The contributing factors towards e-logistic customer satisfaction: a mediating role of information technology

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CHRONICLE	ABSTRACT
	In this era of industrialization, there is an increase rate of e-logistic services, which has raised the necessity to pay more attention on e-logistic customer satisfaction. E-logistic services spread so rapidly worldwide which overlook the significant segment of customer satisfaction. Therefore, the prime objective of the current research study is to develop a comprehensive framework for e-logistics customer satisfaction. Various studies highlighted the area of e-logistic customer satisfaction, however, in a rare case, literature formally documented the problem of e-logistic customer satisfaction. Hence, less attention has been paid to the aspect of customer satisfaction in e-logistic. To address this gap, four hypotheses are proposed concerning the relationship of low distribution charges (LDC), low transit time (LTT), effective payment method (EPM), information technology (IT) and e-logistic customer satisfaction. An e-mail survey was preferred, and questionnaires were distributed by using simple random sampling technique. The three hundred (300) questionnaires were distributed among the e-logistic users. The results of the current study found that low distribution charges, low transit time, effective payment method and information technology had a positive significant relationship with e-logistic customer satisfaction. Furthermore, information technology found main contributory element between effective payment method and e-logistic customer satisfaction. This study is contributing to the body of knowledge by developing a comprehensive framework to solve various e-logistic problems. Hence, the current study is helpful for e-logistic companies to mitigate e-logistic customer satisfaction problems.

1. Introduction

Electronic commerce (e-commerce) is no longer a new phenomenon in developing countries including Pakistan. However, the penetration and growth of e-commerce are still very low (Shed Khan & Bawden, 2005). Based on this issue, the electronic logistic (e-logistic) services in Pakistan is facing crucial challenges. As, e-commerce and logistics show different grounding paths across different regions with diversified built environments (Xiao et al., 2017). These challenges negatively impact on e-logistic performance. Since Pakistani's e-commerce market is more volatile, thus, a logistic industry facing numerous problems (Shamsi & Syed, 2015).

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Most of the issues facing e-logistic companies include high distribution charges, high transit time and ineffective payment methods. Distribution charges such as the delivery price of the product have a significant impact on customer satisfaction (Xia & Tingting, 2016). High distribution charges increase the overall cost which increases the product price. In Pakistan, high fuel prices as well as other taxes have increased the distribution charges, which is the reason to consider e-logistic customer satisfaction in Pakistan.

Moreover, transit time is an important logistic factor which affects significantly on customer satisfaction (Lina et al., 2014). The time between the order of the customer and actual delivery is basically called transit time. Long transit time dissatisfy the customers which is one of the crucial issues in Pakistan. Dissatisfaction with e-logistic customers influences negatively on e-logistic companies' performance. Nevertheless, apart from distribution charges and transit time, the payment method for e-logistic goods is one of the influencing factors towards customer satisfaction. In Pakistan, the online payment methods are not much appropriate. Electronic payment is a secure, reliable as well as a convenient way of making payment of e-logistic goods (Kousaridas et al., 2008). However, Security of transaction is the most important issue of e-logistic (Peha & Khamitov 2004; Stroborn et al., 2004). The significant factor of electronic payment is security and this issue of e-payment now becoming more critical (Cotteleer et al., 2007; Linck et al. 2006; Stroborn et al. 2004).

Although the security system has been much improved in these days, however, numerous security problems are still remained (Chou et al., 2004; Dai & Grundy, 2007) which threaten the e-logistic customers. Around 95% of customers are concerned with privacy or security issues while using credit cards, moreover, approximately six out of ten customers fear about credit card theft (Kim et al., 2010).

