

**INFLUENCES OF ORGANIZATION RESOURCES ON CAPABILITY OF
LOGISTICAL INFORMATION TECHNOLOGY AND ITS IMPACTS ON
EFFICIENCY OF AUTOMOTIVE PARTS MANUFACTURERS IN THAILAND**

P. Pisitkasem

Rangsit University and Rangsit Business School, Thailand

Published online: 30 May 2018

ABSTRACT

This paper study the impacts of the capability of logistical information technology on the efficiency of automotive parts manufacturers in Thailand. It consists of 365 automotive parts manufacturers listed in “Thai Automotive Industry Directory” by Thai Auto-Parts Manufacturers Association. The study was conducted through questionnaires and data were analyzed by using descriptive and inferential statistics in terms of percentages, means, standard deviations and hypothesis tests with structural equation modeling. Responses from 365 questionnaires show that most manufacturers are Thai nationality. Results from the hypothesis tests indicate that organization resources have positive influences on external linkages with a statistical significance level of 0.01 and the external linkages have positive influences on the organization efficiency at a statistical significance level of 0.05.

Keywords: organization resources; capability of logistical information technology; efficiency.

Author Correspondence, e-mail: phat.p@rsu.ac.th

doi: <http://dx.doi.org/10.4314/jfas.v10i2s.82>



1. INTRODUCTION

It is widely known that the logistics development is considered as an important strategy, as demonstrated in the preparation of the 2nd Thailand's logistics development strategic plan (2013-2017) linked to the development guidelines for the national economic and social development plan, government policies and linkages to ASEAN community. This strategic plan is in line with the Eleventh National Economic and Social Development Plan (2012-2016) focusing on the economic structural reform for better quality and sustainability and building linkages among countries in the region for economic and social stabilities. The development strategy includes the development of competitive capability for efficiency, equality and fairness; the development of infrastructures and logistics to connect domestic and international transportations for better efficiency and achieving international standards.

Although the overall logistics development is considered at the national level, organization resources are so important that organizations must manage effectively to bring the organizations to their goals and success. Organization resources consist of tangible and intangible resources that have impacts on the efficiency and effectiveness of market responses in value creation. The organization resources such as humans, materials, finances and information, must be planned, organized and controlled [5].

Information technology capability significantly influences overall logistics competition [9], since the current trend in supply chain management is the application of information technology in all components of the logistics system. Information will help maximize the organization's profits by eliminating nonproductive works, lowering the costs, improving labor efficiency and resource utilization, increasing returns on assets and reducing issues from working capitals. Therefore, the study of this research is emphasized on the capability on these important variables as they can systematically improve the efficiency of logistics management in the organization as indicated in the 2nd Thailand's logistics development strategic plan (2013-2017).

Automotive parts industry involves with logistics in many aspects. Therefore, many problems and obstacles may rise from factors that have impacts on logistics such as high logistics costs in comparison with internal standards, facilities related to logistics as well as lack of logistical information technology such as resource management and automatic technology systems. As

automotive parts manufacturers have to prepare themselves for the future and be competitive at the global level and logistics may be a solution for this preparation. Hence, it is the researcher's interest to study influences of organization resources on the capability of logistical information technology and its impacts on efficiency of automotive parts manufacturers in Thailand since knowledge on the logistics management is in consistency with the current situation of automotive parts manufacturers and necessary for the business management in such extreme competitive world. Moreover, the academic research on this subject in Thailand are not extensive. Hence, the studied results from this research can be useful for future application.

1.1. Research Objectives

1. To examine the impacts of organization resources on the capability of logistical information technology.
2. To examine the impacts of the capability of logistical information technology on the efficiency of automotive parts manufacturers in Thailand.

1.2. Expected Benefits

1.2.1. Academic Benefits

The study of the impacts of organization resources and the capability of logistical information technology on the efficiency of automotive parts manufacturers in Thailand is considered as a new knowledge in the academic area. Very few studies in Thailand studied on these variables. Therefore, results from this research is considered to be new.

1.2.2. Practical Benefits

Automotive parts manufacturers in Thailand can use results from this research to improve their organization efficiency. Moreover, other industries can apply the results for their improvement.

