



**INFORMATION TECHNOLOGY, LOGISTICS PERFORMANCE AND  
MODERATING EFFECT OF FIRM SIZE: EMPIRICAL EVIDENCE FROM EAST  
COAST REGION OF MALAYSIA**

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**ABSTRACT**

*Information Technology (IT) is universally accepted as one of efficiency boosters. Logistics Service Providers (LSPs) around the world involve in IT implementation with the purpose to increase their service efficiency in catering business demands, especially for LSPs which operate in the areas of heavy trade activities. The activities create congestion which lead to deficient of LSPs performance and increase delivery time and total costs. However, the review of literature reveals that IT implementation met with productivity paradox. Thus, in order to examine how IT implementation influences the performance of LSPs in East Coast Malaysia, 81 LSP firms in the region were involved in this study. This study also investigated the moderating effect of LSP sizes on their performance. The findings reveal that IT implementation significantly influenced LSPs' performance, but it happened vice versa for the moderator investigation. This study has bridged the literature gaps of IT adoption in such that it offers empirical evidence and new insights on the significant moderating effect of firm size in the relationships between IT implementation and logistics firm performance using Malaysian samples.*

**Keywords:** Information Technology, logistics service providers, performance, firm size, Malaysia.

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**1.0 INTRODUCTION**

The development of logistics industry in Malaysia is parallel with its evolution in this world. As reported by Bank Negara, 2003, the GDP in Malaysia's manufacturing sector inclined up

to 33.1% in 1995 and steadily arose and stabilized. The GDP is then reported to stabilize at 24% from 2009 to 2012 (Bank, 2013). In the meantime, the total exports of manufactured goods increased by 11.6% and imports of manufactured goods increased up to 19.9% in 2009 (MITI, 2010). Therefore, due to the good growth of manufacturing industry in Malaysia, logistics sector becomes a key role in supporting the industry that it is recognized as an engine for Third Industrial Master Plan (IMP3), with the target to increase the GDP from 50.5% in 2005 to 59.7% by 2020 (MITI, 2009). Recently, MITI (2013) updated that Service Sector has contributed 58% of the total GDP in 2011 and is aimed to hit 65% in 2020. The logistics services eventually lies under this service sector. Hence, this phenomenon results in an increment of demand for more and more effective and efficient logistics services especially logistics transportation service to the trade countries like Singapore, Thailand, Indonesia and Malaysia (Ali, Jaafar, & Mohamad, 2008; Sum & Teo, 1999). This is crucial because logistics industry performance will influence the development of the country's industrialization and its competitiveness in global market trade.

Nevertheless, behind the hustle and bustle of economic expansion and good demand for logistics transportation services, there is a problem that spoiled the logistics transportation services to be efficient and effective; traffic congestion. Traffic congestion negatively affects businesses generally on deliveries, business schedule, workers, customers and meeting with clients (Hartgen, 2007). In a previous study, Hartgen (2007) found that 78% of businesses in Charlotte assume congestion is a greater problem for their business, as the congestion disturbs business performance through time delays that are hard to manage and avoid. Other than Charlotte, this issue has been widely debated especially in big countries such as China (Guiyan, Zu-tuo, Zu, Jia-qi, & Lei-lei, 2007), Japan (Taniguchi et al., 1999) and UK (Trunick, 2004). Taniguchi et al. (1999) added, the congestion is pretty bad in urban areas, slightly due to the increment of truck, which then lead to increase in costs of transportation, spoil the efficiency and quality of logistics operations (McKinnon et al., 2009).

To overcome this issue, many studies have shown that the implementation of IT is significantly positively associated with firm performance; both in terms of logistics efficiency and effectiveness in delivering the services (Evangelista et al., 2012; F. Lai, Li, Wang, & Zhao, 2008; Langley et al., 2007; Qiang Wang & Zhao, 2008). Langley et al. (2007) also argued that the implementation of IT is a top three factor for logistics performance. Simultaneously, logistics users claimed that IT is among the three main on-going challenges with the LSPs. This paper discusses the significant relationship between IT and firm performance and reviews the moderating effect of firm size on the relationship of IT implementation and firm performance. Firm size as a moderator has been used in many fields to observe its effect, but it is still at its infancy in the logistics field.

