AN ASSESSMENT OF THE EFFECT OF ENTERPRISE RESOURCE PLANNING IMPLEMENTATION ON SUPPLY CHAIN PERFORMANCE IN MANUFACTURING SECTOR IN KENYA: A CASE OF MABATI ROLLING MILLS LTD

Mariam Ali Mahmud

Student, Jomo Kenyatta University of Agriculture and Technology

Noor Ismail Shale, PhD

Jomo Kenyatta University of Agriculture and Technology

ABSTRACT

Enterprise Resource Planning (ERP) is a software solution that integrates business functions and data into a single system to be shared within a company. While ERP originated from manufacturing and production planning systems used in the manufacturing industry, ERP expanded its scope in the 1990's to other "back-office" functions such as human resources, finance and production planning. Kenya has embarked on a concerted effort in joining the league of industrialized nations in the acquisition, deployment, consumption and utilization of ERP. It has become an indispensable tool for individual and national empowerment, improvement, development and actualization of service. The main objective of this study was to assess the effect of enterprise resource planning implementation on supply chain performance in manufacturing sector in Kenya: a case of Mabati Rolling Mills ltd. This is a case study of Mabati Rolling Mills Ltd. The study specifically used employees of Mabati Rolling Mills Ltd as the target population. A descriptive research design was used in this study. This study is expected to produce both quantitative and qualitative data. Once the questionnaires are received they were coded and edited for completeness and consistency. Quantitative data was analyzed by employing descriptive statistics and inferential analysis using statistical package for social science (SPSS). The findings were presented in tables of frequency distributions percentages, bar graphs and pie charts. The study concluded that there's need for quality awareness to among employees through education. The study recommended that the top management should communicate ERP adoption to the entire organization to create awareness, interest, desire and action

Keywords: *Enterprise Resource Planning, manufacturing, industrialized and syst*

INTRODUCTION

Enterprise Resource Planning (ERP) is a software solution that integrates business functions and data into a single system to be shared within a company. While ERP originated from manufacturing and production planning systems used in the manufacturing industry, ERP expanded its scope in the 1990's to other "back-office" functions such as human resources, finance and production planning (Swartz&Orgill, 2001; Nieuwenhuyse, Boeck, Lambrecht, & Vandael, 2011). Moreover, in recent years ERP has incorporated other business extensions such as supply chain management and customer relationship management to become more competitive. Lured by guarantees of improved business productivity, streamlined business operations, and increased cost savings (Tilley et al., 2007), organisations worldwide have launched initiatives to integrate ERP systems into their existing business environments.

Indeed, Christopher's (2008) emphasizes the significance of information flow and by implication the significance of information communication technology, as he defines of logistics as "The process of strategically managing the procurement, movement and storage of materials, parts, and finished inventory (and the related information flows) through the organisation and its marketing channels in such a way that current and future profitability are maximized through the cost-effective fulfilment of orders." In the past, management used information technology to simply automate routine business tasks (Ward and Griffiths, 2006). A paradigm shift has occurred, as academics and practitioners have witnessed "the transformation of IT from a back-office support role to a strategic business partner" (Roepke et al. 2000).

Statement of the problem

North America and Western Europe are the two largest market segments for the ERP system in 2013 with approximately 51.6 and 29.9 percent, respectively. However, the Asia/Pacific region is the third largest market segment for ERP system, with approximately 13.6 percent of the total spending on ERP system. The results of a market research conducted by the Korea IT Industry Promotion Agency indicated that the total ERP market in Korea was $252 million in 2011 and increased to $262 and $277 million in 2002 and 2003, respectively (Katerattanakul et al., 2006). The total ERP market in Korea was $290 million in 2014 which is approximately 8 percent of the total spending on ERP system in the Asia/Pacific region. Moreover, it was reported a rapid growth of ERP systems in Taiwan market, the market grew from $2.113 billion in 1997 to $4.68 billion in 1998 and from $6.13 billion in 1999 to $8.01 billion in 2000, and from $9.88 billion in 2001 to $12.65 billion in 2002. These results indicate a rapid growth of ERP market in Asia. However, ERP market was expected to increase up to $36.1 billion in 2008 (Sonnen et al., 2005).

While there is 89% adoption of ERP systems in Europe and North America, developing countries like Kenya has only adopted it 27% (Huang & Palvia, 2001; Huanget al., 2004). This can be attributed to among others; lack of top management commitment, poor staff training on use of erp systems, high costs of implementing the systems and how well is integrated within the

organization . Many studies in literature have shown the importance of ERP system in companies' effectiveness, and this is because ERP system have become one of the main prerequisites, a price of entry, and a strong and integrated IT infrastructure for many companies enabling them to compete in the local and global marketplace, and ensuring them to gain a competitive advantage in the global economy particularly with the current e-business era (Al-Mashari and Zairi, 2000; Huang et al., 2001; Rashid et al., 2002; Al-Mashari, 2003; Al-Mashari and Al-Mudimigh, 2003).

