Determinant Factors of Logistic Information Technology (LIT) Adoption by Logistic Service Providers (LSPs) in Malaysia : A Review

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Abstract

Purpose- This paper aims to identify the determinant factors of Logistic Information Technology (LIT) Adoption by Logistic Service Providers (LSPs) in Malaysia. Many LSPs in Malaysia however have not realized the need to employ technology in their operations and haven't implemented information technology and aligned their strategies with the changes in technology. Technology has been used as competitive tool to again competitive edge against competition and in most instances redesigning the sales process. With these developments, efficiency in service delivery has been key in pushing many organisations towards implementation of computer systems. Logistic Information Technology is where LSPs implement various logistics systems is one of the technologies implemented towards improving service delivery. The purpose of this study is to understand factors affecting the implementation of LIT adoption by LSPs in Malaysia. This research was guided by TOE model in identifying factors determining LIT adoption by LSPs in Malaysia. PLS-SEM is used to analyse the relationship of each construct using the structural equation modeling. This research concludes a need for LSPs to further understand the importance of LIT and how it can shape their operations towards improving service delivery.

Keywords: Determinant Factors, TOE Model, LIT Adoption, PLS-SEM, LSPs

1. Introduction

The logistic industry is the backbone of Malaysian economy and Malaysia are moving towards Industry 4.0. The fourth industrial revolution, Industry 4.0, the name given to the latest evolution in the digitisation and automation of manufacturing processes. Industry 4.0 covers the entire value chain, including suppliers, procurement, design, logistics and even sales, resulting in higher productivity and flexibility. The first few countries that initiated Industry 4.0 were Germany, Japan and the United States. These countries recorded a significant level of R&D spending as a percentage of their GDP. In contrast, Malaysia has only recorded 1.30% in 2016. If Malaysia were to successfully move to Industry 4.0, it will need to consider measures to further assist and encourage R&D spending. The success of Industry 4.0 is highly dependent on the capability of the workforce to innovate and apply advanced knowledge and technologies. So, LSPs are being encouraged to invest in ICT systems. This would enable them to undertake complex activities such as managing large orders and inventories, coordinating and tracking real-time delivery and processing returned items.

