



**The influence of online logistics service mode on
customer loyalty: the moderation effect of signal
credibility and switching costs**

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Abstract

With the fast development of society and technology, customers' demand for homogeneousness is gradually decreasing, while the demand for diversification and customisation is increasing. In this sense, online logistics service mode (OLSM) emerges to better satisfy customers' needs. OLSM is a kind of customised service provided by the online retailer, which consists of several logistics elements such as delivery time, logistics service provider and so on. In particular, it enables customer to choose their preferred delivery time and ways to delivery, as well as decrease customer's perceived uncertainty, which further enhances customer loyalty. The provision of OLSM requires more investment from online retailers and brings more complexity. Although it could enhance customers' loyalty to some extent, many online retailers in China still hesitate to provide such customised service since there is a lack of theory or research to show the mechanism about how OLSM affects online customer's loyalty. Hence, the aim of this dissertation is to examine the relationship between OLSM and e-loyalty, and to seek for how OLSM affects e-loyalty based on signalling theory and relationship marketing theory.

Seven basic hypotheses were tested, as parts of a theoretical model. Data was collected through a questionnaire and statistical analysis software such as SPSS, AMOS and EXCEL was used to analyse the data to check the reliability, validity, and test the proposed hypotheses. The empirical results reveal that OLSM positively influences relationship quality (e-satisfaction, e-trust and e-commitment), and relationship quality positively affects e-loyalty; OLSM positively influences e-loyalty via relationship quality; signal credibility moderates the relationship between OLSM and relationship loyalty, and the mediation effect of relationship quality on the relationship between OLSM and e-loyalty; switching costs moderates the relationship between e-satisfaction and e-loyalty, and the mediation effect of e-satisfaction.

This research contributes to knowledge in several ways. Most importantly, it defines the definition of OLSM and discovers the mechanism about how OLSM affects e-loyalty. In addition, it discusses the moderation effect of logistics service price from the perspective of signalling theory.

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Chapter 1 Introduction

1.1 Background

1.1.1 Customised needs of online logistics services

With the development of society and technology, customers' demand for homogeneousness is gradually decreasing, while the demand for diversification and customisation is increasing. In this sense, the ability of a company to satisfy these customer needs will play a significant role in its competitiveness. Online sales can not only reduce constraints because of product categories, time, and geography, but also shorten the supply chain length through directly making transactions with customers. The online channel is gradually developing into a powerful commodity market, which also becomes a vital approach to satisfy customers' demand for customisation.

According to Maltz et al. (2004), the logistics service, as the critical process for achieving the transaction between an online retailer and the customer, are essential for enhancing a company's competitiveness in the online market. The online shopping platform achieves the information flow and capital flow in the transaction, while the logistics service achieves the physical distribution of the transaction. The ability to satisfy a customer's logistics service demand can not only affect the customer's purchasing decision, but also influence their post-purchasing behaviour, such as complaints, satisfaction, loyalty, and so on (Liu et al., 2008). Therefore, how to satisfy a customer's logistics service demand is becoming one of the critical issues for online retailers.

Compared to the traditional market, customers must wait for an undetermined period to receive the product after an online capital transaction rather than obtain the product simultaneously with the capital transaction. Customers have different requirements for the waiting time. For instance, some customers wish to get the product as early as possible, some customers do not have specific requirements about the delivery time, and some customers wish to get the product at a preferred time. Likewise, customers may have different requirements for the logistics service provider. For example, if the goods are expensive and essential for the customers, they may prefer to choose a perceived good-quality logistics service provider like SF in China.

Therefore, it is vital for online retailers to pay more attention to how to better satisfy customers' customised logistics service demand. In this sense, online logistics service mode, as a kind of customised service, is proposed. Online logistic service mode enables customers to choose their preferred ways of delivery, delivery time, logistics service provider and so on.

The application of Online logistics service mode is mature in America and UK, and most online retailers in the US and UK can meet the relatively higher degree of customised logistics service demand. However, it is not as widespread in the Chinese online market, as only a few online retailers can provide such service. The possible reasons may be the difference in the market environment, cultural differences, the scale's difference, and so on. It is worth noting that the ambiguity of the mechanism of how the online logistics service mode influences customer loyalty is another vital factor.

1.1.2. The influence of customer loyalty on online retailers

Customer loyalty appears to be closely linked with the market competitiveness of the business, which in turn has a significant role in the profit and future development of the business. In the traditional retail market, a 5% increase in customer loyalty can contribute to a 25% to 95% increase in the retailer's profit, while the positive impact of customer loyalty on the retailer enhances in the context of the retail e-commerce market (Reicheld and Scheffer, 2000). Loyal customers can not only bring more sales for the retailers, but also recommend the retailers to their friends. Undoubtedly, the development of the internet and technology makes it possible for customers to provide their recommendations more quickly, which in turn decreases the cost for the company to seek new potential customers. Hence, compared to the traditional market, customer loyalty is much more critical for the online retail market.

However, although online companies know that it is quite crucial for them to develop customer loyalty, it is more difficult for them to maintain a stable relationship with customers compared to the traditional market. On the one hand, the cost for customers to switch from one retailer to another retailer is low, while the possible switching cost for customers in the context of the traditional market is high due to the limitations of factors like geography and

time. In this sense, the online switching cost is low enough to be ignored by the customers usually, and it is common for customers to switch to other online stores. On the other hand, generally speaking, customer satisfaction and trust with the online retailer are essential prerequisites for the development of customer loyalty. However, due to the low barriers to entering online markets and imperfect regulations or policies in the online markets, the quality of products or services cannot be guaranteed. Meanwhile, customers have no insight into the products/services and the process of logistics due to information asymmetry, leading to low trust in online companies. The uncertainty and complexity of online markets increase the difficulty of obtaining customer satisfaction and trust. Nevertheless, once the customer's loyalty has developed, the customer is unlikely to switch to other stores.

Based on the above analysis, the development of customer loyalty has excellent value for online retailers. Yet, how to develop customer loyalty in the online market is a significant challenge for e-retailers.

1.1.3 The impact of online logistics service mode on customer loyalty

According to Toufaily et al. (2013), many factors influence customer loyalty, including product or service attributes, customer characteristics, company or retailer characteristics, environmental characteristics, and website characteristics. The logistics service is gradually becoming an essential factor affecting customer behaviour apart from the price of the product. Rao et al. (2011) note that meeting the needs of the logistics service preferred by customers is the key to developing customer loyalty in the e-commerce market.

Customer loyalty refers to the willingness to maintain a stable relationship with a preferred supplier and to repeat visits or purchases, deciding to prioritise the supplier's website among alternatives (Toufaily et al., 2013). This loyalty is grounded in favourable beliefs and emotions towards the online supplier, regardless of situational influences and marketing efforts that may result in switching behaviour (Toufaily et al., 2013). Online Logistics Service Mode (OLSM), as a kind of customised service, can meet customers' customised needs and satisfy customers' demands, which in turn stimulates customer satisfaction. Moreover, the provision of the selection of preferred time and

logistics service provider for the customer can make the customer feel emotional and psychological concern from the retailer, leading to a high possibility of repurchasing behaviour. Therefore, OLSM is a crucial factor that can help to develop customer loyalty.

However, the implementation of OLSM requires online retailers to invest more resources. For example, the provision of the selection of logistics providers for customers forces online retailers to consider cooperating with different logistics service providers, which disperses a customer's selection and decreases the scale effect. This leads to low bargaining power of online retailers when they cooperate with the logistics service provider. Furthermore, the selection of preferred delivery time also increases the cost and complexity of delivery, since online retailers must invest more to guarantee the punctuality of delivery. Although the implementation of OLSM will definitely increase the investment and complexity of management, the increased value and profit brought by increased customer loyalty may be higher. Online retailers should pay more attention to how OLSM influences customer loyalty in order to formulate more rational logistics service policies in the future.

1.2 Research aim, objectives, and questions

1.2.1 Aim

This dissertation aims to evaluate how online logistics service mode influences customer loyalty in the context of the online retail market, to discover related factors and approaches, providing a solid foundation and theory for online retailers when they formulate logistics service policies.

1.2.2 Objectives

In order to meet the aim of this study, the following objectives are pursued:

Objective 1: Identify the definition of OLSM.

Objective 2: Evaluate the effect of OLSM on relationship quality (customer satisfaction, trust, and commitment) and verify the impact of relationship quality on customer loyalty.

Objective 3: Explore the mechanism of how OLSM influences customer loyalty in detail.

1.2.3 Research questions

In order to achieve the objectives as mentioned above, this study must answer the following questions:

1. What is OLSM?
2. Does OLSM have an effect on relationship quality and does relationship quality have an influence on customer loyalty in the context of the online retail market?
3. Does relationship quality play a mediation role in the influence of OLSM on e-loyalty?
4. Do switching cost and signal credibility play moderation roles in the mediation effect of relationship quality?

1.3 Research contribution

This research explicitly defines OLSM, which is a kind of customised service consisting of several elements of the logistics service. Moreover, it discovers how OLSM affects customer loyalty in the context of e-commerce in China, which practically and theoretically helps to increase the operational management level of the online market in China.

OLSM is a critical factor that distinguishes the online market from the traditional market, which has a significant influence on customer behaviour. In the current online market in China, most online retailers have similar logistics service policies. For instance, they only provide one or two fixed logistics service providers and unfixed and uncertain delivery times, like Taobao, ignoring customers' customised logistics service needs like the opportunity to choose a preferred logistics service provider and delivery time. OLSM is a corresponding product resulting from customers' customised logistics service needs.

In the past, scholars (Rao et al., 2011; Liu et al., 2008; Lee and Whang, 2001 etc.) mainly focused on how e-logistics service quality, logistics performance, or some individual elements of a logistics service affect customer behaviour in the field of online logistics services, ignoring the research about how OLSM, as

the integration of several elements of logistics services, affects customer behaviour and loyalty. For example, Rao et al. (2011) note that electronic logistics service quality (E-LSQ) can play a decisive role in customers' purchase satisfaction and retention. In this study, the author not only defines OLSM, but also studies how OLSM affects customer loyalty based on signalling theory, relationship marketing theory, and previous literature. Through empirical research, the author discovers the ways through which OLSM influences customer loyalty combined with the moderation role of signal credibility and switching cost. The author suggests that online retailers optimise logistics services through integrating different logistics service elements like logistics service provider, delivery time, self-pick-up, and so on. This research not only fills the gap of the lack of research on OLSM, but also provides a solid foundation for online retailers to improve their logistics services.

Also, the author studies the moderation effect of logistics service prices based on signalling theory, which is the different approach from previous research about logistics service prices from the perspective of economics. The present study offers a theoretical foundation for the pricing policy when online retailers set up a logistics service price.

1.4 Thesis structure

The following section describes and outlines the contents of this research. More specifically, it displays the principal purposes of the remaining chapters.

Chapter One: This chapter presents an outline of why this research was conducted, along with the description of the aims, objectives, and questions of the research. In addition, the practical and theoretical contributions of the research are reported and discussed. Finally, an overview of all the chapters in this study and a graphic view of the research procedures are displayed.

Chapter 2: Following by the introduction section, this chapter offers the literature review for the present Master of Philosophy thesis, which helped the author to narrow down the research field and provide a solid foundation for the research. It covers the definition of OLSM, along with some primary aspects of electronic customer loyalty. In addition, it explores the relationships between

customised service and customer loyalty, including the exploration of two variables that may affect the relationships in a particular approach.

Chapter 3: This chapter aims to construct the theoretical research model based on the literature previously discussed in Chapter 2. In addition, several hypotheses are discussed and proposed in accordance with the established theoretical model to be addressed and proved in later chapters.

Chapter 4: This chapter describes the methodological approach of the research in detail in order to achieve the study's objectives and answer its questions. It highlights the rationale concerning choosing the approach to the research, the data collection method, research samples, and the measurement items. More specifically, this study adopts an empirical research method and leans more towards a deductive and quantitative methodology, since all the variables, including OLSM, electronic customer satisfaction, customer trust, customer loyalty, and so on, can be measured through a quantitative approach, and survey questionnaires are used to collect the primary data in this study. In addition, the planned analysis strategies such as correlation analysis, confirmatory factor analysis, and so on are provided, followed by a discussion of the ethical issues associated with the research design.

Chapter 5: In this chapter, a quantitative methodology is used to answer the questions. The data in this part has been collected through survey questionnaires and analysed quantitatively using the Statistical Package for Social Sciences (SPSS) software to clean and screen the data and describe the sample. Structural Equation Modelling (SEM) was used to measure the direct and indirect relationships between the dependent and independent variables through exploring the pathways between variables. The latest version of Amos 24.0, a software package used for SEM, was adopted by the author to perform CFA and SEM to test some of the proposed hypotheses (H1 to H3). Moreover, SPSS was adopted to conduct hierarchical regression to verify the rest of the proposed hypotheses (H4 to H7).

Chapter 6: This chapter mainly discusses the results presented in Chapter 5. More specifically, the possible reasons why the hypotheses are proven or rejected are discussed.

Chapter 7: This chapter concludes the whole thesis and presents the managerial and theoretical contributions. In addition, the study limitations, recommendations, and future directions of the research are described in this chapter. Figure 1-1 below reveals the structure of this thesis.

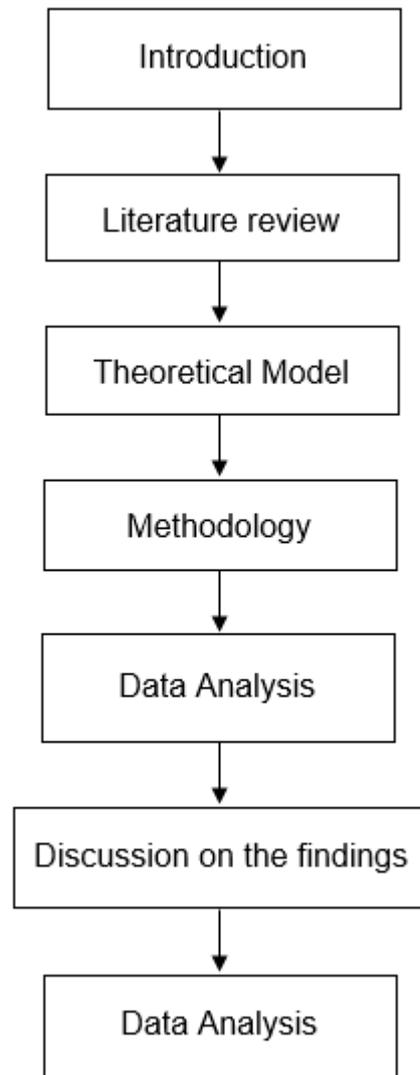


Figure 1-1 The proposed structure of this thesis

Chapter 2: Literature review

This section reviews the literature relating to several topics, which helped to narrow down the research area and provide a foundation for later theory and empirical research. Section 2.1 addresses the online logistics service literature, in which the OLSM is proposed by the author. In addition, section 2.2 focuses on the literature on customer loyalty, in which the definition and components of customer loyalty, as well as the antecedents of customer loyalty, will be introduced. Section 2.3 introduces the relationship marketing theory, followed by the definition, constructs, and outcomes of relationship quality. Section 2.4 defines the switching cost and discusses the influence of switching cost. Finally, signalling theory is introduced in section 2.5.

2.1 Online logistics service

As a significant element of the e-retailing supply chain, logistics services have an essential role in the influence of customer behaviour. During the last two decades, the electronic logistics service quality (e-LSQ) appears to be recognized as an efficient way to obtain and sustain an organization's competitiveness and a strategic issue for long-term success (Parasuraman et al., 2005). E-LSQ plays a critical role in customer online satisfaction (Liu et al., 2008), which in turn has a significant influence on customer loyalty (Bouzaabia et al., 2013). Moreover, Saura et al. (2008) propose four dimensions of logistics service quality, namely timeliness, personnel, information, and order quality. The authors assert that these four dimensions have a tremendously positive influence on customer satisfaction, which further affects customer loyalty. Similarly, Rao et al. (2011) note that e-LSQ can play a decisive role in customers' purchase satisfaction and retention. They further claim that customers who experience low e-LSQ will decrease their order frequency and total order value and face higher anxiety with the next purchase (Rao et al., 2011). However, Lin et al. (2016) found that although e-LSQ contributes to customer satisfaction remarkably, e-LSQ did not indirectly affect customer loyalty through customer satisfaction with logistics service quality, which is contrary to the findings of Saura et al. (2008).

It is worth noting that various elements of logistics services have emerged in the evolution of the e-retailing supply chain, including logistics service providers, the mode of delivery, and inventory management. From the perspective of logistics service providers (LSPs), Xu and Li (2017) indicate that e-retailers can either provide their own delivery service or cooperate with a third-party logistics company to establish a flexible distribution, and the quality and quantity of third-party logistics providers (3PLP) appears to be an issue in e-retailing. Anderson et al. (2011) explain why e-retailers are willing to choose 3PLP, grounded in transaction costs theory and network theory.

There are two methods of delivery, namely customer self-pickup and drop-off. The research by Lee and Wang (2001) demonstrates that the choice of delivery modes is affected by product attributes. For example, customers are willing to pick up their purchased goods in the store when the product has the characteristics of high value and is easy to take. Although the online retailers who provide the choice of logistics service elements will be appreciated by customers, since customers are likely to enjoy a customised logistics service, the online retailers still need to compare the cost to provide such a logistics service and its potential benefit (Mahar et al., 2014).

Most online logistics services are accomplished by 3PLP, and most online retailers just cooperate with one fixed 3PLP, which makes it impossible for online retailers to provide a high-quality logistics service responding to customers' increased customisation requirements. Newton (2011) proposed that customers have different logistics service requirements according to product attributes. Thirumalai and Sinha (2005) note that customers' satisfaction with the order fulfillment changes with the change of product category, and the online retailers must personalize the order fulfillment based on the product category. Ghezzi et al. (2012) divide online logistics service problems into four categories based on product features (value density, product range, obsolescence risk, product-specific needs) and the level of customer service (returns management, order cycle time, punctuality, flexibility). This includes product-side complexity, service-side complexity, high-complexity, and comparatively easy issues.

Esper et al. (2003) posit that displaying the name of the logistics service provider can enhance customers' perceived quality of the logistics service, while Thirumalai and Sinha (2011) found that the customisation of the process of online transactions will influence customer satisfaction with the process of the transaction. Further, delivery service is one ingredient of the process of the transaction, although the authors did not provide detailed elements of a customised delivery service.

Previous studies have examined the importance of online logistics services in the online retail market from the perspective of logistics service quality or performance and some single elements of logistics services. However, there is a lack of research that integrates the elements of logistics services and investigating its influence in customer satisfaction and loyalty. In this sense, the author proposes the new term, online logistics service mode or OLSM, which means that the online retailer integrates several elements of online logistics services to meet customers' specific requirements. The elements of a logistics service are provided in the table 2-1 below. The column 'representatives' shows the online retailers who have provided such service currently.