## **2.0 THEORIES AND HYPOTHESES**

A theory is a basic line for a researcher to execute a certain study. As for this study, Resource-Based View (RBV) theory is used as a foundation for firm competitiveness. Based on RBV, firms gain and sustain competitive advantages by constructing and deploying valuable resources and capabilities (Wernerfelt, 1984). Barney (1991) mentioned that, in RBV theory, core capabilities might be identified from capabilities and resources of the firms. They are two main elements which construct the theory and mainly contribute to the success of any

organizations (Grant, 1991). Grant (1991) claimed that resources which include capital of equipment, skills, branding, patents, finance and etc. are considered as inputs for the production process. Well cooperation and coordination among resources promise a productive activity. Meanwhile, capability means the ability of team of resources in performing certain activity or task. Hence, based on RBV theory, this study conceptualizes that IT and resources in LSPs are the combination of capability and resources that eventually influence their performance. This combination is supposed to catalyse the competitive advantage among competitors. According to the model of this study, IT implementation is considered as a resource, while firm size is assumed as the capabilities. The combination of both constructs will be examined to observe the intended results.

Today, everyone who lives in this modern life knows the words IT and ICT. Oxford Dictionaries defined IT as *“the study or use of systems (especially computers and telecommunications) for storing, retrieving, and sending information”*. Hence, in implementing IT in certain system, Li et al. (2009) in Evangelista et al. (2012, p. 3) defined IT adoption as *“the extent to which a firm embeds a certain set of technologies in its processes and makes them fully operational for being used”*. By implementing IT into a firm process, it is thus can be considered as a resource (Evangelista et al., 2012). To make it clear about both terms IT and ICT, some journals use the term IT and some use the term ICT to present the systems which referred to computerized hardware and software. For instance, Chadee and Pang (2008) use IT and ICT simultaneously in their study. Hence, it is agreed that both terms convey the same meanings in academic journals. Thus, IT and ICT also will be used interchangeably in this study.

Nowadays, the use of ICT in logistics field is growing fast throughout the world. Singapore's 3PLs for example, are happy with the benefits of IT and planning to adopt IT in their management system which automatically makes the providers gain new technologies, knowledge and skills as well. As a result, IT is considered as a virtuous weapon for them to be excellent in their business (Piplani, Pokharel, & Tan, 2004). Not only in developed country like Singapore, ICT products has expended speedily in Asia's less-developed countries too (Chadee, 2008). Li et al. (2009) said that by serving reliable, accurate and timely information, the growth of IT has greatly changed the means of doing business regardless of the geographic factor, thus improving the performance of supply chain directly. They confirmed that many empirical studies showed the distinctions between small and large logistics firms. However, Jung, Semeijn, and Ghijsen (2008) argued that customers found that size has no significant effect on improving operational performance. Both large and small firms are in ability to serve the service to their customers without any distinction. Nevertheless, a number of studies on firm size in logistics field focused on small firms, not really comparing between large and small firms (Evangelista & Sweeney, 2006; Gunasekaran & Ngai, 2003; Large, 2007; Murphy, Daley, & Knemeyer, 1999).

The implementation of IT is considered as a key factor to achieve logistics excellence (Bowersox, Closs, & Stank, 1999; Global Logistics Research Team, 1995). It enables firms to optimize the level of their service and costs (Barbosa & Musetti, 2010; Bardi, Raghunathan, & Bagchi, 1994). In Singapore for example, the logistics firms are enjoying the IT activities whilst obtaining new technologies with new knowledge and skills (Piplani et al., 2004). Not only developed country like Singapore, less developed countries in Asia are also started to adopt ICT systems in their business operations (Chadee & Pang, 2008). Hence, by providing reliable, accurate and timely information, IT implementation is found to be changing the dynamism of

doing business, thus automatically increasing the performance of supply chain (Li et al., 2009) and giving great influence to the performance of modern logistics firms simultaneously (Evangelista et al., 2012).

