THE INFLUENCE FACTORS OF E-LOGISTICS IMPLEMENTATION IN CHINA: THE CONCEPTUAL FRAMEWORK

Guo Lisha[1]
Emy Ezura A Jalil[2]
Nizamuddin Bin Zainuddin[3]

School of Technology Management and Logistics (STML), Universiti Utara Malaysia,
06010 Sintok, Kedah Darul Aman
guolisha821414@gmail.com
ezura@uum.edu.my
nizamuddin@uum.edu.my

ABSTRACT

Since from last decade, the e-logistic industry of China facing different issues due to high volume worldwide. To address this issue, this study introducing a framework to mitigate various issues of e-logistic in China. Therefore, the prime objective of the current study is to examine the factors influencing e-logistics in China. To achieve this objective, the current study examines the effect of distribution rate, transit time, payment and information and communication technology (ICT) on e-logistic. It is found that distribution rate and transit time has a significant positive relationship with e-logistic. Moreover, it is found that ICT playing a mediating role between payment and e-logistic. Hence, this study contributes to the body of knowledge by introducing a research framework to enhance the performance of e-logistic, particularly in China. Furthermore, this research study introduced information and communication technology (ICT) by updating the concept of IT (information technology). Thus, the current study is beneficial for the e-logistic industry to enhance the performance by employing the current model.

Keywords: *e-logistics, distribution rate, transit time, e-payment and ICT.*

INTRODUCTION

Logistics plays the central role in delivering the products from manufacturers to consumers through the supply chain (Lee & Seo, 2017). That is the reason why the logistics industry has sharply increased when the global economy has digitized rapidly.After that, traditional logistics services transformed in electronic commerce logistics called e-logistics.

Now, the e-logistic is put into practice all over the world.It involves circulation of goods throughout the industry. Thus it has a considerable effect on businesses (Lee & Seo, 2017) worldwide, particularly in developed nations such as United Kingdom (UK),

Germany and Netherland. From 1999 to 2005, a dramatic growth was recorded in these countries. In United Kingdom (UK), the growth was approximately 720%, in Germany 1060% and in Netherland growth was recorded 1403% (Weltevreden, 2007a). Therefore, e-logistic activities are covering a wider scope.

However, in China, logistics industry development took many years, turnover of this industry, the volume of delivery goods, the road, as well as rail transportation, achieved number one position worldwide, and air cargo volume achieved the second position worldwide (Qu, Mao & Zhou, 2017).

In 2015, China's logistics industry confronted with complex international as well as the domestic environment. As far as international environmental concerned, the world economic environment was slow, prices of most commodities were dropped, and the worldwide trade was a slump. As far as the domestic environment concerned, the overall growth rate of China was continuously slowing down (Jiao, Lee, Wang & Liu, 2017). The author further explained that, in 2015, China's logistics industry show different characteristics of e-logistic growth.These characteristics include slow down of logistic growth, various weak points of China's infrastructure regarding the logistics industry, suffered by international competition and start mergers.All these problems made various issues on China's e-logistics industry.Due to these problems, the overall e-logistics customer satisfaction level and the customer retention were decreased automatically.

Furthermore, latest and new type of logistics has the power factors to promote the development of economic (Xiao, Wang, Lenzer & Sun, 2017).Newest types of electronic commerce logistic (e-logistic) and important factors such as distribute rate, e-payment, transit time, and information communication technology(ICT).(Gunasekaran and Ngai, 2003)E-logistics can be defined as the transfer of goods and services using Internet communication technologies such as electronic data interchange (EDI), e-mail and World Wide Web (WWW).

Different issues related to e-logistic are high distribution rate, long transit time, payment issues, and various issues related to the delivery of goods. That is why different studies in China found various weaknesses in the logistic system (Lin and Ho, 2009). Although the industry of China's e-logistics is on the top of worldwide position, because of these issues, the Chinese e-logistic industry is rough.For most of the companies in China, these issues become the problem which is needed to be solved promptly.

However, as the electronic commerce (e-commerce) business practices are increasing dramatically in recent years in China, several companies are facing a crucial problem of logistics service (Yu, Wang, Zhong & Huang, 2016). These services include distribution rate, transit time, payment.

