Predictors of Performance of the ERP Adpopters in the Companies of LILAMA

Khanh Viet Tran[1], Cuong Hung Pham[2] & Long Pham[3]

[1] LISEMCO. JSC, Vietnam

[2] Foreign Trade University, Ho Chi Minh City Campus, Vietnam

[3] National Economics University, Vietnam

Correspondence: Cuong Hung Pham, Foreign Trade University, Ho Chi Minh City Campus, #15D5, Ward 25, Binh Thanh District, Ho Chi Minh City, Vietnam.

Abstract

This study is conducted in companies of Lilama. The results of this study are top management support refers to the executive sponsor (1) invest sufficient time, effort and resources to the project; (2) have a realistic understanding of the capabilities and limitation of the systems; (3) legitimize new goal and objective and ask questions before the project implemented ; (4) establish and approve new organizational structures, roles, policies and responsibilities; (5) monitor project process constantly; and (6) in times of conflict, managers should mediate between parties. The importance of the top management support is agreed by all researchers. The IT literature has clearly documented that for IT projects to succeed top management support is critical. It is said that top managers' understanding of the systems and IT is highly related to the quality of the top management support factors. The success of a project completely hinges on the strong, sustained commitment of top management. It is the first condition of any success ERP project. No support from the top managers, everything is hard to do.

Keywords: Enterprise Resources Planning (ERP), performamce, adpopters, LILAMA

1. Introduction

In a global business environment, firms are seeking to improve or maintain their competitiveness in the increasingly challenging global marketplace. Information systems are often used as tools to improve customer services; reduce cycle times, increase effectiveness, and decrease cost. Enterprise Resource Planning (ERP) systems have drawn interesting attention because they provide a variety of benefits to a business. ERP, which evolved from Manufacturing Requirements Planning (MRP), is an integrated information system that supports business processes and functions by managing the entire organization's resources efficiently and effectively. In other words, ERP involves the planning and managing of the organization's resources in the most efficient, productive, and profitable manner (Banker and Frolirk, 2003). It enables companies to integrate their business processes and all information relevant to their organization (Nah and Delgado, 2006). Kumar and Van Hillegersberg (2000) define it as configurable information systems packages that integrate information and business processes within and across functional boundaries within an organization. ERP is a comprehensive software solution that seeks to integrate the complete range of business from a single IT architecture (Al-Mashari et al., 2003). When companies have efficient business processes, they can be more competitive in the marketplace.

The benefits of ERP systems are linked to effectiveness and efficiency of business processes because firms can get more accurate and timely information (Trott and Hoecht, 2004). Through integrating business functions, firms can reduce data collection time and avoid data duplication. With timely information, ERP helps managers improve decision making speed and quality as well as facilities communication between users. Barriers between business functions and departments are lowered because an ERP system is a vehicle that integrates business processes across functional boundaries. Links with suppliers and customers can be significantly strengthened (Trott and Hoeacht, 2004). ERP systems improve coordination and facilitate cooperation with suppliers, and they improve responsiveness to market and customer requirements. ERP systems also allow firms to access electric commerce. Therefore, implementation and upgrades of ERP systems are identified as one of the top five IT priorities among global chief

information officers (CIOs) (Beauty and Williams, 2006). A recent study by AMR Research indicates that the enterprise application market is expected to grow from $28.8 billion in 2006 to $47.7 billion by 2016.

Many researchers have studied the reasons for ERP implementation (Finney and Corbett, 2007): Companies want to (1) integrate financial data; (2) standardize manufacturing process; (3) standardize human resource (HR) information; (4) have real-time information; (5) generate information for decision making; (6) reduce cost; (7) increase sales; (8) fulfill taxation requirements; and (9) respond to growing global competition. ERP systems can be comprehensive and useful in integrating many kinds of information processing abilities by placing data into a single database. Successful ERP implementation is quite beneficial to firms and provides them with competitive advantages (Teece et al., 1997). This explains why an ERP system is generally considered to be a vital element for enhanced business performance.