Again, according to Evangelista et al. (2012), there is a significant positive relationship between enterprise data interchange (EDI), frequency identification (RFID) and barcode with the effectiveness and efficiency of operations and customer service of a firm. While in terms of road transportation, EDI and cargo tracing system are among important systems that lead to superior firm performance (Lai, Cheng, & Yeung, 2004; Murphy & Poist, 2000). Other than EDI and cargo tracing, global positioning system (GPS) is also installed to the road logistics transportation in order to ensure accurate position of desired destinations and traffic conditions, thus the delivery time could be saved and be on-time (Poon et al., 2009). In contrast, a study on Italian logistics firms showed that basic technologies like the usage of phone/fax, internet and e-mail do not have any important effect on the performance of their firms (Evangelista et al., 2012).

Furthermore, the advanced IT adoption also improves quality of firms' process, firms' productivity, as well as enhancing customer service (Bowersox & Daugherty, 1995; Calder & Marr, 1998; Chow, Choy, Lee, & Chan, 2007; James, Grosvenor, & Prickett, 2004; Lau et al., 2006; Liu et al., 2010). Realizing this, Evangelista et al. (2012) concluded that the implementation of IT has a significant relationship with firm performance.

The coveted results from logistics are various. It ranges from customer satisfaction, environmental responsibility to overall cost-viability. Dehler in Deepen (2007) argued that performance of logistics should consist of two dimensions; logistics costs and logistics service levels. Back to the issue of road transportation on logistics performance, cost and service performance are crucial to the customers. Although low costs are important to attract customers, the customers' satisfaction on their services still lead their business process. Therefore, most customers select their LSPs in the highlight of operation performance such as speed and reliability, freight rates and rate of loss and damage (Menon, McGinnis, & Ackerman, 1998).

Specifically, delivery performance is conceptualized by on-time delivery (Krauth et al., 2005). Stewart (1995) conceptualized delivery performance by delivery-to-request rate, delivery-to-commit date, order fill lead-time and goods in transit. Delivery performance can also be enhanced through the quality and means of information exchange so that the delivery system is much flexible and meet customers' requests accurately (Stewart, 1995).

Meanwhile, Krauth et al. (2005) addressed logistics firm performance through four dimensions such as effectiveness, efficiency, satisfaction as well as IT and innovation. However, the terms effectiveness and efficiency are always being confused by people. Theoretically, effectiveness means a measure of capability to produce intended results, while efficiency is a measure to produce results in which resources used by the firms are taken into consideration. Since this study is going to conceptualize the effectiveness and efficiency of logistics firm performance when applying IT systems in their services, there are six indicators that will represent performance. In terms of effectiveness, it will be indicated by the increase of total loading capacity, on-time delivery, as well as number of delivery. In contrast, firm efficiency will be indicated by the decrease of overtime employees, total distribution cost and total delivery cost (Krauth et al., 2005).

Performance is theorized by a variety of measurements such as financial and non-financial elements. Most customers valued both financial and non-financial performance in order to select their LSPs. In the case of logistics transportation for example, speedy delivery with less risk and low costs are two vital measures to determine their performance. It is considered as a good package offered by the firms to their customers. The combination of both criteria is called as efficient and effective service. However, there are a lot of other determinants which determine the efficient and effective performance as mentioned by a number of scholars. Hence, this study is aimed to conceptualize the efficiency and effectiveness of services provided by the LSPs as a result of IT implementation in their daily operations.

Meanwhile, when discussing firm size, the obvious element representing it is the number of full-time employees employed. According to previous literature, larger firms have more advantages over smaller firms including their resources and capabilities. This situation drags the disadvantages of smaller firms by influencing their relationships with suppliers and other clients as well. Most of the smaller firms also fail to attract larger suppliers to tie business contracts, thus making them less competitive in larger business market.

Since size of firm is a vital element influencing many factors of a firm, it is being a motivation to test the size of firm as a moderator in many fields. For instant, Jayaram, Ahire, and Dreyfus (2010) studied the moderating effect in the relationship between total quality management and effectiveness of a firm. Wahab, Rose, and Osman (2011) used size as a moderator in the study of knowledge transfer. They also addressed that firm size significantly moderates the relationship of know-how and collaborative, as well as knowledge tacitness and ambiguity.

