

The Influence of ERP Implementation to Supply Chain Management Performance through Logistics: a Case Study of Food Industry in Thailand

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Abstract - This research were to study on the impact of ERP implementing over the Supply Chain Management Performance. The attitude rating of ERP Implementation was used as the independent variable whereas the Logistic Management was the mediator variable and the dependent variable was the Supply chain management. There were 314 sample firms from CIOs /IT leaders /IT professionals represented for the medium and large sizes of food industry in Thailand. The data as gathered from the researcher were analyzed using SEM for the model's validity and reliability determination. A structure equation model was use for the hypothesized testing and to assess for the total fit, which confirmed by the results of the study the significant support from the goodness of fit. From the hypotheses testing, ERP Implementing was found without the direct positive relationship with the performance of supply chain management. In addition, it also presented the equally indirect positive relationship with the Logistic management in which indicated that the firm shall implement ERP when having good logistic management and brining to use for the benefits of the business. This showed that Food industry that implement ERP should give important to logistic management because ERP Implement did not have any direct effect on the supply chain performance but must go through mediator

respectively.

Keywords - ERP Implementation, Supply Chain Management Performance, Logistic Management

I. INTRODUCTION

Food industry is the factor that response to the human needs as it is the basis for human living [1]. The global food industry is quickly expanding by bringing the strategies such as Supply Chain, Logistics, Information Technology or Cold Chain to help for the successful management [2]. Food industry in Thailand is the main industry with the high potential in the production for domestic consumption and exporting. Since Thailand has the strong basis for agricultural production therefore, it leads to the product outcomes that can bring to use as raw materials for diverse transformation and continually. Also, the country has large amount of workforce as well as the advanced technologies with the product forms development that conform more to the needs of market. Bringing Enterprise Resource Planning (ERP) to help in human resources management in the organization is part that could enhance the effectiveness in the operation in form of traditional Supply Chain. This begins with the process to seek for the raw material until the process to hand it to customers [3]. In the food industry, Supply Chain management under ERP system has

brought the Logistics module to play more roles since the food products have the different processes and procedures from other products from the raw materials transportation till the production procedures, storing, distribution and transport to the customers [4]. Therefore, in all the procedures of food products movement, it requires to have the Cold Chain procedure as the key variable for the benefit to preserve the quality and standard that will help keeping the food product fresh and extending the shelf life which is to add more values to the products [5].

II. RESERCH OBJECTIVE

1. To study the relationship of ERP systems with the logistics management Module influencing the success of supply chain management of the food industry in Thailand.

2. To confirm that, if ERP implementation has given important to Logistics Management, it will improve supply chain management performance.

III. RESERCH FRAMEWORK AND HYPOTHESIS

H1: ERP Implementation has positive effect to Supply chain Performance

H2: ERP Implementation has positive effect to Logistic Management.

H3: Logistic Management has positive effect to Supply chain Performance.

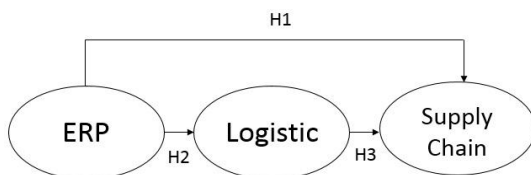


Fig. 1 Research Framework

IV. LITERATURE REVIEWS

A. ERP Implementation

ERP software is an information system that can facilitate to all procedures of work in the business procedures and any organizational

units to link the information of all procedures and units into the database. Thus, for every unit to have the mutual information and it will reduce the working time and repeated jobs as well as the conflicts and mistakes from the communication no matter from within or outside the organization. This will directly result on the resources for the utmost benefits of the business procedure. ERP system has not limited only the coordination of all units together but it supports for the management decision such as in the financial budget analysis that the management can consider on the information immediately and correctly in order to make the immediate decision on the real information basis [6].

Bringing ERP software into operation requires having the implementation for the study and system layout to conform to the organizational task first for the suitable in the operation and reach to the real requirements either on the amount and ability of the existing resources [7]. It can be said that it is the coordination between ERP system and the resources strategy and the organizational process that mostly mixed together. In bringing ERP system software to use, there shall be the establishment and indication for the understanding on any systems at recent in big picture. This is to indicate for the procedures that directly result on the customer's demands or the organizational targets. Therefore, the information will be gathered to place the objectives of each procedure to find the core in that procedure. Next is the interviewing process to go in detail of each procedure by obtaining the information from the real operators for the analysis to check whether procedure is required for the improvement to add most effectiveness in the operation [8].