The implementation of ERP system leads to important changes in companies, affects the ways of conducting business, and reorganizes the supply chain of the companies. Therefore, supply chain and all stakeholders involved in the supply chain in particular and in the entire company in general, need to realize and understand these important changes. Task performance will be in a new and different manner from that previously performed (Kremzar and Wallace, 2001; Thao, 2002).

Thus, if the management do not realize and understand the actual impacts of ERP system on the company and on its business performance includes supply chain performance, and are not prepared and ready for the large changes, this might affect the performance of the whole company and greatly affect the GDP. It particularly affects supply chain performance and may eventually lead to system failure. Hence, it is important to understand the actual effects of ERP system on a company as a whole and particularly on its supply chain performance. It is also important to understand the relationship between ERP system and supply chain performance in similar companies before undertaking any decision such as ERP system implementation. This probably will limit the likelihood of ERP system failure.

Low involvement of employees, lack of top management support, cultural misfit problem, and ineffective usage of ERP system will lead to ERP system failure and then lead the whole company to bankruptcy. These results will prevent Kenyan manufacturing companies to implement ERP system and therefore they will not be able to connect their supply chain with many of global as well as local companies in order to respond effectively to the market where ERP system has become a prerequisite in the marketplace and a backbone for e-business and this is eventually could cause a decline in their market share in the local as well as global markets (Otieno 2005; Ravendran, 2002; Sangaran, 2000). This study therefore sought to fill this gap by doing an assessment on the effect of enterprise resource planning implementation on supply chain performance in manufacturing sector in Kenya: a case of Mabati Rolling Mills ltd.

Literature Review
In 2000, a survey has been conducted on large manufacturing companies in USA indicated that, companies with a solid supply chain are able to reduce their operating costs, inventories, product life cycle, and cycle time tremendously, and that will certainly increase cash flow, working

capital, efficiency of transactions in supply chain, customer services, and on-time delivery (Zheng et al., 2000).

However, supply chain is considered as one of the most important success factors in the future of business environment, meanwhile managing the entire supply chain is very challenging and not an easy task, therefore companies began to consider and redirect their efforts toward information systems, such as ERP system, in order to improve their supply chain performance and give them the opportunity to gain a competitive advantage in the global economy (Lambert and Cooper, 2000).

Zheng et al. (2000) pointed out that, the main five parts of any supply chain is plan, buy, make, move, and sell. Supply chain contains applications such as, manufacturing planning, demand planning, distribution planning, transportation management, warehousing management, performance management, production scheduling, freight payment, capacity planning, customer clearance, sourcing and procurement, and finally supply chain optimization.

Ngulube and Tafor (2006) in a study on impact of management of records in the public sector in Africa found that records and information management in developing countries was significant in effective management of the sector. This is because effective record management leads to accountability. However, the researchers observed that record management in most public sectors in developing countries were poorly management and hence the poor performance of most public institutions. One of the problems identified was lack of staff and appropriate training, inadequate funding to maintain records and the digital divide. This implies that if these problems are looked at, stores management in the public sector could be managed.

In a study on the relationship between inventory operations and human capital, (Maria, 2011) it was found that inventory operations management depends highly on the skills of the human resource handling them. It was observed that every task and action required to be carried out by the operatives will impact the inventory as well as the delivery lead times and other parameters.

World Bank (2000) in a study on managing records as the basis for effective service delivery and public accountability in development; it was found that the quality of any records management program was directly related to the quality of the staff who operated it. The study established that lack of considering the quality and quantity of staff needed to run a store in the civil service often led to incompetence and ineffective procurement management. It was also found that because the care of records calls for a continuous management process at any phase of the life-cycle of the records, the functions of registrar, records manager, records center manager, and archivist should be performed within an integrated structure, with no rigid boundaries that limit professional collaboration and development.

Critique of existing literature

ERP require implementation of an information system that facilitates and expedites the exchange of data and information between supply chain partners, integrate functional units, and allow everyone in a company to access to a single database and use the same data and information without any data inconsistency problems. The suitable information system that can provide all

the above-mentioned characteristics is the ERP system (Amoako-Gyampah, 2007; Kemp and Low, 2008). During the implementation of ERP system, companies should seek assistance from the external consultants in order to provide the above-mentioned facilities and avoid system failure (Maditinos et al., 2012).