Hence, increases the distribution cost; ultimately the whole fee increased as the increase in distribution rate, which reduces the customer satisfaction level.As the price of delivery (distribution rate) has a significant influence on customer satisfaction (Xia & Tingting,

2016). Furthermore, personized service and quick expansion in smaller cities lead to a serious problem such as cost control (Yu, Wang, Zhong & Huang, 2016).

As, transit time is a vital logistic factor which impacts on customer satisfaction (Lina, Guiling & Weiwei, 2014). Online market research in China found that logistics service coverage, as well as delivery efficiency, are the primary logistics-related problems (CNNIC, 2014). According to Benfang and Feng (2014), almost 80% of goods delivery is not proper in China.

The logistic development process, analyses the basic concept of electronic logistics, compares the traditional logistics, the information and integration of logistics are not enough, it still has a long road to move forward.For example, ICT level of e-logistic goes especially in payment online.The payment of e-logistic is one of the problematic areas as well, which is a factor influencing customer satisfaction. Approximately 95% of customers are worried regarding privacy or security while using credit cards on the internet, moreover, six out of ten respondents fear about credit card theft (Kim, Tao, Shin & Kim, 2010).The important factor of e-payment is security and this issue of e-payment now becoming more crucial (Cotteleer, Cotteleer & Prochnow, 2007; Linck et al. 2006; Peha & Khamitov 2004; Stroborn et al. 2004; Tsiakis & Sthephanides, 2005). Hence, there is a growing need to mitigate the risks linked with e-payment transaction processes (Tsiakis & Sthephanides, 2005).

In result, customer satisfaction level decrease which affects the overall performance of e-logistic activities. However, it is entirely possible to mitigate these problems by developing a comprehensive framework for e-logistic activities.

Therefore, this study will make a great effort to fill the gap in the literature.Firstly, this study added new indirect factors which are influencing customer satisfaction in e-logistics.It is e-payment which can improve the whole performance of e-logistic activities.Most of the previous studies overlooked the importance of e-payment.Secondly, nevertheless, without information and communication technology(ICT), it will limit the benefits of these indexes.Therefore, the current study updates the concept of IT(information technology) to information and communication technology(ICT), Thirdly, based on previous studies, it introduces three direct factors to reduce the existing problem which are distribution rate, transit time and ICT level are introduced to reduce the existing issues in e-logistics.Fourthly, the current study is combining effect of all these factors(distribution rate, transit time,-payment and ICT)on e-logistic.Finally, e-commerce and logistics show different grounding paths across various regions with diversified built environments (Xiao, Wang, Lenzer & Sun, 2017).Hence, this research conducted a particular region in China which filled the contextual gap in the previous literature.Therefore, the current study struggled to find out the solution of e-logistic problems and filled up various kinds of literature gaps.

LITERATURE REVIEW

E-Commerce and Logistic

It consists of different types, such as business-to-business (B2B), consumer-to-consumer (C2C), business-to-consumer (B2C), consumer-to-business (C2B), consumer-to-administration (C2A) and business-to-administration (B2A). However, business-to-business (B2B) e-commerce has a major contribution to overall e-commerce process, which constitutes over 85% of total e-commerce volume (Turban, Whiteside, King & Outland, 2017).

Logistic is one of the parts of the supply chain process that controls, plans and implements the efficient as well as effective forward and reverse flow and storage of goods, different services, and various information's between the point of origin and the point of consumption to meet requirements of customers (Srinivas & Srinivas, 2008). When the e-commerce becomes the part of the logistic system, then it is called electronic logistic (e-logistic) which provides an easier system for the customer as well as for logistics companies.

E-Logistics

D. Graham, I Manikas, D.K. Folinas (2013)specify the logistics based on information technology solutions, i.e. supporting logistics processes using ICT systems and tools, and the Internet as e-logistic. P. Dura (2002) and B. Śliwczyński (2009)claim that e-logistics is the implementation of logistics processes using modern information tools. On the other hand, M. Fertsch(2008), in his proposal of the concept definition, specifies that e-logistics uses three basic Internet tools, such as e-mail, website, data exchange protocol to accelerate the exchange of information in the logistics supply chain. On the other hand, according to W. Wieczerzycki (2012), e-logistics amounts to a broad use of the latest information technologies to support logistics management of the enterprise, e.g. in the field of production, warehouse management, supporting the cycles of order processing, as well as supporting the board with its business environment, especially supply chains (e.g. procurement, distribution).