From the previous results, most studies mentioned that deeper roles of the tested relationships are more effective in smaller firms rather than larger firms, but some relationships are found to be vice versa (Jayaram et al., 2010). Similar to Sazali, Raduan, and Suzana Idayu (2011), they found that the association between characteristics and degree of tacit knowledge is much stronger within smaller firms compared to larger firms. Since the firm size is very important, many studies in numerous disciplines have explored the moderating effect of firm size on firm performance. Unfortunately, there is still no study in logistics field using firm size as a moderator in any performance research. Thus, this research proposes a model which analyses the association between IT implementation and logistics firm performance, with firm size as a moderator to fill this gap.

*H1: The implementation of IT has a significant positive effect on firm performance.*

*H2: Size of firm moderates the relationship between IT implementation and firm performance.*

### **3.0 RESEARCH METHODOLOGY**

The sample frame is taken from FMM Directory of Malaysian Industries 2013, which indexed 240 LSPs located in the respected research areas. After excluding 30 firms for an earlier pilot survey, 210 firms are left for the actual survey, which were then approached via postage. The rule for the sample size of this study follows the census for small populations, ruled by Tabachnick and Fidell (2012). The rule claims that the entire population can be considered as the sample of the study if the population is small. Thus, in this case, 210 LSPs firms are the sample for this study.

Waiting about three months after the postage of actual survey, only 93 out of 210 questionnaires were returned and just 81 questionnaires were usable (after a series of follow-up through phone calls and reminder e-mails). The remaining 7 sets of questionnaires were excluded because the vast majority of the questions were left unanswered and 4 were absolutely clear because of specific firms declining to participate in this survey. Along these lines, the response rate for this study is 38.57% which is very high since in Malaysian setting. 15% - 25% of response rate is measured as suitable and satisfactory. Despite the quantity of 81 questionnaires appear to be small, it is adequate for this survey, taking after Tabachnick and Fidell's (2012) rule for a small populace examination. Be that as it may, the G Power analysis is as yet done to confirm the sufficiency of sample size. By taking after Cohen (1992) in utilizing a medium effect size,  $f^2 = .15$  and  $\alpha$  criterion = .05, the total sample size produced by the G Power is 79. Consequently, the sample of 81 questionnaires that were accumulated in this survey is adequate. The G Power application is outlined as a solitary power investigation program for statistical tests generally utilized as a part of social and behavioural research.

#### **4.0 INSTRUMENT AND MEASUREMENT**

In order to reach the objective of this research, it needs to accumulate data about the LSPs performance measures in the East Coast region, which comprises three states: Pahang, Terengganu, and Kelantan. Since this study is a quantitative study which uses primary data collection method, a set of questionnaire was constructed to obtain reliable and accurate information from LSPs. Expanding on the past studies of IT implementation and logistics performance, the questionnaire adapted multi-item scales, which had been altered accordingly to suit the setting of the study. Each variables were measured utilizing the five-point Likert scale (1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree and 5 = strongly agree).

#### **4.1 Logistics Performance (LP)**

LP is affected by a blend of two contributions: first, the performance of the logistics processes is outsourced to outsiders (third-party) and second, the logistics process performance is executed in-house by the firms. However, Deepen (2007) contended that LP comprises of two components, logistics costs and logistics services. In addition, Deepen claimed that logistics services includes the capability of supplying customers timely, reliably, and flexibly with qualitatively perfect products that suit the market demand, while, the logistics costs comprise all costs acquired to provide the chosen level of logistics services. Moreover, it is important to measure the logistics capability in order to fulfil and satisfy customers' requests (La Londe, Cooper, & Noordewier, 1988). Some previous studies have verified that quality, cost, time, and flexibility are four elements that give impact to customers in picking up their LSPs (Neely, Gregory, & Platts, 1995). Consequently, logistics performance is divided into four categories: effectiveness, efficiency, satisfaction, as well as IT and innovation (Krauth et al., 2005). In this case of study, effectiveness and efficiency total up the LP criteria expected to answer the research questions, accompanied by three items with the following description: 1) Effectiveness is designated by the increase of on-time delivery performance, increase in the number of delivery per day and increase in the total loading capacity; and 2) efficiency is described by the decrease in the total distribution cost, decrease in the total delivery cost, and

decrease in the employees' overtime hours (Krauth et al., 2005). The reliability test showed that LP obtained 0.835 for Cronbach's Alpha value.