2. Literature Review

Enterprise Resource Planning (ERP) is a useful system to organize activities, decision, and information flows across many different functions and departments in a firm (Koh et al., 2008). ERP is the leading approach to integrate business management and information technology. Basoglu et al. (2007) defined ERP systems as integrate software solutions used to manage an organization's resources. According to Watson and Schneider (1998), ERP is an integrated, customized, packaged software-based system that handles the majority of an enterprise's system requirement in all functional areas, such as accounting, human resources, finance, sales, marketing, and manufacturing. ERP systems provide a seamless integration of all information flows in an organization to eliminate cross-functional coordination issues in the business process (Davenport, 1998). Through implementation of ERP system, firms can reduce the overall costs, make accurate data available in real time, and exchange information with customers and suppliers (Basoglu et al., 2007). Thus, a firm implementing an ERP system can have benefits such as fast and accurate information gathering, quick decision making, low inventory cost, improved interaction with customers, and improved product quality. Therefore, ERP can be defined as an integrated information system that supports the business processes and functions through managing the entire organization's resources efficiently and effectively.

Organizational performance measurement plays an important role in organizational growth. Through measuring performance, a firm can identify and track progress against organizational goals, seek opportunities for improvement, and compare performance against both internal and external standards. A firm can also formulate strategic activities through reviewing its performance. Academics and practitioners are interested in the relationship between information system investment and organizational performance (Ward and Zhou, 2006). Many researchers suggest that IT investment leads to improved firm performance including cost, quality, delivery, product variety, and time-to- market (Li 2002). Most manufacturing firms place ERP implementation as a key technology priority in today's increasingly competitive and turbulent business environment. Keeping on top of the various activities and process involved in product production, sales, and distribution can be a tremendous challenge. Firms must design, built and deliver the highest quality products in the timeliest manner at the lowest costs to win and retain customers. With an ERP system, companies can leverage advanced features and functionality to improve all aspects of their operations from product development, sourcing and procurement, through manufacturing, quality testing, and to delivery. As a result, they can enhance efficiency and profitability by reducing cost, developing various products, introducing new products faster than competitors, delivering products on time, and improving quality.

Cost performance is referred to as the degree to which a firm can attract customers primarily at a low price (Krause et al., 2007). The most successful companies indentify needs and opportunities to substantially reduce costs in the supporting areas of their businesses. Reducing administrative costs, manual effort, and overhead can lead a firm to be more efficient, effective, responsive, and profitable. Through integrating business processes across departments onto a single enterprise- wide information system, ERP improves cross- functional coordination and increases efficiencies in doing business.

Product variety is referred to as the degree to which a firm introduces new goods and/ or services with additional features and improved performance with offering. Product variety aims to deliver variety levels that are compatible with market requirements and to improve the impact of product and part variety on the operations performances (Da Silveira, 1998). The literature on product variety has focused on its importance within competitive strategy (Uzemeri and Sanderson, 1995), its impact in operations performance (MacDuffie et al., 1996), and the use of flexibility for dealing with product and part variety in operations and strategy (Da Silveira, 1998). The importance of product variety has been increasing since 1990s (Uzemeri and Sanderson, 1995).

Delivery reliability is referred to as the degree to which a firm provides products or services according to the schedule promised at the time of sale. Shortages and quality problems in supplier parts are additional sources of product delay. Key benefits of an ERP system, such as enhanced control over component inventory, more precise

demand planning, smooth production scheduling, and more effective coordination of distribution channels, enable firms to improve on- time delivery of products, a critical performance measure for today's manufacturers. Evidence shows that reliable suppliers can help buyers cut processing time, increase quality, and improve manufacturing competitiveness (Nahm et al., 2003).

Time- to- market is referred to as the degree to which a firm introduces new products faster than its competitors (Li, 2002). In turbulent rapid changing, and highly competitive markets, products have reduced life cycles. This means that there is a need for companies to reduce the time- to- market of new products that will simultaneously ensure their success in the market. Early products introduction improves profitability by extending a product's sales life and allowing development and manufacturing cost advantages. Researchers claim that earlier and faster product development leads to better performances (Griffin, 1997). The importance of time- to- market for new products as a factor of competitive advantage is well known. In fact, a considerable number of articles on this subject have been published in the last decade. Griffin (1997) used time- to- market as a dependent available and analyzed its relationship with the use of multifunctional teams, the use of formal processes of new product development, and the degree of product complexity and originality.