Table 2-1 Elements of the logistics service

	Elements	Description	Representatives
Forward logistics	Self-pickup	The customer can pick up their purchased items in a nearby offline store or collection point.	Tesco (UK); SuNing (China)
	Delivery time slot	The customer can choose a preferred delivery time slot.	ASDA; Ocado (UK)
	Logistics service provider	Online retailers can cooperate	T-mall; Amazon China

		with different logistics service providers, and customers can choose their preferred logistics service provider.	
Reverse logistics	Self-sent	Customers send their purchased goods back to the address provided by the online retailers.	T-mall
	Exchange or refund in nearby stores	Customers can exchange or refund in a nearby offline store.	Boots, Clarks
	Pick-up	The logistics service provider will collect the goods from the customers' home.	JingDong

2.2 Customer loyalty

2.2.1 Definition of e-loyalty

There is no doubt that customer loyalty occupies a leading place in the contemporary market and plays a significant role in the success of online retailing. Toufaily et al. (2013) note that customers are typically loyal to a store, a brand or goods, an organization, or a company. Initially, most researchers

simplified loyalty as a customer's repurchasing behaviours from the perspective of behaviour. For instance, McConnell (1968) reported the times that customers repurchase the same brands as the measurement of customer loyalty to a brand. Likewise, Neal (1999) defined customer loyalty to a company as the number of times that customers patronise an individual company to enjoy a specific service or buy some products. This is explained regarding the customers' total number of times buying the same services or products. However, in contrast to the views of McConnell (1968) and Neal (1999), Jacoby and Kyner (1973) asserted that it is not convincing enough to explain customer loyalty just from a behavioural point of view since loyalty can be true or false. For example, if there are insufficient companies or products offered for customers, their repurchasing behaviour may not be regarded as real loyalty, since they can switch to other companies or products if there are more choices. Jacoby and Kyner (1973) explained brand loyalty by using six conditions, namely "a biased response, a behavioural response, expressed over time, by one or more decision-making units, where several alternatives are possible, and a function of a psychological process." Similarly, Han et al. (2011) claim that there is a possibility that behaviour loyalty may not capture the actual levels of customer loyalty, since their repurchasing behaviour may not be attributed to their psychological commitment to a specific company or brand through a decision-making process.

Although there are diverse conceptions about loyalty, one of the most common conceptions is that the formation of loyalty is a sequential process that constitutes four stages, including cognition, affection, conation, and action (Toufaily et al., 2013). Taking loyalty to the product as an example, in the first stage, the customer selects a specific product through a series of processes like searching, evaluation, and decision making, thus developing cognition of the product. The second stage, defined as affective loyalty development, contains emotions and satisfaction. It reveals the customer's affective responses associated with the product he bought based on cumulatively satisfying usage occasions. After that, the customer may develop a repurchase or rebuy intention about the product if he shows positive cognitive and affective responses to the product. Fang et al. (2016) agree, and they categorize the

cognitive, affective, and conative loyalty phases as an intentional loyalty phase and define the action loyalty stage as the behavioural stage.

Obviously, loyal customers contribute to a great share of profits for organizations or brands that they usually patronise, especially for e-commerce markets. According to Kunttner (1998), improved symmetric information in the online market made it convenient for customers to switch to other companies or stores, leading to fierce challenges for contemporary online organizations and gradually eroding brand loyalty. Therefore, it is necessary to have a precise and accurate insight into e-loyalty. The table 2-2 below demonstrates several understandings about customer loyalty from different scholars in the context of e-commerce.

In summary, some scholars have regarded loyalty as an intention to maintain a stable relationship with an online company, such as repurchase or revisit intention (Cyr et al., 2008; Doong et al., 2008, etc.). The rest of the authors have defined loyalty as an attitudinal or psychological preference, followed by repeated purchases or visits (Wallace et al., 2004; Huang, 2008, etc.). Toufaily et al. (2013) discuss previous definitions about loyalty and propose their own opinion considering the characteristics of online markets and customer behaviour, which will be used in this thesis.

Table 2-2 Concepts of E-loyalty

Authors	Definition
Wallace (2004)	Attitudinal and behavioural favourable toward to a certain online supplier
Taradar and Zhang (2005)	The possibility of customer's repeated visits on the same websites
Cyr et al. (2008)	The intention to repurchase from or repeated visit the website in the future
Doong et al. (2008)	The intention to repurchase products or services from the same e-retailer in the future

Sultani and Gharbi (2008) Huang (2008)	Attitudinal favourable toward an online organization leading to repeated purchasing behaviour
Yoo et al. (2013)	The degree to which customers are willing to reorder from a preferred online supplier.
Toufaily et al. (2013)	The willingness to keep a stable relationship with a preferred supplier and to repeated visit or purchase, deciding to priority the supplier's website among alternatives grounded in favourable beliefs and emotions toward the online supplier, regardless of situational influences and marketing efforts which may result in switching behaviour,
Liao et al. (2014)	Customer loyalty could be divided into intention loyalty and behavioural loyalty

2.2.2 Measurements of e-loyalty

In the traditional market, the research into customers' loyalty has evolved from a behavioural dimension, followed by an attitudinal approach, and lastly, a composite approach, which combines behavioural and attitudinal dimensions simultaneously (Toufaily et al., 2013). Similarly, scholars take these two aspects into account in their research in loyalty in the context of e-commerce. The table below presents several measurements adopted in previous studies of e-loyalty.

Table 2-3 Measurements of online customer loyalty

Authors	Construct	Items
Lee and Overby (2004); Donio et al., (2006)	Behavioural loyalty	How many times did you patronize your preferred online supplier in the last 12 months?
		The total cost you spent on your preferred online retailer in the last 12 months.

		The number of people to whom you have recommended the website or e-retailer.
		The frequency you purchased from or visited this website or online retailer.
Ponnaolu (2000); Anderson and Srinivasan (2003); Kim et al. (2009)	Attitudinal loyalty	This website is always my first choice when I want to purchase such products.
		I will not change to other websites or retailers as long as the current services continue.
		I am willing to recommend this website/product to my other friends.
		I think this website is really suitable for me.

As discussed previously, behavioural loyalty may not be able to capture the real level of customers' loyalty in e-commerce. Therefore, in order to eliminate the possibility of false loyalty and enhance the validity and reliability of collected data, the author investigates e-loyalty with an attitudinal approach in this thesis.

2.2.3 Antecedents of online customer loyalty

Compared to traditional markets, it is more difficult for customers to develop their loyalty to a certain company or product in the context of e-commerce. Therefore, it is vital to have a clearer and deeper insight into factors that help

to develop loyalty. The table 2-4 shows several antecedents of e-loyalty adopted in various studies.

Table 2-4 Antecedents of e-loyalty

Authors	Antecedents	Technological/Transactional/Relational aspects
Mouakket and Alhawari (2012)	E-service quality, values, satisfaction	Transactional quality
Chiu et al. (2012)	Value, satisfaction, trust, habit, familiarity	Transactional quality
Audrain-Pontevia et al. (2013)	e-satisfaction, perceived acquisition value, transaction value	Transactional quality
Shin et al. (2013)	Site quality, trust, commitment, satisfaction	Technological and relational quality
Carter et al. (2014)	Trust, switching cost	Relational quality
Chen (2012)	e-satisfaction (trust, involvement, commitment as mediators)	Relational quality
Zhang et al. (2016)	Relationship value	Relational quality
Moriuchi and Takahashi (2016)	Product experience, satisfaction, trust	Transactional quality

The review of these articles demonstrated that diversity exists regarding the antecedents of e-loyalty. Indeed, all these antecedents can be found in the

study of Toufaily et al. (2013), who categorize antecedents into five overarching types, including customer characteristics, environmental characteristics, product/service attributes, company/retailer characteristics, and website characteristics. However, Toufaily et al. (2013) do not further study the mediating or moderating role of each factor in the development of e-loyalty. Thus, this thesis will analyse and prove the moderating or mediating role of several factors based on their study.

Previous studies have revealed that the factors mentioned by Toufaily et al. (2013), such as switching cost, customer satisfaction, gender, perceived value, and so on, play a mediating role in customer loyalty. The study of Anderson and Srinivasan (2003) demonstrates that although e-loyalty is affected by e-satisfaction to some extent, the relationship between them is moderated by individual customer-level factors like convenience motivation, purchase size, and inertia, and business-level variables including trust and perceived value. Based on 1,211 effective returned questionnaires, the authors found that convenience motivation and purchasing size will positive moderate the relationship between e-satisfaction and e-loyalty, while inertia plays a negative moderating role in the relationship. In addition, Sanchez-Franco (2009) collected data from 815 online shopping customers in Spanish and state that gender can moderate the relationship between relationship quality and customer loyalty. The results further show that “the influence of trust on commitment and commitment on loyalty was significantly stronger for females than males, while the effects of satisfaction on commitment and the trust on loyalty were significantly stronger for males.” Paramaporn et al. (2016) studied the moderating role of age in the influence of network quality and customer service on customer satisfaction, commitment, and customer loyalty through analysing data obtained from 1,989 internet users. Studies about switching cost reveal that it has both moderating (Lam et al., 2004; Lee et al., 2001) and mediating (Aydin and Ozer, 2006; Chuah et al., 2017) role in the satisfaction-loyalty relationship. Moreover, Carter et al. (2014) tested 299 repeat users in terms of online travel services and found that trust has a higher influence on e-loyalty compared to switching cost, and the trust can also influence the effect of switching costs on e-loyalty. In relation to customer loyalty, other scholars

like Chen (2014) and Samar (2016) also studied the moderating role of culture in the relationship between service quality and e-loyalty and the moderating role of brand image in the relationship between customers' perceived value and customers' perceptions of public relations respectively.

Other factors such as customer satisfaction, commitment, and trust play mediating roles in customer loyalty. Kassin and Abdullah (2008) propose that customer satisfaction and trust can mediate the relationship between website service quality and customer loyalty based on the analysis of 241 online shoppers. Likewise, Kim (2009) analysed data from 182 online customers and found that the reliability of e-retailer, website design, security/privacy, and responsiveness can influence e-loyalty through the mediating effect of e-satisfaction and e-trust. Furthermore, Chou et al. (2015) focused on the study of female online purchasing behaviour and asserted that website design and delivery quality could indirectly influence e-loyalty through e-satisfaction, while website design, security, and privacy can affect e-loyalty through e-trust indirectly. Luarn and Lin (2003) studied 180 customers related to online traveling services and claimed that e-satisfaction, e-trust, and perceived value not only have a direct influence on e-loyalty, but also indirectly influence e-loyalty through customer commitment. In addition, Ramanathan (2010) also found that logistics performance of a website significantly affects customer loyalty.

Based on the literature review above, it is clear that diversity exists in the field regarding how switching cost, e-satisfaction, trust, and commitment influence e-loyalty. Hence, in-depth analysis is necessary to determine the role of these factors.

2.2.4 Consequences of customer loyalty

According to Smith (2000), the most notable benefit brought by customer loyalty is that increasing the price of products has only a small influence on the purchasing intention of loyal customers. In other words, customer loyalty decreases customers' price sensitivity. Similarly, Choi et al. (2006) found that loyal behaviour plays a negative role in customers' price sensitivity, while disloyal behaviour has a clear and positive role in customers' price sensitivity,

through analysing a questionnaire-based survey with 159 effective responses. Moreover, Liang et al. (2008) claim that both intentional (attitudinal) and behavioural loyalty can increase organizations' benefits. Toufaily et al. (2013) concluded the consequences of e-loyalty from eight studies and claim that e-loyalty can increase cross-sales, the number of patrons to the site, willingness to pay more, and so on, regardless of the type of loyalty. The authors further assert that e-loyalty can promote customers' online purchasing behaviour and satisfaction and retention while decreasing their sensitivity to price and the switching possibility. Hence, developing customer loyalty is important for online retailers to gain more benefits and become more competitive. Different strategies should be considered by online retailers to obtain more loyal customers.

2.3 Relationship Quality

2.3.1 Relationship marketing in the consumer market

Relationship marketing was initially investigated as a way to establish, maintain, and enhance the relationship between the buyer and the seller in the context of business to business (B2B). With the increase in fierce competition between companies, the relationship marketing gets more attention in not only B2B but also business to customer (B2C) markets due to the importance of relationship marketing. Bhattacharya and Bolton (2000) claim that business and consumer relationship marketing contributes to developing relational bonds that will result in reliable repeat business. Likewise, Kumar et al. (2003) suggest that customers' positive attitudes towards the suppliers are more likely long-term when they have a high trust in and affinity with the company instead of being opportunistic; thus, they are more willing to pay more to maintain the ongoing relationship.

2.3.2 Definition of relationship marketing

The phrase 'relationship marketing' was first defined by Berry (1983) as "attracting, maintaining, and-in multi-service organisations-enhancing customer relationships" in the context of services marketing. According to Morgan and Hunt (1993), relationship marketing refers to all the marketing activities held by

the companies in order to develop and maintain a successful exchange relationship with customers, and the key to maintaining a stable relationship is to understand every customer's needs. A similar definition has been offered by Evans and Lasking (1994), who regard relationship marketing as "the process in which a firm builds long-term alliances with current and potential clients in such a way that the buyer and seller both work towards a common set of specific goals." Moreover, Tzokas and Saren (1997) state that relationship marketing is "the process of planning, developing and nurturing a relationship climate that will promote a dialogue between a firm and its customers which aims to imbue an understanding, confidence, and respect of each other's capabilities and concerns when enhancing their role in the marketplace and society."

It seems that the definitions above defined by prior scholars differ from each other somewhat. However, all of them agree on the critical elements of relationship marketing, including mutual benefit, process and effort to understand and satisfy customer's needs, confidence in and respect for each other, and a dialogue with customers. Thus, the aim of relationship marketing is to develop customers' lifelong loyalty through offering goods and services associated with customers' specific needs, resulting in an increase in the number of sales and revenue.

According to Henning-Thurau et al. (2002), the goal of reviewing relationship marketing theory is to determine the key drivers that affect the relational outcomes like customer loyalty. The two most promising approaches including relationship quality and relational outcomes have been recognized to explain relationships between service suppliers and customers. The relational benefit approach depends on the assumption that a relationship produces customer loyalty according to different types of benefits, while the relationship quality approach depends on the belief that "customer loyalty is largely determined by a limited number of constructs reflecting the degree of appropriateness of a relationship" (Lu, 2007). The focus of this dissertation is relationship quality, and the next section discusses the definition, construct, and outcomes of relationship quality.

2.3.3 The definition of relationship quality

In the context of service marketing, consumers always experience uncertainty deriving from factors like intangibility, complexity, lack of service familiarity, and uncertain delivery service (Crosby et al., 1990). Uncertainty may lead to the potential for service failure and negative outcomes. Hence, relationship quality is achieved through the salesperson's ability to reduce the customer's perceived uncertainty from the interpersonal influencing perspective, and high relationship quality means that "the customer is able to rely on the salesperson's integrity and has confidence in the salesperson's future performance because the level of past performance has been consistently satisfactory." In addition, Levitt (1986) regards relationship quality as "a bundle of intangible values which augments products or services and results in an expected interchange between buyers and sellers." However, Jarvelin and Lehtinen (1996) posit that relationship quality stands for customers' perceptions of how well the buyer-seller relationship fulfils the predicted, desired, and expected goals of the customer. Smith (1998) proposes a widely accepted definition of relationship quality, in which relationship quality is regarded as "a higher-order construct of a variety of positive relationship outcomes that mirror the overall strength of a relationship and the degree to which it meets the parties' needs and expectations." Likewise, Henning-Thurau et al. (2002) define relationship quality as a meta-construct consisting of several key components reflecting the overall nature of relationships between companies and customers. Anderson and Gerbing (1988) claim that relationship quality is a higher-order construct consisting of at least trust and satisfaction. Furthermore, Zhang et al. (2011) hold the same view that relationship quality is a higher-order construct made up of trust and satisfaction in the context of the online retailing market. Liang et al. (2008) also insist that relationship quality refers to an overall assessment of the strength of a relationship.

As concluded from the above studies, the author in this dissertation defines relationship quality as a higher-order construct consisting of some critical components reflecting the overall nature of relationships between consumers and online retailers. This relationship quality is achieved through the online retailer's ability to reduce the customer's perceived uncertainty.

2.3.4 The construct of relationship quality

Relationship quality is a higher-order construct consisting of several key components. Although there is still no consensus as to which components comprise relationship quality, considerable overlap exists in the literature. The table below presents different dimensions of relationship quality mentioned by various scholars. As shown in the table 2-5, three main components overlap in previous studies, namely customer satisfaction, trust, and commitment. Moreover, Keating et al. (2003) and Lang et al. (2003) demonstrate that trust, satisfaction, and commitment appear to be the most sensitive dimensions of relationship quality. Building on these past studies, the present research regards customer satisfaction, trust, and commitment as the three most important facets of relationship quality. The next section discusses customer satisfaction, trust, and commitment in detail respectively.

Table 2-5 Constructs of relationship quality

Study	Context	Dimensions
Anderson and Gerbing (1988)	B2C	Customer trust, satisfaction
Crosby et al. (1990)	B2C	Customer trust, satisfaction
Smith (1998)	B2B	Customer satisfaction, trust and commitment
Johnson (1999)	B2B	Customer trust, justice, opportunism
Wulf et al. (2001)	B2C	Customer trust, satisfaction and commitment
Parsons (2002)	B2B	Customer commitment, common goal, common interests
Keating et al. (2003)	B2C	Customer satisfaction, trust and commitment
Liang et al. (2008)	B2C	Customer satisfaction and trust

Ozdemir and Hewett (2010)	B2C	Customer satisfaction and commitment
Mullins et al. (2014)	B2C	Customer satisfaction, trust and commitment

2.3.4.1 Customer satisfaction

Customer satisfaction is an effective response associated with customers' experiences in the process of a certain purchase, which plays a significant role in both customer's future purchase behaviour and maintaining a company's competitiveness (Chang and Chen, 2009). Choi et al. (2013) state that customer satisfaction stands for the customer's overall evaluation of the product or service that is purchased by him/her. Similar to the traditional market, satisfaction is an essential ingredient for a successful relationship between the customer and online retailer in e-commerce. According to Anderson and Srinivasan (2003), compared to the satisfied customer, a dissatisfied customer is more willing to seek alternative information and switch to other competitors. Meanwhile, a dissatisfied customer is more likely to reject the efforts of the current company who aims to develop closer relationships with its customers and is more willing to try to decrease their dependence on that retailer (Pereira et al., 2017). Hence, increasing customers' satisfaction with the purchased product or service appears to be quite important so as to stimulate their next patronage, leading to the development of customer loyalty gradually.