E-logistics consists of different tools used by companies accessible through the internet. According to Barcik & Jakubiec (2012), these tools consist of a different electronic platform, internet portal, electronic catalog, transactions systems, data warehouses, communication tools, systems of offers as well as purchasing and different other software for planning, supply chains, digital maps and e-learning systems.

E- Logistics Worldwide
E-commerce logistics grown rapidly in most of the developed nations, for instance, from 1999 to 2005 online sale grew with a tremendous growth of 720 percent in the United

Kingdom (UK), more increase has been seen in Germany which is 1,060 percent, even much more in Netherland equal to 1,403 percent (Weltevreden, 2007a). It is expected that this growth rate continues gradually. However, the online retail sale was only 3.1 percent in United Kingdom (UK), 3.8 percent in Germany and 2.8 percent in Netherland (Weltevreden, 2007a). It indicates that business to business transactions are in huge amount as compared to the business to consumer. The author further explained that, in 2012, the retail online sale was increased by 10 percent and expected to increase over the time.

In the United Kingdom (UK) approximately 540 million parcels were delivered to online customers in 2006 (IMRG, 2006), which was increased with the passage of time. In case of home delivery most case related to failing in delivery was received (Weltevreden, 2008), which dissatisfy the customer. In result, the sales volume of e-commerce will be decreased by the low satisfaction of e-logistic which is significantly important part of the e-commerce transaction.

E-Logistics in China
In China, the logistics industry takes 30 years to achieve development stage, and then the volume of logistic delivery goods, turnover from logistics, air cargo and road transportation achieved the highest rank worldwide (Qu, Mao & Zhou, 2017). However, the overall logistics industry of China is still in an extensive stage which is not sufficiently fit for the social as well as economic development of China (Tencent Institute 2015). Hence, the traditional logistics methods were not adequate for continuous economic and social development of China.It is the reason why logistics was updated based on internet and e-logistic was introduced inevitably.

According to Guo, Zhong & Zhang (2016), transactions of China's e-commerce market reached the level of 16.2 trillion and these transactions was 3.4 times of 2010. Further, in 2015, the income of National Express business was reached 276.96 billion yuan (State Post Bureau data, 2015) which is a quite high increase of almost 35.4%, and the total volume of express business was 2.067 billion, increased with the rate of 48% which achieved the highest ranked worldwide. Below figure 2.1 showing growth rate and total China's logistics value from 2006 to 2015.
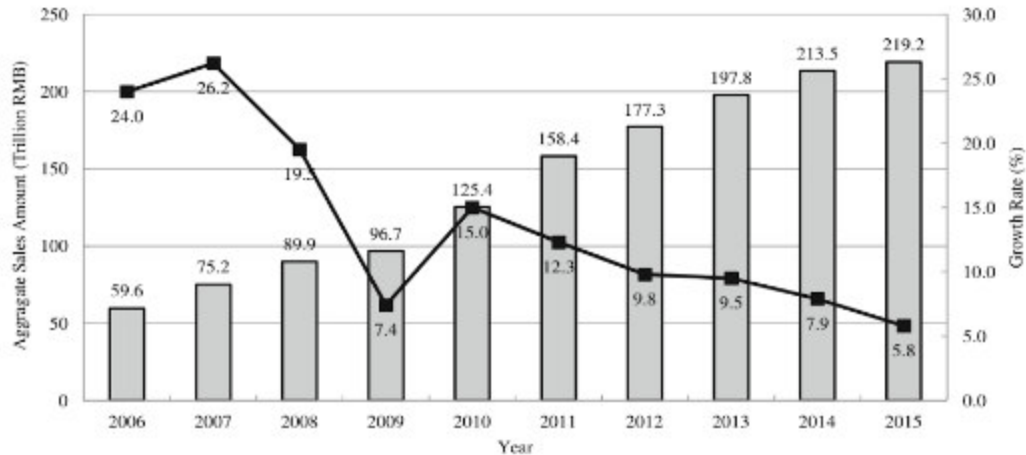
Source: (Jiao, Lee, Wang & Liu, 2017)

