

TRANSPORTATION, LOGISTICS PERFORMANCE AND MODERATING EFFECT OF INFORMATION TECHNOLOGY: A CONCEPTUAL MODEL IN MALAYSIA

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Abstract-Logistics performance is important to economic growth in developed and developing countries worldwide. They believed can act as an invisible catalyst linking supply and demand, and the most important operations for business development. Other than the core competency of delivering goods on time, logistics companies add value to their clients' businesses by designing and executing complex supply chain cycles, project management and inventory reduction. Recognizing the important of logistics performance to economy development, many studies on logistics issue particularly related to small business had been done by previous researcher. Most of the prior studies focus on the impact of logistics activities includes transportation activity on logistics performance, but there is still little research focusing on the moderating effect of IT since IT can be considered the new competitive weapons in the logistics industry. In spite of that, until recently, IT is one of the vital valuable matters to logistics performance, but the ways of applications and how IT can affect logistics performance is still sparking a heat debate. Hence, to fill this gap this paper provides a conceptual model that links the relationship of transportation activity on logistics performance and moderating effect of IT between them. This model is originated by synthesizing the previous evidence, both empirically and theoretically from prior literature. This model is expected could benefit the small business performance, particularly in Malaysia environment well as improve logistics performance via information technology.

Keywords: Information Technology, Transportation, Logistics Performance, Logistics

1. Introduction

Beginning in the 1950s ' and 1960's logistics industry related to transportation and warehousing services have been introduced. Theory related to logistics outsourcing has been around since time immemorial. In 1990s ' there are some logistics activities have been introduced such as import / export management, freight forwarding, distribution, freight forwarding, distribution, freight consolidation and reverse logistics has been added to existing logistics services (Mitra, 2008).

Logistics also play an important role in the improvement of small and medium companies in the country, the Ministry of international trade and industry (MITI) also agrees that the logistics industry is one of the services sector for further improvement as trade remained the key source of support for Malaysia to maintain Malaysia's competitiveness as a trading nation. Between economic improvement that can be supported by efficient logistics services and widespread is to help grow small and medium business (SME) who does not have extensive marketing

capabilities, especially overseas. Incorporation of civil servants in the logistics and SME is essential to awaken again this sector would be a good economic development of the country. Based on the national budget 2014, mentions Malaysia ranked 29th Logistics Performance Index World Bank Report 2012. This index measures the performance benchmark that includes delivery of logistics activities, infrastructure, punctuality, customs clearance and efficiency. Logistics typically includes a variety of supply chain services such as warehousing, packaging, labeling, transportation, quality control and much more. There is a clear integrated logistic sector provides many opportunities for operators of SMES to enhance their access to meet the needs of business customers around the world.

However, 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 as expected by customers; congestion. The congestion negatively affects businesses generally on deliveries, business schedule, workers, customers and meeting with clients (Hartgen, 2007). From the 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 hard to manage and avoid. Other than Charlotte, this issue has been widely debated especially in big countries such as China (Gui-yan et al., 2007), Japan (Taniguchi et al., 1999) and UK (Trunick, 2004). Taniguchi et al. (1999) added, the congestion is pretty worse 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 transportation in logistics activity is significantly positively related to logistics performance. In this context, transportation providers play a more important role than in the past insofar as they are entrusted with the task and information flows along multiple levels of the supply chain and of making the whole logistical system more efficient and flexible in responding to swift market changes and for sure can improve logistics performance (Pietro Evangelista, 2003).

1.1 Theory

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

What does it mean by resources and capabilities? According to Grant (1991), “resources are inputs into the production process. They include items of capital equipment, skills of individual employees, patents, brand names, finance, and so on. But, on their own, few resources are productive. Productive activity requires the cooperation and coordination of team of resources. A capability is the capacity for a team of resources to perform some task or activity”.

Hence, the study is going to measure the efficiency and effectiveness of logistics firms based on the RBV theory, where the mixture of firms' resources and capabilities is believed to catalyze the competitive advantage among competitors. According to the model of this study, Transportation is considered as resources, while IT implementation is assumed as the capabilities since. The combination of both constructs will be examined to observe the intended results.

2. The construct

2.1 Transportation

The operation of transportation determines the efficiency of moving products. The progress in techniques and management principles improves the moving load, delivery speed, service quality, operation costs, the usage of facilities and energy saving. Transportation takes a crucial part in the manipulation of logistic. Reviewing the current condition, a strong system needs a clear frame of logistics and a proper transport implements and techniques to link the producing procedures. Nowadays transportation has progressively developed into a dominant issue facing logistics processes today. It represents a major cost item – transportation costs vary from around 25 percent (Lancionietal.,2000) to upwards of 50 percent of overall logistics costs (Swenseth and Godfrey,2002),depending on the source – and it is also a key factor in providing good customer service affecting delivery punctuality, timeliness, accuracy and the ability to offer tracking information.

