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Factors Affecting Logistic Supply Chain Performance: Mediating Role of Block chain Adoption

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Abstract:
Purpose:The study explores the factors associated with the structure of the company to adopt blockchain in the logistics supply chain (LSC). Also, itdiscusses the relationship betweenfirm IT capacity, staff service quality and e-logistic in the LSC performance. Furthermore, this studyconstructs a theoretical model and demonstrate the effect of blockchain adoption in logistic supply chain performance (LSCP).

Importance of the study:This study contributes to the formation of knowledge by developing a comprehensive framework to enhance logistics supply chain performance in the logistic industry. Therefore, the current study is useful for automated logistics companies to alleviate supply chain performance with e-logistics.

Theory: The Underpinning theory of this study is the unified theory of acceptance and use of technology (UTAUT 2). In this study, reference made to innovation in the adoption of firm IT capacity. Also, the researchers used slightly different factors in E-logistic, ITcapabilities, and staff service quality in LSCP.

Methodology:The current research study was based on a descriptive design and followed by quantitative research. Quantitative research is one of the best ways to accept or reject a hypothesis. The sampling method was used to collect data from all of Malaysia through a cross-sectional study.

Originality:This is one of the latest studies on the logistics supply chain performance. This research demonstrates the blockchain adoption effect on IT capacity, staff service quality and e-logistics

Keywords: *Blockchain,E-logistic; Logistic supply chain performance*

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1.1 INTRODUCTION

In the current decade, the e-logistics andblockchain have increased dramatically (Hamid et al., 2018; Samander et al., 2017; Miraz, Hasan & Sharif, 2018). Electronic logistics consists of several tools used by companies that can be accessed online (Soares et al., 2017). These tools consist of many electronic platforms, web portal, electronic catalog, transaction systems, data stores, communication tools and presentation system, as well as the purchase and packages of many other planning programs, supply chains, digital maps and e-learning systems (Barcik&Jakubiec, 2012; Joseph &Shihu, 2017). Several logistics studies have highlighted many potentials (Cichosz et al., 2017; Hu et al., 2016; Le et al., 2018) in the performance of a logistics company, especially in Malaysia (Miraz, Molla, Habib & Majumder, 2016). Therefore, the current study is one of the attempts to close this research gap by examining the performance of an electronic logistics and blockchain adoption in the logistic supply chain in Malaysia (Abdullah et al., 2019; Miraz et al., 2019). The e-logistic market in Malaysia is a not stable and logistic industry with

many problems (Shamsi and Syed, 2015; Ristovska, Kozuharov and Petkovski, 2017). Therefore, the logistics industry in Malaysia lacks a comparison with other developing countries such as China, India and Vietnam (Hameed et al., 2018; Xiaomin& Yi, 2017). The most prominent problem in the Malaysian logistics industry is the poor quality of the service, no adoption of blockchain and farm IT capacity integration in LSCP.

The quality of the staff service positively affects e-logistics (Hua & Jing, 2015; Miraz, Kabir, Habib & Ahmed, 2019). The services of automated logistics companies, such as behaviour and communication, are not enough to fulfil the logistic chain. In addition, the corporate IT capacity does not represent the complete product and price information, especially unrest of blockchain (Miraz and Habib, 2016). Besides, the availability of blockchain increases satisfaction and improve the LSCP in the logistic industry (Kausar, Garg and Luthra, 2017; Albasu&Nyameh, 2017). However, its lack of availability increases logistic performance. Therefore, the follow-up of the required products also affected the company' logisticssupply chain performance (Kidane and Sharma, 2016; Shamsi and Syed, 2015). These problems affectlogistic performance from buying something through e-logistics (Srinath, 2017; Hameed et al., 2017). Monitoring is mainly in the logistic process chain on the status of the requested goods form consumer. An inadequate tracking system in Malaysian logistics companies creates disappointment among customers (Anand & Grover, 2015). All these problems reduce the level of blockchain adoption in the logistic supply chain, which leads to a reduction in sales and negatively affects the company's logistics performance (Osasuyi&Mwakipsile, 2017)

However, there is the possibility of overcoming all these problems and improving the performance of the company's electronic market through IT and blockchain capabilities (Hameed, 2018a). Most companies now invest in tracking web-based information because they have certain advantages (Bashir, Ahmed& Hassan, 2019). Therefore, the issue of monitoringaddressed through IT (Joseph &Shihu, 2017). However, the company's IT capacity is more important for better customer management, which can capture the public information system and electronic payment (Anyanwu et al., 2016; Basheer, KhorramI& Hassan, 2018). In addition, the quality of service personnel can also improve through the company's IT capacity and staff service quality (Basheer, Hussain, Hussan&Javed, 2015); Chaudhry, Habibullah&Nahr, 2018).