Quality is referred to as the degree to which a firm offers a product that creates a higher value for its customer (Mei, 2005). Firm that can respond faster to customer needs with quality products and innovative design, as well as excellent after- sales service, build customer loyalty, increase market share, and ultimately achieve increased profits (Mei, 2005). Garvin (1988) proposes eight dimensions of quality. These are performance, features, reliability, conformance, durability, serviceability, aesthetics, and perceived quality, which are comprehensive but difficult to establish to measure. ERP systems make it easier for businesses to check product defects and problems. ERP systems enable firms to identify exactly where the design or production process issue is occurring and to take the needed steps to make sure production of products of the supreme quality. This, in turn, will improve sales, customer satisfaction, and profits.

As specified in previous sections, this entire research framework is driven by constantly changing business environments, such as customer demand change, uncertain and rapid technological change. Thus, the real question is about how an ERP implementation can actually create higher value for customers. For this reason, the measure of the customer value" variable is included in this model. Customer value is referred to as the degree of benefits perceived by customers as a trade-off between what customers receive and what they sacrifice. Customer value is a source of competitive advantage for business firms. Tu (1999) defined it as the extent to which customers perceive a firm's products as having higher value, as well as their degree of satisfaction with these products. However, the customer' perceived value can easily be confused with customer satisfaction (Sweeney and Soutar, 2001). While perceived value occurs at various stages of the purchasing process, customer satisfaction and referral are more related to post-purchase and post- use evaluation (Sweeney and Soutar, 2001). Customer value comes from meeting the current needs of customers more efficiently, from identifying the customer needs proactively, and from meeting new customer needs or new needs of existing customers (Chand et al., 2005). Customer value is also related to improve customer service and more accurate customer invoices. To faster customer service a firm can also connect new systems to the ERP system (e.g. a system optimizing distribution routes). An ERP system enables faster response to customers. For example, a firm reported improvement in the customer response for orders with a fulfillment period of less than one week. The new ERP system helped to meet these delivery terms. It also enabled faster and more accurate customer reports regarding project stages, the tasks of project members, and time spent on performing respective tasks.

Value for money is referred to as the degree to which a customer perceives value because a firm has lowered a product's price (Joo, 2007). It is the value that customers perceive the price of a product purchased is lower than average market price. Value for money is related to what a customer sacrifices in order to buy a product (Petrick, 2002). Some customers may know the exact price of the product they purchased, but others may only evaluate the price based on their past purchases. Customers feel that they purchased products with high value and quality. This may be perceived due to cost reductions or a lower price. ERP system enable firms to facilitate quicker data/ information flow between departments and offices and helps employees to work faster, save valuable time, and reduce operational costs. As a result, customers can perceive cost saving in their purchases.

Convenience is referred to as the degree to which a customer perceived value because the firm has provided convenient information and service (Joo, 2007). Customers experience convenience due to timely and update information. Valid delivery promises and fulfilling customer orders on time through using an ERP system improves customer service. An ERP system enables a firm to develop customer order quotations faster and even more accurately, improve job estimating, and shorten delivery lead times. As a result, customers can perceive convenience in their purchases. Convenience along with timely response is included in non- monetary costs.

Timely response is referred to as the degree to which a customer perceives time saving because a firm quickly acts upon customer needs (Joo, 2007). Through the experience of quick services, such as order fulfillment and delivery, customers can perceive time saving. ERP systems enable the organizations to response to any challenges in real time, so that a firm is able to respond in a timely fashion to any customer demands. ERP systems also allow for timely and accurate responses to customer problems and priorities.

