IT infrastructure benefits including build business flexibility for current and future changes, IT costs reduction, increased IT infrastructure capability, and organisational benefits that includes support organisational changes, facilitate business learning, empowerment, build common visions. ERP system adoption is also motivated by management's need for timely access to consistent information across the diverse functional areas of a company. Davenport (2000) proposed that implementing the ERP systems bring many benefits for the organisation including reduction of cycle time, promotion the flowing efficiency of information, generating the financial information fast, proceeding the e-business, and assistance in development of new organisational strategies. After ERP implementation, enterprises can successfully integrate the processes of each department, decrease costs, improve effectiveness, increase clients' level of satisfaction, and also immediately share information with the whole enterprise (Davenport, 1998; Krumwiede and Jordan, 2000; Pan and Jang, 2008).

The implementation of ERP systems may prove as significant to accounting practice as the transitions to database management systems and electronic data interchange systems (Williams,1992) . In 2009, security, privacy, and other information control issues headed the list of the American Institute of Certified Public Accountants' (AICPA) top technology issues, as it has for many years now (Walters, 2007; AICPA, 2009) . ERP technology does not impose a specific control structure, but neither can controls be analyzed independently of the technology or its context of use. Management control in ERP becomes a collective activity as control issues are distributed to different areas of organisation (Dechow and Mouritsen, 2005). .

ERP systems are also considered a solution to the growing information requirements within public sector organisations to achieve accuracy in management information systems (Singla, 2008), improve competitiveness (Allen, 2000; Raymond,1987), increase scale efficiencies of firm operations (Harris and Katz, 1991; Mitra and Chaya, 1996), improve efficiencies through computerization, enhancing decision making by providing accurate and timely enterprise-wide information (Wah, 2000), process business transactions effectively (Malone *et al.*, 1987; Johnson and Lawrence, 1988), increase effectiveness and cost control (Blick *et al.*, 2000), collect and disseminate timely information for decision making (Simon, 1955), increase throughput and delivery speed by reducing order cycle time and customer response time (Cotteleer and Bendoly, 2006; McAfee, 2002), monitor and record employee performance effectively (Zmud and Apple, 1992), maintain records of business functions within the organisation and communication channels with lower cost (Cash and Konsynski, 1985), provide high levels of process integration across interdependent organisational units (Park and Kusiak, 2005), reduce cash-to-cash cycle times and the time needed to reconcile financial data, thereby reducing the amount of operating capital (Mabert *et al.*, 2000, 2003), to provide products and services of higher value to their customers, that is, to improve their competitive capabilities (Roth and Jackson, 1995), replace legacy systems based on outdated information technology (Chaterji, 1999), improve organisational decision making (Holsapple and Sena, 1999), share the same database which avoids duplication costs, and collection and analysis of the same information (Ferrando, 2001), allow organisations to re-engineer their business processes (Koch, 2001; Singla, 2008), achieve greater efficiency (Singla, 2008), better communication among organisational units (Miranda and Kavanagh, 2005). Moreover, ERP systems can provide high levels of process integration across interdependent organisational units (Park and Kusiak, 2005), increase throughput and delivery speed by reducing order cycle time and customer response time (Cotteleer and Bendoly, 2006; McAfee, 2002), and reduce cash-to-cash cycle times and the time needed to reconcile financial data, thereby reducing the amount of operating capital (Mabert, Soni, and Venkataramanan, 2000 and 2003), provide growth options and can enhance a firm's agility and innovativeness (Fichman, 2004; Sambamurthy, Bharadwaj, and Grover, 2003), integrate business processes (Brakely, 1999; Davenport, 1998, 2000), reduces costs and inefficient processes (Harris, 2005).

3. Research Methodology

The Study: The study focuses on understanding the effect of ERP on internal processes of an organisation.

The Sample: The sample of the study constituted of 100 respondents working in organisations which are using ERP systems. The respondents were selected through non-probability convenience sampling method. Sample for the survey was selected from the city of Indore.

Tools for Data Collection: A self-structured questionnaire is used for the purpose of collecting data from the respondents. The questionnaire adopted in this study consisted of 40 independent variables for collecting responses related to internal processes of an organisation which were further grouped under 7 groups (Time Consumption, Information Accessibility, Error Handling, Organisational Effectiveness, User-Interface, Security and Control, and Task Management) . All items were measured by responses on a seven-point scale, ranging from 1= Very Less to 7= Very High.

Tools for Data Analysis: For comparing the perception of employees after the installation of ERP systems, Paired Sample T-Test was used for data analysis. The Paired Samples T- Test compares the means of two variables. It computes the difference between the two variables for each case, and tests to see if the average difference is significantly different from zero.

3.1. Objectives

- To study the effect of ERP on internal process of an organisation.

