

IMPACT OF ERP USAGE ON OPERATIONAL PERFORMANCE OF SRI LANKAN MANUFACTURING COMPANIES

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ABSTRACT

Today most businesses are changing from being function driven to being process driven entities and the integration of business processes is achieved through Enterprise Resource Planning (ERP). ERP is a process where a company, often a manufacturer, manages and integrates the important parts of its business. Therefore ERP systems are becoming popular among business organizations globally as well as locally. Currently Sri Lankan manufacturing companies are considering the implementation of ERP system but the information on benefits arising from ERP usage is limited due to lack of research in this area. Therefore this study aims to identify the current level of ERP usage in Sri Lankan manufacturing companies and its impact on operational performance. For this purpose, a standard questionnaire was used for primary data collection, gathered from manufacturing companies that are currently using any type of ERP software. Data was analysed using both descriptive and inferential statistics. The study found that the level of ERP usage in Sri Lankan manufacturing companies are at average level and there is a significant impact of ERP usage on operational performance. These findings will be supported for manufacturing companies for making decision to use ERP for their business activities.

Keywords: ERP usage, Operational performance, manufacturing companies

1. INTRODUCTION

With the advancement of Information systems, the use of Enterprise resource planning (ERP) systems within organizations is increasingly becoming much popular and common worldwide. Thus, most businesses today are changing from being function driven to being processed driven entities and the integration of business processes is achieved through ERP system. ERP as a comprehensive software solution for business operations, attempts to integrate the comprehensive array of business processes and functions with the purpose of presenting a holistic view of the business from a single unit (Klaus, et al., 2000). As a result, use of ERP systems make firms day-to-day activities more easily, fast, and simple that saves many of organizational level resources and thus, ultimately it enhances business performances (Elragal & Al-Serafi, 2011). Firms, adopting ERP systems with more functionalities, are benefitted with standardization, efficiency & better communication (Sheu et al., 2003). In getting these advantages of ERP systems that leads enhanced business performance, many organizations world-wide,

ranging from very large to small-scaled, adopt ERP systems in their organizations as a strategy of cost effectiveness and competitive advantage (Klaus, et al., 2000). However, the level of ERP use is different from business to business, industry to industry even country to country.

Despite many of the enhanced advantages of the usage of ERP systems in organizational operations, both practitioners and the scholars report many examples of negative impacts of ERP on business performance (Gupta et al., 2004). Thus, it has gained much attention in the information systems research. A significant number of scholarly works has been conducting on the impact of ERP on business and operational performance for more than two decades, but most of them are from well-developed and advanced economies, except very few from emerging economies (Elragal & Al-Serafi, 2011). To our best knowledge, studies in this line of research in the context of Sri Lanka – an emerging country in the Asian region, are extremely hard to find. This was the prime motive for us to conduct a study related to ERP systems in Sri Lankan context. Through this study we expect to find the level of ERP usage in Sri Lankan manufacturing companies and the impact of ERP usage on operational performance expecting to fill the vacuum of research in this area in the Sri Lankan context.

2. LITERATURE REVIEW

Enterprise resource planning (ERP) is a process where a company, often a manufacturer, manages and integrates the important parts of its business. It integrates all the functional areas such as planning, purchasing, inventory, manufacturing, sales, marketing, finance and human resources. Osnes et al., (2018) recognized the ERP systems as standardized, off the shelf software packages. Recently much of scholars have paid their attention on ERP implementation as large number of companies are using ERP software at different levels. However, ERP implementation is challenging undertaking due to its complex configuration, adaptation, and data conversion (Osnes et al., 2018). When implementing an ERP system, the major concern is about the size of the company like Small and Medium (SME) or large scale which is based on number of employees and revenue (Mabert, Soni, & Venkataramanan, 2003). Most of the larger companies employ more ERP functionality than small companies (Mabert et al., 2003). The top three most important critical successful factors for ERP system implementation in large enterprises are top management support, good project management teams and good communications during implementation (Ali & Miller, 2017). According to ERP Report 2019, when implementing ERP, integrating people, process and technology determine the success of the ERP projects.

The global ERP market has significantly grown over the years. According to ERP statistics, the global ERP market is expected to reach \$47 billion in revenue from 2007-2022 (ERP Software Market, 2018). The ERP market has segmented into four main divisions as industry verticals, installation, geographies and applications. Within the industry verticals, it has divided into manufacturing, Banking, financial services and insurance, entertainment, healthcare and IT. Geographically it spreads over the world across North America, Europe and Asia Pacific regions. Currently, many companies in South Asian region including Sri Lankan is considering ERP to implement while some have already implemented. In Sri Lankan context, majority of ERP implementations are from manufacturing sector (Wickramasinghe & Gunawardhana, 2010).