Pham and Ahammad (2017) summarise previous studies about customer satisfaction and state that the antecedents of online customer satisfaction consist of nine ingredients related to three phases, namely the pre-purchase stage (product information, ease of use, website appearance, customisation), purchase stage (ease of check out, security assurance), and post-purchase stage (order fulfilment, responsiveness of customer service), while the consequences of customer satisfaction include repurchase intention, word of mouth, and willingness to pay more.

2.3.4.2 Customer trust

Customer trust plays a positive role in developing successful relationships between customers and retailers and is defined as the perceived degree of

reliability and integrity of the exchange partner (Morgan and Hunt, 1994). In an online situation, e-customer trust is generally defined as “reliance on a specific firm by its stakeholders with respect to the firm’s business activities in the electronic medium generally, and specifically on its website” (Shankar et al., 2002).

In the context of e-commerce, the transaction environment becomes uncontrollable due to asymmetric information and the lack of related policies or laws, resulting in increasing uncertainties perceived by customers. A customer will not trust the retailer because of inadequate information, which can be adopted to help him judge whether the retailer is trustworthy or not. If there is a lack of solutions to reduce the complexity and uncertainty of an online purchase, it is not possible for the customer and online retailer to develop a long-term and stable relationship. Kim and Peterson (2017) analysed ten antecedents of online trust, including perceived risk, disposition to trust, perceived security, perceived privacy, perceived reputation, perceived usefulness, perceived system quality, perceived information quality, perceived service quality, and perceived design quality. The authors also summarise six consequences of online trust, namely satisfaction, attitude, purchase intention, repeat purchase intention, intention to use website, and loyalty. Therefore, it is important to develop customer trust if the online retailer wants to be more competitive.

Customer trust can be measured through three main attributes, integrity, ability, and benevolence (Lee and Turban, 2001). Integrity means that the online retailer can provide corresponding products or services as stated by them; ability refers to the technology and capacity of the online retailer to solve certain problems in a specific situation; and benevolence means the degree of amity between online retailers and customers (Lee and Turban, 2001).

2.3.4.3 Customer commitment

Commitment refers to the belief of an exchange partner that the relationship with another (the supplier) is worth maintaining and continuing (Morgan and Hunt, 1994). In this dissertation, online customer commitment is regarded as the customer’s desire to maintain and continue the relationship with an online retailer. Although there is no consensus regarding the facets of commitment,

most scholars agree on the three general types, namely affective, calculative, and normative commitment (Allen and Meyer, 1990).

As for affective commitment, Allen and Meyer (1990) state that it refers to a person's emotional and psychological attachment to, identification with, and involvement with the exchange partner. Calculative commitment, also called continuance commitment, depends on the customer's recognition of the costs related to leaving the company. For instance, if the costs of changing to other organizations are high, the calculative commitment may be relatively high. Furthermore, normative commitment depends on the sense of obligation to the exchange partner. However, only the affective and calculative commitment is considered in the majority of studies on customer loyalty. In the situation of online retailing, normative commitment is expected to be less relevant in relationships between customers and an online retailer due to the absence of direct human contact. Moreover, Rafiq et al. (2013) claim that the effect of calculative commitment is more likely to be considered and tested where investments in the relationship are high, and switching costs are very high, or there are normally numerous alternatives. However, in the context of online retailing, customer investment tends to be not very high, and numerous alternatives may be available. In this sense, an affective commitment-based relationship is more likely to last much longer compared to a calculative commitment-based relationship. Advocates (Kumar et al., 1994; Wetzels et al., 1998) believe that more affectively committed partners show a much stronger intention to stay than customers who feel more calculatively committed, because calculative commitment positively affects the development of alternatives and opportunism. Given this, the author mainly focuses on the effect of affective commitment in terms of e-commitment in this study. For calculative commitment, one of its antecedents switching cost, which will be investigated in a later section.

2.3.5 Outcomes of relationship quality

This section describes a series of benefits derived from building and maintaining good relationship quality with customers. According to Henning-Thurau et al. (2002) and Roberts et al. (2003), the relationship quality between

customers and their exchange partners directly influences behavioural intentions, which are posited to result in positive behavioural outcomes and increase customer lifetime value. Marie and Maggie (2010), for example, claim that higher relationship quality between customers and suppliers will trigger stronger will of purchase and result in more purchase behaviour. Similarly, Ozdenmir and Hewett (2011) investigated the influence of relationship quality on customer behavioural intention in the context of service marketing, and they found that high relationship quality will result in right word of mouth, good recommendations, and repurchase intention. Meanwhile, based on previous literature, Verma et al. (2015) propose a meta-analytic framework for relationship marketing in online retailing, in which they found that a high quality of a relationship between customers and retailers positively affects customers' expectations of continuity, word of mouth, and loyalty respectively. The authors also categorize six antecedents (relationship benefits, dependence on the seller, relationship investment, seller expertise, communication, and similarity) of relationship quality into three types, namely customer-focused, seller-focused, and dyadic antecedents. In the e-commerce context, online retailers try to release different kinds of market signals to help customers reduce perceived uncertainty. The market signal can also be regarded as a kind of relationship investment, which may influence the quality of the relationship between customers and retailers. Hence, the author will take the market signal into account in this paper, and it will be described in a later section.

2.4 Switching costs

2.4.1 The definition of switching costs

Switching costs have been investigated and presented in the literature for more than three decades. The research into switching costs derives from the phenomenon that traditional retailers may experience that loyal customers are not satisfied, and satisfied customers are not loyal when the retailers provide their services or goods (Jones et al., 2000). This phenomenon has revealed that customer satisfaction cannot entirely affect customer loyalty and other factors may exist. Jones et al. (2000) further claim that many factors will influence customer loyalty, and the switching cost will have an impact on

customers' behaviour, especially when customer satisfaction diminishes to a certain degree.

In traditional retailing, Porter (1980) states that switching costs can be regarded as the one-time cost that customers endure when switching to another supplier from one supplier, as opposed to the ongoing costs. Likewise, Burnham et al. (2003) define switching cost as the one-time cost that customers associate with the process of changing from one supplier to another. This cost is categorized into three types, namely procedural switching cost, financial switching cost, and relational switching cost. More specifically, procedural switching costs contain an economic risk cost, evaluation cost, set-up cost, and learning cost. Financial switching cost consists of benefit and monetary loss costs, and the relational cost is divided into personal and brand relationship loss costs respectively. Lee et al. (2001) propose two sub-constructs of switching cost, including searching cost and transaction cost, and they argue that the time spent by the customers to seek the new alternative providers should also belong to customers' perceived switching cost. Meanwhile, Jones et al. (2002) introduce six sub-dimensions of switching cost in the field of services, namely lost performance costs, uncertainty costs, pre-switching search and evaluation costs, post-switching behavioural and cognitive costs, setup costs, and sunk costs. Furthermore, Liu et al. (2010) believe that switching cost includes the cost of time, money, and the effort related to changing service providers, which may entail "search costs resulting from the geographic dispersion of service alternatives, as well as learning costs resulting from the customised nature of many service encounters." The switching cost will not make sense until customers begin to consider whether or not to transfer to another supplier.

Scholars like Bakos (1997) and Friedman (1999) claim that the switching cost is almost negligible since the competing firm is 'just a click away' in the context of e-commerce and too low to affect the customer when they consider switching to other providers. However, the switching cost does exist in the online retailing market and will influence customers' behaviour to some extent. For instance, when customers consider switching to another supplier, they must look for the alternative online retailers first, then try to adapt to the new environment, and have more insight into the quality of goods and services provided by the

alternative retailers. Therefore, customers must sacrifice their own time, energy, and effort to switch to another supplier; thus, the switching cost emerges.

Chen and Hitt (2002) define the switching cost faced by online customers as “any perceived disutility a customer would experience from switching service providers,” which is made up of setup costs, learning costs, and highly customised service. Meanwhile, Ray and Morris (2012) propose that the constructs of switching cost in the electronic market are vendor-related and user-related switching costs respectively. The vendor-related switching costs consist of benefit-loss costs, service-uncertainty costs, and brand relationship costs, while user-related switching costs are categorized into search and evaluation costs, transfer costs, and learning costs. However, Yen et al. (2010) hold a different view that an online customer will not face tangible costs of switching between different retailers like setup costs and learning costs; instead, customers will face economic or psychological switching costs such as searching costs, service quality provided by the alternative retailers, and so on. Based on previous literature, this study defines the online customer’s switching cost as a one-time cost due to the switching behaviour of the customer from one retailer to another, which consists of searching cost and monetary loss cost.

2.4.2 The influence of switching costs

A review of empirical studies of switching costs from marketing streams has shown mixed findings of the role of switching cost in customer repurchase behaviour or loyalty formation. Some scholars agree with the direct impact of switching cost in loyalty formation in both B2C online and offline retailing, and other scholars focus on investigating and discussing the moderation effect of switching cost in the marketing stream. The table 2-6 below summarises some studies associated with the effect of switching costs in the context of the traditional retail market.

Table 2-6 The influence of switching costs in offline market

Research (offline)	Context	Findings
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Jones et al. (2000)	CFA, chi-square test N= 228 bank customers and 206 barber customers in the US	As perceived switching costs increase, the relationship between core-service satisfaction and repurchase intentions will diminish, which means that switching costs negatively moderate the influence of satisfaction on repurchase intentions.
Burnham et al. (2003)	SEM N=158 credit card holders and 144 long-distance phone customers	Switching costs positively moderate the influence of customer satisfaction on customer retention.
Lam et al. (2004)	SEM N=268 business customers of a courier service firm	There is a positive interaction effect between customer satisfaction and switching costs on customer loyalty.
Shin and Kim (2008)	SEM N= 520 customers of US mobile phone provider	Both main and moderating effects of switching costs were found, influencing the link between satisfaction and switching intention. Switching costs positively moderate the impact of satisfaction on switching intention.

As discussed previously, switching costs also play an essential role in the online market. Some scholars have researched the moderation role of switching costs in the context of the electronic market. The table 2-7 below summarises some fundamental research related to the study of the role of switching costs in the online market.

Table 2-7 The influence of switching costs in e-commerce

Research (online)	Context	Findings
Chen and Hitt (2002)	LRA N= 2257 clients of online brokerage firms	The moderation effect of switching costs is not significant.
Holloway (2003)	MRA N= 264 e-shoppers of pure online companies and 252 e-shoppers of bricks-and-clicks companies in the US	Both main and interaction effects of switching costs were not significant in either group. The attractiveness of alternatives positively influences the intention and negatively moderates the impact of satisfaction on the intention for pure online companies only.
Yang and Peterson (2004)	SEM N=235 online banking customers	The positive influence of switching costs on customer loyalty is not significant. The switching costs can negatively moderate the influence of satisfaction on loyalty when satisfaction is above the average level, while the interaction effect of switching costs and perceived value is not significant.
Tsai et al. (2006)	SEM N=526 customers of an e-retailer in Taiwan	The influence of switching barriers on repurchase intentions is stronger than satisfaction.
Balananis et al. (2006)	SEM	Switching costs play a moderation role for e-

	N= 192 online customers from one university in the UK	satisfaction and loyalty when e-satisfaction is higher than average.
Chang and Fang (2013)	SEM N= 324 online customers	Switching costs positively moderate the influence of customer satisfaction on loyalty.
Carter et al. (2014)	SEM N= 299 e-tourism service users	The main influence of trust on customer loyalty is stronger than switching costs. Switching costs positively moderate the influence of trust on loyalty.

It seems that there is no consensus on the role of switching costs, especially for its moderation effect. Because of the mixed findings in prior studies, the moderation effect of switching costs in the online market still warrants further investigation.

2.5 Signalling theory

From the perspective of a consumer, signalling theory is applied to help understand how consumers assess product quality and how the market signals influence customer's behaviour (Wells et al., 2011). From the perspective of information economics, the emergence of signalling theory relies on the situation, in which buyers and suppliers cope with asymmetric information while interacting in the market (Taj, 2016). Asymmetry of information refers to "pre-purchase information scarcity and post-purchase information clarity" (Kirmani and Rao, 2000). The seller apparently knows the quality of products or services, while the buyer is not able to access or interpret the quality of a product or service prior to purchasing. Only if the product or service is purchased and delivered to the consumers are they able to readily assess the quality of purchased goods or services. For example, the online purchase of a pair of

shoes has a high level of pre-purchase information scarcity, since it is not possible for the customer to physically inspect or try on this pair of shoes. After purchasing and delivering, however, the consumer will have a precise and accurate insight into the fit and durability of the shoes.

According to Taj (2016), the signaller, signal, and the receiver appear to be the key elements of signalling theory. Signallers are insiders, like retailers, who obtain information about the product or service. Signals are informational cues sent out by insiders to outsiders in order to influence expected outcomes (Taj, 2016), and signals are always extrinsic cues (Wells et al., 2011). Intrinsic cues refer to goods' attributes associated with the fundamental nature of the product, while extrinsic cues are product-related attributes, whose changes will not influence the original nature of the product (Richardson et al., 1994). According to Wells et al. (2011), typical extrinsic cues include brand, price, advertisement, retailer reputation, warranties, and store environment. Compared to intrinsic cues, extrinsic cues are more important and influential when consumers try to assess the quality of offered products or services, since extrinsic cues are more likely to be captured and recognized than intrinsic issues (Zeithaml, 1998).

In the current market, in order to decrease information asymmetry and the customer's perceived uncertainty about the product or service and positively affect desired outcomes, the insiders usually send out positive signals to outsiders and avoid sending out negative information cues. Therefore, signals are critical and vital to help consumers distinguish good retailers. It is worth noting that the market signal cannot only influence pre-purchasing behaviours, such as the perceptions of the quality of the product or service, but also have a positive impact on post-purchasing behaviours, like customer complaints and post-purchasing comments (Hu et al., 2015).

Signal credibility, also referred to as bond credibility, plays a vital role in making the signal an efficient mechanism for conveying high product quality. Higher signal credibility occurs when the customer believes that the seller can provide the same quality of products or services as stated in the signals; the seller makes a significant investment associated with signals, so the investment is risky if the signal is false. Such a situation is defined as separating equilibrium (Boulding and Kirmani, 1993). Conversely, a pooling equilibrium occurs when

customers cannot distinguish right retailers from bad retailers (Bergen et al., 1992).

Compared to traditional retailers, it is much more critical for online retailers to guarantee the signal credibility, since electronic word of mouth helps to ensure that online retailers will be penalized for providing low credibility signals. Online customers can easily share their opinions and comments through e-mail, online referrals, and so on, which in turn affects future sales (Reichheld and Scheffer, 2000).

Online logistics service quality plays a significant role in online customer behaviour. However, it is difficult for customers to perceive the logistics service quality prior to purchasing. The provision of OLSM enables customers to choose a preferred logistics service provider and delivery time slot, diminishing the uncertainty of perceptions of logistics service quality. Hence, the author regards OLSM as a reflection of the market signal released by online retailers.

2.6 Research gap identification

Previous studies have examined the importance of online logistics services in the online retail market from the perspective of logistics service quality or performance and some single elements of logistics services. For example, Rao et al. (2011) noted that e-LSQ can play a decisive role in customers' purchase satisfaction and retention, Ramanathan (2010) also found that logistics performance of a website significantly affects customer loyalty. In addition, Xu and Li (2017) indicate that e-retailers can either provide their own delivery service or cooperate with a third-party logistics company to establish a flexible distribution, and the quality and quantity of third-party logistics providers (3PLP) appears to be an issue in e-retailing, the research by Lee and Wang (2001) demonstrates that the choice of delivery modes (self-pick or drop-off) is affected by product attributes. OLSM is a kind of customised service, which integrate several logistics service elements. And it is gradually becoming more and more important in e-commerce. However, there is still a lack of focus on OLSM and the mechanisms about how OLSM influence customer loyalty are still ambiguity. Therefore, this thesis aims to address this research gap.

Chapter 3 Theoretical model

3.1 The construction of the theoretical model

The more e-retailers the customer can choose from, the more challenges the e-retailer must face. For an online business, its goals are not only to seek and attract potential customers, but also to maintain a stable relationship with customers to encourage the development of customer loyalty. It is worth noting that the key to developing customer loyalty is to enhance the relationship quality (customer satisfaction, trust, and commitment) between customers and retailers. In the context of e-commerce, relationship quality is achieved through the ability of online retailers to decrease the uncertainty perceived by customers.

In the online market, it is always difficult for customers to have a clear insight in e-logistics service quality. Instead, other signals are necessary for them to decrease perceived uncertainty. As discussed in Chapter 2, the author proposes a new term, online logistics service mode, which refers to a kind of customised logistics service, in which online retailers integrate different elements of logistics services. The provision of OLSM makes it possible for customers to choose a preferred logistics service provider, preferred delivery time, and so on, which in turn enhances the customer's control of the e-logistics service and simultaneously decrease the customer's perceived uncertainty about the e-logistics service. Hence, OLSM can be regarded as a kind of market signal to help reduce consumers' perceived uncertainty from the perspective of signalling theory. Meanwhile, from the perspective of relationship marketing, the customised service offered by a business can be regarded as one tactic of relationship marketing investments (Huang, 2015).

According to relationship marketing theory, the lower the customer's perceived uncertainty resulting from the release of market signals, the higher the ability of companies to decrease consumers' perceived uncertainty and the higher the relationship quality between retailers and consumers. Moreover, Verma et al. (2015) posit that relationship investments can affect customer loyalty through relationship quality. Therefore, based on the above analysis, the basic model can be confirmed, which is that OLSM will influence e-loyalty indirectly through relationship quality. Since signal credibility has a significant influence on the

relationship between market signal and consumer behaviour, it is necessary to take it into account when designing a model. Similarly, we should also consider the role of switching cost in the model. The theoretical model is developed as the figure 3-1.

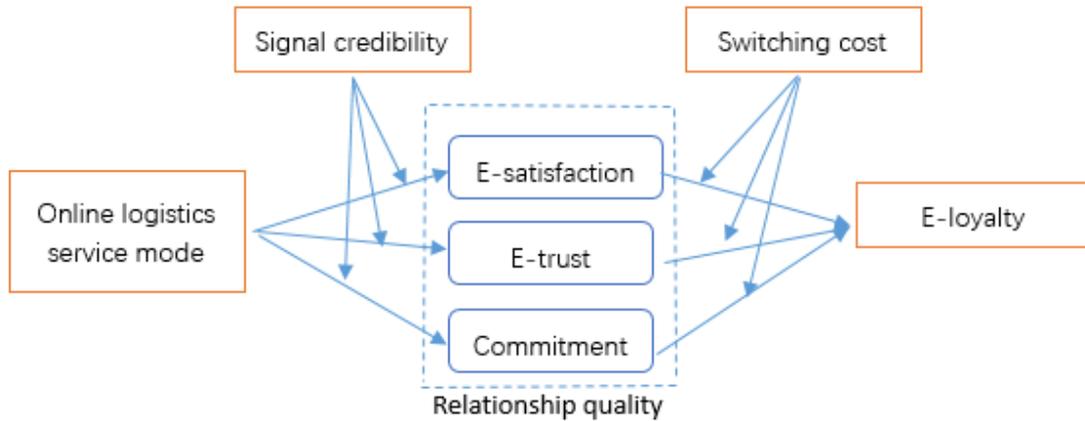


Figure 3-1 Theoretical model of this thesis

3.2 Research hypothesis

3.2.1 Hypothesis about the mediating role of relationship quality

1) The influence of online logistics service mode on relationship quality

According to Wells et al. (2011), customers always choose other accessible information to help them judge online retailers when it is not possible for them to have a clear and accurate insight into the quality of products or services provided by online retailers. The authors further claim that similar to the influence of the decoration of a traditional retail store on the consumer's perceived product quality, website quality also has a positive influence on consumers' perceived product quality. Rao et al. (2011) state that sometimes, customers will feel anxiety in terms of the process of logistics services, due to the uncertainty of logistics service quality, such as the uncertainty of delivered product quality, the attitude of logistics staff, delivery time, etc. Hence, customers need other information to reduce perceived uncertainty.