B. Logistic Management

Logistics is the operation that gathers all the activities related to the seeking, moving, storing and transporting all the product status in production by having the information service and management as the supporting factors in any operation to effectively complete the objectives. At the same time,

Logistics need the operation plan, flow controlling, and raw material and product storing as well as the information from the production point to the consumers effectively with the least cost. The aim is to improve the customer service toward the best satisfaction. Applying logistics comes from product distribution which is the management on the products transportation and storing from the production until consumption. Products distribution business can also be divided into many types no matter the distribution for purchasing, distribution for production and distribution for sales. In general, distribution will relate to the three main tasks which are warehouse storing, product packaging, and product transportation. Logistics Management System is the tasks management which is the activity in Logistics system for the operation as designed. All the management must mix with the engineering knowledge and management knowledge together to manage on the transportation management, warehouse management and controlling of inventory, managing on purchasing order, raw material seeking, selection and assessment of suppliers, planning for the needs of material in packaging, and human resources management.

C. Supply Chain Management Performance

Supply Chain Management is the combination between the business procedures from the raw materials supplier through the production procedure or industrial production to the consumers [9]. These procedures have passed along the information technology and products together and lead to the values added to those products before presenting to the consumers. It can be seen that the scope of Supply Chain management system has covered the entire industrial system. Supply Chain has the critical role toward the companies that emphasize on the advantages in business competition. Company can add the values to the overall products of the company by using the resources throughout the company [10].

V. RESERCH METHODOLOGY

A. Research Sample Assumption

To analyze Structure Equation Model, the data have to be enough and suitable with indicator in model. The minimum of data can compute from formula $p(p+1)/2$; where p is indicator in model. The returned back of 314 questionnaire can reverse equation, thus $(p+1)$ equal 25, indicate that the indicator of a model should not more than 24.

B. Validity and Reliability

• Content Validity Testing

The content validity was used for assessing the accuracy of the questionnaire. The questionnaire was assessed by five experts in the field of information technology by applying the IOC (Index of item objective congruence) method. The discriminate validity test by the factor analysis. Usually, there are many questions representing each factor or variable. If the questions represent different variable, it should summarize into different groups by factor analysis. Then, the convergent validity test by the correlation statistic. If the questions represent the same variable, it must have correlation among them.

• Reliability Testing

The research test the internal consistency of reliability by the Cronbach's alpha after designing the questionnaire. The score ranges from 0 to 1 and the acceptant of the score of this research are more than 0.7 [11].

VI. RESEARCH RESULT

A. Convergent Validity

This researchers measured Convergent Validity with Confirm Factor Analysis. If the research model is converge, the value of factor loading should be greater than 0.6 [12]. The Fig. 2. shows the construct model for Convergent Validity testing.

TABLE I
FACTOR LOADING OF ALL LATENT
VARIABLES WHEN CONSIDERING
THE TABLE I, TIM1

Variable	Factor Loading	Variable	Factor Loading	Variable	Factor Loading
ERP Implementation		Logistic Management		Supply Chain Management Performance	
LGS1	0.76	TRBL1	0.85	BEP	0.92
LGS2	0.78	TRBL2	0.84	BES	0.92
LGS3	0.78	TRBL3	0.85	BEO	0.92
LGS4	0.72	TRBL4	0.84	BETV	0.81
BUV1	0.87	TRCE1	0.73		
BUV2	0.83	TRCE2	0.82		
BUV3	0.85	TRCE3	0.81		
STPL1	0.89	TRCE4	0.82		
STPL2	0.88	TRUS1	0.90		
STPL3	0.86	TRUS2	0.81		
PTI1	0.78	TRUS3	0.84		
PTI2	0.86	TRUS4	0.84		
PTI3	0.86	TIM1	0.34		
PTI4	0.85	TIM2	0.88		
PTI5	0.85	TIM3	0.88		
PTI6	0.80	TIM4	0.85		

When considering the table I, TIM1 are not convergent. It was dropped in this step.

B. Discriminate Validity

This process is the testing of the directness on the aspect of discriminant to confirm for the right membership of the observed variables and latent variable by using two testing methods of the observing on covariance value between the latent variables from CFA model and testable on the coefficient between the observed variable. By considering the Covariance values between the latent variables in CFA model that should not more than .85 and testable in finding for the relationship between the observed variable with the high relation only in the same group of latent variables but with the low relation values with the observed variable in other group of latent variables.