## **4.2 IT Implementation (IT)**

According to the literature, there are numerous types of IT systems used in logistics management including enterprise resource planning – ERP (Al-Mashari, 2002; Hsu & Chen, 2004; Kotnik & Hagsten, 2013); electronic data interchange – EDI (Angeles, Nath, & Hendon, 1998; Closs & Xu, 2000; Lucchetti & Sterlacchini, 2004), frequency identification – RFID (Evangelista et al., 2012; Helo & Szekely, 2005), global positioning system – GPS (Evangelista et al., 2012; Giaglis et al., 2004), transportation management systems – TMS (Perego, Perotti, & Mangiaracina, 2011; Mason et al., 2003), and barcode (Closs & Xu, 2000). As for this study, it will conceptualize the implementation of IT in terms of two dimensions; basic technology (internet access and wide computer usage) (Li et al., 2009) and advanced technology (GPS, ERP, EDI and ERP) (Banomyong & Supatn, 2011; Evangelista et al., 2012).

## **4.3 Firm Size (FS)**

According to SMECorp (2013), size of firm is determined by two means; annual sales turnover and number of full-time employees. These two categories are then differentiated by these sectors; manufacturing (including agro-based) and manufacturing-related services, primary agriculture, and services sector (including ICT). For this study, the number of employees is used to determine the size of firm, with respect to the number of employees differentiated based on the sectors mentioned before. Since it lies under the service sector, the size of firm is divided into four groups; micro (less than 5 employees), small (five to less than 20 employees), medium (20 to less than 50 employees) and big (more than 50 employees) firms. Previous studies (Wahab et al., 2011), also measured the total of full-time employees in the firms for FS. To make it easy for analysis, the FS is coded as 0 for small/medium FS (employees < 50) and 1 for large FS (employees > 50) (SMECorp, 2013).

## **5.0 MODEL AND ANALYSES**

### **5.1 Pearson Correlation Analysis**

#### **5.1.1 IT Implementation (IT) and Firm Performance (FP)**

The Pearson Correlation matrix indicates the direction, strength, and significance of the bivariate relationships among all the variables that are measured at an interval or ratio level (Sekaran & Bougie, 2010). This will clarify the extent of the relationships that exist between the independent and dependent variables. For this study, the researchers used this correlation to observe how strong the relationships between IT and LP. According to Cohen (1988 in Pallant, 2010), if the value of  $r$  is in the range of 0.1 - 0.29, the correlation is considered small; when  $r = 0.3 - 0.49$ , it is assumed that the relationship has a medium strength and the correlation is large when  $r = 0.5 - 1.0$ , suggests that the relationship of both examined variables is strong.

To determine the variance shared by both variables, the coefficient of determination is calculated using the following formula:

$$\text{Percentage of variance} = (r \times r) \times 100 \quad (1)$$

## 5.2 Moderated Multiple Regression (MMR) Analysis

### 5.2.1 Moderating Effect of Firm Size (FS)

In this study, Moderated Multiple Regression (MMR) analysis is used to measure how FS moderates the relationship between IT and FP, following Wahab et al. (2011). The analysis is designated as an inferential procedure, which consists of comparing two different least-squares regression equations (Aguinis, 2004; Cohen & Cohen, 1983; Jaccard et al., 1990). In measuring the moderating effect of the variable (product term), the MMR analysis was interpreted by two conditions; 1) the R<sup>2</sup> change in the models obtained from the model summaries; and 2) the regression coefficients for the product term obtained from the coefficients tables. The steps of doing MMR analysis are as follow:

Equation (1) below is used to represent the variables in the ordinary least-squares (OLS) model:

$$\text{OLS model: } Y = a + b1.X + b2.Z + e \quad (2)$$

To determine the presence of the moderating effect, the OLS model is compared to the MMR model, which is represented by Equation (2) below:

$$\text{MMR model: } Y = a + b1.X + b2.Z + b3.X.Z + e \quad (3)$$

In these equations, Y = FP (dependent variable), X = IT (independent variable), Z = FS (moderator variable), X.Z = product term (moderating effect of Z), a = least-squares estimate of the intercept, b1 = least-squares estimate of the population regression coefficient for X, b2 = least-squares estimate of the population regression coefficient for Z, and e = residual term. These equations were then matched with the variables involved in this model and entered in the SPSS software to compute the results. The moderating variable (product term) is a binary grouping moderator, where the moderating variable, FS was coded using the dummy coding system of 0 = small size of firm (small/medium) and 1 = large size of firm. The coding was done to simplify the calculation and made it easy to interpret the results when comparing between those two different groups (Aguinis, 2004; Wahab et al., 2011).



Table 1: Correlation analysis for IT and FP

		IT	FP
IT	Pearson Correlation	1	.284*
	Sig. (1-tailed)		0.01
	N	81	81
FP	Pearson Correlation	.284*	1
	Sig. (1-tailed)	0.01	
	N	81	81

\*Correlation is significant at the 0.05 level (1-tailed).

## 6.0 SUMMARY OF FINDINGS

### 6.1 IT Implementation (IT) and Firm Performance (FP)

Table 1 shows the results for the correlation analysis between IT and FP. The Pearson Correlation coefficient,  $r$  is only 0.284 and the significant  $p$  is equal to 0.01, with number of sample,  $N$  is equal to 81. Since the value of  $r$  is considered small, it could be concluded that IT and FP had a weak positive relationship, with 0.01 of significance. It indicates that only 1% chances that this relationship did not truly exist. Therefore, the increase in IT could be associated with the increase in FP. In addition, this correlation gained 8.066% percentage of variance ( $0.284 \times 0.284 \times 100$ ) which explained that IT helps to explain approximately 9% of variance in respondents' scores on the FP. Thus, hypothesis 1,  $H1$  is fully supported. IT has a significant positive relationship with FP when  $r = 0.284$  and  $p = 0.01$ .

### 6.2 Moderating Effect of Firm Size (FS)

Table 2 and Table 3 show the model summary and coefficients for the relationship of IT and FP, with the FS is set as the moderator variable. Table 2 shows that for Model 1,  $R = 0.391$ ,  $R^2 = 0.153$  and  $[F(2, 78) = 9.528, p = .002]$ . This  $R^2$  means that 15.3% of the variance in the FP is explained by IT scores and FS. Model 2 shows the results after the product term (IT\*FS) was included in the equation. Table 2 also indicates that the inclusion of the product term resulted in an  $R^2$  change of 0.013,  $[F(1, 77) = 1.239, p > 0.05]$ . Thus, the results do not support the presence of significant moderating effect. To put it differently, FS does not give any moderating effect to the relationship of IT-FP. Thus, it can be reasonably concluded that hypothesis  $H2$  is not supported.

Back to Table 3, Model 1 indicates that IT and FS were statistically significant ( $p < 0.10$ ; Beta value = 0.182 and  $p < 0.05$ ; Beta value = 0.246 respectively). Equation (4) shows that for 1-point increase in IT, the FP is predicted to have a difference by 0.182, given that the FS is held constant. The regression coefficient associated with FS means that the difference in FP between small and large company is 0.246, given that IT is held constant.

$$FP = 1.985 + 0.182IT + 0.246FS \quad (4)$$

The higher-order of interaction effects of the MMR test was conducted to differentiate the extent of FP that was influenced by FS. Model 2 in Table 4.16 shows the results after the

product term (IT\*FS) was included in the equation. As indicated in Table 2, the inclusion of product term resulted in R<sup>2</sup> change of 0.013, [F (1, 77) = 1.239, p>0.05]. Model 2 shows that IT, FS and product term IT\*FS are not significant (p>0.05). Thus, the results did not support the presence of a significant moderating effect. Table 3 also reveals information on the regression coefficients after the inclusion of product term in the equation. Equation (5) is for Model 2:

$$FP = 0.660 + 0.633IT + 0.724FS - 0.160(IT*FS) \quad (5)$$

Since the result shows that moderating variable FS does not give any significant effect on the relationship of IT and FP, therefore Equation (5) cannot be interpreted.