3.2. Hypotheses

H_{01}: There is no significant difference in the internal process of an organisation due to ERP installation.

H_{02}: There is no significant difference in time consumption of internal processes of an organisation due to ERP installation.

H_{03}: There is no significant difference in information access by an organisation due to ERP installation.

H_{04}: There is no significant difference in error handling process of an organisation due to ERP installation.

H_{05}: There is no significant difference in organisational effectiveness due to ERP installation.

H_{06}: There is no significant difference in user interface of processes of an organisation due to ERP installation.

H_{07}: There is no significant difference in security and control of processes of an organisation due to ERP installation.

H_{08}: There is no significant difference in handling of tasks by an organisation due to ERP installation.

4. Results and Discussion

As shown in table 1 significant value is 0.75 which is greater than 0.05. Hence null hypothesis, H_{01} is accepted at 5% level of significance. This is in contradiction with the study of Benchmarking Partners (1998) who after consulting survey results of Fortune 500 companies suggest perceived benefits from ERP are improved information and improved processes. Duff and Jain (1998), Shang and Seddon (2000) and Hayes *et al.* 2001) also suggested that ERP systems lead to increased efficiency and effectiveness in business processes permeating management decision-making at all levels. Helo (2004) also indicated that ERP can help manage operation process. Velcu (2007) also indicated that ERP can reduce business operating and administration.

As depicted in Table 1, there is a significant difference in the perception of users of ERP regarding information accessibility and time consumption since p value is less than 0.05. Hence hypothesis H_{02} and H_{03} are rejected respectively. This perspective is not supported by Wand and Wang (1996) who argue that untimely data are manifested in the form of wrong, meaningless or ambiguous representations. However, Stefanou (2002) reports that the integration of accounting applications, information exchange and reporting capabilities are notable advantages/ strengths of ERP system. Increased flexibility in information generation, improved quality of reports, integration of applications and easy maintenance of databases appear the major benefits derived from the ERP systems (Charalambos and Sylvia, 2003). It has been quickly realized that ERP systems are good for storing, accessing and executing data used in daily transactions, but are not good at providing the information needed for long-term planning and decision making (Radding, 2000; Adam and Doyle, 2001) as ERP systems are not designed to know how the data are to be used once they are gathered (Inmon, 1999). In some cases, the introduction of ERP systems created major distortions in corporate decision-making processes (Lindley *et al.*, 2008). An ERP system with poor information quality and inappropriate processes guarantees that more wrong answers look prettier and they are accessed faster by decision makers (Lynn and Madison, 2000).

Output quality can be referred to a show well the system performs tasks matching the user's job goal (Venkatesh and Davis, 2000). The results are in accordance with the study be Fryer (1999), who reported that one of the benefits of ERP implementation is information visibility and ERP systems have proved to be quite effective in transaction processing but less effective in reporting and decision support. The harsh reality of ERP systems implementation, to the expense of those organisations that invested resources in the initiative, is that ERP only gets data into the system, it does not prepare data for use and analysis (Inmon, 2000). The use of ERP systems is shown to provide benefits like improved information availability/quality and improved business operations and integration (Olhager and Selldin, 2003). This further confirms that ERP systems are currently becoming a necessary tool for companies to remain competitive in this new business environment rather than constituting a new strategic move. Mabert *et al.* (2000) surveyed the US manufacturing firms found that ERP systems implementation benefits are concentrated more on quickly providing high-quality information within the firm. This is due to the fact that ERP systems lack certain functionality and reporting capabilities (Adam and Doyle, 2001). However, it bears thinking that as long as organisations can analyze data, supporting different business processes, even across differing data structures that change with the diversity of systems, there is no need to force a rigid standardization of business processes (a straightjacket) across the organisation (Hayler, 2003). Many organisations experience frustration when they attempt to use their ERP system to access information and knowledge (Radding, 2000).

Hypothesis H_{04} stands accepted since p value is 0.75. This means that due to ERP, error handling was not affected. This is contrary to the study by Rizzi and Zamboni (1999) and Latamore (2000) who reported that errors are reduced and employees have access to current information for decision-making. Data reentry errors and omissions from one business process to the next are eliminated. Finally with the adoption of ERP systems, information errors are no longer confined to one area of the company. This is true since errors maintained within the ERP system are propagated throughout the entire business (Lynn and Madison, 2000).