1.3. Research Scope

1,964 Automotive parts manufacturers in Thailand listed in "Thai Automotive Industry Directory" by Thai Auto-Parts Manufacturers Association (TAPMA).

1.4. Conceptual Framework

The conceptual framework of this study is as follows.

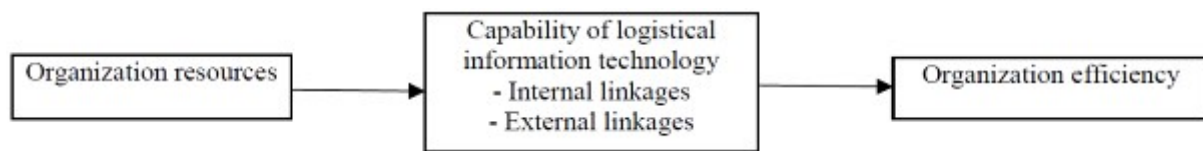


Fig.1. Conceptual framework

1.5. Definitions

Organization resources means key factors used for managing and leading the organization to its goal. Organization resources consist of tangible and intangible resources that have impacts on the efficiency and effectiveness of market responses in value creation by planning, organizing, and controlling these resources.

Capability of information technology means application of technology on data management including data collecting, storing, processing, communicating and servicing in order to connect the business organizations within the supply chain.

Automotive parts manufacturers' means members of automotive parts manufacturers and companies listed in "Thai Automotive Industry Directory" by Thai Auto-Parts Manufacturers Association (TAPMA) that can be classified into 160 product types.

1.6. Research Hypotheses

1st Hypothesis: Organization resources have positive influences on capability of logistical information technology.

1.1. Organization resources have positive influences on internal linkages.

1.2. Organization resources have positive influences on external linkages.

2nd Hypothesis: Capability of logistical information technology has a positive influence on organization efficiency.

2.1. Internal linkages have positive influences on organization efficiency.

2.2. Internal linkages have positive influences on external linkages.

2.3. External linkages have positive influences on organization efficiency.

2. METHODOLOGY

2.1. Population and Samples

Population in this research is 1,964 automotive parts manufacturers and companies listed in “Thai Automotive Industry Directory” by Thai Auto-Parts Manufacturers Association (TAPMA).

The sample size for this study was determined from [11]. The number of samples should be more than 200 for a simple structural equation model analyzed by LISREL program [4]. Thus, this research defined the sample size of 333. With the response rate of 21.28%, as referenced from previous studies, 1,565 questionnaires were sent to the mentioned population through a simple random sampling plan. 365 questionnaires from qualified respondents were returned with the response rate of 23.32%.

2.2. Research Tools

The questionnaire was used as data collection tool for this research and it consists of 4 parts as follows:

Part 1: Questions related to organization resources such as machines, labors, capital and management.

Part 2: Questions related to capability of logistical information technology such as internal linkages.

Part 3: Questions related to organization efficiency such as costs and times.

Part 4: Information on the organization and the respondents.

2.3. Assessment of Research Tools

The questionnaire was tested in the following steps.

2.3.1. Step 1: Content Validity

The Index of Item Objective Congruence (IOC) was validated by three experts in the area. The IOC result is equal or higher than 0.5. Hence, it can be concluded that all questions are valid [10].

2.3.2. Step 2: Construct Validity

After the questionnaire adjustment according to IOC, the questionnaires were identified with variables and indicators, then were tested on a small target group of 30 organizations randomly chosen from the list of 1,964 automotive parts manufacturers listed in the alphabetical order. These organizations were eliminated from the population, so the final

questionnaires would not be sent to them. The missing values of each indicator were identified and replaced by its mean value before the reliability analysis.

2.3.3. Step 3: Reliability Analysis

Reliability analysis is a measurement to determine the correlation between variables. A high reliability indicates a high correlation between variables. In this research, the reliability was determined by using Cronbach's Alpha Coefficient. It was found that Cronbach's Alpha Coefficients were higher than 0.7 [6] for all variables and the Item-Total Correlations were higher than 0.3 [3], thus all questions were reliable for data collection.