Table 2: Model summary of FP, IT and FS

Model	R	R Square	Adj. R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.391 <sup>a</sup>	0.153	0.131	0.66222	0.153	7.026	2	78	0.002
2	.408 <sup>b</sup>	0.166	0.134	0.66121	0.013	1.239	1	77	0.269

a. Predictors: (Constant), FS, IT

b. Predictors: (Constant), FS, IT, IT\*FS

Table 3: Coefficients for the variables involved

Model		Unstandardized Coefficients		Standardized Coefficients		t	Sig.	95% Confidence Interval for B	
		B	Std. Error	Beta				Lower Bound	Upper Bound
1	(Constant)	1.985	0.363		5.473	5.473	0	1.263	2.707
	IT	0.182	0.095	0.208	1.916	1.916	0.059	-0.007	0.372
	FS	0.246	0.095	0.279	2.574	2.574	0.012	0.056	0.436
2	(Constant)	0.66	1.245		0.53	0.53	0.598	-1.818	3.138
	IT	0.633	0.416	0.721	1.522	1.522	0.132	-0.195	1.462
	FS	0.724	0.44	0.822	1.645	1.645	0.104	-0.152	1.6
	IT*FS	-0.16	0.143	-0.851	-1.113	-1.113	0.269	-0.445	0.126

a. Dependent Variable: FP

## 7.0 DISCUSSION AND CONCLUSION

In the case of East Coast region, the correlation analysis found that IT implementation has a significant relationship with firm performance. This is aligned with prior studies that affirmed that the adoption of IT has significantly influenced the firm performance (Bowersox & Daugherty, 1995; Evangelista et al., 2012; James et al., 2004; Lau et al., 2006; Liu et al., 2010). The adoption of RFID and EDI for example, provide efficiency and effectiveness for flexibility, operations and customer service (Evangelista et al., 2012). In complement, GPS is adopted for

easy cargo tracing and route tracking (Poon et al., 2009). However, the relationship is found weak when the value of Pearson Correlation coefficient,  $r$  is 0.284. It indicates that IT implementation only gives small effect on the logistics service providers' performance in East Coast region. On the other side of the coin, the results of the MMR analysis measuring the moderating effect of firm size propose that firm size does not significantly moderate the relationship of IT implementation and firm performance. These findings then fill in the gaps in the existence literature of logistics fields by providing new information on the boundary of the examined relationships (Auguinis, 2004). This is linked with previous studies which empirically revealed that studies in IT adoption have frequently given diverse outputs, despite advocating the positive relationship between IT and firm performance. This phenomenon of various results is identified as "productivity paradox" of IT adoption (Brown & Hagel, 2003). Studies done by Weill (1992), Hitt and Brynjolfsson (1996), Lee and Barua (1999), and Devaraj and Kohli (2003) also encounter this phenomenon. The result suggests that weak significant positive relationship between IT implementation and logistics firm performance in East Coast region is due to the less usage of advanced IT applications by the LSPs firms there. Most of them only use basic technologies like computer and internet to operate their services. This might be because most of the firms in the region are small, thus having less capital in investing in advanced technologies like large companies did. Similar to China and some other developing countries, small and medium firms there are normally less capable in IT due to limited capital to invest in IT (Chin, Bae, & Kim, 2007). The other reason is the firms in this region are able to manage their services using only basic technologies since the business there are rather small, compared to big city like Klang Valley. East Coast region might have big development someday when the trade activities at ports in the region are as busy as Klang Valley. At that time, advanced IT implementation might be needed by LSPs in East Coast region to cater the demand with high efficiency; increase delivery with decrease in total distribution cost and total delivery cost.

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