1.2 OBJECTIVE OF THE STUDY

The foremost objective of this study is to investigate the performance determinants of the logistics company in Malaysia. However, to achieve this primary objective, study the following secondary objectives, as described below;

1. Examine the effects of E-Logistic performance in the logistic supply chain.
2. Examine the mediation role of blockchain and logistics supply chain performance (LSCP).
3. Examine the intermediate role of service quality, e-logistic and blockchain.

1.3 SIGNIFICANT OF THE STUDY

Therefore, this study contributed to the knowledge group by closing the literacy gap through the company's logistical capacity and IT service facility. This study presented the company's IT capacity as a variable and blockchain as a mediator to solve various problems related to the quality of employee service and traceability. Therefore, the study is of fundamental importance for professionals and e-logistics companies to improve their LSCP by developing the productive capacity of information technology.

1.4 REVIEW OF LITERATURE

The logistics representthe external image of the staff and communication with the client, and personal service content can have a significant impact on the perception of e-logistics (Miraz, Saleheen& Habib, 2017; Tanoos, 2017; Miraz et al.,

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2019). The quality of the logistics staff's service concerning their customers, image, attitude and communication helps shape the overall quality (Wang & Lu, 2016; Miraz, Hasan & Sharif, 2018). Ensuring the distribution of logistics refers to the ability of company personnel to confirm the quality of services (Benfang& Feng, 2014)

The supply chain performance is the service satisfaction form user and logistic chain. The best logistic chain comparison made by customers between their expectations about the service and their perception of the way it performed (Miraz, Kabir, Tuhin& Majumder, 2019). According to this concept, the logistic chain depends on the production and process, and the concept of quality of service based on blockchain adoption and interactive service quality. After that,Sechuz et al. (2017) presented a deviceservice quality model (Miraz, Kabir, Habib &Alam, 2019). It has a significant impact on customer satisfaction, which improves the company's performance blockchain and e-logistic. According to Khan et al. (2013), staff service quality often includes an attribute (Paulraj, Chen &Blome, 2017). This feature linked to the company's automated logistics staff that has an attitude and an external image of staff and firm IT capabilities (Maldonado-Guzman, Marin-Aguilar & Garcia-Vidales, 2018). The quality of the staff service generally reflects whether the staff tool and the attitude of the staff regarding service and communication capabilities effectively meet the necessary quality needs (Miraz, Hassan &Cherif, 2019; Marovi, Ardalan&Tabaradhi, 2017)

Imran et al. (2018) studied the quality of service, the different standard evaluation characteristics and discovered that it had a significant impact on profitability and LSCP. In addition, Imran et al. (2019) conducted a study on the purchasing logistics network to examine the rating system of the customer satisfaction and increases logistic performance (Nze, Ogwude, Nnadi&Ibe, 2016). The authors found that several logistics services, blockchain are secondary indices regarding customer satisfaction with e-logistics (Kidane & Sharma, 2016). Therefore, the quality of the staff service is anessential element to improve logistics that automatically improves the logistic performance of the company (Wang &Lalwani, 2007). According to the results of Hua and Jing (2015), the quality of service of employees has a healthy and positive relationship with blockchain with electronic logistics (Mowlaei, 2017). Therefore, the quality of staff service plays a vital role in electronic logistics practices for logistic supply chain performance (Wang, Gunasekaran, Ngai &Papadopoulos, 2016). It directly affects customer satisfaction that automatically affects the performance of many electronic logistics companies (Andries, Debackere&Looy, 2013).

Table 1. *Blockchain-base supply chain start-ups*

	Main Goal	**Blockchain Type**
Ambrosus (Kirejczyk et al., 2017)	Ensuring the origin, quality, compliance and proper handling of food and pharmaceutical tracked product	Public: Ethereum blockchain Private (for testing): Ambrosus Blockchain
Ascribe (McConaghy& Holtzman, 2015)	Web-based solution, to track, record and verify ownership, in the digital art market. All the digital contents shared with artist and clients	Public: Bitcoin Blockchain
Blockverify (Blockchain-Based Anti-Counterfeit Solution)	Identify counterfeit goods, stolen merchandise and fraudulent transactions by introducing blockchain into the supply chain. Used for luxury and pharmaceutical items	Public: Bitcoin Blockchain
Chronicled (Registry, 2016)	Protect goods from fraud and tampering	Public: Ethereum blockchain Future work: implement their private blockchain
OwlChain (OwlChain, 2017)	Build a trusted ecosystem between the producer and the customer, by	Private: AMIS blockchain based on the Ethereum technology