However, according to Guo, Zhong & Zhang (2016), because of the inclusive development, logistics service has extremely limited the growth of e-commerce, which has been one of the crucial complaints of different online shopping customer. Logistics suppliers are challenged with the choice of self-distribution or outsourcing for distribution services. For instance, when the size of any business is low, based on cost-effective distribution services will tend to outsource. But when the volume of business increased to a good level, they may adopt self-distribution to ensure the overall quality of different service, so as to win the subsequent orders. Thus, after facing challenges, now the e-logistic of China is growing but still facing problems due to huge transactions.

This growth rate is one of the highest growth rates in the global economy.The Chinese government is struggling to update the newest technology through for e-logistics.Because e-logistic will reduce the whole cost, shorten the time of delivery, provide easy payment and will be the benefit to increase e-commerce transaction both in domestic markets and international markets.Ultimately, it will increase the whole economy in China.

Nevertheless, the logistics industry in China is facing many problems. According to Ta, Choo & Sum, (2000), these issues are including complicated customs procedures, lacking in the delivery reliability, lacking in carrier selection and geographical fragmentation which limits the e-logistic services.To relieve all these problems, China's logistics services should include technological innovation (Lin, 2007) to foster the proper distribution rate, less transit time, e-payment.

CONCEPTUAL FRAMEWORK

E-logistics is known as internet-enabled logistics (Gunasekaran, Ngai & Cheng, 2007) which is spreading worldwide, particularly in China where overall transactions increased in an incredible speed, which touched the maximum level (Guo, Zhong & Zhang, 2016). However, the rapid growth of different online market helping customers with more

secure ways to make their transactions (Evanschitzky, Iyer, Hesse & Ahlert, 2004). Various e-logistic services influence positively on customer satisfaction. These services are including distribution rate, transit time, and e-payment.Distribution rate such as the delivery price of the product has a point impact on customer satisfaction (Xia & Tingting, 2016). Because it is one of the factors which determines the overall prices and overall price of the product has a significant impact on the purchase intention of customers. It is a major factor of the e-logistic system which has an effect on the satisfaction level of customers (Lina, Guiling & Weiwei, 2014).

Moreover, time in order to the actual delivery is also the essential logistic factor which has more impact on the satisfaction level of customer (Lina, Guiling & Weiwei, 2014). More speed of delivery means less transit time which has a positive influence on customer satisfaction. As mentioned by Benfang and Feng (2014) that speed of delivery has an effect on customer satisfaction. Therefore, transmit time has a significant influence on e-logistic customer satisfaction.

Nevertheless, electronic payment has a significant role in e-logistic. Electronic payment is more secure, reliable and convenient way of making payment of e-logistic goods (Kousaridas, Parissis & Apostolopoulos, 2008). As, the security system of electronic payment is one of the vital factor in growth as well as the development of electronic commerce market (Kim, Tao, Shin & Kim, 2010).

Additionally, e-commerce consists of different information communication technologies (ICT) to run various business activities (Rahayu & Day, 2017) and it has a significant influence on e-logistic. It consists of different processes which facilitate buying and selling using computer network (Turban, 2010) which is more convenient. ICT also facilitates payment of goods which is necessary for e-logistic. Therefore, ICT has a significant relationship with e-logistic. Because ICT facilitates the e-payment procedure, that is the reason ICT has a mediating role between e-payment with e-logistic.