However, e-logistic payment issue could be resolved through better information technology (IT). As a good information technology (IT) system can play a significant role to decrease security issues. Information and communication technology (ICT) plays the role to promote logistics services (Meuter et al., 2000). Information and communication technology (ICT) has an impact on the growth of business within different service sectors such as retail business, transportation, communications, and finance (Pilat, 2003). Thus, information technology is one of the tools to enhance the e-payment services of e-logistic. Hence, in this study, information technology (IT) is used as a mediating variable between effective payment method and e-logistic customer satisfaction. Therefore, the objective of the current study is to investigate the influencing factors of e-logistic customer satisfaction and is divided into two sub-objectives;

1. To investigate the role of low distribution charges, low transit time and effective payment method towards e-logistic customer satisfaction,
2. To investigate the mediating role of information technology (IT) between effective payment method and e-logistic customer satisfaction.
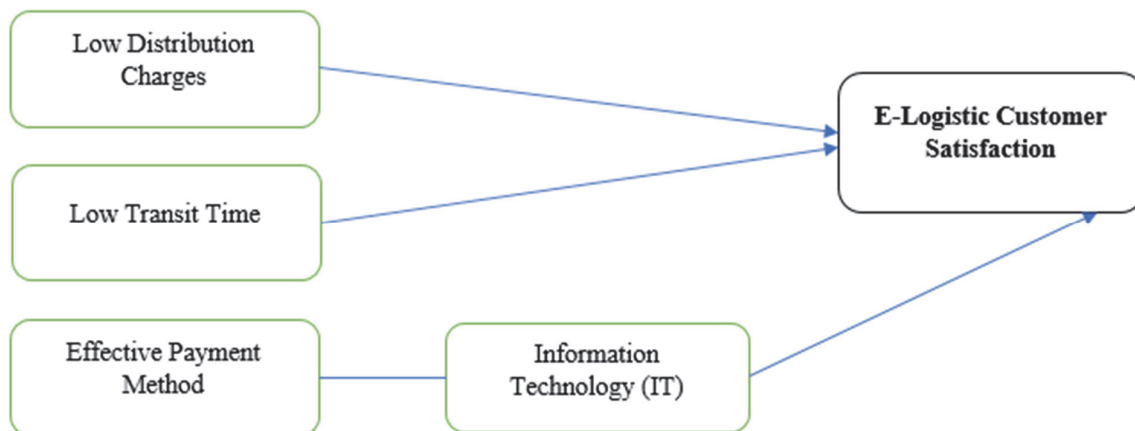

Fig. 1. Theoretical Framework

2. Review of literature

E-commerce represents the utilization of various networked information technologies, particularly internet technology, in different business practices (Rahayu & Day, 2017). It is one of the procedures which consists of transferring, exchanging, buying, or selling different types of products and services by using computer-based networks, usually the internet and intranets (Turban, 2010).

However, logistics is defined as part of the supply chain that plans, implements and controls effectively the flow and storage of numerous services and goods as well as linked information from the point of origin to the point of consumption to encounter the customer necessities (Netro et al., 2016). It is a function by which international and local sub-contractors manage the services by sustaining the quantity, timeliness, quality and cost parameters (Makepeace et al., 2017). When this logistic system handled electronically through internal, similar with e-commerce, then it is called e-logistic. Additionally, the performance of e-logistic is heavily based on customer satisfaction. Customer satisfaction is based on different factors, namely; distribution charges, transit time, payment method and information technology.

Distribution is an important element of any logistic system (Gunasekaran & Ngai, 2003). It comprises distribution of goods to the actual customer. The logistics operations consist of inputting, storing, transporting as well as distributing physical goods to the final customers (Gunasekaran & Ngai, 2003). However, distribution of goods incurs a reasonable fee which normally charged from customers which has the impact on customer satisfaction.

The price of delivery (distribution charges) has a significant influence on customer satisfaction level (Xia & Tingting, 2016). Low distribution charges increase the satisfaction level; however, high distribution charges decrease the satisfaction level among customers. To handle this issue, new channels of distribution can be introduced in e-logistics companies to increase the satisfaction of the e-logistic customer by decreasing the distribution charges.

It is also comprised on the return of goods fee (Yuanxiao, 2014). When the customers are not available at mentioned address, then logistic representative returns the goods to a company which causes extra cost. The customer is also responsible to pay this cost. Additionally, Lina et al. (2014), logistic costs related to distribution are one of the influencing factors to satisfy the customer. Thus, it is hypothesized that;

H$_1$: There is a positive relationship between low distribution charges and e-logistic customer satisfaction.