Results show that Hypothesis H_{05} is also rejected. This means there is a significant difference between organisational effectiveness parameter before ERP and after ERP. Campbell and Sankaran (2005) report that ERP systems have a definite internal focus providing organisational connectivity and helping to better coordinate functions within organisations. Even though ERP systems are perceived as rigid, some public organisations have experienced a greater level of flexibility in organisational processes after their implementation (Singla 2008). Granlund and Malmi (2002) argue that a common organisation-wide information structure and integrated information system could produce significant benefits for global organisations. At least one study found that ERP adopters perceive their ERP system to provide

significant decision-support characteristics, and these DSS characteristics are considered valuable (Holsapple and Sena, 2003). Krantz (2005) defines ERP implementation as a complex issue because it consumes time to achieve it and will result in a valuable change in the organisation once implemented as it is an integrated way of business processes. Severe disappointment with ERP when managers realized that getting business benefits from ERP required change in business practices (Dolmetsch *et al.*, 1998). In this context, enterprise resource planning (ERP) systems have been promoted as a panacea for dealing with lack of data integration by replacing inadequately coordinated legacy systems (Davenport, 1998; Knolmayer and Ro¨thlin, 2006).

For user-interface parameter, p value is 0.29 (table 1), Hence null hypothesis H_{06} is accepted which means that users did not find any difference in user interface after adoption of ERP though according to Mahmood *et al.* (2000), information technology (IT) user expectations are potentially an important factor affecting the perceived benefits arising from the use of new information systems.

Security and control were found to be highly affected after ERP implementation since p value is 0 (Table 1), hence null hypothesis H_{07} is rejected**.** This is in accordance with the study by Latamore (2000) who reported that ERP systems reduce data redundancy and data errors and, as a result, significantly enhance data integrity and reliability and provide current, accurate information to all decision makers. Heightened segregation of business processes, whereby one individual's single data entry can trigger actions across several interconnected processes (Grabski, Leech, and Lu, 2001). Hypothesis H_{08} also stand rejected since p value is 0. This is in accordance with the study by Mabert *et al.* (2001) and McAfee (2002) who found that ERP systems enable firms to standardize, integrate, and streamline their data and process flows. According to Austin and Nolan (1999) and Lindley *et al.* (2008), one of the problems with ERP systems is their rigidity

5. Conclusion

ERP systems are more than a new information technology. They are more business-process-oriented than technology-oriented. This study finds that ERP does not shows a considerable effect on the internal processes of an organisation after ERP installation. . The study also found that most of the parameters of measuring internal processes of an organisation i.e Time Consumption, Information Accessibility, Organisational Effectiveness, Security and Control, and Task Management were highly affected by use of ERP systems while parameters like Error Handling and User Interface were not affected after ERP implementation .

6. Suggestion and Limitations

The focus of research was on capturing the knowledge of ERP practitioners, vendors and consultants. The information contained in this paper is intended only to provide effect of ERP on internal processes of an organisation. It does not purport to be a complete description of the research issues on all the effects of ERP on an organisation. As with any study, this research has a potential limitation. Since the research was conducted in Indore, with a unique culture and some special characteristics, the results might not hold true in other organisations and environments for other cities. Also, longitudinal data gathered after a satisfactory time frame from the same company, by surveying the same respondents, will reveal whether satisfaction level has changed and which factors, if any, has contributed to this change.

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Appendix

Table 1: Paired Samples T-Test for Processes of Organisation

PAIRED SAMPLES T_TEST								
	Paired Diff							sig 2-tail
	Mean	Std. Dev	Std. Error Mean	95% confidence Interval				
				Lower	Upper	t	df	
pre-post (Internal Processes)	-1.935	59.42	6.16	-14.17	10.30	-.314	92	0.75
pre-post(Time Consumption)	8.2	8.911	0.89	6.43	9.968	9.20	99	0
pre – post (Information Accessiblity)	5.69	10.23	1.02	3.659	7.721	5.56	99	0
pre – post (Error Handling)	0.42	13.37	1.33	-2.23	3.072	0.31	99	0.75
pre – post (Organisational effectiveness)	-3.46	14.52	1.45	-6.34	-0.58	-2.38	99	0.01
pre – post (User Interface)	-2.25	21.13	2.11	-6.44	1.943	-1.06	99	0.29
pre –post (Security and Control)	-7.67	8.493	0.88	-9.43	-5.93	-8.72	92	0
pre-post (Task Management)	-3.89	13.61	1.36	-6.59	-1.19	-2.86	99	0.00

Table 2: Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Time Consumption	preERP	19.99	100	4.904	.490
	postERP	11.79	100	5.319	.532
Information Accessibility	preERP	18.24	100	5.691	.569
	postERP	12.55	100	5.802	.580
Error Handling	preERP	20.63	100	6.128	.613
	postERP	20.21	100	8.874	.887
User Interface	preERP	23.62	100	14.651	1.465
	postERP	25.87	100	16.499	1.650
Security and Control	preERP	15.43	100	6.555	.680
	postERP	23.11	100	8.835	.916
Task Management	preERP	21.86	100	6.342	.634
	postERP	25.75	100	8.375	.838
Organisational Effectiveness	preERP	16.97	100	6.387	0.639
	postERP	20.43	100	9.178	0.918