C. Multicollinearity Testing

Due to the structural equation model is the base on regression analysis, thus this research must go through Multicollinearity testing. The assumption of regression analysis has a limit that each variable should not highly correlate with other. The Tolerance and Variance Inflation Factor (VIF) measurement used for testing. The Tolerance should more than 0.1 or VIF should less than 10 ($VIF = 1 / \text{Tolerance}$) for to accept that they have no multicollinearity problem.

D. The Construct Model

This model was constructed to measure that ERP Implementation has a positive effect on Supply chain management performance and then to measure that ERP Implementation has a positive effect on Supply chain management performance through Logistic management. The finding shows that ERP Implementation affects to Supply chain management performance through Logistic management.

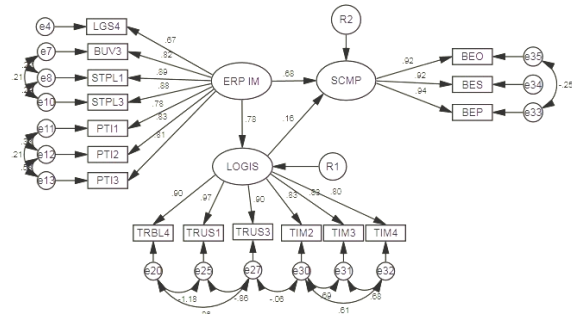


Fig. 2 Presents the Results
of the Construct Model Tested

The measurement model for the three latent constructs was assessed by confirmatory factor analysis, In this research, the goodness of fit shown as follows: Chi-Square = 170.715, df = 87, CMIN /DF = 1.962, GFI = 0.939, AGFI = 0.905, NFI = 0.970, CFI = 0.985, RMR = 0.056, RMSEA = 0.55 (PCLOSE = 0.224), and Hoelter = 222 (0.01).

• Direct and Indirect Effect

The standard indirect, direct, and total effect of model shows on table IV.

TABLE II
THE STANDARD INDIRECT, DIRECT,
AND TOTAL EFFECT

	Direct Effect		Indirect Effect		Total Direct Effect	
	ERP IM	LOGIS	ERP IM	LOGIS	ERP IM	LOGIS
ERP IM						
LOGIS	.776				.776	
SCMP	.682	.163	.126		.808	.163

• Hypothesis Testing

Considering fig. 3, the result of hypothesis testing show as follows:

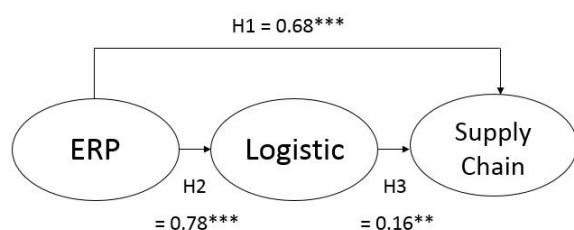


Fig. 3 Hypothesis Testing

H1: ERP Implementation has a positive effect on Supply chain management performance. This hypothesis was supported with standard regression weight is 0.68 ($p < .05$).

H2: ERP Implementation has a positive effect on Logistic Management. This hypothesis was supported with standard regression weight is 0.78 ($p < .001$).

H3: Logistic Management has a positive effect on Supply chain management performance. This hypothesis was supported with standard regression weight is 0.16 ($p < .001$).

VII. CONCLUSIONS

This research aims to study to test the influence of ERP system implementation toward the Supply Chain Management with the Logistic Management variable as the mediator that comes to have role over the Supply Chain performance according to the assumptions made on H1, H2, and H3. The investigation will be done with the leading companies in food industry group of Thailand by 314 medium and large sizes companies are selected. From the hypotheses testing in Fig. 4 and effect on Table IV, it is found that ERP implementation in food industry with the Supply Chain Management performance shall consider on the importance of Logistic Management factors regarding checking of product route from the customers, transportation process management, information to manage for the business communication, product transportation time table control, control the product transportation quality and time management for the transportation process to add more

values to the products. However, if food industry pays more attention on the ERP implementation under the module of Logistic Management, it will result better for the organizational Supply Chain Management performance. In this case, the research has conformed and supported on further study of ERP implementation toward Supply Chain Management Performance in the future.

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(Arranged in the order of citation in the same fashion as the case of Footnotes.)

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