Generally speaking, customers can choose a preferred logistics service provider based on their own experience and requirements in the provision of OLSM. For example, customers can choose to pick up ordered products in nearby brick stores if there is a high possibility that the quality of delivered

goods perceived by customers is low. Meanwhile, they can select preferred delivery time, resulting from the perceived uncertainty of delivery time. Therefore, the provision of OLSM can reduce consumers' perceived uncertainty. Further, as discussed previously, the higher the ability of companies to decrease consumers' perceived uncertainty, the higher the relationship quality between retailers and consumers. Therefore, based on the above analysis, the provision of OLSM has a positive influence on relationship quality. Since relationship quality consists of customer satisfaction, trust, and commitment, the author will further analyse the influence of OLSM on these three elements respectively.

According to expectation confirmation theory, the degree of satisfaction depended on the difference between perceived actual obtained products or services and expected obtained products or services. Thirumalai and Sinha (2011) argue that a customised service can reach customers' expectations more realistically, which positively affects online customers' satisfaction. OLSM can be regarded as one kind of customised service that can properly satisfy customers' requirements for a logistics service. Hence, OLSM has a positive influence on e-satisfaction. According to Arora et al. (2008), customisation stands for the process or situation in which customers proactively specify one or more elements of their marketing mix. That is to say, customers are expected to be involved in the process of the purchase transaction in order to satisfy their specific requirements. The customisation is a point of differentiation, resulting in the generation of higher customer satisfaction and loyalty. The provision of OLSM makes it possible for customers to choose their preferred delivery method and/or logistics service provider to fit their specific needs.

Based on Morgan and Hunt (1994), trust develops when the consumer has confidence in the retailer's or exchange partner's reliability and integrity. Compared to the traditional market, the environment of e-commerce is more complicated and uncontrollable, leading to a higher level of uncertainty. Customers cannot judge whether the online retailer is trustworthy or not due to the lack of adequate available information (Wirtz and Lihotzky, 2003). However, OLSM enables the customer to obtain enough information about the logistics service, which will contribute to the development of trust. Moreover, Koufaris

and Hampton-Sosa (2004) state that enterprise ability is one factor that influences customers' trust, and a customised service can be treated as a kind of enterprise capacity. OLSM is a kind of customised service, and it not only requires more investment from online businesses, but also increases the complexity of e-commerce supply chain management. In other words, OLSM stands for the operational ability of online retailers. Hence, OLSM positively affects e-trust.

Nowadays, the majority of online retailers cooperate with one third-party logistics service provider, and they also will not provide a specific delivery time for customers in China. Yet, OLSM enables customers to select preferred delivery time and logistics service provider, which can be regarded as a kind of value-added service. Hsieh et al. (2005) claim that the provision of value-added services makes customers feel respect from exchange partners, resulting in emotional or psychological dependence, which in turn enhances customer commitment. Therefore, OLSM contributes to the development of e-commitment.

In summary, the author proposes several hypotheses as follows:

H1: OLSM has a positive influence on relationship quality.

H1a: OLSM has a positive influence on customer e-satisfaction.

H1b: OLSM has a positive influence on e-trust.

H1c: OLSM has a positive influence on e-commitment.

2) The influence of relationship quality on e-loyalty

Relationship quality stands for the ability of online retailers to reduce customers' perceived uncertainty. High relationship quality means high confidence and trust of customers in the retailers based on their previous purchasing experience. Previous studies show that an increase in relationship quality can contribute to the development of customer loyalty in the context of e-commerce.

As discussed previously, customer satisfaction develops when customers' perceived actual quality of obtained products or services is higher than expected value, which in turn leads to possible repurchasing behaviour. Compared to satisfied customers, dissatisfied customers may be easily

attracted by or switch to other retailers. Anderson and Srinivasan (2003) also claim that dissatisfied customers prefer not to establish a deeper relationship with previous companies. Safa and Ismail (2013) reveal that customer satisfaction will positively influence the development of customer loyalty. Compared to the traditional market, it is easier for customers to switch to other online retailers due to a higher transparency of information and lower switching cost. Walsh et al. (2010) propose that customer satisfaction has a higher influence on customer loyalty in the context of e-commerce compared to the traditional market. Therefore, the author posits that relationship quality contributes to the development of e-loyalty.

Apart from satisfaction, trust also plays a critical role in the formation of customer loyalty (Wang et al., 2006). Customer trust can enhance relationship quality between consumers and retailers, leading to the development of loyalty (Safa and Ismail, 2013). More specifically, when consumers trust an online retailer, they will have more confidence in the quality of products or services provided by the online retailer, and they are more willing to disclose their personal information, which will contribute to the formation of e-loyalty (Ismail and Safa, 2014). Palvia (2009) also argues that trust in the online retailer is the prerequisite for the formation of loyalty to the retailer.

Consumer commitment develops when consumers are keen on a certain business and feel emotional or psychological dependence on the business (Fullerton, 2005). The higher commitment represents a higher level of customers' dependence on the business. In other words, customers are more willing to maintain and rely on current relationships with retailers, leading to higher revisiting intention and higher possibility of repurchasing behaviour. Henning-Thurau et al. (2002) state that commitment has a positive impact on customer loyalty. Moreover, Izogo (2015) asserts that commitment plays a positive mediating role in attitudinal loyalty.

Based on the above analysis and combining it with hypothesis 1, the author proposes hypotheses 2 and 3 as follows.

H2: Relationship quality plays a positive role in e-loyalty.

H2a: e-satisfaction plays a positive role in e-loyalty.

H2b: e-trust plays a positive role in e-loyalty.

H2c: e-commitment plays a positive role in e-loyalty.

H3: OLSM has a positive and indirect influence on e-loyalty through relationship quality.

H3a: OLSM has a positive and indirect influence on e-loyalty through e-satisfaction.

H3b: OLSM has a positive and indirect influence on e-loyalty through e-trust.

H3c: OLSM has a positive and indirect influence on e-loyalty through e-commitment.

3.2.2 Research hypothesis about the moderating role of signal credibility

According to signalling theory, sellers will release some signals to convey product quality information to consumers in order to reduce customers' perceived uncertainty and stimulate a purchase or exchange (Wells et al., 2011). Hu et al. (2015) found that the credibility degree of a signal will influence to what extent the market signal will affect customer behaviour. Signals, including brand names, prices, advertising expenditures, security policies, and so on, play a critical role in helping consumers to distinguish bad retailers from good retailers (Boulding and Kirmani, 1993). However, if online retailers release the same signals, customers must consider the signal credibility before making decisions. High signal credibility occurs when customers believe that the retailers are able to provide services or products as indicated by the signal (Wells et al., 2011). Accordingly, higher signal credibility represents that the customer can have stronger confidence in the online retailer who releases the signals. On the other hand, if the signal credibility is low, this market signal has little or even a negative influence on customers' purchasing behaviour, since customers will think that the sellers are dishonest and will not be willing to patronize them (Hu et al. 2015). Furthermore, Wells et al. (2011) propose that website quality can be treated as a signal of product quality and the investment of website design is regarded as signal credibility. They further state that signal credibility can enhance the relationship between website quality and perceived product quality.

From the perspective of signalling theory, OLSM is a kind of market signal released by online retailers to help customers reduce uncertainty about the perceptions of logistics service quality, which positively influences customer behaviour. However, the selection of a logistics service provider will also influence customers' behaviour. For example, although two online retailers offer the same market signal (OMSM) to customers, they can choose different cooperating service providers. Imagine that one online retailer provides a selection of some famous logistics service providers, while another retailer only offers some small and obscure logistics service providers. In this case, there is no doubt that the former will help reduce perceived uncertainty more efficiently. Therefore, the author includes signal credibility in the theoretical model.

Generally speaking, the higher the quality provided by the logistics service provider, the higher the price, since higher cost is needed to achieve a higher quality of logistics services. Moreover, higher logistics price implies that customers can have higher perceptions of logistics service quality (Rabinovich and Bailey, 2004). Hence, the logistics price can be regarded as the ability of online retailers to achieve high logistics service quality, representing the credibility of the market signal (OLSM) released by the online retailers. A lower logistics price means lower signal credibility, which weakens the function of OLSM to differentiate good retailers, while a higher logistics price as higher market signal credibility can strengthen the function of OLSM to differentiate good retailers from bad retailers. Gumus et al. (2013) propose that free shipping possibly does not mean actual free delivery, as most retailers who provide free delivery simply add the shipping fees to the original product price. For customers, it is not honest for online retailers to provide unclear delivery fees, which may in turn increase the uncertainty perceived by customers in terms of logistics service quality. In contrast, a higher logistics price will improve customers' confidence in perceived quality.

A lower logistics price means that OLSM has less influence on relationship quality, while a higher logistics price means that OLSM has a higher influence on relationship quality. Take a famous Chinese online business, Jing Dong, as an example. Jing Dong did not set up a corresponding price for the logistics service at different times. Although customers can select preferred delivery time,

packages are always not available to be delivered on time. This phenomenon makes it not possible for customers to judge and perceive the logistics service quality provided by Jing Dong based on the released market signal (OLSM), leading to a negative influence on customer purchasing behaviour and a positive effect on complaint behaviour. For example, some customers complain about the logistics service on the Jing Dong website.

Based on above analysis, the author proposes the following hypotheses:

H4: Signal credibility positively moderates the influence of OLSM on relationship quality.

H4a: Signal credibility positively moderates the influence of OLSM on e-satisfaction.

H4b: Signal credibility positively moderates the influence of OLSM on e-trust.

H4c: Signal credibility positively moderates the influence of OLSM on e-commitment.

In addition, it is assumed that OLSM positively influences e-loyalty indirectly through relationship quality in H3. In this sense, assuming signal credibility will moderate the mediation effect of relationship quality between OLSM and e-loyalty is rational and logical (Edwards and Lambert, 2007). Thus, hypothesis 5 is proposed as follows:

H5: Signal credibility positively moderates the indirect influence of relationship quality on the relationship between OLSM and e-loyalty.

H5a: Signal credibility positively moderates the indirect influence of e-satisfaction on the relationship between OLSM and e-loyalty.

H5b: Signal credibility positively moderates the indirect influence of e-trust on the relationship between OLSM and e-loyalty.

H5b: Signal credibility positively moderates the indirect influence of e-commitment on the relationship between OLSM and e-loyalty.

3.2.3 Research hypothesis about the moderating effect of switching costs

Switching costs refer to all the costs due to customers' switching behaviour from one retailer to another retailer, including time, effort, learning, transactions,

searching costs, etc. (Burnham et al., 2003). Previous studies from Chuah et al. (2017) and Lam et al. (2004) show that switching costs play both a direct and moderating role in customer loyalty. The higher the switching costs, the lower the influence of customer satisfaction on loyalty. For instance, when the switching costs are high, the possibility of switching to other good retailers for dissatisfied consumers may be low, and the satisfied consumers will also not consider other retailers. In this sense, there is only a small difference between dissatisfied consumers and satisfied consumers in terms of their loyalty to the retailers. Nevertheless, when the switching cost is low, those dissatisfied consumers may purchase from other retailers, while satisfied consumers still show their interest in the original retailer. In this sense, customer satisfaction has a distinct influence on customer loyalty. Therefore, although e-satisfaction positively influences e-loyalty, the influence will become weaker if the switching cost increases. Likewise, the higher the switching costs, the lower the influence of customer trust (or commitment) on loyalty. For example, when the switching costs are higher than customer's perceived benefits brought from switching to other online retailers, the possibility for low trust and commitment customers to switch to other online retailers may be low even if they do not have strong emotional or psychological dependence on the online retailers or strong belief to maintain the relationship with retailers, and high trust and commitment customers will also not consider other retailers. In this sense, there is only a small difference between low and high trust (or commitment) in terms of their loyalty to the retailers. However, when the switching cost is low enough, low trust (or commitment) customers may switch to other new retailers if they think the benefits brought from such switching behaviour are more than switching costs, while high trust (or commitment) customers may still choose to keep exchange relationship with this retailer. Therefore, the influence of customer trust and commitment on customer loyalty will decrease with the raise of switching costs.

In a word, when the relationship quality between consumers and online retailers is deficient, customers may adopt several approaches to search for new online retailers. However, if the switching cost is very high, customers must spend more time and money to search for new retailers, and consumers may prefer

maintaining the current relationship with the former retailer when the benefit brought by switching to new retailers is lower than the switching cost. In this sense, the relationship quality has a low degree of influence on customer loyalty. In contrast, if the switching cost is low, customers can easily change to other retailers, and they may prefer not maintaining the relationship with the former retailer when the benefit brought by switching to new retailers is higher than the switching cost. In this condition, relationship quality has an enormous impact on the development of e-loyalty. Based on above analysis, although relationship quality positively influences e-loyalty, the influence will become weaker if the switching cost increases.

To summarise, the hypotheses about the moderating effect of switching cost are as follows:

H6: Switching cost negatively moderates the impact of relationship quality on e-loyalty.

H6a: Switching cost negatively moderates the impact of e-satisfaction on e-loyalty.

H6b: Switching cost negatively moderates the impact of e-trust on e-loyalty.

H6c: Switching cost negatively moderates the impact of e-commitment on e-loyalty.

Moreover, it is assumed that OLSM positively influences e-loyalty indirectly through relationship quality. Similar to hypothesis 5, the author proposes the following:

H7: Switching cost negatively moderates the indirect influence of relationship quality on the relationship between OLSM and e-loyalty.

H7a: Switching cost negatively moderates the indirect influence of e-satisfaction on the relationship between OLSM and e-loyalty.

H7b: Switching cost negatively moderates the indirect influence of e-trust on the relationship between OLSM and e-loyalty.

H7c: Switching cost negatively moderates the indirect influence of e-commitment on the relationship between OLSM and e-loyalty.

Chapter 4 Methodology

4.1 Introduction

Having reviewed the relevant literature associated with customized service, customer satisfaction, trust and commitment, customer loyalty, switching cost, and signal credibility, the research gaps were highlighted in Chapter 2. Seven hypotheses and a proposed model framework were formulated in Chapter 3 to address the research objectives. This chapter begins with a discussion of the philosophical debate underlying the choice of methodology, followed by the introduction of the data collection method and research samples. Then, the process of developing measurement items will be displayed in this chapter as well as the results of a pilot study. Furthermore, this chapter introduces the planned analysis strategy to test the hypotheses proposed in Chapter 3. The final section consists of ethical considerations associated with the research design of this study and conclusions of the whole chapter.

4.2 Justification of research paradigm

As a foundation of a study, the paradigm or worldview always reveals the perspective that authors or researchers hold towards about world. According to Creswell and Plano Clark (2011), the primary elements differ in terms of different worldviews, and the essential elements appear to be ontology (“the view on nature of being, existence or reality”), epistemology (“the way to gain knowledge of what we know about the reality”), axiology (“the role value in the research”), rhetoric (“research language”), and methodology (“the process of research”).

As mentioned above, epistemology is about how we gain knowledge and know reality. A more detailed explanation by Hamlyn (1995) shows that epistemology addresses the questions of “the nature of knowledge, its possibility, scope and general basis.” Klein (2005) further claims that epistemology is a branch of philosophy that addresses “nature, sources and limits of knowledge.” Knowledge here refers to “propositional knowledge” that is “distinct from ‘belief’ in that it requires that we give reasons for saying that something is so and can potentially convince others” (Porta and Keating, 2008).

In the natural sciences, shared criteria of evidence, argument, and logic are adopted to address such questions. However, it is not the same in the social sciences. Although some social scientists call for objective evidence similar to the natural sciences, others firmly believe that there are other possible forms of knowledge (Porta and Keating, 2008). In this sense, different philosophical foundations or bases for deciding possible kinds of knowledge and ways of ensuring that they are not only adequate but also legitimate are influenced and even determined by different epistemological points of view. Hence, it is necessary to identify, clarify, and explain our epistemological stances before the start of any particular study.

Although paradigms have been defined differently by previous researchers, two fundamental paradigms with broad agreement and identification have frequently emerged in previous papers, namely positivism and interpretivism. Glogowska (2011) also asserts that these two paradigms are usually used in quantitative and qualitative research respectively. Historically, researchers who focused on marketing and consumer behaviours always side with positivism.

Positivism is always linked and coordinated with 'objectivist' ontology (Crotty, 1998). Crotty further explains that objectivist ontology means that people regard reality as an independent existence and the meaning of any existing objects will not be affected or decided by the operation of any consciousness. In other words, the object itself always exists objectively without caring about any other people's consciousness. For instance, a desk in an office is a desk (objective thing), regardless of whether any people have noticed its existence or not. David and Sutton (2011) further state that "such a 'positivist' knowledge requires the non-normative, non-judgmental detachment of the researcher in relation to what they are studying, and the commitment to 'evidence' and the rejection of all speculation and conjecture that cannot be grounded and/ or tested with reference to evidence." As mentioned above, the positivism paradigm is always associated with quantitative research. Likewise, positivist epistemology is usually linked with hypothetic-deductive research. Under such epistemology, what is true or false will be tested through neutral data input used to guarantee the measuring and computing of theories. According to Russell (1979), positivists insist that the social phenomena can be measured and

generalized, which is in many ways quite similar to the natural sciences. This is echoed by Porta and Keating (2008), who state that “positivist approaches share the assumption that, in natural as in social sciences, the researcher can be separated from the object of his research and therefore observe it in a neutral way and without affecting the overserved object.” Such a viewpoint and quantitative research can be added into ethnographic research when pursuing the ‘truth’ to enrich and diversify the research process of social sciences.

In this study, all the variables like customer satisfaction and customer loyalty can be measured by a quantitative approach. Apparently, the author maintained a stance of positivism, as it lends itself to a deductive and quantitative methodology, which is in accordance with the dominant tendency in this research field.

