

Factors Influencing the Information and Communication Technology (ICT) of Third Party Logistics in Malaysia

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Abstract—The function of Information Communication Technology is still unevenly distributed among the logistics providers leading to sizeable front-liners controlling the logistics market. The ICT involves directly with the customer relationships, manufacturing, transportation, warehousing networks and data streams. This study targeted at providing remedies to the most of existing gaps relating the influence of ICT facilities in logistics industry especially among the 3PLs in Malaysia. Third Party Logistics Services can be referred as an outsourcing of transport and logistics activities belong to other companies in the movement of goods to meet their purpose. In most cases, more than one activity is outsourced and it includes storage, warehousing and transportation. The study utilized in the used of questionnaire to gather the required information from Third party logistics service providers. The data were analysed among 150 respondents and the correlated result shows that the selection of an appropriate tool of ICT has a significant impact on the competitive advantage of third party logistics companies. The result of the study is able to be used for the measurement of the performance and benchmarking on the importance of ICT in leading the 3PLs logistics industry in future.

Keywords—Information, communication, technology, third party Logistics, transportation, competitive advantage

1. Introduction

The usage of application in Information and Communication Technology (ICT) is broadly diversified at the present business organization. The demand of ICT tools has increased due to the availability of new products and gadgets in the present market. The ICT is able to be used in many ways of communication for the purpose of coordination within the management, customers and suppliers [1]. Using the ICT tools is able to manage the Third Party Logistics and supply chain relationships and it's considered an important

approach to enhance the companies' ability during the time of forecasting and response to market changes [2], [3]. The logistics and supply chain business entities were using organization through identification and adjustments on the rapid changes in the market for the higher scale in business. This would be benefited by increasing the productions and maintaining on the sustainability of the company for the longer period of times. The investment of ICT tools or gadgets in the organization would be able to generate good revenue with the excellent progress towards the success and prosperity [4], [5].

In order to remain at the edge of competition, several studies were established to distinguish between the successful strategies versus the ICT infrastructures. Companies might be facing the challenges in aligning their supply and demand in today's manufacturing environments. Unreasonable amounts of times and resources were spent by organizations in an attempt to have a better prediction of their demands. Therefore, outsourcing in their logistics activities to another firm of 3PLs which specialized in these activities should be practiced. On the other hand, the contemporary industrial developments have contributed immensely to the gaps between large and small 3PLs providers [6].

Despite the related effort in upgrading the ICT's facilities, creating on its highest responsive team is able to meet the changing and increasing the peak demand. The use of ICT is still unevenly distributed among the logistics providers leading to sizeable front liners in dominating and controlling the market only with relationships towards their customers. ICT is also used in monitoring for transportation movements, warehousing networks and information flows [7]. Despite these improvements of ICT, several organizations were

experiencing on the delays on inaccurate information, incomplete services, ineffective operations and higher reported on damage products. Based on these mentioned issues, this research intended to examine the influence of ICT facilities on the logistics and supply chain among the 3PLs companies in Malaysia.

2. Literature review

2.1 The Third Party Logistics and Supply Chain Management

Third Party Logistics is a part of Supply chain management with interlink series of activities which incorporate into planning, coordinating, controlling, leading from materials, parts until the finished goods for both suppliers and customers [8]. It consists of the geographical distribution of facilities and transportation links were connected in all these facilities. In services such as retails and deliveries, logistics and supply chain technique are able to minimize the peculiar challenges in distribution whereby the finished products are required to be supplied at clients' premises promptly as scheduled. This is different as compared in pure service operation, such as a financial firm or consulting operation services whereby the supply chain is principally working together with the flow of information [9], [10]. Logistics and Supply chain management are focusing on the improvement of performance through reduction of time and resources and gear up towards the effective and efficient use of both internal and external suppliers with appropriate capacities and technology know-how. Hence the ICT is creating a seamlessly coordinated logistics and supply chain and raised, inter-company competition for inter-logistics towards better in supply chain development.