In order to create an effective and successful supply chain, it requires cross-functional integration, as well as many companies need to integrate the whole supply chain, which includes suppliers, warehouses, factories, distributors, and retail outlets, and provide cooperation between all supply chain partners through planning, coordination, and information sharing which is critical to achieve successful and effective operation of supply chain (Stevenson, 2002).

In fact, the key to achieve effective supply chain is accomplishing customer demand on time. However, there are several steps must be taken in order to attain an effective supply chain that includes developing a strategic objectives and tactics, creating strategic partnerships, coordinate activities with suppliers and customers, and finally organize planning and execution within the supply chain (Lambert and Cooper, 2000).

Therefore, the success of supply chain depends on how efficient and effective each part and application of the supply chain, and also on how well these parts and applications integrated with each other in order to assist the entire supply chain to move smoothly and efficiently (Zheng et al., 2000). ERP system is able to integrate all parts and applications of the supply chain, and also able to facilitate the efficiency of each part and application in the supply chain.

Research Gap

ERP market found a great acceptance in developed countries such as USA, UK, Canada, and Australia, while in developing countries, ERP systems is a new idea and still in infancy stage because there are many untapped countries such as China, Korea, and Malaysia. ERP could be an effective system that assists companies in creating effective and successful supply chain. In fact, ERP system introduced to integrate all functional units of a company and its supply chain in order to make it in one system. Therefore, all data and information related to supply chain will be accessible and retrieved from one system. The ease of access to one system from various functional units and the advancement of IT and computing research can result in enhancement of supply chain performance (Tjoa and Raman, 1999; Rashid et al., 2002).

Summary

In supply chain management the emphasis is on how well a chain or group of companies perform in order to create value for the final customer (Brewer and Speh, 2001). There are several ways of describing the performance in a supply chain. One way of structuring performance in the supply chain was provided by Krajewski et al. (2007), who distinguished between inventory measures (such as inventory value, weeks of supply and inventory turnover), process measures (such as customer satisfaction, on-time delivery or lead times) and financial measures (e.g. return

on assets or cost of goods sold). Another way could be found in the SCOR model, which describes supply chains in five dimensions, namely reliability, responsiveness, flexibility, cost and efficiency in asset utilization (Stephens, 2001). These attributes are then transformed into defined performance metrics such as delivery performance, order fulfillment lead times and cash-to-cash cycle. Altogether, it can be seen that measuring supply chain performance is a complex issue, containing many possible metrics that in many cases also are interrelated (Basu, 2001). An ERP system can be described as a modularized suite of business software applications that are seamlessly integrated to provide automated interactions and a common source of data for a firm.

Research Methodology

A descriptive research design was used in this study. The target population of this study comprised of the general staff of Mabati rolling mills which are 500. Once the questionnaires are received they were coded and edited for completeness and consistency. Quantitative data was analyzed by employing descriptive statistics and inferential analysis using statistical package for social science (SPSS).

Results and Findings
Regression analysis

A linear multiple regression analysis was used test the relationship between the independent variables and the dependent variable. The researcher applied the statistical package for social sciences (SPSS) to code, enter and compute the measurements of the multiple regressions for the study.

Coefficient of determination explains the extent to which changes in the supply chain performance of manufacturing sector in Kenya can be explained by the change in the independent variables (ERP integration, cost, staff training and top management support)

Model Summary

Model	R	R Square	Adjusted R Square	Change Statistics	
				F Change	Sig. F Change
1	.897[a]	.805	.8025	7.567	.029

Source, author (2014)

According to the findings in the table above, the value of adjusted R^2 is 0.8025. This indicates that there was a variation of 80.25 % of supply chain performance of manufacturing sector due to the four independent variables at a confidence level of 95%. In addition other factors that were not studied in this research contribute to 19.75% of the supply chain performance of manufacturing sector in Kenya. Therefore, further research should be conducted to investigate the other factors which contribute to that 19.75% of supply chain performance in manufacturing

sector in Kenya. The significance value was 0.029 which is less than 0.05 thus the model is statistically significance in predicting how the independent variables (ERP integration, cost, staff training and top management support) vary on the dependent variable (supply chain performance of manufacturing sector). The F critical at 5% level of significance was 2.789. The F calculated (value =7.567) was greater than the critical value (7.567> 2.789) which indicates that the independent variables (ERP integration, cost, staff training and top management support) affect the supply chain performance of manufacturing sector in Kenya with reference to Mabati Rolling Mills ltd.