Transportation is a key factor in determining the effectiveness and success in logistics. Where transport services working properly and smoothly it will be able to increase the company's revenue. Without well-developed transportation systems, logistics could not bring its advantages into full play. A good transport system in logistics activities could provide better logistics efficiency, reduce operation cost, and promote service quality. The improvement of transportation systems needs the effort from both public and private sectors. A well-operated logistics system could increase both the competitiveness of the government and enterprises. Transport system is the most important economic activity among the components of business logistics systems. Around one third to two thirds of the expenses of enterprises' logistics costs are spent on transportation

2.2 Implementation of IT

Today, everyone who lives in the modern life knows the words IT and ICT. Academically, Oxford Dictionaries, Press (2013), defined IT as *“the study or use of systems (especially computers and telecommunications) for storing, retrieving, and sending information”*, while following Devenport (2001) in Zhou (2014), ICT is *“a set of technologies that includes computing, telecommunications, multimedia and virtual reality”*. As *“the glue that holds a supply chain together”*, IT is considered an important enabler of effective supply chain management (Kopczak 1997; Simchi-Levi et al. 2000). The role of IT in business is noted to be that of facilitating information transfer between various companies and individuals in the supply network (Forza et al. 2000). Essentially, IT can save time and improve accuracy in exchanging information about company goals and strategies, and it removes much of the human error inherent in complex and repetitive tasks.

According Cheng-Min, F., & Chien-Yun, Y. (2006), Information technologies may be defined as “electronic means of capturing, processing, storing, and disseminating information”. All these technologies provide new mechanisms for handling existing resources and information. The convergence of telecommunication and computer technology has resulted in the emergence of IT, which is a general term used to describe a large number of different technologies and applications to capture, store, process and provide data and to establish communication over long distances. Furthermore, since IT shortens the channel, reduces the intermediaries and generates direct contact with customers in terms of information and communication, it is viewed as an important tool for improving communication speed and reducing information transmission costs (Saura et al, 2008). IT is generally divided into positioning and tracking technology, and communication technology infrastructure. In this study, IT refer to any hardware or software that automatic the basic operational process (such as order entry, order tracking, order scheduling etc.) of a transportation logistics operation.

When discussing about information technology, many researcher and past study agree that is IT becomes necessary to support logistics and transportation processes. IT helps automate routine logistics activities, thus enabling managers to focus on strategic issues and core competencies. Some studies have reported that IT can improve logistical effectiveness, efficiency, productivity, flexibility, and cost and service quality. The reason for IT’s potential in achieving logistics success is that it can help the logistics firms to improve their competitive advantages. Previous literatures also showed that all level of countries nowadays start to enjoy IT advantages, but somehow their implementations depend on how developed the countries are.

2.3 Logistics Performance

The preferred outcomes from logistics are numerous and range from customer satisfaction over issues such as environmental responsibility to overall cost-effectiveness. Other than Deepen, Dehler (2001, p.208) in Deepen (2007) argued that logistics performance should consists two measures; logistics costs and level of logistics services. Back to the issue of transportation and logistics performance, cost and service performance are crucial to the customers. Although low costs are important to attract customers, but the customers’ satisfaction over their services still lead their business process. Consequently 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 et al., 1998).

Nowadays, logistics performance may be viewed as a subset of the larger notion of firm or organizational performance. The latter has attracted a large volume of diverse research over the years .Jiuping Xu (2009), and illustrates the futile nature of the search for the “one best way” of defining performance. For example, Gleason and Barnum chose to distinguish between effectiveness and efficiency. They defined effectiveness as “the extent to which an objective has been achieved”, while efficiency was defined as “the degree to which resources have been used economically” Richard Oloruntoba, Richard Gray (2009). Simply put, efficiency is “doing things right”, while effectiveness is “doing the right thing” (Richard Oloruntoba et.al 2009). Sink and his colleagues, on the other hand, defined seven dimensions in order to capture their conception of “what performance means”: they are effectiveness, efficiency, quality, productivity, quality of work life, innovation and profitability/budgetability Stephan Schmidberger (2009).

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

3. How Does The Three Constructs Relate?

3.1 Implementation Of Transportation And Logistics Performance

The implementation Transportation as logistics activities and key factor to achieve logistics excellence (Bowersox et al., 1999, Team and Management, 1995). Over the past few years, the transportation industry has experienced increased competitiveness (Bowersox and Daugherty, 1995; Davies et al., 2007). In the first place, new international players have entered the competitive arena thanks to ever-increasing globalisation and internationalisation (Lemoine and Dagnæs, 2003).

Moreover, players consider leading factors like cost compression and service level when choosing their providers. Lastly, environmental concerns (e.g. reduction of traffic congestion and improvement of safety and security requirements) have taken on renewed importance (Bander et al., 1998; Loebbecke and Powell, 1998). In this scenario, i.e. increasing complexity of logistics and transportation networks and stronger competition on costs and service performance.

P1: The implementation of Transportation has positive significant effect on firm performance.