Moreover, according to Lina et al. (2014), transit time is a vital logistic factor which influences significantly on customer satisfaction. Online market research in China revealed that logistics service coverage and delivery efficiency are the prime logistics-related problems (CNNIC, 2014). Late delivery causes dissatisfaction among customers. Therefore, low transit time is the most useful to enhance the satisfaction level.

Transit time is the key element of the logistics process as well as to influence the customer which include time for responding order, time for handling order by e-merchant, time for delivering product and time to reverse the logistic (Lina et al., 2014). It is ranked as the second important element for firms with an attribute of transit time speed (Pearson & Semeijn, 1999). Thus, this factor cannot be neglected in case of customer satisfaction. There is always a high importance given by companies, especially shippers to transit time (Collison, 1984; McGinnis, 1990) because it is one of the most important aspects of e-logistic services. Low transit time creates a positive image of e-logistic companies which encourage customers to purchase through e-logistic. Thus, low transit time has a positive influence on e-logistic customer satisfaction. Therefore, it is hypothesized that;

H$_2$: There is a positive relationship between low transit time and e-logistic customer satisfaction.

Payment is the most influencing factor of e-logistic customer satisfaction. Easy and reliable payment system always encourage customers to purchase online. E-payment becomes the core element of business operations for companies, however, e-payment has become the most critical problems for successful business and all other financial services (Cotteleer et al., 2007; Hsieh, 2001; Kousaridas et al., 2008; Stroborn et al., 2004). Furthermore, according to Hameed et al. (2018), e-payment has a significant positive effect on e-logistic customer satisfaction. Therefore, e-payment has a significant relationship with customer satisfaction.

Information technology (IT) is the fundamental element of e-payment and e-payment is classified into five categories (Abrazhevich, 2004; Dai & Grundy, 2007; Guan & Hua, 2003; Schneider, 2007) which includes; electronic-cash, pre-paid card, debit cards, electronic checks and other cards linked with customer bank account. All these methods are based on information technology (IT). Therefore, information technology (IT) is a major facilitator of e-logistic customer satisfaction.

In e-payment, security and trust are most important factors which are only possible through effective information technology (IT) system. Customer observations of security, as well as trust during e-payment, can retain the customer by increasing the satisfaction level (Chellappa & Pavlou 2002; Stroborn et al., 2004; Tsiakis & Sthephanides, 2005). Therefore, the role of e-payment is important to satisfy the customer in e-logistics.

Thus, e-payment has a significant relationship with information technology (IT) and e-logistic customer satisfaction. Moreover, from the discussion, it is concluded that e-payment has also a significant relationship with e-logistic customer satisfaction. Nevertheless, it is concluded that information technology (IT) mediates the relationship between effective payment method and e-logistic customer satisfaction. Hence, the below hypotheses are proposed;

H₃: There is a positive relationship between effective payment method and e-logistic customer satisfaction.

H₄: There is a positive relationship between effective payment method and information technology (IT).

H₅: There is a positive relationship between information technology (IT) and e-logistic customer satisfaction.

H₆: Information technology (IT) mediates the relationship effective payment method and e-logistic customer satisfaction.

3. Methodology

The research method is the most crucial part of research. The choice of suitable technique for the analysis should be accordance with the type of problem (Hameed et al., 2017, 2018). The current study is based on quantitative research approach. However, according to the nature of the study, cross-sectional design was selected. A survey was conducted to collect the data from an e-logistic customer in Pakistan.

The 5-point Likert scale was used to collect the data. An e-mail survey was preferred, and questionnaires were distributed by using simple random sampling technique. However, the sample size was selected based on Comrey and Lee (1992) series for inferential statistics. According to this series, "sample having less than 50 participants will observe to be a weaker sample; a sample of 100 sizes will be weak; 200 will be adequate; a sample of 300 will be considered as good; 500 very good whereas 1000 will be excellent." Thus, three hundred sample size was elected in this study.