After explaining the paradigm in this study, the next section will discuss the methods and approaches adopted related to the development of measurement items and questionnaires. Since the data for this study were collected through questionnaires, it was essential to ensure that the instrument was able to gather reliable and valid information to test previous hypotheses and fulfil the research objectives.

4.3 Research instrument

The instrument used in this dissertation consisted of six measurement scales. Excluding the last section, which focused on understanding the demographic information and additional suggestions from the participants, the other five measurement scales included ‘OLSM’; ‘relationship quality’, ‘market signal’, ‘switching cost’, and ‘customer loyalty’, which were taken directly or derived from valid measurements in previous studies. It is worth noting that relationship quality was divided into three parts, namely ‘e-satisfaction,’ ‘e-trust,’ and ‘e-commitment.’ In the following section, description of the measurement scales adopted in this dissertation as well as detailed contents of these measurement scales will be introduced.

4.3.1 Measurement scale: Online logistics Service Mode

To meet customers' customisation needs, the online retailers integrate several logistics service elements to provide OLSM for customers. Thus, the new term 'OLSM' emerges, which is regarded as a kind of customised service and in which several elements of logistics services such as estimated delivery time slot, 3PL providers, and so on are integrated and provided to customers. However, there is a lack of existing designed items to measure OLSM in the previous literature. Hence, the author aims to establish some available and appropriate items to measure OLSM from previous measurement items associated with customisation, especially for service customisation.

Coelho and Henseler (2012) designed three items to measure customisation in their study. Unlike Coelho and Henseler, Cho and Lau (2014) distinguished the type of customisation and designed two five-item scales representing service customisation and product customisation respectively. In addition, Bock et al. (2016) investigated the service customisation and divided the service customisation into two categories, namely customizing the service process (interpersonal adaptive behaviour) and customizing the service offering (service offering adaptation). These two scales are measured by five and four items respectively. Table 4-1 records the measurement items used in these three studies in detail.

Table 4-1 Measurement Items of Customisation

Author	Measurement items
Coelho and Henseler (2012) (Customisation)	"My company" offers me products and services that satisfy my specific needs. "My company" offers products and services that I could not find in another company. If I changed between companies I would not obtain products and services as customized as I have now.
Cho and Lau (2014) (Service Customisation)	This online store serves you in a good way that is unlikely happened in other customers. This online store usually places your request in a high priority.

	This online store provides you with fast service that is unlikely happened in other customers.
	This online store provides you with good treatment that is unlikely happened in other customers.
	This online store allows you to state your preference on the design of a product
	This online store allows you to specify your product
Cho and Lau (2014) (Product Customisation)	This online store helps you better determine your product requirements.
	This online store actively participates in building the product features that you want.
	This online store actively aids you in identifying which product attributes that fit your needs
	The employee treated me as a unique individual.
	The employee tried to “get-to-know” me.
Bock et al. (2016) (Interpersonal adaptive behaviour)	The employee provided me with personal treatment.
	The employee communicated with me on a personal basis.
	The employee treated me as an individual and not just a number.
	The product or service was “tailor-made” for me.
Bock et al. (2016) (Service offering adaption)	The product or service was customized to my needs.
	The product or service was customized for me.
	The employee adapted the type of service to meet my unique needs.

Apparently, it was not appropriate to use the original items for customisation in previous research to measure OLSM. And OLSM is defined as a special kind of customised service provided by the online retailer to satisfy customers’ needs, in which several logistics service elements are integrated such as delivery time,

logistics service provider and so on. Thus, the author absorbed some of items for customisation from previous studies and changed them with consideration of the characteristics and definition of OLSM to adapt them to measure OLSM. Finally, five items were designed to measure OLSM as shown in table 4-2 below. and a seven-point Likert scale was adopted to measure all items, ranging from (1) 'strongly disagree' to (7) 'strongly agree'.

Table 4-2 Designed Measurement Items of OLSM

Construct	No.	Measurement items
OLSM	OLSM1	The online retailer provides me more selected ways of logistics service than other retailers.
	OLSM2	The online logistics service mode provided by this online retailer always meets my specific needs.
	OLSM3	Other online retailers could not provide me with the logistics service mode that satisfy my specific needs.
	OLSM4	The provision of OLSM makes me feel that I am specially treated by the online retailer in this purchasing process.
	OLSM5	This online retailer always actively participates in satisfying my needs when I raise the requirement about the logistics service.

4.3.2 Measurement scale: relationship quality

As mentioned in Chapter 2, the relationship quality between the customer and the online retailer is regarded as the ability of the online retailer to reduce customers' perceived uncertainties and is composed of customer satisfaction, trust, and commitment.

According to Chang and Chen (2009), online customer satisfaction is an effective response associated with their experiences in the process of a certain purchase from a certain online retailer. In this study, e-satisfaction was

measured using four items derived from Anderson and Srinivasan (2003), Fang et al. (2014), Coelho and Henseler (2012), and Kim et al. (2009), presented in table 4-3. A seven-point Likert scale was adopted to measure all items, ranging from (1) 'strongly disagree' to (7) 'strongly agree'. The table below shows the four-item scale representing e-satisfaction.

Table 4-3 Designed Measurement Items of online customer satisfaction

Construct	No.	Measurement items	Source
E-satisfaction	ES1	I am overall satisfied with this online retailer.	Fang et al. (2014); Coelho and Henseler (2012); Kim et al. (2009)
	ES2	I am overall pleased with this online retailer.	Fang et al. (2014)
	ES3	My expectations about the service and goods provided by the online retailer were satisfied, and even exceeded.	Fang et al. (2014); Coelho and Henseler (2012); Kim et al. (2009)
	ES4	My choice to purchase from this online retailer was a wise one.	Anderson and Srinivasan (2003)

According to Morgan and Hunt (1994), customer trust plays a positive role in developing successful relationships between customers and retailers and is defined as the perceived degree of reliability and integrity of the exchange partner. A review of the literature revealed that the measurement items used in Anderson and Srinivasan (2003) and Fang et al. (2014) reveal relatively high validity and reliability. Hence, two items were adapted and modified based on measures developed by Anderson and Srinivasan (2003), while two items were modified from Fang et al. (2014). These measures capture customers' perceived degree of reliability and integrity of the online retailer. The detailed items included in the pilot-test are presented in table 4-4. A seven-point Likert

scale was adopted to measure all items, ranging from (1) 'strongly disagree' to (7) 'strongly agree'.

Table 4-4 Designed Measurement Items of online customer trust

Construct	No.	Measurement items	Source
E-trust	ET1	This online retailer is worthy and trustworthy.	Anderson and Srinivasan (2003)
	ET2	This online retailer is keen on fulfilling my needs and wants, and consistent in quality and service.	Fang et al. (2014)
	ET3	This online retailer could successfully complete the transaction.	Anderson and Srinivasan (2003)
	ET4	I trust the claims and promises this online retailer made about its logistics service.	Fang et al. (2014)

According to Tsao and Hsieh (2012), commitment is “an exchange partner’s belief that an ongoing relationship with another is so important as to warrant maximum efforts at maintaining it, that is, the committed party believes the relationship is worth working on to ensure that it endures indefinitely.” e-commitment was operationalised using items taken and modified from two research papers. One of them was adapted from Bansal et al. (2004), while another two items were taken from Tsao and Hsieh (2012) with modifications in order to suit the context of this study. The detailed items included in the pilot-test are presented in table 4-5. A seven-point Likert scale was adopted to measure all items, ranging from (1) 'strongly disagree' to (7) 'strongly agree'.

Table 4-5 Designed Measurement Items of online customer commitment

Construct	No.	Measurement items	Source
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	EC1	I have emotional and psychological dependence on this online retailer.	Bansal et al. (2004)
E-commitment	EC2	I am willing to continue investing my time and effort on this online retailer.	Tsao and Hsieh (2012)
	EC3	I intend to continue shopping at this online retailer over the next few years.	

4.3.3 Measurement scale: online customer loyalty (e-loyalty)

Customer loyalty occupies a leading place in the contemporary market and plays a significant role in the success of online retailing. In this study, the author used the definition of customer loyalty in the e-commerce context from Toufaily et al. (2013) for reference, which states that e-loyalty is regarded as the willingness to keep a stable relationship with a preferred supplier and to repeat visits or purchases, deciding to prioritise the supplier's website among alternatives. It is grounded in favourable beliefs and emotions towards the online supplier, regardless of situational influences and marketing efforts that may result in switching behaviour. Referred to Anderson and Srinivasan (2003), Kim et al. (2009), and Yen (2010), five items were used to measure this scale. The detailed description of these five items is presented in table 4-6 below. A seven-point Likert scale was adopted to measure all items, ranging from (1) 'strongly disagree' to (7) 'strongly agree'.

Table 4-6 Designed Measurement Items of online customer loyalty

Construct	No.	Measurement items	Source
E-loyalty	EL1	This online retailer is my first choice when I want to purchase similar products.	Kim et al. (2009)

EL2	I will not change to other retailers as long as the current services continue.	
EL3	I am happy to recommend this online retailer to my friends.	Yen (2010)
EL4	I keep visiting and prioritizing this online retailer whenever I need to make a purchase.	Anderson and Srinivasan (2003)
EL5	To me this retailer is the best online retailer to do business with.	

4.3.4 Measurement scale: switching cost

Switching cost is defined as all possible costs due to customers' switching behaviour from one retailer to another retailer, including time, effort, learning, transactions, searching costs, and so on. (Burnham et al., 2003). Yang and Peterson (2004) also state that switching costs are not only economic in nature, but also can be psychological and emotional. In this study, four items were derived from Yang and Peterson (2004) and Jones et al. (2007) with some minor modifications in wording in order to suit the context of this study. The four-item scale reflecting switching cost is presented in table 4-7. A seven-point Likert scale was adopted to measure all items, ranging from (1) 'strongly disagree' to (7) 'strongly agree'.

Table 4-7 Designed Measurement Items of switching cost

Construct	No.	Measurement items	Source
Switching cost	SC1	Overall, it would cost me a lot of time and energy to find and get used to an alternative online retailer.	Yang and Peterson (2004)

SC2	I cannot be sure that the new online retailer can provide better service than the old one.	Jones et al. (2007)
SC3	It costs me too much to switch to another online retailer.	Yang and Peterson (2004)
SC4	In general, it would be a hassle switching to another online retailer.	Yang and Peterson (2004)

4.3.5 Measurement scale: signal credibility

As discussed before, signals are always extrinsic cues and typical extrinsic cues include brand, price, advertisement and so on (Wells et al., 2011). And signal credibility is used to describe the degree to which the signaller is honest and the signal corresponds with signaller quality and it changes over time (Connelly et al., 2011). In other words, signal credibility refers to the ability of the seller to provide the services or products as indicated by the signal. From the perspective of signalling theory, OLSM is a kind of market signal released by online retailers to help customers reduce uncertainty about the perceptions of logistics service quality, which positively influences customer behaviour. Hence, signal credibility in this study should be used to describe the ability of the online retailer to achieve the released market signal OLSM to reduce customers' perceived uncertainty about the logistics service quality. Generally speaking, the higher the quality provided by the logistics service provider, the higher the price, since the higher cost is needed to achieve a higher quality of logistics services. Moreover, a higher logistics price implies that customers can have higher perceptions of logistics service quality (Rabinovich and Bailey, 2004). Hence, the logistics price can be regarded as the ability of online retailers to achieve high logistics service quality, representing the credibility of the signal OLSM that can be corresponding achieved by the online retailers. A higher logistics price means higher market signal credibility, while a lower price

means lower signal credibility. Therefore, logistics service price was specially used to indicate the signal credibility in this study.

Based on previous studies from Lewis (2006), this study adopted three items to indicate this scale. Table 4-8 shows the proposed items. A seven-point Likert scale was selected to measure all items, ranging from (1) 'strongly disagree' to (7) 'strongly agree'.

Table 4-8 Designed Measurement Items of Signal Credibility

Construct	No.	Measurement items	Source
Market Signal Credibility	MS1	Compared to other online retailer, the logistics service price of this online retailer is more expensive.	Lewis (2006)
	MS2	I have to spend more on logistics service that matches my needs.	
	MS3	I can only get free delivery as if the total value of purchased products is over a certain amount.	

4.3.6 Control variables

The questionnaire also included typical questions relating to respondents' demographic information, namely gender, age, educational qualifications, and monthly income, which were used to describe the sample. In addition to this demographic information, the respondents' online shopping experience was captured in the question about how many years they had shopped online.

4.4 Pilot study

4.4.1 Data collection of pilot test

In order to empirically examine previous hypotheses, the author designed a questionnaire with multiple questions per construct. Following the design of the questionnaire, a small-scale pilot survey of the population was conducted to detect the weaknesses associated with the instruments and questionnaires. Ticehurst and Veal (2000) state that a pilot study can help the author to test

questionnaire wording, sequencing, and layout, gain familiarity with respondents, estimate questionnaire completion time, and test analysis procedures.

In this study, a pilot study aiming to achieve about 100 responses was launched to detect and test the weaknesses in the design and instruments. The target people in the pilot study were sourced from a WeChat group associated with Taobao online shopping and were individuals with a great deal of experience in online shopping. The questionnaire was designed on a famous Chinese survey platform called wenjuanxing, and the link to the questionnaire was sent to each participant through WeChat by the researcher. It is worth noting that every respondent could get a reward of 1 RMB after submission. In total, 150 questionnaires were distributed to the participants who shopped online in China. Using a seven-point Likert scale, ranging from strongly disagree (1) to strongly agree (7), respondents were asked to choose the answer that best described their level of agreement based on their last shopping experience. This pilot study lasted three days from 14th to 16th November 2017. The results showed that all participants answered and submitted the questionnaires, indicating a 100% response rate. In order to make sure that all the data was able to generate good quality results, invalid questionnaires were excluded based on these two requirements or criteria. Firstly, questionnaires submitted by the respondents who tended to respond similarly to all items or respond with a repeated rhythm were excluded. Besides, questionnaires whose completion time was less than 160 seconds (20 seconds for reading the description and filling in part 1 and an average of 5 seconds for remaining questions) were classed as invalid. In total, 48 questionnaires were deleted, and 102 questionnaires were left for analysis, with a 68% valid rate.

After removing the invalid questionnaires, the valid data were analysed by using preliminary basic statistical methods using SPSS 24, and the reliability and validity of the instrument will be presented in the following section.

4.4.2 Reliability test

Ticehurst and Veal (2000) state that “reliability is the extent to which research findings would be the same if the research were to be repeated at a later date,

or with a different sample of subjects.” In other words, the reliability of a measure reveals the extent to which the bias (being error-free) is not included in the measure, and hence, consistent measurements across time and different items in the instrument are offered (Alhaiou, 2011). The most popular indicator, Cronbach’s coefficient alpha, was adopted in this study to assess the reliability of a measurement scale with multi-point items, which reflected the homogeneity of the items in the scale. Sekaran (2000) claims that a reliability result of less than 0.6 is unacceptable, a result of at least 0.7 is acceptable, and results over 0.8 are considered to be good. Apart from the Cronbach’s alpha, another indicator, Corrected Item-Total Correlation (CITC), which is the correlation between scores on each item and the total scale scores, can help the author to measure something different from the scale as a whole (Pallant, 2010).

4.4.2.1 Reliability test of OLSM

The Cronbach's Alpha value shown in the reliability statistics table is 0.863 (>0.8), suggesting outstanding internal consistency reliability for the scale with this sample.

Table 4-9 Reliability Statistics of OLSM

Cronbach’s Alpha	Cronbach’s Alpha Based on Standardized items	N of Items
0.863	0.865	5

In addition, the CITC values shown in Table 4-10 demonstrate an indication of the degree to which each item correlates with the total score. Low values (less than 0.3) indicate that the item is measuring something different to the scale as a whole (Pallant, 2010). DeVellis (2003) also mentioned that items whose CITC values are over 0.5 should be kept and values below should be rejected. In this study, all CITC values from OLMS1 to OLMS5 are over 0.5. In addition, comparing the values in the column for Cronbach’s Alpha, if an item is deleted with the final alpha value obtained, the final value of 0.863 is the highest, which means that there is no need to consider removing any item from the scale.

Table 4-10 Item-Total Statistics of OLSM

Measurement items	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if item deleted
OLSM1	19.39	31.290	0.737	0.552	0.820
OLSM2	19.50	33.302	0.668	0.556	0.838
OLSM3	20.75	33.063	0.573	0.479	0.863
OLSM4	20.14	29.941	0.760	0.632	0.813
OLSM5	19.36	33.738	0.688	0.596	0.834

4.4.2.2 Reliability of e-satisfaction

As shown in table 4-11, all the values of CITC from ES1 to ES4 are far over 0.5 and the Cronbach's Alpha value is 0.896 (>0.8), suggesting excellent internal consistency reliability for the scale with this sample.

Furthermore, all the values in the column for Cronbach's Alpha if item deleted are smaller than the final Cronbach's Alpha 0.896. Hence, there is no need to remove any item from the scale to increase the final Cronbach's Alpha.

Table 4-11 Reliability of E-satisfaction Initial Measurement

Measurement items	Corrected Item-Total Correlation	Cronbach's Alpha if item deleted	Cronbach's Alpha
ES1	0.755	0.871	0.896
ES2	0.841	0.843	
ES3	0.706	0.893	
ES4	0.792	0.857	

4.4.2.3 Reliability of e-trust

As indicated in table 4-12, all the values of CITC from ET1 to ET4 are far over 0.5, and the Cronbach's Alpha value is 0.939 (>0.8), revealing excellent internal consistency reliability for the scale with this sample.

Also, all the values in the column for Cronbach's Alpha if an item is deleted are smaller than the final Cronbach's Alpha of 0.939. Hence, there is no need to eliminate any item from the scale to increase the final Cronbach's Alpha.

Table 4-12 Reliability of E-trust Initial Measurement

Measurement items	Corrected Item-Total Correlation	Cronbach's Alpha if item deleted	Cronbach's Alpha
ET1	0.874	0.913	0.939
ET2	0.815	0.934	
ET3	0.836	0.926	
ET4	0.899	0.906	

4.4.2.4 Reliability of e-commitment

As indicated in table 4-13, all the values of CITC from EC1 to EC3 are far over 0.5, and the Cronbach's Alpha value is 0.808 (>0.8), revealing good internal consistency reliability for the scale with this sample.

In addition, all the values in the column for Cronbach's Alpha if an item is deleted are less than the final Cronbach's Alpha. Hence, there is no need to delete any item from the scale to increase the final Cronbach's Alpha.

Table 4-13 Reliability of E-commitment Initial Measurement

Measurement items	Corrected Item-Total Correlation	Cronbach's Alpha if item deleted	Cronbach's Alpha
EC1	0.642	0.757	0.808

EC2	0.721	0.668
EC3	0.618	0.779

4.4.2.5 Reliability of e-loyalty

As indicated in table 4-14, all the values of CITC from EL1 to EL5 are far over 0.5, and the Cronbach's Alpha value is 0.940 (>0.8), revealing good internal consistency reliability for the scale with this sample.