Implementation of ERP improves operational performance of the companies (Cotteleer, 2006). Early ERP implementations focus more on inter firm activities (Hernandez, 1998, Mabert et al., 2000) but today it focuses more in depth, complex modular integration (Madupsi. A., & D'Souza, D. 2012). Literature shows that operational performance improves as employees use the ERP system in unique and different ways to enhance organizational tasks and processes (Chou & Chang, 2008). Some companies extend ERP systems by adding more modules expecting to

improve performance. Bendoly et al., (2009) found that extending ERP systems further improves operational performance. With the support the existing literature, this study proposes;

H1: There is a significant impact of ERP usage on operational performance of manufacturing firms in Sri Lanka

3. METHODOLOGY

In achieving the main objective of this study, a survey based quantitative approach was utilized for data analysis purpose. Unit of analysis of the study was firm level. A structured questionnaire was used to collect data from 34 manufacturing companies in Sri Lanka who are using any type of ERP system. All these companies are listed in Colombo Stock Exchange and the total number of companies listed in manufacturing sector is 39 (<https://www.cse.lk>), and thus, the total population sampling technique was used with the successive response rate of 87%. The questionnaire included three main sections as general information of the company, ERP usage and operational performance. For ERP usage, 11 modules were considered with five-point likert scale for measuring how often a particular module use in the company and the standard scale used by Madurapperuma, Galkotuwa, & Thelijjagoda, (2009) in their study was employed. Operational performance was measured using cost, cycle time, quality and customer service, measured subjectively in a five-point Likert scale, provided by (Gunasekaran, 2007) in his study was used. For data analysis purpose, both descriptive analysis and regression analysis were the main statistical techniques used in this study. Descriptive analysis was used employing summated value proposed by (Jayarathna, 2016) to measure the level of ERP usage while regression analysis was used to find the impact of ERP usage on operational performance.

4. ANALYSIS

4.1 Profile of the Sample

The majority of the sample companies are large scale companies (82%) and the rest represent medium scale (28%). 41% of the sample companies have been operating for more than 10 years and 26% are in the industry less than three years. Others have been in the industry in between 3 to 10 years. Out of the total companies in the sample 59 % of the companies use SAP system while 11% of the companies use Oracle. 29 % of the sample use other type of ERP systems.

4.2 Level of ERP use

The level of ERP usage was categorised by the summated value of 5 point likert scale score range for 11 items. The summated value ranged from 11 to 55, as the possible minimum score is 11 if one gives 1 for all 11 items (1*11) and maximum value is 55 if one gives 5 for all 11 items (5*11). In order to find the current level of ERP usage, summated value of range were separated into equal 5 levels and identified as 11-19 “Highly used”, 20-28 “Averagely used”, 29-37 “Moderately used”, 38-46 “Rarely used” and 47- 55 “Not used”. The results are represented in the following table (Table 1).

Table 1. Level of ERP Use

Level of Use	Frequency	Percent	Cumulative Percent
Highly used	9	26.5	26.5
Averagely used	10	29.4	55.9

Moderately used	9	26.5	82.4
Rarely used	6	17.6	100
Not used	0	0	100
Total	34	100	100

Source: Survey data

According to the above table, the highest percentage (29.4%) of the sample companies are using all the modules at an average level. 26.5 % of the sample highly use all the modules of ERP system whereas similar percentage moderately used all the modules. The percentage of the companies who rarely use all the modules represent 17.6% of the sample. All these figures clearly show that there is no any companies who are not using all these modules.

When looking at the level of ERP use in each module (refer Table 2 & Figure 1), all most all the companies use Financial accounting module, Production module, Supply chain & logistic module, Inventory module, Payroll and Quality management whereas Management Accounting, Fixed Asset Register and Ecommerce modules, Sales & Markering and Distribution modules are not used by some companies. Financial Accounting is the mostly used module (88.2%) among the others and E-Commerce is the module all the companies use little compared to others even 85.3% of the sample are not using this module. 58.8% of the sample companies rarely use payroll but 32.4% of the companies highly use it. For quality management also the percentage of rarely used (41.2%) is higher than the percentage of highly use (38.2%).