2.2 The Influence of ICT facilities in The Third Logistics and Supply Chain Management

Information and communication technologies able to perform all important influence in the process of providing an effective, efficient, unique services, products, packaging and transportation for the better satisfaction of their customers. The important roles of ICT in management of Logistics and supply chain are able to present two major positive and negative effects. These may be either positively

pursue the costly and problematic processes of attaining the position of value added organization or company through an extensive usages of ICT tools. The contrary of these phenomena, the ICT is to overcome in the low-esteemed cost of service providers [11]. The influence and practicality of ICT facilities in the management of supply chain operations have witnessed true revolutions over decades [12], [13]. The concept of transformation is the most importantly in the category of companies' attraction [14], [15]. In ICT's structure was transformed into the idea and reframed to enhance the decision making [16]. The ICT's information, management does not have to follow the same structure path similar as the physical flows [17], [18]. The ICT can be used to reduce the channels, the intermediaries, and generating immediate and direct connection with the customers [19]. The aspect of reduction of communication channels is actually an increase of relay and reduces transmission costs of information [10]. The important process of information and physical flows able to differentiate the management roles and it brings the ease of optimization of information separately and enhance company's productivity.

Based on extensive review of literature, there were some and most widely used or applied the ICT facilities in TPL logistics companies and more importantly is to improve the quality services [20]. Business software called Enterprise Resource Planning (ERP) - This software gives firms the opportunity of planning and controlling of all required resources for ordering, processing, forwarding and assigning of customers' orders which fulfilled with manufacturing and services firms [21]. Software for planning material resources is engaged for the optimization of material needs and planning [22]. Software for interchanging of electronic data is for transmission of telemetries information in a standardized style from firms to another system. This system eliminates on manual interference which can come up through a network managed by third party operators [23], [24]. Software for transport optimizing technology is ordinary gadgets for planning and routine movements. E.g. GPS, RFID, VMS, WMS, HMS and OCS.

2.3 ICT and Factors Influencing ICT Adoption by Malaysian 3PL Service Providers

The generalize engagement of ICT facilities has brought a greater and higher level transformation to various business transactions which includes logistics, management procedures for stock and placing of order, warehousing, fleets, trucking and haulage management systems (HMS). It seems to be the main strategic practices that can gain for betterment of innovations presented by ICT facilities to expedite a new supply chain relationship channel. Relative to the present implementation procedure of ICT facilities for strategic management, yet there are still lacking of deeper understanding of ICT application and their influences [20]. The economic growths and development in Malaysia in all sectors are dependent upon on the smooth flow of each movement in the transport industry. It is considered that the economic influence of this industry cannot be over emphasized with main links to both manufacturing and service sectors. Based on these facts, the issues of globalization and coupled with competitive advantages in the Third Party Logistics industry are able to increase pressure on Malaysian producers and manufacturers.

Studies showed the usage of ICT is the most influencing elements which involved the logistics services towards the procurement, communication, data exchanges and supply chain. The ICT has important tools that influencing the success of logistics and supply management. Contrary to what was obtained in the past when there were difficulties in obtaining information because of lacks of accessibility in receiving or sending such information on time [25]. It is well-known that the third party logistics service providers keep abreast in communicating with each other in business towards global competition. It is a developmental required of all members in logistics, supply chain management companies to coordinate their production and logistics activities. According to [25] as quoted by [26], that 'this type of coordination can be facilitated by supply chain technology, which includes all the ICT facilities, particularly when these technologies are used to integrate the traditional boundaries of supply chain companies. The ICT also able to secure the competitive advantage of the same nature of business with others [12