The critical success factors in the left side of the model are identified from literature. We searched and listed the factors mentioned in prior studies. The descriptive language differs slightly by different scholars. We traced the content of each factor and categorized them by the real meaning. After comparison and combination, seven factors were identified. They are: (1) top management support (TMS), (2) training and education (TE), (3) project management (PM), (4) departmental communications (DC), (5) cultural adaptability (CA), (6) software competence and IT skills (CITS), and (7) hardware and equipment (HE). With the identified CSFs, the research model is specified.
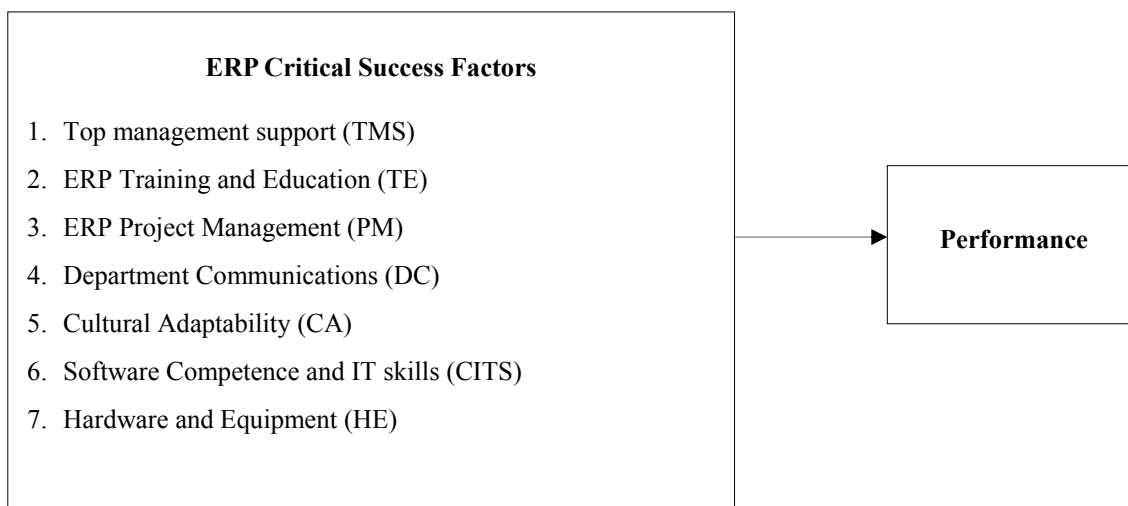

ERP Critical Success Factors

1. Top management support (TMS)
2. ERP Training and Education (TE)
3. ERP Project Management (PM)
4. Department Communications (DC)
5. Cultural Adaptability (CA)
6. Software Competence and IT skills (CITS)
7. Hardware and Equipment (HE)

Performance

Figure 1. Research model

H1: There are positive relationships between "ERP dimensions" and "market and profitability"

H2: There are positive relationships between "ERP dimensions" and "customer satisfaction"

H3: There are positive relationships between "ERP dimensions" and "order time"

H4: There are positive relationships between "ERP dimensions" and "employee satisfaction"

H5: There are positive relationships between "ERP dimensions" and "process efficiency"

H6: There are positive relationships between "ERP dimensions" and "process effectiveness"

3. Research Method

This study adopted a deductive approach and best fits in the positivism and objectivism positions, while explaining the epistemological and ontological considerations. Thus, quantitative methodology was selected for this research project. The self-completion questionnaire survey method was used to collect the data. This data collection method was selected in view of constraints like cost, time, and the nature of the study. The perception based data about the implementation of ERP was collected from the managers of companies of Lilama. The self-completion questionnaire was prepared. A pilot testing of the questionnaire was conducted. Individuals from various backgrounds (academics, ERP experts and company managers) participated in the design and pilot testing of the questionnaire. A total of 135 questionnaires were sent to one hundred companies which were members of Lilama. Different statistical tools and techniques like descriptive statistics, correlations, multiple regression were used to analyze the data. The selection of any statistical tool and technique for specific research questions was based on the nature of the variables in each research question. The data was analyzed by using SPSS 22, one of the most widely used analytical software tools in social and management sciences.

4. Research Results

Table 1 shows the reliability of the construct – top management support. As shown, the Cronbach alpha for the construct is 0.975 that is very high (greater than 0.7) and the Cronbach alpha if item deleted for all the items of top management support is less than or equal 0.975. In a word, we can conclude that the construct top management support has a very high reliability.

Table 1. Item-Total Statistics for top management support

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
ERP11	32.4444	46.532	.919	.971
ERP12	32.5852	46.946	.947	.969
ERP13	32.5704	47.098	.932	.970
ERP14	32.6519	47.273	.933	.970
ERP15	32.6000	49.212	.902	.972
ERP16	32.6519	49.378	.876	.974
ERP17	32.8074	50.709	.864	.975

Table 1 shows the reliability of the construct – training and education. As shown, the Cronbach alpha for the construct is 0.903 that is very high (greater than 0.7) and the Cronbach alpha if item deleted for all the items of training and education is less than or equal 0.975. In a word, we can conclude that the construct training and education has a very high reliability.