Table 2: Level of ERP use in each module

Modules	Highly used	Averagely used	Moderately used	Rarely used	Not used
Financial Accounting	88.2	2.9	8.8		
Management Accounting	55.9	11.8	2.9	5.9	23.5
Fixed Asset Register	55.9	5.9	8.8	2.9	26.5
Production	70.6	11.8	5.9	11.8	
Supply chain & Logistic	61.8	11.8	8.8	17.6	
E Commerce	2.9	2.9	5.9	2.9	85.3
Inventory Mgt	67.6	2.9	2.9	26.5	

Payroll	32.4	5.9	2.9	58.8	
Quality Mgt	38.2	11.8	8.8	41.2	
Sales & Marketing	70.6	8.8	2.9	2.9	14.7
Distribution	52.9	5.9	11.8	2.9	26.5

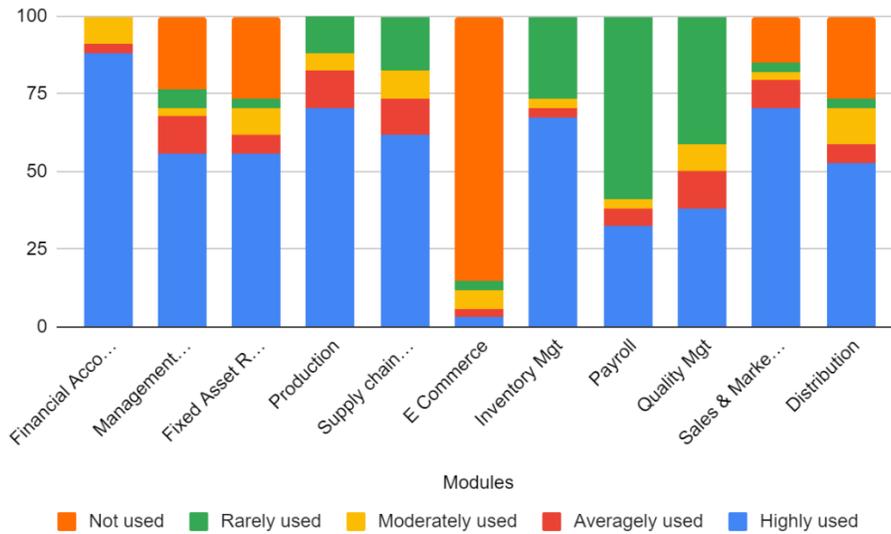


Figure 1: Level of ERP use in each module

4.3 ERP Usage & Operational Performance

Linear regression analysis was employed after the confirmation of the non-violation of assumptions to examine the impact of ERP usage on operational performance. According to the table 3, the model was significant at 95% significance level hence it implies that the ERP usage significantly impact on improving operational performance. Table 5 indicates that 83% variance of the operational performance is explained by the ERP usage.

Table 3: ANOVA table for ERP usage and operational performance

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	18.099	1	18.099	71.512	.000 ^b
	Residual	8.099	32	.253		
	Total	26.198	33			

- a. Dependent Variable: Operational performance
- b. Predictors: (Constant), ERP_usage

Table 4: Coefficients of ERP usage and operational performance

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	.036	.278		.131	.897
ERP_usage	.909	.108	.831	8.456	.000

a. Predictors: (Constant), ERP Usage

Table 5: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.831 ^a	.691	.681	.50309	.890

b. Predictors: (Constant), ERP Usage

c. Dependent Variable: Operational Performance

5. DISCUSSION & CONCLUSION

Based on the results of the current study, we identified that the level of ERP usage in Sri Lankan manufacturing companies are at average level because highest percentage responded as all the modules are using averagely. But there is no much variance among the percentage of companies who are using ERP modules highly and moderately. This indirectly implies that there is increasing trend in use of ERP system among Sri Lankan manufacturing sector. Furthermore, when looking at the use of individual modules, more than 50% of usage is taken by modules of financial accounting, management accounting, fixed assets register, production, supply chain & logistic, sales & marketing, and distribution. This evidence that ERP system has gained much importance among the financial and operation activities of manufacturing sector. Also the results reveal that companies in this sector have not paid much attention to use ERP system for Payroll and quality management purposes. This may be sometimes due to companies are following separate systems for that. For instance outsourcing payroll function. According to the results we can conclude that the level of ERP usage in overall is at average level. On the other hand, this level of use has positively contributed on operational performance of the companies. Thus, the results of the study shows that ERP usage significantly impact on operational performance of the companies in terms of cost & cycle time reduction and quality & customer service improvement.

This study is useful for both academics and practitioners. The findings of this study can be used by the ERP vendors for further improvement of ERP system modules and they can customized their products focusing more on the level of usage. Academics can further research on this area to find what factors are contributed to the level of use of ERP system and can further analyse how ERP usage impact on cost reduction, cycle time reduction, quality improvement and enhancing customer service individually. We expect this study will add more literature for existing body of knowledge and fill the vacuum of ERP research in Sri Lankan context.

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