2.4. Data Analysis

1. Descriptive Statistical Analysis: Data of organizations and respondents were statistically analyzed to determine frequencies, percentages, means and standard deviations.
2. Reliability Analysis: Cronbach's Alpha Coefficients were calculated and it was found that the coefficients of all variables were acceptable and higher than 0.7 [6].
3. Confirmatory Factor Analysis: Measurement model and latent variables were analyzed to confirm the construct validity, convergent validity and discriminant validity.
4. Hypothesis Test: Data were analyzed by using structure equation models, which can describe both direct and indirect influences of the variables.

3. RESULTS AND DISCUSSION

3.1. General Information of Organizations and Respondents

Results from 365 questionnaires can be summarized as follows.

3.1.1. Organizations

57.81% have the registered capital of less than 50 million Baht and 29.86% have the registered capital of 50-200 million Baht. 56.16% are Thai nationality and 35.07% are Japanese nationality. The average number of employees is 198.76 persons and the average operational years is 21.54 years.

3.1.2. Respondents

57.4% are assistant managers. 65.21% are male and 34.79% are female. 64.38% were graduated with bachelor degree and 24.36% were graduated with master degree. The average age of the respondents is 35.65 years old with the average 14.34 years of experiences.

3.2. Information of Organization Resources, Capability of Logistical Information Technology and Organization Efficiency

3.2.1. Organization Resources

The means of observed variables are 3.81 for management, 3.78 for machines, 3.62 for labors and 3.58 for finances. It can be concluded that all observed variables relate to the organization resources and the respondents highly agree with these observations.

3.2.2. Capability of Logistical Information Technology

3.2.2.1. Internal Linkages

The means of observed variables are 3.89 for collaborated planning, 4.01 for collaborated resource utilization and 3.86 for collaborated problem solving.

3.2.2.2. External Linkages

The means of observed variables are 3.65 for information sharing among partners, 3.73 for collaboration between partners and 3.52 for flexibility between partners. It can be concluded that all variables relate to the capability of logistical information technology and the respondents highly agree with these observations.

3.2.2.3. Organization Efficiency

The means of observed variables are 4.09 for costs and 3.95 for times. It can be concluded that all variables relate to the organization efficiency and the respondents highly agree with these observations.

3.3. Confirmatory Factor Analysis

Confirmatory factor analysis accepts the correlated errors, and the fitness of descriptive data to the measurement model can be determined from the Relative Chi Square values calculated from χ^2/df equation. Criteria to confirm the fitness of the measurement model to variables are as follows; the Relative Chi Square is less than 2.00, the p-value has a statistical significance level of higher than 0.05, the root mean square error of approximation (RMSEA) is less than 0.05, the standardized root mean square residual (SRMR) is less than 0.05, the goodness of fit index (GFI) is higher than 0.9, the adjusted goodness of fit index (AGFI) is higher than 0.9 and the comparative fit index (CFI) is higher than 0.9 [2].

From the measurement model, variables that pass the criteria are; organization resources variables (OGR), internal linkage latent variables (INT), external linkage latent variables (EXT) and organization efficiency variables (PER).

3.4. Convergent Validity

Criteria for convergent validity are the factor weight is higher than 0.5, average variance extracted (AVE) should be higher than 0.5 and construct reliability should be higher than 0.6 [4]. The analysis shows that all factor weights pass the criteria.

3.5. Discriminant Validity

Discriminant validity is a measurement to determine the discrepancy of all variables. Confidence intervals of two variables at 95% confidence level were calculated from their correlation values. The two variables are considered discrepancy if the calculated confidence interval does not include 1 or close to 1 [1]. The analysis shows that each variable is unique and does not duplicate with other variables.

3.6. Hypothesis Test

Path analysis of the adjusted linear structure equation model is shown as follows.