3. Research methodology

3.1 Research Methods Design

The study focuses on the influence of ICT facilities in the Third Party Logistics service providers. According to the study, a research that is an exploration in perspective is certified to be more appropriate [25]. This study explores on the roles of ICT' facilities in Third Parties Logistics, Service and focusing on the selection and value added in the competitive advantage of the companies related to them. The first stage has identified in the total of logistics companies involved and registered with the 3PL's service industry in Malaysia. The quantitative study employed questionnaire surveys which were distributed among 150 companies staff of 3PL firms. It comprised of all third party logistics providers with ICT facilities. The survey also made through online i:e e-mail and other telecommunication. The targeted groups in each company were the owners, managers, supervisors and IT officers. The companies examined were from small, medium and large scaled sized industry with an average turnover of RM5 Million- RM 100 Million / year and between 150 staffs. There are numerous 3PL firms and very large in this to select our sample size²⁶ postulation was used in soliciting the sample, therefore sample of 175 was selected and the questionnaires were distributed, however a total number of 150 was collected and analysed

The characteristic budget suggested is 0.5% of overall turnover of ICT facilities investments in their organization. This characterization is in perfect compliance with the outcome of a study conducted by [27] in which identification of firms' size is a key factor in the adoption of ICT's development. Sampling denotes for selecting a certain proportion of individuals from the overall population and able to represent the features and characteristics of the study [28]. Simple random sampling was adopted in this study and data collections were made using the pre-tested survey and basically through a structured questionnaire. The validity and reliability of the surveying instrument were done

The framework was structured for further investigation on the requirement in influencing factors of ICT towards competitive advantages for the TP Logistics as in Figure 1. The objectives of the study and hypotheses were formulated.

3.2 Hypotheses

H1: There is a significant relationship between the usage of ICT facilities and the competitive advantage of 3PL service provider in logistics and supply chain.

H2: There is a relationship between speed and accuracy of the selected ICT facilities and the competitive advantages of 3PL service providers.

H3- There is a relationship between quality and cost of the selected ICT facilities and the competitive advantages of 3PL service provider.

3.3 Conceptual Framework

MEDIATING VARIABLES

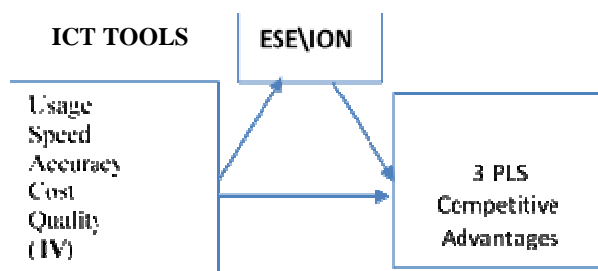


Figure 1. A conceptual diagram of a conditional process model: Corresponding to the study [32].

4. Findings and discussion

The demography of 3PLs company structures included in this study is in line with the findings of previous studies. The study revealed a decentralized organization structure, adequate technological adoption and selection process are better for competitive advantages [29]. The results also align with the findings as suggested by [30], in which was established that the organization size plays a major significant role in terms of the selection process, adoption level and the use of technologies.

4.1 Influence of ICT's tools on Competitive Advantages of 3PLs

Multiple regression analysis was conducted to test the influence of ICT tools (usage, speed, accuracy and cost) on competitive advantage in this study. The result of the multiple regression analysis.

Table 1: Influence of ICT tools (usage, speed, accuracy and cost) on competitive advantage.

Model		Uns/Coefficient		Stand/Coef	T	Sig.
		B	Sr			
1	(Constant)	.700	.263		2.66	.009
	Usage	-.033	.026	.085	-1.28	.20
	Speed	.008	.027	.016	.298	.766
	Accur	.041	.040	.076	1.026	.307
	Cost	.000	.038	.001	.007	.994
	Select	.836	.061	.771	13.745	.000

- Dependent Variable: Competitive Advantage
- Predictors: (Constant), Selection, Speed, Cost, Usage, Accuracy