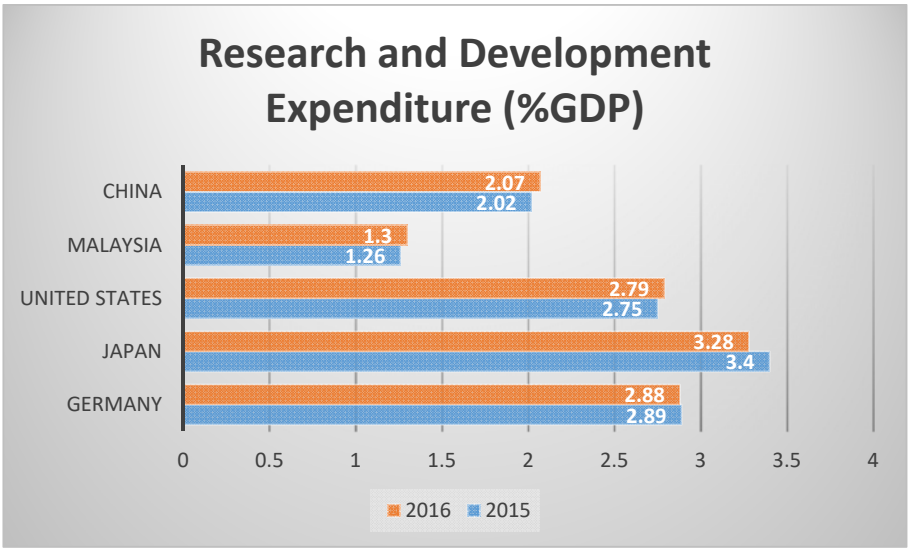

Figure 1 : Research and Develoment Expenditure (%GDP)
Source : The World Bank

Furthermore, The Malaysia logistics industry in has grown exponentially over the years. Computer and information technology has been utilized to support logistics for many years. Information technology is seen as the key factor that will affect the growth and development of logistics. With impressive accessibility, large availability of warehouse space and increased connectivity of logistics locations, Malaysia provides a great opportunity for company expansion. Thus, Information Technology is seen as the key factor that will affect the growth and development of LSPs in Malaysia. Information technology has influenced the overall logistics operations capabilities in terms of productivity and service quality, through on time and accurate information with a minimum costs. In addition, study by Lalonde and Master (1994) revealed that logistics process can be meaningful and successful with the usage of ICT. This will help company achieving competitive advantage in term of costs effective; as a result from reduce cycle time and increase productivity and reliability. Through Logistics Information Technology (LIT), companies can increase competitiveness and sustain competitive advantage. Logistic Information Technology (LIT) refers to the software and hardware that facilitates logistics activities which include order, inventory, warehousing and transportation management (Closs et al. 1997).

2. Literature Review

Many companies have been implementing IS in their respective organisations and re-organising their business processes (Rajagopal, 2002). Computer-based IS mainly depend on IT; consequently, successful IS can be measured by the effectiveness of IT to support an organisation's strategies (O'Brien, 2004). Every business must consider startup costs when implementing any type of information technology system. In addition to the cost of hardware and software, some technology vendors require businesses to purchase user licenses for each employee that will be operating the system. In logistic industry, companies rely on information technology to enable integration, order and transportation management and warehouse management. It also involves the delivery of products or services for the client with assured quality and quantity. The logistics industry also depends on the timeliness in which products are delivered to a destination.

In previous study, Information Technology can have significant effects on logistics operations, facilitating collaboration among supply chain partners, as well as allowing the automation of many routine logistics activities , thus enabling logistics professionals to focus on more strategic issues in logistics management

(Benjamin & Wigand, 1995 ; Handfield & Nichols, 1999). Moreover, the effectiveness of logistics services is depends on adequate information technology systems support (Prahalad & Krishnan, 1999).Through logistics information technology, companies can increase competitiveness and sustain competitive advantage.

2.1 LIT Adoption

Conferring to Hammant (1995), investment in the information technology is good for future business. It brings greater benefits to the logistics companies in future as system enables management to monitor inventory at all locations throughout the organization and help the companies in facilitating the inter-company integration. Based on a study by Gopalakrishnan and Damanpour, 1997, states that LIT adoption processes in an organisation are considered to be successful only if the innovation is implemented in the organisation and individuals continue to use the innovation over a period of time.

2.2 TOE Framework

According to Khasawneh (2008) defines the technology adoption as the first use or acceptance pf a new technology or new product. TOE framework was developed by Tornatzky and Fleishcer (1990) to examine firm-level adoption of various IS/IT products and services. There are three types of contexts in TOE framework a) Technological context b) Organizational context c) Environmental context.

a) Technological context.Technological context is comprised of the variables that influence an individual, an organization, and an industry's adoption of innovations (Huang et. al, 2008 : Claycomb et al., 2005 : Abdul Hafaz et al., 2017)
b) Organizational context. It refers to descriptive measures related to organizations such as firm scope, firm size and managerial beliefs and etc.(Salwani et al., 2009 : Abdul Hafaz et al., 2017)
c) Environmental context. It focuses on areas in which a firm conducts its business operations, with the priority given to external factors influencing the industry such as government incentives and regulations. (Salwani et. al., 2009 : Abdul Hafaz et al., 2017)

3. Methodology

The study initially performed a literature search to identify theoretical models utilised in examining LIT adoption. Based on this search result, the study then identified the most commonly used LIT adoption model. The studies are accessed from the popular databases such as Emerald, EbschoHost, Science Direct using keywords (or combination of keywords) such as technology adoption, technology adoption model, TOE, EDI and etc. The studies based on TOE framework is included to identify relevant variables which can be used to study the adoption of similar technologies in future such as LIT. The study employed quantitative survey with structured questionnaires in an effort to test theory and acquire new knowledge while utilizing statistical methods to validate results . Later, the researcher will use PLS-SEM to analyse data.