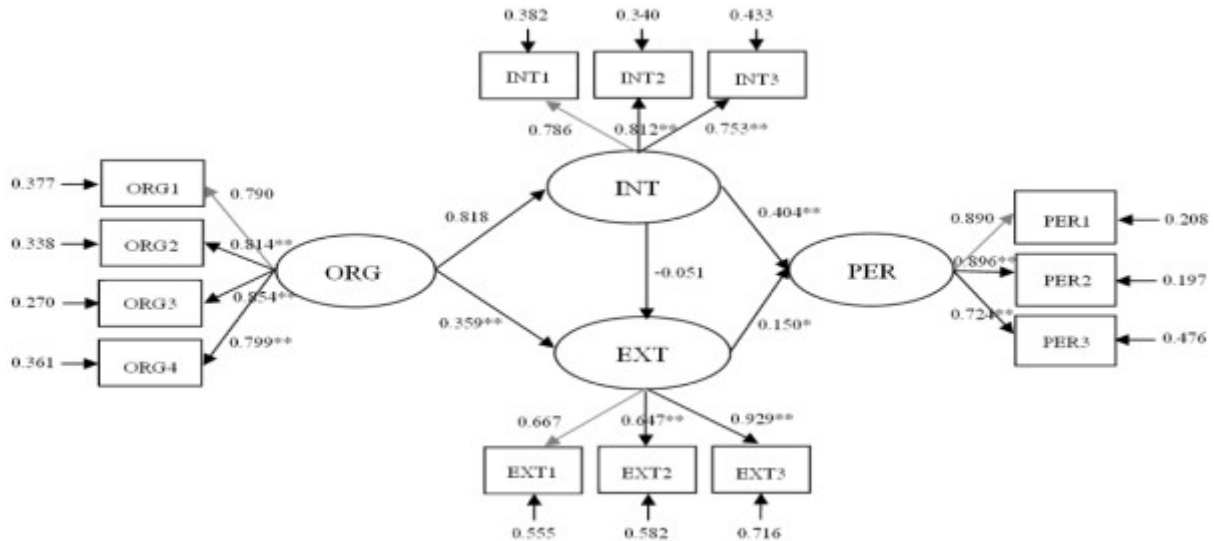


Fig.2. Adjusted resources structure equation model

$$\chi^2 = 19.728, df = 20, \chi^2/df = 0.986, p \text{ value} = 0.830, GFI = 0.956, AGFI = 0.909, RMSEA = 0.000$$

Table 1. Path coefficients, standard errors, t-values of structures according to hypotheses for the analysis of adjusted structure equation models

Path Diagram	Path Coefficients	Standard Errors	t-values
INT → INT1	0.786	-	-
INT → INT2	0.812**	0.063	16.365
INT → INT3	0.753**	0.069	14.094
EXT → EXT1	0.667	-	-
EXT → EXT2	0.647**	0.066	14.993
EXT → EXT3	0.929**	0.142	10.035
PER → PER1	0.890	-	-
PER → PER2	0.896**	0.044	23.042
PER → PER3	0.724**	0.050	16.357
LAMBDA-X			
OGR → OGR1	0.790	-	-
OGR → OGR2	0.814**	0.057	18.228
OGR → OGR3	0.854**	0.062	17.518
OGR → OGR4	0.799**	0.068	14.923

Table 2. Direct influences, indirect influences, and overall influences

Effect Variables	internal linkage latent variables			external linkage latent variables			organization efficiency variables		
	DE	IE	TE	DE	IE	TE	DE	IE	TE
Cause Variables									
organization resources variables	0.818	-	0.818	0.359**	-	0.359**	-	0.355	0.355
internal linkage latent variables	-	-	-	-0.051	-	-0.051	0.404**	0.007	0.397**
external linkage latent variables	-	-	-	-	-	-	0.150*	-	0.150*

Table 3. Hypothesis testing results

	Hypotheses	Hypothesis Testing Results
1st Hypothesis	Organization resources have positive influences on capability of logistical information technology	
	1.1 Organization resources have positive influences on internal linkages.	Hypothesis rejected
	1.2 Organization resources have positive influences on external linkages	Hypothesis accepted
2nd Hypothesis	Capability of logistical information technology has a positive influence on organization efficiency	
	2.1 Internal linkages have positive influences on organization efficiency.	Hypothesis accepted
	2.2 Internal linkages have positive influences on external linkages.	Hypothesis rejected
	2.3 External linkages have positive influences on organization efficiency	Hypothesis accepted

4. CONCLUSION

4.1. 1st Hypothesis

Organization resources have positive influences on capability of logistical information technology. The supported hypothesis is the positive influences of organization resources on external linkages with statistical significances. It can be interpreted that the organization has modern equipment and machines, sufficient number of employees for workloads, sufficient working capitals for operation, good knowledge in management. Hence, it results in collaborated information sharing as well integrated collaboration between partners to complement each other, which is in consistent with the research result by [12]. In [12] studied the effect of resource utilization on the development of organization's information technology capability. They found that the resource utilization is an important factor for the development of organization's information technology capability and an investment on information will help the organization survive and grow from the collaboration between partners.