Firstly, the e-mail IDs were collected by various e-logistic customers. After that, the e-mail was generated along with questionnaire, the purpose of study and instructions to fill the questionnaire. The response rate is given in below Table 1. Moreover, SmartPLS 3 (SEM) was used to analyze the collected data.

Table 1
Response Rate

Response	Frequency/Rate
Number of questionnaires distributed	300
Number of questionnaires returned	170
Number of Useable questionnaires	162
Number of excluded questionnaires	08
Response rate before data entry	56.6%
Response rate after data entry	54%

4. Data Analysis and Results

4.1 Measurement Model Assessment

SmartPLS 3 was used to assess the measurement model. In this process factor internal consistency, Cronbach's alpha, composite reliability and average variance extracted (AVE) were examined. Fig. 2 shows the measurement model assessment. The results of measurement model assessment are given in Table 2. The results show that all the items had a factor loading more than 0.70. However, only two items had the factor loading value below 0.70 but above 0.60. According to Hair et al., (2010), factor loading should be more than 0.50 and all those items should be deleted with factor loading less than 0.50. Internal consistency is achieved as the factor loading is more than 0.50 which confirms the convergent validity. Composite reliability and AVE are also more than acceptable range 0.70 and 0.50, respectively (Fornell & Larcker, 1981; Hair & Lukas, 2014). Moreover, for the discriminant validity used the Fornell & Larcker criteria to confirm the external consistency, Table 3 shows the results of discriminant validity.
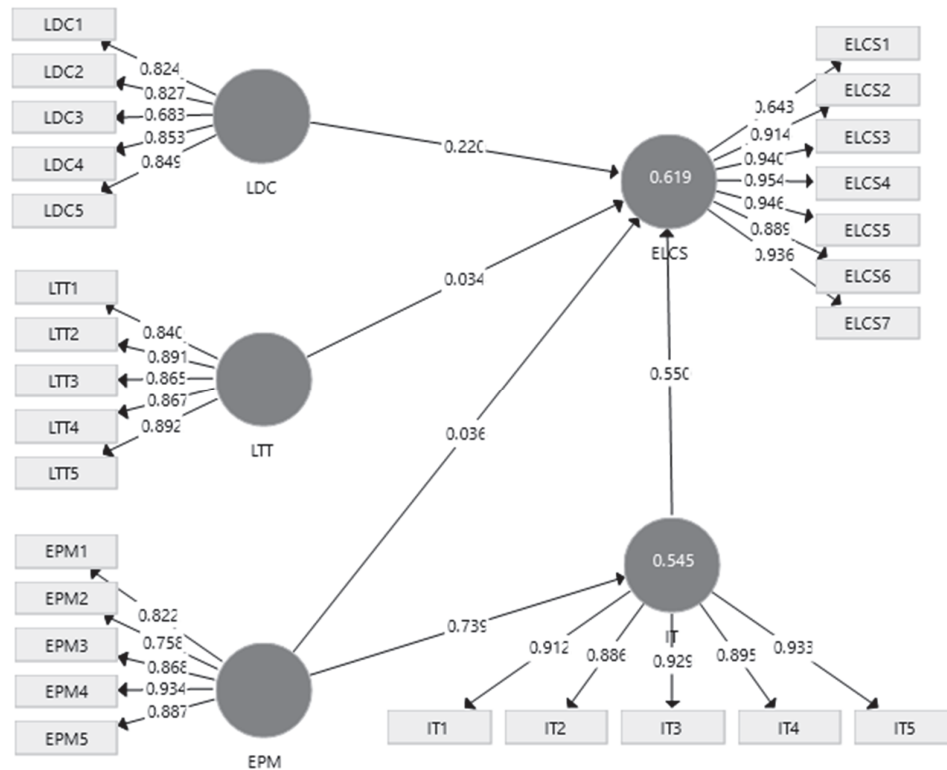