Various studies on third-party logistics service providers in China (e.g., Lai et al., 2006; Lai et al., 2008; Lin & Ho, 2009) find out weaknesses in information integration capability, especially among different Chinese companies, which is one of the main limitation in the progress of logistic services. Logistics users in China should have a good system of information and communication technology (ICT) to get access to global connectivity and web-enabled communications (Lai et al., 2008), as mentioned by Ding, Kam, and Lalwani (2012). In the climate of increasing dynamics, poor information infrastructure and little investment found in ICT which effect on customized logistics provision (Evangelista & Sweeney, 2006; Wang & Lalwani, 2007). Furthermore, according to Han et al., (2009), integrated information communication technology (ICT) and integrated logistics management have an indirect impact on the performance of firms. Additionally, as discussed above, e-payment have a significant relationship with ICT and ICT has a significant relationship with e-logistic, therefore, according to Baron and Kenny (1986), ICT can be used as a mediator between e-payment and e-logistic.

Hence, from the above discussion, the research framework of the current study is developed as shown in Figure 1;
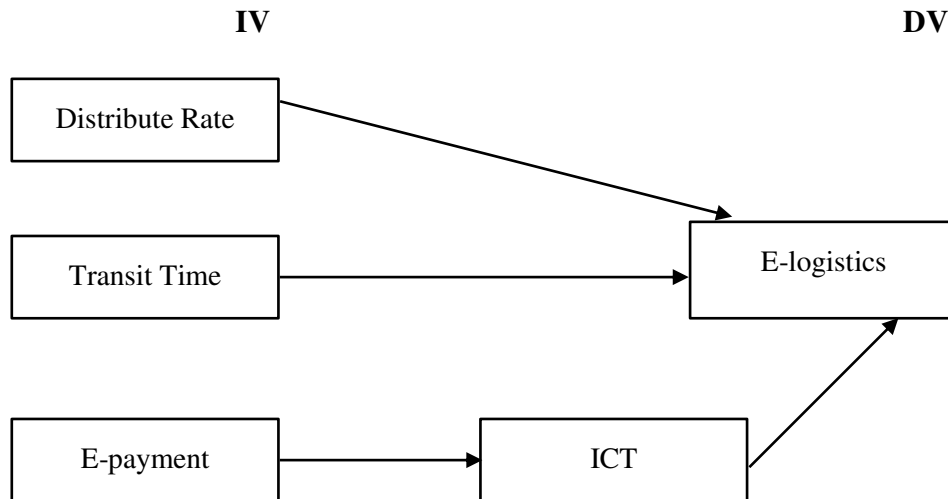
IV   **DV**

Figure 1
Research Framework

The following hypotheses are proposed:

H1:There is a significant relationship between distribute rate and e-logistics.
H2:There is a significant relationship between Transit time and e-logistics
H3:There is a significant relationship between E-payment and e-logistics
H4:There is a significant relationship between Information technology communication (ICT) and e-logistics.
H5:There is a significant relationship between E-payment and Information technology communication(ICT).

CONCLUSION

 This study showed that high distribute rate, transit time, e-payment and ICT(information communication technology) have the greatest impact on e-logistic; and ICT(information communication technology) have a significant relationship between e-payment and e-logistic.Therefore, this paper proposes a research model that distribute rate, transit time, ICT is the direct factor to e-logistic.And payment is the indirect factor of e-logistic. All of these factors have a significant relationship with e-logistic.Moreover, ICT is the mediator-factor between e-payment and e-logistic. Moreover, this study illustrates that high distribute rate, long transit time, the mature ICT level are always important for logistics companies in China, which need to improve in the future.

Furthermore, it shows that it is very important to pay more attention to find out weaknesses in ICT (information communication technology), especially among different Chinese companies, which is one of the main limitation in the progress of logistic services. Because ICT level impacts on e-payment level at the same time, which will influence the process of e-commerce transactions.

Finally, to foster direct factors (distribute rate, transit time, ICT level) and indirect factors (e-payment) is the key for logistics companies to enhance their competitions in both domestic and aboard market.

REFERENCES

Barcik, R., & Jakubiec, M. (2012). e-logistics–aspects of functioning,. *Acta academica karviniensia,* 1.

Baron,R.M.,& Kenny,D.A.(1986).The moderator-mediator variable distinction in social psychological research:Conceptual, strategic, and statistical considerations.*Journal of personality and social psychology*,*51*(6),1173.