In addition, all the values in the column for Cronbach's Alpha if an item is deleted are less than the final Cronbach's Alpha 0.940. Hence, there is no need to delete any item from the scale to increase the final Cronbach's Alpha.

Table 4-14 Reliability of E-loyalty Initial Measurement

Measurement items	Corrected Item-Total Correlation	Cronbach's Alpha if item deleted	Cronbach's Alpha
EL1	0.889	0.916	
EL2	0.777	0.938	
EL3	0.853	0.923	0.940
EL4	0.881	0.918	
EL5	0.794	0.933	

4.4.2.6 Reliability of signal credibility

As indicated in table 4-15, all the values of CITC from MS1 to MS3 are over 0.5, and the Cronbach's Alpha value is 0.770 (>0.7), revealing acceptable internal consistency reliability for the scale with this sample.

In addition, all the values in the column for Cronbach's Alpha if an item is deleted are less than the final Cronbach's Alpha. Hence, there is no need to delete any item from the scale to increase the final Cronbach's Alpha.

Table 4-15 Reliability of Signal Credibility Initial Measurement

Measurement items	Corrected Item-Total Correlation	Cronbach's Alpha if item deleted	Cronbach's Alpha
MS1	0.672	0.615	
MS2	0.608	0.686	0.770
MS3	0.536	0.763	

4.4.2.7 Reliability of switching cost

As indicated in table 4-16, all the values of CITC from SC1 to SC4 are far over 0.5, and the Cronbach's Alpha value is 0.889 (>0.8), revealing good internal consistency reliability for the scale with this sample.

In addition, all the values in the column for Cronbach's Alpha if an item is deleted are less than the final Cronbach's Alpha 0.889. Hence, there is no need to remove any item from the scale to increase the final Cronbach's Alpha.

Table 4-16 Reliability of Switching Cost Initial Measurement

Measurement items	Corrected Item-Total Correlation	Cronbach's Alpha if item deleted	Cronbach's Alpha
SC1	0.772	0.852	
SC2	0.734	0.867	0.889
SC3	0.790	0.845	
SC4	0.741	0.865	

4.4.3 Validity analysis

According to Burns and Bush (1995), validity refers to "the accuracy of measurement, whether the conceptual and operational definitions are truly a

reflection of the underlying concept to be measured.” Sekaran (2003) states that there are three types of validity tests, namely content validity, criterion-related validity, and construct validity.

Content validity mainly refers to the extent of subjective agreement from professionals that the measurement scales are able to accurately reflect what is supposed to be measure (Cooper and Schindler, 2001). In this study, content validity was tested by: (1) all items except items for measuring OLSM, which were derived from the previous literature review; (2) discussing with a group of professors, doctors, and Ph.D. students in terms of the items used to measure OLSM; (3) asking a number of people who have experiences in online shopping to provide their suggestions about whether each question was clear enough to answer.

Construct validity refers to “the extent to which the constructs relate to one another to measure a concept based on the theories underlying a research study” (Alhaiou, 2011). According to Pallant (2010), factor analysis is always used to test construct validity, including exploratory and confirmatory factor analysis. Exploratory factor analysis is often used in the early stages of research to gather information to explore the interrelationships among a set of variables. In contrast, confirmatory factor analysis is much more complex and complicated and will be used later in the research process to test or confirm specific hypotheses or theories concerning the structure underlying a set of variables. Leandre and Duane (2011) also state that exploratory factor analysis is useful to not only assist in identifying the key constructs needed to account for a particular area of inquiry, but also help to assess constructs in the process of development of measurement instruments. For the purpose of the pilot study, exploratory factor analysis was adopted to test the construct validity of measurement items in the scale.

4.4.3.1 Exploratory factor analysis

Exploratory factor analysis tries to group inter-correlated variables together into more general and manageable variables. More specifically, the aim of EFA is to decrease “the dimensionality of the original space and to give and interpretation to the new space, spanned by a reduced number of new

dimensions which are supposed to underlie the old ones” (Rietveld and Van, 1993) or to explain the variance in the observed variables in terms of underlying latent factors” (Habing, 2003). It is worth noting that EFA is particularly suitable for a preliminary analysis when there is a lack of solid theory about the relations of the indicators to the underlying constructs or scales (Gerbing and Anderson, 1988).

Generally speaking, the first step in conducting EFA is to assess the suitability of the data for factor analysis. Pallant (2010) asserts that two main issues are worth being considered in terms of determining whether a particular data set is suitable for factor analysis, including sample size and the strength of the relationships among each variable or item. Although there is a lack of agreement on how large a suitable sample should be, the general recommendation is the larger, the better and the minimum size should be 100. For the second issue, an inspection of the correlation matrix for evidence of coefficients greater than 0.3 is proposed by Pallant (2010). He also states that two statistical measures are generated by SPSS to help assess the factorability of the data, namely Bartlett’s test of sphericity and the Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy. According to Tabachnic and Fidell (2007), the KMO index ranges from 0 to 1, with a minimum of 0.6 suggested as an acceptable value for good factor analysis, while the Bartlett's test of sphericity should be significant ($p < 0.05$) for appropriate factor analysis.

In the EFA, there are various approaches that can be used to extract the number of underlying factors or dimensions, including principal components, principal factors, image factoring, and so on, and the most commonly used approach appears to be principal components analysis. In the process of principal components analysis, only factors with an eigenvalue of 1.0 or more are retained for further investigation. The eigenvalue of a factor stands for the extent to which the total variance can be explained by that factor (Pallant, 2010). According to Hair et al. (2010), the factor extracting process will not stop until the extracted factors occupy 95 per cent of the variance or until the last factor only accounts for less than 5 per cent of the variance in the natural sciences. In contrast, it is common to consider a solution that takes up 60 per cent of the total variance explained as satisfactory in the social sciences.

After factor extraction, factor rotation is adopted to help make clusters of variables load optimally (Hair et al., 2010). Then, factor loadings and factor scores will be calculated by SPSS. They also suggest that factor loadings with an absolute value greater than 0.4 are recommended and that less than 0.4 should be deleted.

Since there is a lack of theory about the relations between the designed items and the constructed scale of OLSM, it is necessary to utilize EFA to identify and test the construct validity.

4.4.3.2 Validity analysis of OLSM

The five items of the Online Logistic Service Mode Scale (OLSMS) were subjected to principal components analysis (PCA) using SPSS version 24. Prior to performing PCA, the suitability of data for factor analysis was assessed. Table 4-17 illustrates the KMO and Bartlett's test of OLSM. The KMO value was 0.785, exceeding the recommended value of 0.6, and Bartlett's test of Sphericity reached statistical significance, supporting the factorability of the correlation matrix.

Table 4-17 KMO and Bartlett's Test of OLSM

Kaiser-Meyer-Olkin Measure of Sampling Adequacy		0.785
	Approx. Chi-Square	254.693
Bartlett's Test of Sphericity	df	10
	Sig.	0.000

Principal components analysis shows the presence of one component with eigenvalues exceeding 1, explaining 65.11 percent of the variance (table 4-18), which is greater than the recommended 60 percent of the variance. An inspection of the screen plot also demonstrates a clear break after the first component. Since there is only one extracted component, the solution cannot be rotated.

Table 4-18 Total Variance Explained of OLSM

Component	Total	Initial Eigenvalues % of Variance	Cumulative %	Extraction Total	Sums of Squared % of Variance	Loadings Cumulative %
1	3.255	65.110	65.110	3.255	65.110	65.110
2	0.803	16.055	81.164			
3	0.373	7.467	88.632			
4	0.344	6.877	95.509			
5	0.225	4.491	100.00			

Extraction Method: Principal Component Analysis

Tables 4-19 and 4-20 reveal that almost all the communalities of each item are greater than 0.5, and all factor loadings are greater than 0.7, suggesting that these six items can reflect the construct effectively.

Table 4-19 Communalities of each item in OLSM

Measurement Items	Initial	Extraction
OLSM1	1.000	0.716
OLSM2	1.000	0.646
OLSM3	1.000	0.497
OLSM4	1.000	0.727
OLSM5	1.000	0.669

Extraction Method: Principal Component Analysis

Table 4-20 Component Matrix (a)

Measurement Items	Component 1
OLSM4	0.853
OLSM1	0.846
OLSM5	0.818
OLSM2	0.804
OLSM3	0.705

4.4.3.3 Validity analysis for rest scales

Since the designed measurement items of the rest scales derived from different researchers and some minor changes exist in the measurement items, it is necessary to use EFA to test each scale to check whether the measurement

items in each scale could measure what it claims or purports, to be measuring and whether the measurement items in each scale could reflect corresponding scale effectively. The procedures of exploratory factor analysis for the remaining constructs and items are similar to those for OLSM, and table 4-21 below reveals the results of EFA. As seen in the table, each value of all constructs is greater than the recommended value of 0.6, and for each Bartlett's test of sphericity, the p value of all scales is 0.000, which is at the level of $p < 0.001$. Both indicators have reached statistical significance, supporting the factorability of the correlation matrix.

Table 4-21 The results of Exploratory Factor Analysis for rest scales

Construct	KMO	Bartlett's Test of Sphericity		
		Approx. Chi-Square	df	Sig.
E-satisfaction	0.795	265.765	6	0.000
E-trust	0.844	369.395	6	0.000
E-commitment	0.695	102.311	3	0.000
E-loyalty	0.879	462.505	10	0.000
Switching cost	0.813	230.977	6	0.000
Signal Credibility	0.674	82.667	3	0.000

Table 4-22 Exploratory factor analysis for rest scales

Construct	Measurement items	Communalities	Factor loadings	Total Variance Extracted	Remain or not
E-satisfaction	ES1	0.760	0.872	76.88%	✓
	ES2	0.847	0.921		✓
	ES3	0.683	0.827		✓
	ES4	0.784	0.886		✓
E-trust	ET1	0.870	0.933	84.75%	✓
	ET2	0.800	0.895		✓

	ET3	0.826	0.909		✓
	ET4	0.894	0.945		✓
	EC1	0.705	0.839		✓
E-commitment	EC2	0.787	0.887	72.48%	✓
	EC3	0.682	0.826		✓
	EL1	0.866	0.931		✓
	EL2	0.730	0.854		✓
E-loyalty	EL3	0.828	0.910	80.85%	✓
	EL4	0.863	0.929		✓
	EL5	0.755	0.869		✓
	SC1	0.772	0.879		✓
Switching cost	SC2	0.728	0.853	75.33%	✓
	SC3	0.785	0.886		✓
	SC4	0.728	0.853		✓
	MS1	0.757	0.870		✓
Signal Credibility	MS2	0.696	0.834	68.67%	✓
	MS3	0.607	0.779		✓

As depicted in table 4-22, all measurement items have communalities of over 0.60, suggesting that the variables can significantly load on the factors. In addition, almost all factor loadings of the measurement items are greater than 0.80, except MS3, with a 0.779 factor loading. These results prove that all items can reflect corresponding variables effectively. Furthermore, the total variance extracted for each variable is over than 60 per cent, which illustrates that it is reliable to extract only one component as the principal component.

In summary, all measurement items have passed both reliability and validity tests. Hence, all measurement items are recommended to be retained in the questionnaire.

4.5 Data collection method

4.5.1 Questionnaire survey

A questionnaire is a series of questions that are pre-defined so as to solve or analyse a specific problem. Selected participants were asked to finish or answer these questions in order to provide adequate data to help the researcher to analyse the studied phenomenon and obtain conclusions or solutions. McDaniel and Gates (2006) indicate that various methods for collecting data are adopted in marketing research, in which focus groups, in-depth interviews, and surveys are widespread and popular. In this study, a survey was utilized to collect the primary data. According to Aaker et al. (2000), the decision to select a survey method may be based on a number of factors, including sampling, type of population, question format, question content, response rate, costs, and duration of data collection. Weber (2004) also insists that the choice of different research methods is largely because of factors like type of training provided for the researcher, social pressures related to advisors, and preferences of obtaining certain types of insights during the research.

According to Dwivedi (2005), the case study method was preferred when the researcher considered an organization as a unit of analysis, while the survey approach was preferred in terms of studies associated with individual users or customers. This can be attributed to issues such as convenience, cost, time, and accessibility (Gilbert, 2001). In addition, the goal of this study was to examine the relationship between OLSM and e-loyalty. Hence, in order to obtain an overall picture of the research issue, collecting data from a large number of participants was necessary. This meant that employing any other approach, like ethnography, which uses interviews or observation as data collection tools, would cost a substantial amount of financial resources and time. Therefore, a survey approach was much more appropriate in this study.

In addition to the above reasons, the choice of the approach in this research was also affected by the type of theory and models employed to examine the relationships between the variables (Chapter 3). The conceptual model proposed in Chapter 3 contains some research hypotheses that needed to be tested and proven before concluding this study. Hence, collecting quantitative data and statistical analysis were required so as to check the research hypotheses. Although a number of research approaches are available within the category of quantitative positivist research (Straub et al., 2005), on the basis

of the above-mentioned analysis, it was decided that the survey was one of the most appropriate and practicable research approaches for conducting this research.

4.5.2 Designing the questionnaire

The survey questionnaire was divided into the following parts:

- An introductory section about the research objectives by the author to the participants.
- Designed questions by the researcher for participants to fill in.

The questions in the survey questionnaire consisted of three parts. The first section addressed individual demographic information, such as gender, age, level of education, monthly income, and number of years associated with online shopping. The second part of the survey questionnaire comprised eight questions related to the logistics service in participants' last shopping experience, in which individuals were asked to answer how they felt about the online retailer's OLSM and logistics service price. The final part was made up of 20 questions and dealt with the features of the remaining five constructs in the research model.

As stated in the operationalisation of each construct, all the items in the second and third sections were measured by using a seven-point Likert scale, ranging from 1 'strongly disagree' to 7 'strongly agree'. Symonds (1924) was the first to suggest that seven categories gives the most reliable results, and Finn's (1972) research bore that out, suggesting that reliability is maximized with seven-point scales. Furthermore, similar conclusions were drawn by Oaster (1989) with regards to test-retest reliability and inter-item consistency. Therefore, a seven-point Likert scale was selected for this research due to its high reliability and appropriateness for the nature of the research.

Similar as the process adopted by Farrgwia (2012), the questionnaire was designed in English, the source language, and then translated into Chinese, the target language, by the researcher. A panel of experts was invited to validate the questionnaire (Brislin, 1970), including three marketing and logistics academicians and two bilingual translators (English/Chinese), with the aim of

ensuring that the questions were free from ambiguous wording or errors and participants could understand it easily (Burns and Bush, 2002). After revising the designed questionnaire, the final Chinese version was used for data collection.

4.5.3 Questionnaire distribution and administration

A self-administered survey was adopted in this study. According to Grossnickle and Raskin (2011), a self-administered questionnaire is a questionnaire that has been designed specifically to be filled in by the participants without any intervention of the researchers. In other words, participants are able to carefully consider and answer the questions at their direction, which in turn increases the effectiveness of the data. In addition, self-administered surveys enable researchers to reach a large number of potential participants in a variety of locations, especially when using online questionnaires (Kassim, 2001). Kassim (2001) also states other advantages of self-administered surveys, such as a higher response rate of almost 100%, better privacy for respondents, and a higher degree of control over sample selection.

4.5.4 Sampling methods

Oates (2006) claims that sampling methods refers to how the researcher chose the actual participants of the study, including probability sampling and non-probability sampling. Probability sampling means that every unit in the population has a chance greater than zero of being selected in the sample, and this probability can be accurately determined. In contrast, non-probability sampling is a method in which some elements of the population have no chance of selection or the probability of selection cannot be accurately determined.

According to Alhaiou (2011), probability sampling is always used when the purpose of the research is to draw conclusions or make predictions affecting the population as a whole, while non-probability sampling is always adopted when it is not necessary to have a representative sample or when it is not possible to obtain it. This study aimed to investigate online shoppers. However, the internet represents a common problem for surveying, as there is no central registry of all online shoppers. As such, this research attempted to select a

subset of online shoppers to participate. Online customers from some Wechat groups on the topic of 'online shopping' were selected, and convenience sampling was adopted to enable the researcher to collect data from these participants efficiently. Although random sampling techniques are not usually employed due to the lack of generalization in the research, it was found that the sample characteristics of this study could represent the target population to some extent.

4.5.5 Sample size

In this study, a total of 33 observed items were included: five items for demographic information, five items for online logistics service mode, four items for e-satisfaction, three items for e-trust, four items for e-commitment, five items for e-loyalty, four items for switching cost, and three items for signal credibility.

The sample size determination for this research depended on Structural Equation Modelling (SEM), which is quite sensitive to sample size and lack of stability when estimated from small samples (Tabachnick and Fidell, 2011). Currently, there is still no consistent criteria for minimum sample size. Minimum sample size recommendations are based on having a sufficient sample size to reduce the likelihood of convergence problems and to obtain unbiased estimates or standard errors. Several guidelines associated with determining adequate sample size for SEM in the literature have been introduced. Kline (1998) argues that almost any type of SEM analysis may be untenable with a small sample size less than 100. Similarly, Anderson and Gerbing (1984) indicate that the model fails to converge with a sample size equal to 100. Jackson (2001) offers rough guidelines for the optimal SEM sampling size, suggesting that the minimum sample size should be between 200 and 400. Apart from specific numbers for sample size, the ratio of cases to free parameters is commonly used for minimum recommendations. Tanaka (1987) and Bentler and Chou (1987) state that the minimum sample size is required to be at least five times and ten times greater than the observed variables respectively, which suggests that in the case of this research, 165 and 330 respondents were needed respectively. Moreover, Stevens (1996) suggests that 15 cases per predictor are necessary for a reliable equation in terms of

social sciences research, which implies that in case of this research, at least 495 respondents were needed to get a reliable equation.

Considering the model complexity of this study and the rough guidelines from previous research, an estimation of a minimum 500 sample size was felt to be necessary to meet the requirements for SEM analysis. In the end, a total of 563 valid questionnaires were received within two weeks.

4.6 Main survey data processing and analysis

After collecting the data through the survey questionnaire, the following processes were used to check and code the data. Checking the data involves checking the missing data, outliers, and normality. However, outliers do not really exist in Likert scales. In other words, answering at the extreme (1 or 7) is not really a representative outlier behaviour. Hence, there is no need to check the outliers in the later analysis of data. Coding the data was done by assigning a number to the data. This can be done in two ways, namely pre-coding and post-coding (Wong, 1999). In this study, pre-coding was used in questions 6-33, giving a number corresponding to a particular selection, while post-coding was needed to code the first demographic part. For example, the author coded the gender 'male' as 1 and 'female' as 2.

After processing the data, the collated data was analysed using SPSS version 24.0, AMOS version 24.0 and Process 3.0.