Fig. 2. Measurement Model Assessment

Table 2

Factor Loading, Cronbach's alpha, Composite reliability and AVE

Construct	Indicators	Loadings	Cronbach's alpha	Composite Reliability	AVE
Low Distribution Charges (LDC)	LDC1	.824	.867	.904	.656
	LDC2	.827			
	LDC3	.683			
	LDC4	.853			
	LDC5	.849			
Low Transit Time (LTT)	LTT1	.840	.920	.940	.759
	LTT2	.891			
	LTT3	.865			
	LTT4	.867			
	LTT5	.892			
Effective Payment Method (EPM)	EPM1	.822	.908	.932	.732
	EPM2	.758			
	EPM3	.868			
	EPM4	.934			
	EPM5	.887			
Information Technology (IT)	IT1	.739	.949	.961	.830
	IT2	.912			
	IT3	.886			
	IT4	.929			
	IT5	.895			
	IT6	.933			
E-Logistic Customer Satisfaction (ELCS)	ELCS1	.643	.956	.965	.801
	ELCS2	.914			
	ELCS3	.940			
	ELCS4	.954			
	ELCS5	.946			
	ELCS6	.889			
	ELCS7	.936			

Table 3

Discriminant Validity

	ELCS	EPM	IT	LDC	LTT
ELCS	**0.895**				
EPM	0.649	**0.856**			
IT	0.766	0.739	**0.911**		
LDC	0.685	0.810	0.739	**0.810**	
LTT	0.683	0.815	0.785	0.715	**0.871**

Note: Low Distribution Charges (LDC), Low Transit Time (LTT), Effective Payment Method (EPM), Information Technology (IT), E-Logistic Customer Satisfaction (ELCS)

4.2 Structural Model Assessment

Table 4 shows the measurement model assessment direct effects. It is found that all the direct relationships had t-value more than 1.96 at 0.05 significance level. Therefore, all the relationships are significant. Moreover, β-value shows a positive relationship. Thus, all the direct hypotheses (H-1, H-2, H-3, H-4, H-5) are accepted as shown in Table 4. Moreover, Table 4 shows the effect size (f^2). By the following the recommendations of Cohen (1988), it is found that low distribution charges (LDC) and effective payment method (EPM) had small effect size (f^2). Low transit time (LTT) and information

technology (IT) had moderate effect size (f^2). However, effect size (f^2) of effective payment method (EPM) in case of Information technology (IT) was strong.

Table 4
Direct Results

Hypothesis		β-value	(STDEV)	T Statistics	P-Values	f^2	Decision
H-1	LDC -> ELCS	0.220	0.110	1.999	0.047	0.03	Accepted
H-2	LTT -> ELCS	0.140	0.031	4.499	0.000	0.17	Accepted
H-3	EPM -> ELCS	0.193	0.090	2.141	0.025	0.02	Accepted
H-4	EPM → IT	0.739	0.050	14.707	0.000	0.46	Accepted
H-5	IT → ELCS	0.550	0.132	4.165	0.000	0.15	Accepted

Note: **p<0.1, *p<0.05, ns= not significant (p>.05) (Two Tail)

Furthermore, Table 5 shows the results of measurement model assessment in-direct effects. It is found that mediation effect is significant with t-value 4.293 with positive β-value. Thus, information technology (IT) is a mediating variable between effective payment method (EPM) and e-logistic customer satisfaction (ELCS). Hence, H-6 is accepted.

Table 5
Mediations (In-direct effect) Results

Hypothesis		β-value	(STDEV)	T Statistics	P-Values	Decision
H-6	EPM → IT→ ELCS	0.406	0.095	4.293	0.000	Mediation

Note: **p<0.1, *p<0.05, ns= not significant (p>.05) (Two Tail)

Nevertheless, according to Chin (1998), R^2 above 0.33 is considered moderate. However, this study found the R-value is 0.545 which is moderate. It indicates that all the set of independent variables are expected to explain 54.5% variable in dependent variable.

Nonetheless, Table 6 shows the results of predictive relevance (Q^2). Generally, predictive relevance (Q^2) shows the quality of the model. The Q^2 value should be more than zero (Henseler et al., 2009). Table 6 shows that the value of Q^2 is more than zero.