3.2 The Moderating Effect Of Information Technology

Since IT is a vital element influencing many factors in a firm, it is being a motivation to test IT as a moderator in many fields. For instant, Seán de Búrca Brian Fynes Teresa Brannick, (2006)," studies the moderating effect in the relationship of services practice and performance. In this scenario, i.e. increasing complexity of logistics and transportation networks and stronger competition on costs and service performance – information technology (IT)-based applications could be seen as a primary key enabler (Bowersox and Closs, 1996; Closs et al., 1997; Bharadwaj, 2000; Spanos et al., 2002; Golob and Regan, 2002a; Giannopoulos, 2004). Following Marchet et al. (2009), the main types of IT applications available for logistics and transportation companies. Besides, the advanced IT adoption also improves quality of firm's process, firm's productivity, as well as enhancing customer service (Bowersox and Daugherty, 1995, Calder and Marr, 1998, James et al., 2004, Lau et al., 2006, Chow et al., 2007, Liu et al., 2010). Realizing this, Evangelista et al. (2012) concluded that the implementation of IT has a significant relationship with the firm performance.

P2: Information Technology moderates the relationship of Transportation and Logistics performance.

From the propositions above, a conceptual model can be formed as in figure 1.

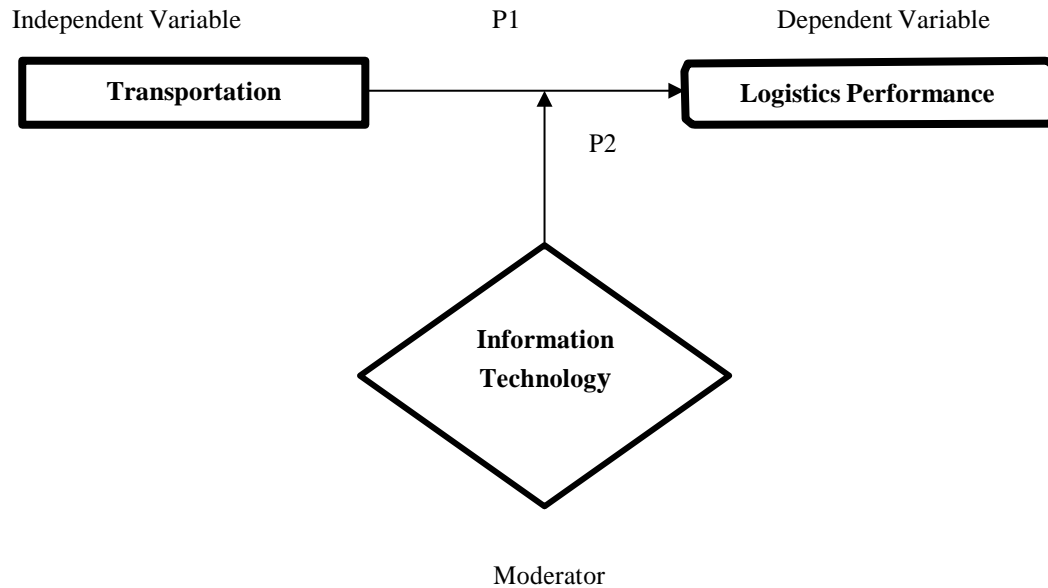


Figure 1: Conceptual model of transportation logistics firm

4. Conclusion

The growth of aquaculture industry in the whole world has increased the demand of logistics services especially for roads logistics transportation. These demands has created congestion, which then disturb the firm performance by delivery time delay and increasing in costs. Therefore, in order to overcome this situation and maintain the effectiveness and efficiency of transportation and logistics performance, implementation of IT in the firm's logistics has been recognized can be a vital element to help them deliver goods smoothly. Based to the literatures, among systems that can be applied are basic and advanced technologies such as internet, GPS, EDI, ERP and RFID. More of firms in developed and less developed countries has implemented those technologies and found to have good influence on their firm performance. In addition IT implementation as a moderator, this study is going to examine relationship of transportation and logistics performance since previous studies showed that over the past few years, the transportation industry has experienced increased competitiveness (Bowersox and Daugherty, 1995; Davies et al., 2007). Since there is still little research testing the moderating effect of IT in logistics firm, this study is going to fill this gap, especially in the Malaysian context. Not only in the logistics field, can this conceptual model also be used in other sectors like manufacturing and agriculture in the future.

5. Future research

Since this is a conceptual paper, the future research should consider this model. This can be done by using primary data collected from the transportation logistics firms in any desired area of study. Nevertheless, this developed conceptual model is not limited to logistics sector only, but it also can be applied to any field as IT nowadays is widely used as an enabler for many groups of performance.

Moreover that for the future research, researcher can consider other additional construct in this model to see their relations on the logistics performance. Also, next researcher is also welcomed to conduct more research in this scope in Malaysian perspective since there is only little studies done and therefore academic world hunger for the literatures in the context of our country, Malaysia.

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