4.7 Main survey statistical techniques

The final step is to select the appropriate statistical analysis techniques. According to Malhotra (1999), in order to select proper techniques in the study, some research elements, including the research problem, objectives, characteristics of the data, and the underlying properties of the statistical techniques, are considered. In order to reach the goals of this research, the following statistical analysis techniques were utilized.

4.7.1 Descriptive statistics

Kassim (2001) and Zikmund (2000) state that descriptive statistics involves the transformation of raw data into a form that can provide information to describe a set of factors in a way that will make them easy to understand and interpret.

Descriptive analysis is “a univariate analysis which consists of frequency tables, diagrams, measures of central tendency (mean, median, and mode) and measures of dispersion” (Bryman and Bell, 2003). In this research, descriptive methods were used to organize, describe, and summarise data to not only gain views about the different characteristics of the sample structure and distribution, but also obtain the different effects of the different characteristics of the sample on scales like e-satisfaction, e-trust, and so on.

4.7.2 Correlation analysis

Correlation is a term that stands for the degree of association between two variables, where a high or strong correlation means that these two or more variables have a strong relationship with each other, while a low or weak correlation implies that the variables are hardly related (Pallant, 2010). Hence, correlation analysis aims to examine the direction and strength of relationships between variables with available statistical data. According to Robson (2002), a correlation matrix contains the values of the correlation coefficients for the variables involved. Pfeifer (2005) states that the correlation appears to be very low if the value of the coefficient is under 0.20, low between 0.21 and 0.40, moderate between 0.41 and 0.70, and high between 0.71 and 0.91.

The most common type of correlation coefficient is the Pearson r . This analysis assumes that the two variables being analysed are measured on at least interval scales, meaning that they are measured with a range of increasing values. The coefficient is calculated by taking the covariance of the two variables and dividing it by the product of their standard deviations (Pallant, 2010). In this study, Pearson r was used to search for the relationships between each measured variable and latent variable respectively.

4.7.3 Factor analysis

According to Rummel (1967), factor analysis contributes to reducing the information from a large number of variables into a small number of factors, which is a statistical technique used for a large set of variables to establish interrelationships between such variables. As discussed before, factor analysis is always used to test construct validity, including EFA and confirmatory factor

analysis (CFA). Since a detailed description of EFA has been provided in the previous section, the next section will introduce CFA in detail.

4.7.3.1 Confirmatory factor analysis (CFA)

CFA is a multivariate statistical technique used to test and verify the factor structure of a set of measured variables (Diana, 2001). CFA and EFA are potent techniques used to test construct validity. As mentioned previously, EFA is often used in the early stages of research to gather information to explore the possible underlying factor structure of a set of observed variables without imposing a preconceived structure on the outcomes. In contrast, CFA is used later in the research process to test or confirm specific hypotheses or theories concerning the structure underlying a set of variables. CFA is a tool that is used to confirm or reject the measurement theory. CFA “allows the researcher to test the hypothesis that a relationship between observed variables and their underlying latent constructs exists” (Fox, 2010). In addition, the researcher uses “knowledge of the theory, empirical research, or both, postulates the relationship pattern a priori and then tests the hypothesis statistically” (Noar, 2003).

CFA is a unique form of SEM. According to Child (1990), the CFA process checks whether the proposed structure provides an excellent fit to the data, or in other words, that a relationship between the observed variables and their underlying latent, unobserved, or unmeasured scales exists. Truxillo (2003) demonstrates several steps for performing CFA as follows:

- a) Determine the model based on previous theory.
- b) Collect data to test the model.
- c) Conduct preliminary descriptive statistical analysis to check for data cleaning and screening including missing data, outliers, multivariate normality, and so on.
- d) Run the CFA procedure using AMOS and obtain both the parameter estimates and model fit indices.
- e) Assess model fit and interpret the results.

4.7.4 Structural Equation Modelling (SEM)

SEM typically refers to a general statistical modelling technique used to investigate and seek causal relationships between latent or unobserved variables (Hox and Bechger, 2005). It is widely used in the behavioural sciences, especially for theory testing. According to Hox and Bechger (2005), SEM can be regarded as a combination of factor analysis and regression or path analysis. The interest in SEM is often on theoretical constructs, which are represented by the latent factors. SEM provides a very general and convenient framework for statistical analysis and contains several traditional multivariate procedures, such as factor analysis, regression analysis, canonical correlation, and so on.

According to Fatthwia (2012), SEM is composed of two main parts, including a measurement model and a structural model, in which the measurement model for both CFA and SEM is a multivariate regression model that describes the relationships between a set of observed dependent variables and a set of continuous latent variables. The structural model illustrates three types of relationships in a set of multivariate regression equations, namely the relationships among factors, the relationships among observed variables, and the relationships between factors and observed variables that are not factor indicators. Structural equation models are usually visualized by a graphical path diagram. According to Norgate (2009), there are four advantages of SEM compared to traditional techniques. Firstly, it makes the assumptions, constructs, and hypothesized relationships in theory explicit. In addition, it adds a degree of precision to theory and permits a more complete representation of elaborate theories. Finally, a formal framework for constructing and testing both theories and measures is provided.

4.8 Ethical considerations

According to Saunders et al. (2016), ethical issues are always considered at the stage of designing project and gaining access. At the start of designing a project, the harmlessness of the research should be confirmed, and appropriate research methods should be chosen. Moreover, ethical issues (e.g. pressure must not be put any participants) should be taken into account when researchers seek access to the data. In this study, the survey contained a

participant information sheet and a consent form to explain the purpose and objectives of the study and describe the potential risks derived from the survey platform. The documents indicated that taking part was voluntary and if participants did not want to take part, they did not need to give a reason and no pressure would be put on them to try and change their mind. Also, the information was collected anonymously, and all the information collected from participants was confidential and used for this study only. The data was collected and stored on the secured server of the online questionnaire platform provider. Only researchers of this study have access to the data, and the data will be destroyed immediately as soon as the study is finished.

Chapter 5 Data Analysis

5.1 Introduction

In the previous chapter, the research methodology was identified and justified for this study. A pilot study was conducted with the aim of checking the reliability and validity of designed constructs. This chapter will discuss the results of the quantitative data collected from questionnaires completed by participants with online shopping experiences. This data will be used to discuss the relationships between the dependent and independent variables mentioned in the proposed structures in Chapter 3. Firstly, the data will be examined, including data cleaning and screening. The descriptive analysis will be analysed in section 5.3, to reveal the influence of demographic characteristics on e-satisfaction, e-trust, e-commitment, and e-loyalty. Following section 5.3, the reliability and validity of the main survey data and the measurement model will be conducted using SPSS 24.0 (or 22.0) and AMOS 24.0 (Confirmatory Factor Analysis; CFA). Then, structural equation modeling (SEM) will be applied to measure the relationships between the dependent and independent variables, to test the hypotheses, and to examine the mediating effects. Finally, SPSS will be used to test the moderating effects.

5.2 Response rate and validity

Questionnaires were distributed to 1000 participants with the online shopping experience, in online shopping groups on WeChat. All participants finished and submitted their questionnaires, a 100% response rate. After eliminating 437 invalid questionnaires, based on the criteria mentioned in Chapter 4, 563 valid questionnaires were left, a 56.3% validity rate. The number of valid questionnaires exceeded the suggested minimum size for structural equation modeling, which was discussed in Chapter 4.

5.3 Data cleaning and screening

This section discusses the process of cleaning and screening the data, before it was analysed. There was no missing data in the returned questionnaires. As mentioned in Chapter 4, there were no outliers in the Likert scale. As a result, this section introduces the normality test of the data.

5.3.1 Normality

According to Hulland et al. (1996), the preliminary assumption about SEM is that all data will have a multivariate normal distribution. Tabachnick and Fidell (2001) further explain that this assumption is necessary, to allow for significance testing using t-test and F statistics. Kassim (2001) also supports the previous opinions by stating that a lack of normality may negatively influence the goodness-of-fit indices and standard errors. Therefore, it is essential to check the normality of collected data before further statistical analysis. As suggested by Pallant (2010), normality can be assessed to some extent by obtaining the values of skewness and kurtosis. Skewness is the symmetry of distribution, while kurtosis is the peakedness of a distribution. Kline (2015) suggests that an absolute value of skewness lower than 3.0, and an absolute value of kurtosis lower than 10.0, may indicate that the data was distributed normally.

Table 5-1 illustrates the sample descriptive statistics for all variables. As observed in the table, no variables have an absolute skewness value greater than 3.0, and all absolute values of kurtosis are less than 10.0. The minimum and maximum values of kurtosis are -0.843 and 1.470, respectively, while the minimum and the maximum values of skewness are -0.941 and 0.595, respectively. These results indicate that the data is distributed normally.

Table 5-1 Sample Descriptive Statistics

	Minimum	Maximum	Mean	Std. Deviation	Skewness	Kurtosis		
	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
Gender	1	2	1.67	0.470	-0.732	0.103	-1.470	0.206
Age	1	6	4.14	1.038	-0.941	0.103	0.366	0.206
Education	1	3	1.62	0.563	0.193	0.103	-0.793	0.206
Monthly income	1	5	2.65	1.124	0.595	0.103	-0.282	0.206
Shopping years	1	4	2.85	1.082	-0.359	0.103	-1.220	0.206
OLSM1	1	7	5.02	1.569	-0.454	0.103	-0.325	0.206

OLMS2	1	7	5.17	1.427	-0.537	0.103	-0.082	0.206
OLMS3	1	7	4.33	1.621	-0.043	0.103	-0.692	0.206
OLMS4	1	7	4.52	1.691	-0.291	0.103	-0.650	0.206
OLMS5	1	7	5.18	1.507	-0.561	0.103	-0.411	0.206
MS1	1	7	4.04	1.575	-0.032	0.103	-0.480	0.206
MS2	1	7	4.04	1.668	-0.044	0.103	-0.838	0.206
MS3	1	7	4.56	1.614	-0.268	0.103	-0.656	0.206
ES1	1	7	5.35	1.272	-0.534	0.103	-0.017	0.206
ES2	1	7	5.23	1.348	-0.519	0.103	-0.266	0.206
ES3	1	7	4.75	1.431	-0.233	0.103	-0.451	0.206
ES4	1	7	5.04	1.375	-0.340	0.103	-0.321	0.206
ET1	1	7	5.21	1.393	-0.500	0.103	-0.339	0.206
ET2	1	7	5.12	1.366	-0.465	0.103	-0.227	0.206
ET3	1	7	5.47	1.254	-0.600	0.103	-0.022	0.206
ET4	1	7	5.31	1.279	-0.468	0.103	-0.189	0.206
EC1	1	7	4.23	1.775	-0.281	0.103	-0.843	0.206
EC2	1	7	4.42	1.670	-0.360	0.103	-0.537	0.206
EC3	1	7	4.72	1.578	-0.466	0.103	-0.335	0.206
EL1	1	7	4.90	1.607	-0.508	0.103	-0.357	0.206
EL2	1	7	4.71	1.669	-0.422	0.103	-0.599	0.206
EL3	1	7	5.07	1.489	-0.587	0.103	-0.043	0.206
EL4	1	7	5.11	1.445	-0.541	0.103	-0.105	0.206
EL5	1	7	4.67	1.597	-0.409	0.103	-0.437	0.206
SC1	1	7	4.82	1.591	-0.536	0.103	-0.303	0.206
SC2	1	7	4.96	1.421	-0.470	0.103	-0.141	0.206
SC3	1	7	4.46	1.634	-0.343	0.103	-0.541	0.206
SC4	1	7	4.45	1.737	-0.306	0.103	-0.732	0.206

5.4 Descriptive statistics for demographic variables

5.4.1 Profiles of respondents

The important demographic characteristics of the participants are illustrated in Table 5-2 below. The table demonstrates that there is no missing data in this study. Respondents were mostly female (67.1%), and the dominant age range of the respondent was 41 to 50 years of age, at 42.3%. The level of education data shows that most respondents hold bachelor's degrees (54.2%), while the monthly income of most participants (38.9%) is in the range of 2000 to 4000RMB. The respondents have significant experience in online shopping, as 37.8% indicated that they have been shopping online for more than five years, and 86% have more than one year of the online shopping experience. This increases the effectiveness of the completed questionnaires, due to the respondents' substantial online shopping experiences.

Table 5-2 Individual Characteristics Descriptive Statistics

Variables	Categories	Frequency	Percent	Valid Percent (%)	Cumulative Percent (%)
Gender	Male	185	32.9	32.9	32.9
	Female	378	67.1	67.1	100
Age	<18	8	1.4	1.4	1.4
	18-25	49	8.7	8.7	10.1
	26-30	62	11	11	21.1
	31-40	194	34.5	34.5	55.6
	41-50	238	42.3	42.3	97.6
	>50	12	2.1	2.1	100
	Level of education	Diploma degree and below	235	41.7	41.7
Bachelor degree		305	54.2	54.2	95.9
Masters and PhD		23	4.1	4.1	100
<2000RMB		71	12.6	12.6	12.6

	2000-4000RMB	219	38.9	38.9	51.5
Monthly Income	4001-6000RMB	163	29	29	80.5
	6001-8000RMB	55	9.8	9.8	90.2
	>8000RMB	55	9.8	9.8	100
	<1y	79	14	14	14
Online shopping years	1-3y	142	25.2	25.2	39.3
	3-5y	129	22.9	22.9	62.2
	>5y	213	37.8	37.8	100

5.4.2 The effects of demographic variables

This study does not aim to investigate the effects of customers' demographic characteristics, such as age, gender and monthly income, on their satisfaction and loyalty towards online retailers. However, the effects of age, gender, monthly income, shopping experience, and education level are analysed, which may help online retailers to segment the market and develop more appropriate marketing strategies.

According to Pallant (2010), an independent-sample t-test is adopted to compare the mean scores of two different groups of people or conditions, while a paired-samples t-test is used to compare the mean scores for the same group of people on two different occasions. However, other control variables have more than two groups. In this situation, a one-way analysis of variance (ANOVA) is the appropriate method to compare the mean scores of more than two groups. If the significant value of the Levene statistic is greater than 0.05, the assumption of homogeneity of variance is not violated. The LSD method can be used for multiple comparisons, while the Dunnett T3 method is selected for post hoc multiple comparisons if the significant value of the Levene's test is equal to or less than 0.05 (the assumption of homogeneity of variance is rejected).

5.4.2.1 The effect of gender

There are two categories of gender, male and female, so an independent-sample t-test is used in this section. It is worth noting that when the significant value for Levene's test is greater than 0.05 ($p > 0.05$), the first line named equal variances assumed should be used, while the second line called equal variances not assumed is available if $p < 0.05$. The results of the independent-sample t-test of gender are recorded in the table below, in which e-satisfaction (ES), e-trust (ET), e-commitment (EC) and e-loyalty (EL) are entered as test variables. As indicated in Table 5-3, the male group's satisfaction, trust, commitment, and loyalty are higher than that of the female group, but the results are not significant.

Table 5-3 Influences of Gender on ES, ET, EC and EL

Test Variables	Gender	Number	Mean	SD	Levene's test	Sig.	t																																
ES	Male	185	5.162	1.333	0.026	0.872	0.336																																
	Female	378	5.122	1.345				ET	Male	185	5.111	1.378	0.299	0.585	0.177	Female	378	5.089	1.344	EC	Male	185	4.899	1.537	0.430	0.512	0.422	Female	378	4.840	1.589	EL	Male	185	5.058	1.357	0.031	0.859	1.401
ET	Male	185	5.111	1.378	0.299	0.585	0.177																																
	Female	378	5.089	1.344				EC	Male	185	4.899	1.537	0.430	0.512	0.422	Female	378	4.840	1.589	EL	Male	185	5.058	1.357	0.031	0.859	1.401	Female	378	4.889	1.344								
EC	Male	185	4.899	1.537	0.430	0.512	0.422																																
	Female	378	4.840	1.589				EL	Male	185	5.058	1.357	0.031	0.859	1.401	Female	378	4.889	1.344																				
EL	Male	185	5.058	1.357	0.031	0.859	1.401																																
	Female	378	4.889	1.344																																			

5.4.2.2 The effect of age

There are six categories of age in this study: younger than 18, 18 to 25, 26 to 30, 31 to 40, 41 to 50 and older than 50. As a result, a one-way ANOVA will be used to test the influence of age on ES, ET, EC and EL. As shown in Table 5-4, the age variable does not have a significant influence on ES ($F=1.214$, $p > 0.05$), ET ($F=0.525$, $p > 0.05$), EC ($F=1.500$, $p > 0.05$), or EL ($F=0.657$, $p > 0.05$).

Table 5-4 Influences of Age on ES, ET, EC and EL

Dependent Variables	Descriptives				Levene Statistic	F	Sig.
	Age	N	Mean	SD			
ES	<18	8	5.156	1.322	2.764	1.214	0.301
	18-25	49	5.408	1.135			
	26-30	62	5.347	1.130			
	31-40	194	5.001	1.449			
	41-50	238	5.146	1.333			
	>50	12	4.854	1.338			
	Total	563	5.135	1.340			
ET	<18	8	4.781	1.887	2.396	0.525	0.758
	18-25	49	5.168	1.303			
	26-30	62	5.262	1.163			
	31-40	194	5.091	1.476			
	41-50	238	5.037	1.301			
	>50	12	5.417	1.165			
	Total	563	5.096	1.354			
EC	<18	8	3.583	1.621	1.948	1.500	0.188
	18-25	49	4.925	1.531			
	26-30	62	4.941	1.551			
	31-40	194	4.806	1.653			
	41-50	238	4.881	1.513			
	>50	12	5.444	1.373			
	Total	563	4.859	1.571			
EL	<18	8	5.000	1.209	3.522	0.657	0.657
	18-25	49	5.127	1.214			
	26-30	62	5.110	1.128			
	31-40	194	4.834	1.456			
	41-50	238	4.945	1.351			
	>50	12	5.100	1.252			
	Total	563	4.945	1.351			

Total	563	4.945	1.350
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5.4.2.3 The effect of education level

A one-way ANOVA was conducted to explore the impact of education level on ES, ET, EC and EL. Participants were divided into three groups based on education level: no undergraduate degree, an undergraduate degree and master's degree and above. As shown in Table 5-5, there were no statistically significant differences in ES ($F=1.611$, $p>0.05$), ET ($F=0.450$, $p>0.05$), EC ($F=0.096$, $p>0.05$) and EL ($F=1.791$, $p>0.05$) scores for the three different groups.