Table 6
Predictive Relevance (Q^2)

Total	SSO	SSE	Q^2 = (1-SSE/SSO)
E-Logistic Customer Satisfaction (ELCS)	630.000	341.000	0.459

5. Findings

The literature reveals that there are many variables influencing e-logistic customer satisfaction (ELCS). However, the most decisive variables are low distribution charges (LDC), low transit time (LTT), effective payment method (EPM), information technology (IT). In particular, the t-value greater than the threshold value of 1.96 with significance value at 0.05 is acceptable. The path between LDC and ELCS (β=0.220, t-value=1.99, p<0.05), shows a positive significant relationship. Therefore, the current study found a significant positive relationship between LDC and ELCS, supporting H_1. It demonstrates that increase in one variable will also increase in another variable with the same direction.

In respect of LTT and ELCS (β=0.140, t-value=4.49, p<0.05), values show a positive significant relationship between two constructs, further beta indicating that 14% contribution of LTT. Thus, there is a significant positive relationship between LTT and ELCS, thus providing support for H_2. Thus, it is shown that increase in one variable will also increase in another variable with the same direction. In term of EPM and ELCS (β=0.19, t-value=2.14, p<0.05), results show a positive significance significant

relationship. However, the beta estimate is 0.19 (β=0.19), indicating 19% change and positive in direction. Therefore, there is a significant positive relationship between EPM and ELCS and H_3 is supported. Thus, increase or decrease in one variable will also cause to increase or decrease in another variable.

Furthermore, the values of relationship path between EPM and IT (β=0.73, t-value=14.70, p<0.05), show strong positive significant relationship. The values of beta indicated a 73% contribution of EPM to increase the IT level in a positive direction. Therefore, there is a significant positive relationship between EPM and IT, H_4 found supported. The last direct relationship between IT and ELCS (β=0.55, t-value=4.16, p<0.05) values presented the strong positive relationship. The beta values show 55% IT will enhance the ELCS. Thus, the H_5 found support. Finally, the mediation role of IT between EPM and ELCS (β=0.40, t-value=4.29, p<0.05), values show a strong mediation role of IT between EPM and ELCS. In respect to mediation type, the current study found the complementary mediation (partial mediation). Therefore, current study results show the IT mediating role between EPM and ELCS, Hence H_6 found support.

6. Conclusion

During this research, it was observed that e-logistic is one of the vital elements for the growth of the economy. It is most significant for the economy of Pakistan. To develop a good e-logistic system, it is mandatory to enhance e-logistic customer satisfaction level, which is a problematic area in the industry of logistics. However, the e-logistic system in Pakistan can be improved through the effective use of low distribution charges (LDC), low transit time (LTT), effective payment method (EPM), information technology (IT). Furthermore, the current study findings show that Information technology (IT) is behaving like a bridge between EPM and e-logistics customers. Information technology (IT) provides the facility to make payment electronically with no time, more secure as well as privacy which increases the satisfaction level of customers. It is quite possible to reduce traceability problems through the better information technology (IT) system. As it provides the facility to investigate the status of e-logistic goods using the internet. Nevertheless, information technology (IT) is helpful to manage information on the website of the e-logistic company. By the help of information technology (IT), it is possible to solve website related problems through providing all information on the website and reduce the complexity of information. Hence, information technology (IT) is one of the promising systems to mitigate different problems and to increase e-logistic customer satisfaction level. It is recommended to the e-logistic companies of Pakistan to invest more in information technology (IT). Therefore, the introduction of the latest regarding low distribution charges (LDC), low transit time (LTT), effective payment method (EPM), information technology (IT) can increase the satisfaction of e-logistic customers.

Future research on this context can be more beneficial for e-logistic companies of Pakistan. The current research study is limited to three problem linked areas, such as low distribution charges (LDC), low transit time (LTT) and effective payment method (EPM). Hence, this research study can be improved by including other problematic areas of e-logistics, such as distribution rate and staff service quality of e-logistic goods.

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