ANOVA[a]

Model		Sum of Squares	df	F	Sig.
1	Regression	4.120	4	7.567	.029[b]
	Residual	50.048	78		
	Total	53.168	82		

Source, Author (2014)

$Ys = \beta_0 + \beta_1X_1 + \beta_2X_2 + \beta_3X_3 + \beta_4X_4 + \varepsilon$ become::

$Y = 0.164 + 0.047X_1 + 0.132X_2 + 0.491 X_3 + 0.279X_4$

Where Y is the dependent variable (supply chain performance of manufacturing sector) X_1 is the ERP integration X_2 is ERP implementation cost, X_3 is Staff training, X_4 is top management support.

Taking all independent variables constant at zero, the supply chain performance of Mabati Rolling Mills ltd will be will be 0.164. The data findings also showed that taking all other independent variables at zero, a unit increase in the Staff training will lead to a 0.491 increase in the supply chain performance of manufacturing sector, a unit increase in the top management support will lead to a 0.279 increase in the supply chain performance of manufacturing sector, a unit increase in ERP implementation cost will lead to a 0.132 increase in the supply chain performance of manufacturing sector; while a unit increase in ERP integration will lead to a 0.0.047 increase in supply chain performance of manufacturing sector.

 Therefore inventory management systems contribute more to the supply chain performance of manufacturing sector. At 5% level of significance and 95% level of confidence; staff training showed a 0.001 level of significant; top management support showed a 0.013 level of significant; ERP implementation cost showed a 0.019 level of significant and ERP integration showed a 0.024 level of significant.

Table 4. 1 Multiple Regressions

Model	Unstandardized Coefficients		Standardized Coefficients	Sig.
	B	Std. Error	Beta	
(Constant)	.164	.472		.029
ERP integration	.047	.083	.141	.024
1 ERP implementation cost	.132	.341	.193	.019
Staff training	.491	.037	.506	.001
Top management support	.279	.110	.168	.013

Source, author (2014)

Summary of the findings

ERP Integration

The study established that ERP integration affect supply chain performance to a great extent. ERP integration is dependent on the factors that influence supply chain performance. The study showed that measuring efficiency is an enterprise resource planning strategy towards supply chain performance. The findings of the study showed that Creating the work breakdown structure and selection of operational teams is integration strategy in regard to supply chain performance.

ERP implementation cost

The study showed that ERP implementation cost affect supply chain performance to a great extent. Lower ERP implementation costs improve supply chain performance of manufacturing firms in Kenya. The study showed that reduced profits, lower labor turnover and improved sales values and Identifying corrective actions to address issues affect supply chain performance in manufacturing sector in Kenya. The study revealed that cost can be reduced by limiting the number of suppliers used by the firm and providing them with necessary training and technology.

Staff Training

Employee training is necessary in implementation of ERP and is coordinated in time. Training reduces cost of sourcing appropriate goods and services and therefore staff training significantly improves the implementation of ERP. The study established that training equips staff with the necessary skills and techniques of quality improvement to be a powerful building

block of business in the achievement of its aims and objectives (Stahl,1995).

Top Management Support

The study found out that top management make efforts to establish quality assurance management systems, make efforts to standardise the Supply chain processes in the organization and they are willing to take accountability for ERP management and delivery time lines. The implementation of the practices includes the constructs of management commitment contribute to improve the quality of service to the customers. The study revealed that top management is committed to staff development and ERP adoption creates the organizations systems that determine how products and services are produced and quality improvement process must begin with management's own commitment to ERP adoption.

Conclusion

The study concluded that investment in ICT can make a statistically significant positive contribution to business performance as it enhances information exchange, accuracy, documentation and monitoring. Lack of awareness and readiness by public authorities to understand markets and technologies can be regarded as an additional barrier. The study concluded that there's need for quality awareness to among employees through education.

Recommendation

The study suggested that the effectiveness of ERP integration should be measured by the degree of integration with their supplier bases because supplier quality management is a critical component of ERP integration. There should be availability of adequate supply of people who are educated in the philosophy and technical aspects of quality to improve the supply chain performance. The study recommended that the top management should communicate ERP adoption to the entire organization to create awareness, interest, desire and action.

Suggestion further Study

The objective of the study was to assess the effect of enterprise resource planning implementation on supply chain performance in manufacturing sector in Kenya. It recommends that a similar research should be conducted with an aim at investigating the impact enterprise resource planning implementation on supply chain performance in manufacturing sector in Kenya. The study was only carried out by interviewing the staff of Mabati Rolling Mills ltd.thus the same study should be carried out in the other manufacturing firms in to find out if the same results will be obtained.

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