Table 2. Item-Total Statistics for training and education

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
ERP21	20.2222	15.816	.711	.894
ERP22	20.6593	15.435	.714	.895
ERP23	20.1704	16.366	.793	.876
ERP24	20.3556	15.738	.843	.865
ERP25	20.1333	16.863	.763	.883

Table 2 shows the reliability of the construct – project managemet. As shown, the Cronbach alpha for the construct is 0.929 that is very high (greater than 0.7) and the Cronbach alpha if item deleted for all the items of project management is less than or equal 0.929. In a word, we can conclude that the construct project management has a very high reliability.

Table 3. Item-Total Statistics for project management

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
ERP31	27.5111	22.610	.763	.919
ERP32	27.6741	21.997	.815	.912
ERP33	27.6000	22.212	.827	.911
ERP34	27.6593	23.301	.730	.923
ERP35	27.5333	23.131	.804	.914
ERP36	27.6148	22.746	.818	.912

Table 3 shows the reliability of the construct – departmental communication. As shown, the Cronbach alpha for the construct is 0.965 that is very high (greater than 0.7) and the Cronbach alpha if item deleted for all the items of departmental communication is less than or equal 0.965. In a word, we can conclude that the construct departmental communication has a very high reliability.

Table 4. Item-Total Statistics for departmental communication

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
ERP41	31.0074	46.455	.849	.962
ERP42	31.0148	46.418	.854	.961
ERP43	30.7481	45.130	.902	.958
ERP44	30.7185	45.577	.905	.958
ERP45	30.7333	46.167	.909	.957
ERP46	30.7704	47.074	.917	.957
ERP47	30.4741	48.624	.803	.965

Table 4 shows the reliability of the construct – cultural adaptability. As shown, the Cronbach alpha for the construct is 0.955 that is very high (greater than 0.7) and the Cronbach alpha if item deleted for all the items of cultural adaptability is less than or equal 0.955. In a word, we can conclude that the construct cultural adaptability has a very high reliability.

Table 5. Item-Total Statistics for cultural adaptability

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
ERP51	23.5630	12.158	.885	.942
ERP52	23.5037	12.312	.871	.945
ERP53	23.3778	12.282	.926	.936
ERP54	23.6741	12.624	.862	.946
ERP55	23.7778	12.682	.828	.952

Table 5 shows the reliability of the construct – software competence and IT skills. As shown, the Cronbach alpha for the construct is 0.912 that is very high (greater than 0.7) and the Cronbach alpha if item deleted for all the items of software competence and IT skills is less than or equal 0.912. In a word, we can conclude that the construct software competence and IT skills has a very high reliability.

Table 6. Item-Total Statistics for software competence and IT skills

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
ERP61	16.7185	9.457	.811	.883
ERP62	16.7407	10.238	.795	.889
ERP63	16.8593	9.331	.806	.885
ERP64	16.6148	10.149	.799	.888

Table 6 shows the reliability of the construct – hardware and equipment. As shown, the Cronbach alpha for the construct is 0.89 that is very high (greater than 0.7) and the Cronbach alpha if item deleted for all the items of hardware and equipment is less than or equal 0.89. In a word, we can conclude that the construct hardware and equipment has a very high reliability.

Table 7. Item-Total Statistics for hardware and equipment

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
ERP71	24.5481	6.608	.692	.876
ERP72	24.7333	6.764	.663	.882
ERP73	24.6000	6.749	.795	.853
ERP74	24.5778	6.679	.774	.856
ERP75	24.5926	6.781	.750	.862

A phase of data reduction through factor analysis was necessary before the examination of the relationship between ERP success factors and organizational performance. Factor loadings of the data set of 39 items developed based on the seven dimensions of ERP was analyzed by principal component analysis and Varimax rotation. As a result, seven factors were extracted. As mentioned, in order to provide empirical evidence supporting the appropriateness of the data for unidimensionably, the Kaiser-Mayer-Olkin (KMO) measure of sampling adequacy was used. As a guideline, KMO values in the .50s or above were relevant, and below .50s were unacceptable (Hair *et al.*, 1998).