The result of the multiple regression analysis as shown in Table 1 has a R² value of 0.589 (R² Adjusted = 0.575) indicating that the predictors (Selection, Speed, cost, Usage and accuracy of ICT tools) explained 58.9% variance in competitive advantage. Furthermore, it is provided in the result that the selection process of ICT tools ($\beta = 0.836$), has more contribution than the other variables in explaining the variance in the competitive advantage of 3PLs in Malaysia. This is followed by Usage of ICT tools ($\beta = -0.33$) explaining 33% of the variance in competitive advantage among the 3PLs in Malaysia. The beta value of accuracy ($\beta = 0.041$) indicates that accuracy of ICT tools only explains about 4% of the variance in competitive advantage. While the speed and the cost of the ICT tools ($\beta = 0.008$ and $\beta = 0.000$) absolutely does not have any effect in explaining the variance in the competitive advantage among the 3PLs in Malaysia. In addition, the result indicates that only the selection process has a significant influence in explain the variance in competitive advantage ($P < 0.05$), while the other constructs (Usage, speed, accuracy and cost) of ICT tools have P values greater than 0.05 and hence, do not significantly influence the competitive advantage of 3PLs in Malaysia.

To test for the mediating effects of the selection process, Hayes (2013) [31] test is employed and from the analysis, it is seen that IV, which is the independent variables can explain 70.65% of DV that is the dependent variable with P-value of 0.0000 at 5% CI using direct relationship.

However, the introducing MV, selection process as a mediator, the following information was observed. The MV was observed to be significant to the DV having P-value of 0.0000 explaining 51.15% of the DV which is the dependent variable. Contrary to what is found under a direct relationship between (IV) and (DV), under the indirect relationship the IV is seen to be insignificant having a P-value of .9370 at 5% CI. Furthermore, it is observed that with the introduction of a mediator, Selection process, the IV ICT tools can only explain a negative 8.7% of the DV, competitive advantage.

4.2 Significant in this study to the Logistics and supply chain industry

This study assigned a certain unique role of ICT for the use of the 3PLs targeting to perform customizing service user operations. Likewise, the study highlighted that the utilization of specific ICT and technological capabilities may influence transport and logistics services and makes possible an effective integration among the firm's dealings in supply chain services. Specifically, this study opens up the ICT capabilities to assure the swift customization of products and proffers a highly competitive lead time. The outcome of this is that 3PLs firms will be centered progressively more on creating customers' values as more value added are in one way or the other relies on ICT utilization as reflected in this study. The propagation of ICT tools will also open up new prospects for the advancement of new tasks in the supply chain of 3PLs such online freight e-marketplaces. In addition the result of the study can be adopted by the stakeholders in Malaysia logistics and transport sectors to enhance their competitive advantages locally and internationally

5. Conclusion

The study concludes that the usage of ICT tools has a full effect on third party logistics. The implications were based on the result in the mediating factors and selection process recorded and influencing the 3PLs in a competitive advantage among the others. The selection of appropriate, functional ICT tools, materials is the most appropriate in the Third Party logistics. The adoption of ICT into logistics operations is not really significant, but the selection of the most efficient ICT tools that will greatly influence with

the competitiveness level of the 3PLs. There are lots of ICT tools and software that can be used for same operation and it also depends on their initiatives and know how in selecting on the appropriate gadgets. This enable for the companies in achieving their tasks through minimum times and with the lowest production costs. Nevertheless, it can be observed on appropriate processes in selecting with an efficient and appropriate ICT tools and able to gain the competitive advantages in the future. The companies are able to manage the appropriate information efficiently by integrating with several logistics providers, planning, distributing, warehousing, routing schedule, operational activities, demand, drivers' assignments and fleet management for better flows of physical products to their customers [32]. The selection of appropriate ICT tools among 3PLs companies is vital and able to dictate to the highest of the competitive advantage for service providers. The analysis result of the Pearson product-movement correlation revealed that ICT facilities (usage, speed, accuracy and costs) have a significant relationship with selection process and competitive advantage. Furthermore, the multiple regression analysis found that only the selection process has a significant on competitive advantage while the Usage, speed, accuracy and cost of ICT tools do not significantly influence the competitive advantage of 3PLs in Malaysia.

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