Benfang Y., Feng X., (2014). Analysis on logistics service influencing factors of C2C E-commerce customer satisfaction. *MODERN BUSINESS*.33-34

CNNIC (2014). *Market research report on online shopping in China 2013*. Beijing, available at: www.cnnic.net.cn/hlwfzyj/hlwxzbg/dzswbg/201404/ P020140421360912597676.pdf (accessed April 21, 2014).

Cotteleer, M. J., Cotteleer, C. A., & Prochnow, A. (2007). Cutting checks: challenges and choices in B2B e-payments. *Communications of the ACM,* 50(6), 56-61.

Ding, M. J., Kam, B. H., & Lalwani, C. S. (2012). Operational routines and supply chain competencies of Chinese logistics service providers. *The International Journal of Logistics Management,* 23(3), 383-407.

Dura P. E-logistics and advanced planning and scheduling systems APS. In: International Logistics Conference Proceedings. Logistics 2002 – Flexible supply chains - conceptions, experiences, challenges. Poznań: 14-15.05.2002.

Evangelista, P., & Sweeney, E. (2006). Technology usage in the supply chain: the case of small 3PLs. *The International Journal of Logistics Management,* 17(1), 55-74.

Evanschitzky, H., Iyer, G.R., Hesse, J. and Ahlert, D. (2004). E-satisfaction: a re-examination", *Journal of Retailing,* Vol. 80 No. 3, pp. 239-247.

Fertsch M. Fundamentals of logistics. Poznań: Wydawnictwo Instytutu Logistyki i Magazynowania; 2008. p. 77.

Graham D, Manikas I, Folinas DK. E-logistics and E-Supply Chain Management: Applications for Evolving Business. USA: IGI Global, 2013. 3.

Gunasekaran, A., & Ngai, E. W. T. (2003). The successful management of a small logistics company. *International Journal of Physical Distribution & Logistics Management*, *33*(9), 825-842.

Gunasekaran, A., Ngai, E. W., & Cheng, T. E. (2007). Developing an e-logistics system: a case study. *International Journal of Logistics*, *10*(4), 333-349.

Guo, F., Zhong, Y., & Zhang, Q. (2016, December). Study on Logistics Outsourcing Strategy of E-Commerce Based on Revenue Sharing Contract. In Computational

Intelligence and Security (CIS), 2016. *12th International Conference on* (pp. 370-373). IEEE.

Han, J., Trienekens, J. H., & Omta, S. W. F. (2009). Integrated information and logistics management, quality management and firm performance of pork processing industry in China. *British Food Journal*, 111(1), 9-25.

IMRG (2006). *Valuing Home Delivery; A Cost‐ ‐Benefit Analysis, IMRG,* London, available at: www.imrg.org (accessed 24 April, 2006).

Jiao, Z. L., Lee, S. J., Wang, L., & Liu, B. L. (Eds.). (2017). *Contemporary Logistics in China: Reformation and Perpetuation.* Springer.

Kim, C., Tao, W., Shin, N., & Kim, K. S. (2010). An empirical study of customers' perceptions of security and trust in e-payment systems. *Electronic commerce research and applications,* 9(1), 84-95.

Kousaridas, A., Parissis, G., & Apostolopoulos, T. (2008). An open financial services architecture based on the use of intelligent mobile devices. *Electronic Commerce Research and Applications,* 7(2), 232-246.

Lai, F., Li, D., Wang, Q., & Zhao, X. (2008). The information technology capability of third-party logistics providers: a resource-based view and empirical evidence from China. *Journal of Supply Chain Management,* 44(3), 22-38.

Lai, F., Zhao, X., & Wang, Q. (2006). The impact of information technology on the competitive advantage of logistics firms in China. *Industrial Management & Data Systems,* 106(9), 1249-1271.No. 9, pp. 1249-71.

Lee, S. Y., & Seo, Y. W. (2017). Corporate Social Responsibility Motive Attribution by Service Employees in the Parcel Logistics Industry as a Moderator between CSR Perception and Organizational Effectiveness. *Sustainability,* 9(3), 355.

Lin, C. Y. (2007). Factors affecting innovation in logistics technologies for logistics service providers in China. *Journal of Technology Management in China*, 2(1), 22-37.