Table 8. Rotated Component Matrix for ERP items

	Component					
	1	2	3	4	5	6
ERP11		.806				
ERP12		.858				
ERP13		.852				
ERP14		.834				
ERP15		.809				
ERP16		.814				
ERP17		.839				
ERP21					.681	
ERP22					.771	
ERP23					.731	
ERP24					.860	
ERP25					.816	
ERP31				.640		
ERP32				.697		
ERP33				.751		
ERP34				.778		
ERP35				.763		
ERP36				.766		
ERP41	.799					
ERP42	.794					
ERP43	.885					
ERP44	.877					
ERP45	.876					
ERP46	.878					
ERP47	.719					
ERP51			.859			
ERP52			.830			
ERP53			.883			
ERP54			.798			
ERP55			.784			
ERP61	.534					
ERP62	.508					
ERP63	.656					
ERP64	.622					
ERP71						.649
ERP72						.612
ERP73						.793
ERP74						.858
ERP75						.842

Results from Regression Models

Before building multiple regression models, the study provides the correlation matrices among the seven criteria of ERP, and between organizational performance and ERP. The bivariate correlation of the seven independent variables

is shown in the following table. All the correlations between the seven independent variables and the six dependent variables are displayed. Examination of the correlation matrix indicates that all the seven criteria of ERP are closely correlated with the six factors of organizational performance.

It is proposed that there was a correlation between the seven criteria of ERP and the organizational performance. If true, each of the measures of the organizational performance should be correlated to the seven criteria of ERP. The six measures of the organizational performance are each used as dependent variables in the regression model and the seven criteria of ERP are used as the independent variables. In addition, it is hypothesized that:

H1: There are positive relationships between "ERP dimensions" and "market and profitability"

H2: There are positive relationships between "ERP dimensions" and "customer satisfaction"

H3: There are positive relationships between "ERP dimensions" and "order time"

H4: There are positive relationships between "ERP dimensions" and "employee satisfaction"

H5: There are positive relationships between "ERP dimensions" and "process efficiency"

H6: There are positive relationships between "ERP dimensions" and "process effectiveness"

The six models (ERP-P1; ERP-OP2; ERP-P3; ERP-P4; ERP-P5; ERP-P6) are statistically significant at less than 1 percent, and the regression coefficients (beta coefficient) of the significant factors are provided. Since six measures of the organizational performance are found to have significant correlation with the criteria of ERP, the propositions are supported.

In model ERP-P1 with *'market and profitability'* as the dependent variable, ERP3 is significant at $p < .05$; ERP7 is significant at $p < .01$. These items have regression correlations with market and profitability. This partially supported Hypothesis 1. This implies that the improvement in ERP3 and ERP7 will result in better market and profitability of the organizations. The largest impact on market and profitability is ERP7 (beta coefficient = .275). In model ERP-P2 with *'customer satisfaction'* as the dependent variable, ERP3 is significant at $p < .05$; ERP7 is significant at $p < .01$. These items have regression correlations with customer satisfaction. This partially supported Hypothesis 2. Hence, effective ERP3 and ERP7 will result in increased customer satisfaction. ERP7 made the highest influence on customer satisfaction (beta coefficient = .303), ERP3 (.293). In model ERP-P3 with *'order time'* as the dependent variable, 2 items ERP3 and ERP7 are statistically significant at $p < .05$ and $.01$, respectively. Hypothesis 3 is partially supported. When the activities of ERP3 and ERP7 are emphasized, order time will be improved. ERP7 has beta coefficient of .320 and .244 for ERP3. In model ERP-P4 with *'employee satisfaction'* as the dependent variable, one factor is statistically significant at $p < .1$, namely, ERP7. Hypothesis 4 is partially supported. When the activities of ERP7 are emphasized, employee satisfaction increases. ERP7 has beta coefficient of .189. In model ERP-P5 with *'process efficiency'* as the dependent variable, one factor is statistically significant at $p < .1$, namely, ERP7. Hypothesis 5 is partially supported. When the activities of ERP7 are emphasized, process efficiency increases. ERP7 has beta coefficient of .194.   In model ERP-P6 with *'process effectiveness'* as the dependent variable, 2 items are statistically significant at $p < .1$ and $.01$, namely, ERP1 and ERP7. Hypothesis 6 is partially supported. When the activities of ERP1 and ERP7 are emphasized, process effectiveness increases. ERP1 and ERP7 have beta coefficient of .201 and .298 respectively

Table 9. Correlation matrix of ERP dimensions

	ERP1	ERP2	ERP3	ERP4	ERP5	ERP6	ERP7
ERP1	1.00000						
ERP2	.563**	1.00000					
ERP3	.489**	.478**	1.00000				
ERP4	.542**	.451**	.561**	1.00000			
ERP5	.481**	.314**	.571**	.316**	1.00000		
ERP6	.611**	.501**	.595**	.710**	.530**	1.00000	
ERP7	.450**	.368**	.471**	.357**	.540**	.589**	1.00000