The literature review process is presented diagrammatically as follows:
Search latest issues in LSPs→ Selection of keywords →Searching published articles in the databases→ Making choice for relevant papers → Identifying IT adoption models at organizational level → Developing model→ Writing discussion and conclusion.

4. Significance of The Study

World is shrinking day by day with advancement of technology. Customers' expectations are also

increasing and companies are prone to more and more uncertain environment. The IT field is evolving and developing every day. New technologies in computers and mobile devices are shaping the way the world communicates with one another, gets work done, and spends free time. That means using LIT adoption , the entire system is designed so that the company will meet its strategic and tactical goals.

5. Conclusion

In this study, researcher developed and proposed a model for the process of LIT adoption in organisations. The study focused on LIT adoption in organisations. The contribution of the study includes an enhancement of our understanding of LIT adoption and implementation process in organisations. The proposed model introduces several determinants that may influence IS security adoption in organisations, in particular, the association between various technological, organisational and environmental and with LIT adoption.

Besides the LIT adoption model proposed in this study provides important implications for practice as well as for further research. This study has a number of implications for managers and IT researchers. Managers can draw up this model and assess the condition of the LITadoption process and possible factors that would lead to a successful adoption of LIT innovations in their organisations. In terms of future research, the proposed model identified the different factors that influence LIT adoption in the context of technology, organisation and environment.

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7. References

Benjamin, R. & Wigand, R., 1995. Electronic markets and virtual value chains on the Information Superhighway. *Sloan Manage. Rev.*

Bernard, H. R., 1996. Sage Publication.

Claycomb, C. I. K. a. G. R., 2005. Predicting the level of B2B E-Commerce in industrial organization. *Industrial Marketing Management,* 34(3), pp. 221-234.

Closs, D. G. T. a. C. S., 1997. Information technology influences on world class logistics capibility. *International Journal of Physical Distribution & Logistics Management,* Volume 27, pp. 4-17.

Cohen, G. S. I. a. N. P., 2002. Information -communication technologies (ICT) and transport : dpes knowledge underpin policy?. *Telecommunications Policy,* Volume 26, pp. 31-52.

Damanpour, G. a., 1997. A Review of Innovation Research in Economics Sociology and Technolgy. *Omega,* pp. 15-28.

Hammant, 1995. Information Technology Trend in Logistics. *Logistic Information Management,* 8(6).

Helo, P. a. S. B., 2005. Logistics information systems- an analysis of software solutions for supply chain co-ordination. *Industrial Management & Data Systems,* Volume 105 No. 1, pp. 5-18.

Hollenstein, H., 2004. Determinants of adoption of information and communication technologies (ICT) : an empirical analysis based on firm-level for the Swiss business sector. *Structural Change and Economic Dynamic,* Volume 15, pp. 315-42.

Huang, Z. J. B. a. F. M., 2008. A Comprehensive examination of internet-EDI adoption. *Information Systems Management,* 25(3), pp. 273-286.

Khasawneh A., 2008. Concepts and measurements of innovativeness the case of information and communication technologies. *International Journal of Arab Culture, Management and Sustainable Development,* 1(1), pp. 23-33.

Master, J. M. & La Londe, B. J., 1994. Emerging Logistics Strategies : Blueprints for the Next Century. *International Journal of Physical Distribution & Logistics Management,* Volume 24, pp. 35-47.

Ngah, A. H., Zainuddin, Y. & Thurasamy, R., 2017. Applying the TOE framework in the Halal warehouse adoption study. *Journal of Islamic Accounting and Business Research,* Volume 8, pp. 161-168.

O'Brien, 2004. *Management Information Systems.* s.l.:Mc- GRaw HIll/Irwin.

Rajagopal, P., 2002. An innovation-diffusion view of implementation of enterprise resource planning (ERP) systems and development of a research model. *Information & Management,* Volume 40, pp. 87-114.

Salwani, M. M. G. N. M. a. C. S., 2009. E-commerce usage and business performance in the Malaysian tourism sector : empirical analysis. *Information Management & Computer Security,* Volume 17, pp. 166-185.