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	using public and transparent information Mainly adopted in the food industry	
Origin (Blockchain: the solution for transparency in product supply chains, 2015)	Tracing back and verifying the origins, attributes and ownership of a specific product	Public: Ethereum Blockchain
Modum (Modum white paper Data Integrity for supply chain operations powered by Blockchain Technology, 2017)	Track and trace pharmaceutical products in a secure way that meets all the requirements imposed by good distribution practice (GDP)	Public: Ethereum Blockchain
Everledger (Introduction to the digital vault of the future, Everledger, April 2015, 2015)	Tracking and protecting valuable assets (such as diamond) from fraud, trafficking and theft	Public: Ethereum Blockchain Private: Hyperledger Blockchain
Verisart (VERISART, 2015)	Certifying, documenting, verifying and tracking artwork ownership	Public: Bitcoin Blockchain
TrustChain (Initiative, 2018)	Tracking and authenticating Jewelry such as diamonds	Public: IBM Blockchain based on the Hyperledger Fabric

1.5 THEORY

The (UTAUT 2) has been extensively applied as a complementary theory in studying supply chain technology adoption (Kausar et al., 2017; Venkatesh, Thong & Xu 2012). In this study, the innovation referred to the supply chain technology adoption. Besides, researchers have used slightly different IT capability factors, which consists of IT infrastructure, IT personnel, IT knowledge, and IT reconfigurability (Kucukkocaoglu& Bozkurt, 2018). These are used to explain the extent of use and usefulness of supply chain blockchain adoption in an organisation (Kausar et al., 2017) and factors affecting supply chain technology adoption (Kimengsi&Gwan, 2017). Keep in mind of all these facts, and the study has the following objectives to be fulfilled within the context of retail supply chain sector of Malaysia (Lan & Zhong, 2018; Mosbah, Serief& Wahab, 2017).

1.6 THEORETICAL FRAMEWORK

In this section, we describe the theoretical framework

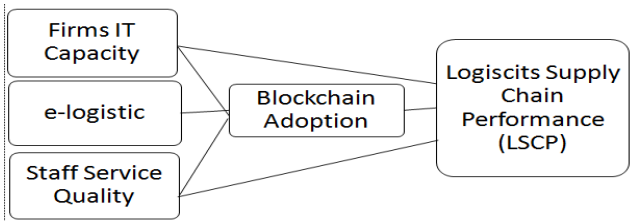

Figure 1 Theoretical Framework

1.7 HYPOTHESIS

H1 Firms IT capacity has a positive relation in LSCP in the logistics industry in Malaysia.

H2 Firms IT capacity has a positive relation in blockchain adoption in the logistics industry in Malaysia.

H3 e-logistic has a positive relation in LSCPin the logistics industry in Malaysia.

H4 e-logistic has a positive relation in blockchain adoption in the logistics industry in Malaysia.

H5 Staff service quality has a positive relation in LSCP in the logistics industry in Malaysia.

H6 Staff service quality has a positive relation in blockchain adoption in the logistics industry in Malaysia.

H7 Blockchain adoption has a positive relation in LSCP in the logistics industry in Malaysia.

1.8 DATA ANALYSIS TOOLS

Thus, 357 questionnaires distributed to the administrative staff of electronic logistics companies in Malaysia of 287 questionnaires, and 217 returned. Of these 217, all 27 questionnaires were incomplete and excluded from the study. Therefore, 190 questionnaires were used to analyse the data. The response rate after data entry was 76.98%, suitable for follow-up analysis (Akter, Wamba& Dewan, 2017). Finally, Smart PLS excluded as a statistical tool (Imran, Hamid &Aziz, 2018b; Zhou, Lu & Wang, 2010; Hair, Sarstedt, Hopkins &Kobelweiser, 2014).

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1.8 RESEARCH ANALYSIS AND RESULTS

In the first step of the data analysis, reliability and validity. We also test the alpha reliability, and vehicle reliability examined. The Cronbach alpha value was considered a threshold level of 0.72. In addition, following the instructions of Hair and Lukas (2014), they stated that a threshold level of 0.70considered for composite reliability. In this study, the reliability of the alpha and Cronbach compound is more than 0.7. Besides, the load factor and the AVE were examined to determine internal consistency and convergence validity. The load factor must be greater than 0.5 (Hair et al., 2010), and the AVE must be greater than 0.5 (Hair & Lukas, 2014). In the present study, it shows that the load value of the factors and AVE is more significant than 0.5.