**: Pearson Correlation is significant at the .01 level (2-tailed)

Table 10. Correlation matrix of ERP dimensions

	ERP1	ERP2	ERP3	ERP4	ERP5	ERP6	ERP7
ERP1	1.00000						
ERP2	.563**	1.00000					
ERP3	.489**	.478**	1.00000				
ERP4	.542**	.451**	.561**	1.00000			
ERP5	.481**	.314**	.571**	.316**	1.00000		
ERP6	.611**	.501**	.595**	.710**	.530**	1.00000	
ERP7	.450**	.368**	.471**	.357**	.540**	.589**	1.00000

**: Pearson Correlation is significant at the .01 level (2-tailed)

Table 11. Correlation matrix of ERP and performance

	P1	P2	P3	P4	P5	P6
ERP1	.248**	.201**	.232	.246**	.237**	.271**
ERP2	.205**	.218**	.151	.169**	.129**	.182**
ERP3	.353**	.351**	.336	.199**	.234**	.231**
ERP4	.136**	.131**	.199**	.181**	.146**	.202**
ERP5	.331**	.291**	.287**	.271**	.282**	.202**
ERP6	.156**	.129**	.156	.157**	.183**	.126**
ERP7	.347**	.339**	.347	.262**	.283**	.294**

**: Pearson Correlation is significant at the .01 level (2-tailed)

Table 12. Multiple regression of ERP on performance

ERP	Performance									
	P1		P2		P3		P4		P5	
	Beta	p-value	Beta	p-value	Beta	p-value	Beta	p-value	Beta	p-value
ERP1	.102	.361	.030	.790	.097	.392	.128	.280	.133	.264
ERP2	.034	.734	.084	.405	-.051	.616	.029	.785	-.047	.658
ERP3	.268	.020	.293	.011	.244	.035	-.013	.913	.081	.502
ERP4	-.003	.979	.025	.839	.149	.224	.155	.228	.031	.807
ERP5	.138	.206	.099	.363	.091	.408	.189	.103	.144	.214
ERP6	-.316	.025	-.354	.012	-.365	.010	-.249	.093	-.136	.359
ERP7	.275	.009	.303	.004	.320	.003	.189	.090	.194	.082
Multiple R	.468		.465		.454		.351		.346	
R square	.219		.216		.206		.123		.120	
F ratio	5.078		5.007		4.716		2.552		2.465	
p-value of F ratio	.000		.000		.000		.017		.021	

For ERP-P6 (process effectiveness), beta values are **0.201**; 0.013; 0.086; 0.199; 0.035; -0.391; and **0.298**, respectively and p-values are **0.084**; 0.904; 0.463; 0.114; 0.755; 0.008; **0.007**, respectively. Multiple R = 0.403; R square = 0.163; F ratio = 3.521, p-value = **0.002**

5. Conclusion

Concerning performance improvement of Lilama's companies, a conceptual framework was developed in this study. This framework was used not only to evaluate the practices of ERP, but also to examine the relationship between ERP practices and organizational performance. The sample of the study includes companies of Lilama. The total sample size was 135, in which 90 from companies (66.67% of the total sample) already had ERP implementation and 45 from companies (33.33% of the total sample) did not have. A set of seven dimensions of ERP was considered from various academic and practitioner perspectives. They included top management support, training and education, project management, departmental communication, cultural adaptability, software competence and IT skills, and hardware and equipment. The measures of ERP were empirically tested to be reliable and valid.

This study evaluated the impact of ERP dimensions on performance by testing six hypotheses:

> H1: There are positive relationships between "ERP dimensions" and "market and profitability"
>
> H2: There are positive relationships between "ERP dimensions" and "customer satisfaction"
>
> H3: There are positive relationships between "ERP dimensions" and "order time"
>
> H4: There are positive relationships between "ERP dimensions" and "employee satisfaction"
>
> H5: There are positive relationships between "ERP dimensions" and "process efficiency"
>
> H6: There are positive relationships between "ERP dimensions" and "process effectiveness"

Through the multiple regression analysis, the six hypotheses were partially statistically significant. This implies that ERP implementation is really a good way to improve organizational performance.

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