4.2. 2nd Hypothesis

Capability of logistical information technology has positive influence on organization efficiency. The supported hypothesis is the positive influences of internal linkages on external linkages with statistical significances. It can be interpreted that the costs will decrease, the response times will increase and the customers' confidence in the organization will increase if the organization has collaboration and share information as well as cooperate in operational planning among employees, which is in consistent with the research by [8]. Their research on the impacts of information management capability of manufacturers in Taiwan indicated that those capability impact benchmarking capabilities with the competitor and flexibility, which have impacts on the organization's logistics operations.

External linkages have positive influences on the organization efficiency with statistical significances. It can be interpreted that the costs will decrease, the response times will increase, and the customers' confidence in the organization will increase if the organization has collaboration and share information as well as cooperate in operational planning between partners. This finding is in consistent with the research by [7] indicating that collaboration and information sharing among members in the supply chain are essential and help improving

the organization efficiency and good collaboration can create values to the shareholders from cost savings and increases in market shares.

5. RECOMMENDATIONS

5.1. Recommendations from This Research

1. To have good external linkages, including information sharing and collaborative working integration between partners for mutual collaboration, the organization must give importance to organization resources in consideration of the appropriate investment on modern equipment and machines, sufficient employees for workloads, sufficient working capitals for operational expenses and good knowledge in management.
2. To obtain good organization efficiency, including cost savings, response time reduction, and high customers' confidence, the organization must give importance to internal linkages by supporting collaboration and information sharing as well as collaborative planning among employees. In addition, the organization must stress the importance of external linkages by supporting collaboration, information sharing and collaborative working integration between partners for Mutual Corporation. The mutual discussion will lead to business process improvement for the highest benefits.

5.2. Recommendation for Future Research

1. Study the organization's other capability related to the operations apart from logistical information technology in order to analyze the efficiency of overall operations.
2. Apply variables from this research for other industries and compare research results to create new knowledge.
3. Further analyze all variables to study the effect of differences in organization's sizes or capital investment to reflect the logistical information technology since they may have impacts on information utilization.

6. REFERENCES

- [1] Anderson J C. An approach for confirmatory measurement and structural equation modeling of organizational properties. *Management Science*, 1987, 33(4):525-541

-
- [2] Aungsuchoti S, Wichitwanna S, Phinyophanuwatana R. Training document on LISREL program: Statistical program for behavioral and social research. Bangkok: Sukhothai Thammathirat University, 2005
- [3] Field A. Discovering statistics using IBM SPSS statistics. CaliforniaSage publications, 2013
- [4] Murtagh F., Heck A. Multivariate data analysis. Berlin: Springer Science and Business Media, 2012
- [5] Lai F, Li D, Wang Q, Zhao X. The information technology capability of third-party logistics providers: a resource-based view and empirical evidence from China. *Journal of Supply Chain Management*, 2008, 44(3):22-38
- [6] Nunnally J. C. Psychometric theory. New York: McGraw-Hill, 1978
- [7] Sezen B. Relative effects of design, integration and information sharing on supply chain performance. *Supply Chain Management: An International Journal*, 2008, 13(3):233-240
- [8] Shang K C, Marlow P B. Logistics capability and performance in Taiwan's major manufacturing firms. *Transportation Research Part E: Logistics and Transportation Review*, 2005, 41(3):217-234
- [9] Christopher M. Logistics and supply chain management. London: Pearson, 2016
- [10] Thirakanun S. Statistics for social research: practical guidelines. Bangkok: Chulalongkorn University Printing House, 2003
- [11] Yamane T. Elementary sampling theory. New Jersey: Prentice-Hall, 1967
- [12] Lai F, Li D, Wang Q, Zhao X. The information technology capability of third-party logistics providers: A resource-based view and empirical evidence from China. *Journal of Supply Chain Management*, 2008, 44(3):22-38

How to cite this article:

Pisitkasem P. Influences of organization resources on capability of logistical information technology and its impacts on efficiency of automotive parts manufacturers in Thailand. *J. Fundam. Appl. Sci.*, 2018, 10(2S), 1107-1118.