1.9 FINDINGS

This study examines the impact of employee service quality, website design and electronic tracking system on the company's electronic logistics performance. Furthermore, the mediation role of the blockchain and the intermediary role of ICTs examined. It discovered that the quality of the service, the firm IT capacity and the e-logistic have a great relationship with the company's performance in the field of electronic logistics. Therefore, find the value of t-value, respectively. Positive values of 0.287, 0.078 and 0.123 found for these direct relationships between the quality of service of the employees, the service quality, respectively, with the electronic logistic performance of the company. The positive value illustrates the positive relationship between these three variables and the logistics performance of the company. It shows that the excellent quality of the service, the firm IT capacity and a well-managed electronic tracking system have a significant positive relationship with the performance of the electronic logistics companies. The improvements in these three elements will automatically improve the company's electronic logistics performance. Moreover, electronic tracking had a moderate effect of 0.149. However, the quality of staff services and blockchain adoption affected 0.047 and 0.039, respectively.

1.10 DISCUSSION AND CONCLUSION

This research was conducted to address the problem of low performance of the logistics industry in Malaysia (Taqi, Ajmal & Ansari, 2018). This low performance based on the low quality of the service of the personnel, the design of the monitoring system and the traceability by the companies of electronic logistics, innovation, electronic monitoring and collaboration (Nazal, 2017). Therefore, to solve this problem, the current study presented the company's capacity for ICT and ICT. Data collected from the administrative staff of the electronic logistics companies. All respondents selected from Malaysia (Mesbah, Serif & Wahab, 2017).

Finally, the study revealed an excellent quality employee service, IT capacity system and had a significant impact on the performance of electronic logistics companies (Nasiri, Davoudpour& Karimi, 2010). Besides, it revealed that the company's IT capacity had contributed significantly to improving the quality of staff service and web design. Functional IT capacity provides a better communication system between employees, customers, employees and employees that can improve overall performance (Stevens & Johnson, 2016). A sound IT system is a mandatory element of website management in a well-managed design that can attract customers. Besides, the electronic tracking system canimprove through IT capacity in LSCP. Customers can track the products ordered through the Internet through a rightblockchain adoption. Therefore, the problem of electronic tracking can solve through better information communication technology. Therefore, electronic logistics companies must focus on the IT capacity of company performance. A well-managed IT system can solve many problems and improve the overall performance of the logistics industry.

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Appendix A

Table A1

Measurement Items

Variables	Items	Adapted from
Staff Service Quality	The level of service quality I receive from logistic industry ishigh.	Dabholkar (1996) and Shamdasani et al. (2008)
	The quality of service I receive from the logistic industry is excellent.	
	The logistics industry provides a high level of service quality.	
	Staff service quality is very much efficient in logistic supply chain	
Blockchain Adoption	I believe the logistics supply chain need proper blockchain adoption	Puschel et al. (2010).
	logistic supply chain performance needs proper blockchain knowledge	Zhou et al. (2010).
	User manual to enhance the productivity of logistics supply chain	
	Logistic supply chain management need user guideline	
	Organisations stakeholder need proper adaptability on blockchain adoption	
Firm IT Capacity	I have the resources necessary to use e-logistic in the logistic supply chain.	Venkatesh et al. (2012).
	I know necessary to e-logistic in the logistic supply chain.	
	Logistic supply chain performance is compatible with other technologies I use.	
	I can get help from others when I have difficulties using change e-logistic for LSCP.	
e-logistic	I have the resources necessary to use e-logistic in the logistic supply chain.	Venkatesh et al. (2012).
	I have the knowledge necessary to e-logistic in the logistic supply chain.	
	e-logistic is compatible with other technologies I use.	
	I can get help from others when I have difficulties using change e-logistic.	
Logistic Supply Chain Performance	My organization has achieved high customer satisfaction through the supply chain.	Ul-Hameeda et al. (2019).
	With organized information, my organization has increased process transparency.	
	With organized information in the supply chain, it reduces errors in work processes in my organization.	
	Good supply chain process reduces work redundancies.	
	Good supply chain process reduces administration cost.	
	My organization can attribute high return through effective supply chain process.	

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