Lin, C. Y., & Ho, Y. H. (2009). RFID technology adoption and supply chain performance: an empirical study in China's logistics industry. *Supply Chain Management: An International Journal,* 14(5), 369-378.

Lina Z., Guiling Z., Weiwei D. (2014). Empirical Analysis of Factors Influencing Logistic Service Satisfaction of Customer of Taobao. *Technology And Method*,33(5),215-217

Linck, K., Pousttchi, K., & Wiedemann, D. G. (2006). Security issues in mobile payment from the customer viewpoint.*In Proceedings of the 14th European Conference on Information Systems* (ECIS 2006), *Goteborg, Schweden*, 1–11.

Peha, J. M., & Khamitov, I. M. (2004). PayCash: a secure efficient Internet payment system. *Electronic Commerce Research and Applications*, 3(4), 381-388.

Qu, T. T., Mao, T., & Zhou, X. J. (2017). Research about the Development Path of "Internet+ Logistics" under E-commerce.

Rahayu, R., & Day, J. (2017). E-commerce adoption by SMEs in developing countries: evidence from Indonesia. *Eurasian Business Review*, 7(1), 25-41.

Śliwczyński B. E-logistics. In: Kisperska-Moroń D, Krzyżaniak S. Logistics. Poznań: Wydawnictwo Instytutu Logistyki i Magazynowania; 2009. p. 422-430.

Srinivas, T., & Srinivas, M. (2008). The role of transportation in logistics chain. Indian J. Math. Math. Sci.(IJMMS), 4(2), 75-82.

Stroborn, K., Heitmann, A., Leibold, K., & Frank, G. (2004). Internet payments in Germany: a classificatory framework and empirical evidence. *Journal of Business Research,57*(12), 1431-1437.

Ta, H. P., Choo, H. L., & Sum, C. C. (2000). Transportation concerns of foreign firms in China. *International Journal of Physical Distribution & Logistics Management*, 30(1), 35-53.

Tencent Institute (2015). "Internet +" era of exploration and thinking. Beijing: Tencent Tencent Tencent Grou. (in Chinese)

Tsiakis, T., & Sthephanides, G. (2005). The concept of security and trust in electronic payments. *Computers & Security*, 24(1), 10-15.

Turban, E. (2010). Electronic commerce 2010: a managerial perspective. *Upper Saddle River: Pearson Education*

Turban, E., Whiteside, J., King, D., & Outland, J. (2017). Business-to-Business E-Commerce. In Introduction to Electronic Commerce and Social Commerce (pp. 101-135). *Springer International Publishing.*

Wang, Y., & Lalwani, C. S. (2007). Using e-business to enable customised logistics sustainability. *The International Journal of Logistics Management*, 18(3), 402-419.

Weltevreden, J.W.J. (2007a). *Winkelen in het Internettijdperk [Shopping in the Internet Age]*, Nai Uitgevers & Ruimtelijk Planbureau, Rotterdam

Weltevreden, J. W. (2008). B2c e-commerce logistics: the rise of collection-and-delivery points in The Netherlands. *International Journal of Retail & Distribution Management*, 36(8), 638-660.

Wieczerzycki W. E-logistics. Warszawa: Polskie Wydawnictwo Ekonomiczne; 2012. p.10.

Xia W., Tingting Y. (2016). Factors of influencing service satisfaction in express under e-commerce environment ——-as YuanTong Express for example. *Modern Business Trade Industry*,(24),47-48.

Xiao,Z., Wang, J.J., Lenzer, J., & Sun,Y.(2017).Understanding the diversity of final delivery solutions for online retailing:A case of Shenzhen, China.*Transportation Research Procedia*,25, 986-998.

Xueling, Z., E. (2016) Research on SWOT Analysis of Cross-border E-commerce Logistics in Chi na. *LOGISTICS ENGINEERING AND MANAGEMENT,* 38(3),7-9.

Yu, Y., Wang, X., Zhong, R. Y., & Huang, G. Q. (2016). E-commerce logistics in supply chain management: Practice perspective. *Procedia CIRP*, 52, 179-185.