Table 5-5 Influences of education level on ES, ET, EC and EL

Descriptives							
Dependent Variables	Education	N	Mean	SD	Levene Statistic	F	Sig.
ES	Below Undergraduate	235	5.251	1.233	3.771	1.611	0.201
	Undergraduate	305	5.061	1.410			
	Master and above	23	4.935	1.398			
	Total	563	5.135	1.340			
ET	Below Undergraduate	235	5.141	1.307	1.359	0.450	0.638
	Undergraduate	305	5.078	1.368			
	Master and above	23	4.880	1.649			
	Total	563	5.096	1.354			
EC	Below Undergraduate	235	4.879	1.569	2.554	0.096	0.908
	Undergraduate	305	4.836	1.593			
	Master and above	23	4.957	1.323			
	Total	563	4.859	1.571			
EL	Below Undergraduate	235	5.071	1.277	3.289	1.791	0.168
	Undergraduate	305	4.859	1.395			
	Master and above	23	4.791	1.408			
	Total	563	4.945	1.350			

5.4.2.4 The effect of monthly income

A one-way ANOVA was conducted to explore the impact of monthly income on ES, ET, EC and EL. Participants were divided into five groups, according to their monthly income. Group one included participants with a monthly income less than 2000 RMB. Group two had a monthly income of 2000 to 4000 RMB. Group three had a monthly income of 4000 to 6000 RMB. Group 4 had a monthly income of 6000 to 8000 RMB. Group five had a monthly income of more than 8000 RMB. The results from Table 5-6 indicate that monthly income has a significant influence on ES ($F=2.410$, $p<0.05$), ET ($F=2.701$, $p<0.05$) and EC ($F=2.957$, $p<0.05$), while there is no significant influence on EL ($F=1.521$, $p>0.05$).

Table 5-6 Influences of Monthly Income on ES, ET, EC and EL

		Descriptives						
Dependent Variables	Monthly income	N	Mean	SD	Levene Statistic	F	Sig.	
ES	<2000	63	4.901	1.354	0.112	2.410	0.048	
	2000-4000	212	5.014	1.320				
	4000-6000	165	5.179	1.325				
	6000-8000	67	5.500	1.389				
	>8000	56	5.290	1.319				
	Total	563	5.135	1.340				
ET	<2000	63	4.877	1.249	1.890	2.701	0.030	
	2000-4000	212	4.969	1.419				
	4000-6000	165	5.173	1.277				
	6000-8000	67	5.522	1.229				
	>8000	56	5.089	1.489				
	Total	563	5.096	1.354				
EC	<2000	63	4.698	1.526	1.159	2.957	0.020	
	2000-4000	212	4.714	1.612				
	4000-6000	165	4.794	1.578				
	6000-8000	67	5.323	1.484				
	>8000	56	5.226	1.427				

	Total	563	4.859	1.571			
	<2000	63	4.683	1.474			
	2000-4000	212	4.871	1.300			
	4000-6000	165	4.993	1.350			
EL	6000-8000	67	5.194	1.362	0.506	1.521	0.195
	>8000	56	5.079	1.350			
	Total	563	4.945	1.350			

To investigate the actual differences in mean scores between the groups, multiple comparisons were conducted between the groups for ES, ET and EC. Table 5-7 shows the results of the multiple comparisons on customer satisfaction, trust and commitment. As demonstrated in the table, group four has a significantly higher influence on ES, ET and EC than group one and group two. In addition, group five has a significantly higher influence on EC than group two, while group three has a significantly lower effect on EC compared to group four. Finally, there are no significant differences between each two of the groups.

Table 5-7 Multiple Comparisons of Monthly Income

Monthly Income (I)	Monthly Income (J)	Mean Difference (I-J)		
		E-satisfaction	E-trust	E-commitment
<2000	2000-4000	-0.113	-0.092	-0.015
	4000-6000	-0.278	-0.300	-0.096
	6000-8000	-0.599*	-0.645*	-0.625*
	>8000	-0.389	-0.212	-0.528
2000-4000	4000-6000	-0.165	-0.203	-0.080
	6000-8000	-0.486*	-0.553*	-0.610*
	>8000	-0.276	-0.120	-0.512*
4000-6000	6000-8000	-0.321	-0.350	-0.530*
	>8000	-0.114	0.083	-0.432
6000-8000	>8000	0.210	0.433	0.097

5.4.2.5 The effect of shopping years

A one-way ANOVA was conducted to explore the impact of online shopping years on ES, ET, EC and EL. Participants were divided into four groups, according to the number of years they have engaged in online shopping. Group one had been shopping online for less than one year. Group two had been shopping online for one to three years. Group three had been shopping online for three to five years. Group four had been shopping online for over five years. The results from Table 5-8 indicate that monthly income has a significant influence on ET ($F=5.653$, $p<0.01$), EC ($F=4.597$, $p<0.01$) and EL ($F=3.737$, $p<0.05$), while there is no significant difference in ES ($F=1.664$, $p>0.05$) for the four groups.

To investigate the actual differences in mean scores between the groups, multiple comparisons were conducted between the groups for ET, EC and EL. Table 5-9 shows the results of the multiple comparisons on the effects of the different monthly income groups on customer's trust, commitment, and loyalty. As depicted in this table, group four has a significantly higher influence on ET than group one and group two. Furthermore, group four has a significantly higher impact on EC than group three. Finally, there are no significant differences between each two of the groups.

Table 5-8 Influences of Shopping Years on ES, ET, EC and EL

Descriptives							
Dependent Variables	Shopping years	N	Mean	SD	Levene Statistic	F	Sig.
ES	<1y	74	4.922	1.382	0.277	1.664	0.174
	1-3y	141	5.039	1.330			
	3-5y	136	5.129	1.383			
	>5y	212	5.277	1.297			
	Total	563	5.135	1.340			
ET	<1y	74	4.841	1.394	6.118	5.653	0.001
	1-3y	141	4.863	1.438			
	3-5y	136	5.031	1.469			

	>5y	212	5.382	1.147			
	Total	563	5.096	1.354			
	<1y	74	4.613	1.692			
	1-3y	141	4.745	1.552			
EC	3-5y	136	4.632	1.697	5.834	4.597	0.003
	>5y	212	5.167	1.408			
	Total	563	4.859	1.571			
	<1y	74	4.611	1.508			
	1-3y	141	4.767	1.330			
EL	3-5y	136	5.047	1.362	2.881	3.737	0.011
	>5y	212	5.113	1.269			
	Total	563	4.945	1.350			

Table 5-9 Multiple Comparisons of Shopping Years

Monthly Income (I)	Shopping Years (J)	Mean Difference (I-J)		
		E-trust	E-commitment	E-loyalty
<1	1-3	-0.022	-0.132	-0.157
	3-5	-0.190	-0.020	-0.436
	>5	-0.541*	-0.554	-0.502
1-3	3-5	-0.168	0.112	-0.280
	>5	-0.519*	-0.422	-0.346
3-5	>5	0.351	-0.534*	-0.066

5.5 Reliability and validity analysis of the main survey

5.5.1 Reliability of the main survey

The definition of reliability has been introduced in detail in Chapter 4. As mentioned, the indicator Cronbach's coefficient alpha (CA) is the indicator most frequently used to assess internal consistency and reliability of measurement items within a dataset. However, scholars such as Shook et al. (2004) and Zumbo et al. (2007) have argued that the CA has numerous limitations, since it is only allowed under the assumption of linearity and equal loading for all

manifest variables, even though it is the most common measure of reliability. Shook et al. (2004) and Zumbo et al. (2007) stated that composite reliability (CR) is a superior choice, due to its ability to draw on the standardized regression weights and measurement correlation errors for each item. Hence, although the CA and CR present different values, they both work to prove whether the data results are consistent. Consequently, both CA and CR will be adopted in this phase to determine reliability. Usually, a CA value of less than 0.6 is unacceptable, while values in the 0.7 range are acceptable, and values over 0.8 are considered to be good (Sekaran, 2000). CR values greater than 0.6 are acceptable, and those over 0.7 are considered to have high reliability (Peterson and Kim, 2013; Bagozzi and Yi, 1988).

5.5.2 Validity analysis of the main survey

As introduced in Chapter 4, validity is the extent to which the conceptual and operational definitions are truly and accurately a reflection of the underlying concept to be measured (Burns and Bush, 1995). In this study, the content validity depended on (1) determining the measurement items of each variable with regards to previous literature and (2) asking several experts in the field and professionals with abundant online shopping experience to provide their judgement and suggestions on the questionnaire, especially on the items in each concept. As a result, some overlapping and confusing questions were deleted or simplified.

Construct validity includes convergent validity and discriminant validity. Convergent validity is “the item’s implicit intention to measure the same construct correlates positively with one another” (Alhaiou, 2011). In other words, it assesses the extent to which two observed factors of the same latent factor are correlated, with high correlation suggesting that the scale is measuring its planned concept. To test the convergent validity, factor loading and the measure of average variance extracted (AVE) were adopted, with both 0.5 as acceptable (Fornell and Larcker, 1981). Discriminant validity is the extent to which measures of theoretically unrelated scales do not correlate highly with one another (Alhaiou, 2011). In other words, it requires less correlation between any two items from different scales or between any two scales. Discriminant

validity is present in criteria where the square root of the AVE of each construct is more than the correlation coefficients of other constructs, and the correlation coefficient of each scale must be less than 0.85 (Barclay and Smith, 1995; Fornell and Larcker, 1981).

5.5.3 The confirmatory factor analysis (CFA)

As mentioned in Chapter 4, factor analysis is used to check construct validity, and contains exploratory analysis and confirmatory analysis. For the main survey, a confirmatory factor analysis was used to test the convergent and discriminant validity of the measures. AMOS 24.0 was used to conduct the CFA. Several fit indices were employed to assess the fit of the model. Since CFA is a special case of SEM, the selection of indices and the corresponding criteria of the CFA used to test the fit of the model are similar to SEM.

There are two kinds of fit indices which should be used for reporting the results of SEM. According to Lin (2005), absolute fit can assess the degree to which the covariance implied by the proposed model matches the observed covariance. The indices of incremental fit are used to assess the degree to which the proposed model is superior to an alternative model. More specifically, absolute fit indices typically gauge 'badness of fit', while indices of incremental fit gauge 'goodness of fit'. Although there is no consensus about the best index to use when reporting structural equation models, the most widely reported absolute fit indices contains χ^2 , χ^2/df , GFI, AGFI, SRMR and RMSEA, while the most commonly used incremental fit indices include NFI, NNFI and CFI. Table 5-10 demonstrates the indices and the recommended criteria for the most frequently reported indices in previous research.

The index χ^2 will not be used in this study, although it appears to be the most popular index, due to its high sensitivity to sample size. According to Ghazali (2011), when the sample size increases, the χ^2 statistic tends toward statistical significance, increasing the possibility of model rejection, irrespective of whether the model is true or false (a type II error). Instead, the degree of freedom was considered when using the chi-square to make the value meaningful. In addition, the values of GFI and AGFI were not considered to reject the model in this study, since they are strongly affected by sample size

and so may appear to be good, even for incorrectly specified models (Kenny, 2010). Therefore, the main fit indices which will be reported in this thesis and used for model assessment are: χ^2/df , SRMR, RMSEA, NFI, NNFI and CFI. The other two indices, GFI and AGFI, are reported as a reference.

Table 5-10 Recommended Criteria of Various Fit Indices Used for Model Assessments

	Index	Description	Recommended Value of the Index	Reference
Absolute fit indices	χ^2	A calculation used to determine how closely the observed data fit the expected data.	$p > 0.05$	Hu et al. (1992)
	χ^2/df	Used to investigate whether distributions of categorical variables differ from one another.	<5 (acceptable) <3 (Good fit)	
	Goodness-of-fit Index (GFI)	Indexes the relative amount of the observed variances and covariance accounted for by a model.	>0.90	Lin (2005)
	Adjusted goodness of fit index (AGFI)	Corrects the GFI, which is affected by the number of indicators of each latent variable.	>0.90	
	Standardized root mean squared residual (SRMR)	Estimates the average size of residuals between fitted and sample covariance matrix. It is very sensitive to model misspecification but less sensitive to sample size.	<0.10	
	Root means square error approximation (RMSEA)	Illustrates the degree to which the model fits the population covariance matrix, taking into consideration the number of degrees of freedom. Unlike other	<0.10 (Acceptable fit) <0.08 (Adequate fit) <0.05	Lin (2005)

		fit statistics, it is able to generate a 90 percent confidence interval, which provides information about precision of the estimate of fit. Adequately sensitive to model mis-specification.	(Good fit)	
	Normed fit index (NFI)	Analyses the discrepancy between the chi-square value of the hypothesized model and the chi-square value of the null model.	>0.90	Ghazali (2011)
Incremental fit indices	Non-normed fit index (NNFI)	Compares the lack of fit of a target model to the lack of fit of a baseline model, usually the independent model. Usually TLI/NNFI is used to estimate the relative improvement per degree of freedom of the target model over a baseline model. Not recommended for small samples (<150).	>0.90	Ghazali (2011)
	Comparative fit index (CFI)	Indexes the relative reduction in lack of fit as estimated by the non-central χ^2 of a targeted model versus a baseline model.	>0.90	Bentler (1995)

At this stage, when the initial proposed measurement model appears to not be the best fitting model, the model needs to be re-specified, based on the modification indices (Kline, 2005). However, if there is a lack of theoretical basis when a path to the model was deleted or added empirically, then model trimming or building should be considered. Once the model is re-specified, the same CFA procedures can be conducted again to determine the best fitting model and check the construct validity. The next section will test the

measurement model of all latent scales. Fit indices will be considered to determine the fit of the model.

5.5.4 The measurement model

According to Awang (2012), the CFA can be run either for each construct model separately or for the pooled measurement models together. The author pointed out that the CFA for the pooled measurement models is more efficient and highly suggested. The measurement model for all constructs involved in the research should be assessed together at once if possible although many researchers have to run the CFA for each measurement model separately since their models have too many latent constructs. Awang (2012) further demonstrated that there is no problem in model identification, even though certain scales have less than four items, as the combined constructs will raise the degrees of freedom for the model. In this study, the CFA for the pooled measurement models will be conducted together. The model was evaluated using AMOS 24.0 to test the construct validity of the items against the sample dataset. In this section, factor loading, AVE, and CR were obtained based on the results of fit for the measurement model. In addition, the CA of each construct was analysed using SPSS 24.0 and displayed in the results table, to check the reliability of the measurement items.

The OLSM scale, e-satisfaction, e-trust, e-commitment, e-loyalty, signal credibility (MS) and switching cost (SC) can be measured by five, four, four, three, five, three and four items respectively. Figure 5-1 shows the hypothetical model of all latent constructs; Table 5-12 displays the results of CFA and the reliability analysis.

As illustrated in Table 5-11, all fit indices meet the criteria stated in Table 5-10 above, in which the GFI, AGFI, NFI, NNFI, CFI and SRMR indices are far above the desired level. The other two fit indices, χ^2/df and RMSEA, have reached good fit, indicating the initial pooled measurement model fits the data reasonably well. All the measurement items indicate that the factor loading of the items model have very good factor loading where each item loads more than 0.75, except OLSM2, with a value of 0.746, which is far more than the proposed standard value of 0.5. This implies that the indicators are good

measures of each construct, and provide evidence of the achievement of unidimensionality of the pooled measurement model.

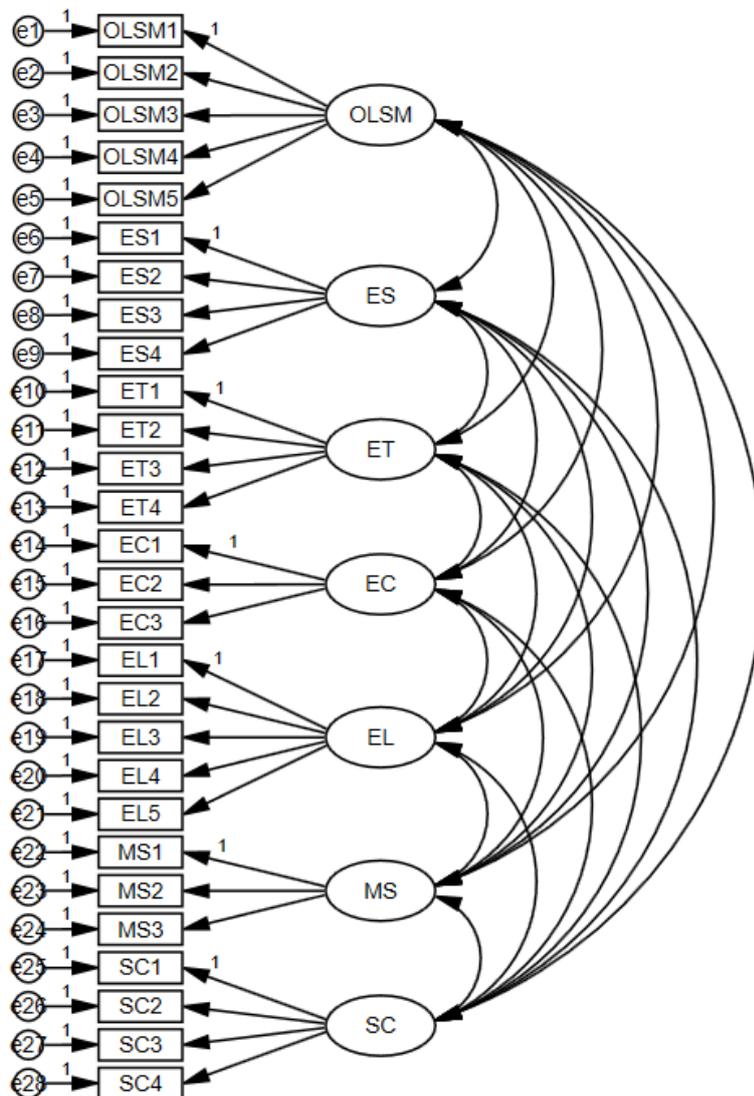


Figure 5-1 The pooled measurement model

Table 5-11 The results of CFA and Reliability analysis

Construct	Items	Standard Estimate	AVE	CR	Cronbach's Alpha	Model Fit
OLSM	OLSM1	0.790	0.639	0.898	0.893	
	OLSM2	0.746				
	OLSM3	0.895				

	OLSM4	0.752				
	OLSM5	0.803				
MS	MS1	0.800				
	MS2	0.795	0.636	0.840	0.840	
	MS3	0.798				$\frac{\chi^2}{df} = 1.648$
ES	ES1	0.855				GFI=0.937
	ES2	0.831				AGFI=0.923
	ES3	0.766	0.654	0.883	0.882	SRMR=0.032
	ES4	0.778				RMSEA=0.034
ET	ET1	0.769				NFI=0.943
	ET2	0.782				NNFI=0.973
	ET3	0.785	0.621	0.867	0.866	CFI=0.977
	ET4	0.815				
EC	EC1	0.868				
	EC2	0.786	0.692	0.870	0.869	
	EC3	0.839				
SC	SC1	0.803				
	SC2	0.779				
	SC3	0.847	0.647	0.880	0.879	
	SC4	0.786				
EL	EL1	0.823				
	EL2	0.758				
	EL3	0.779	0.641	0.899	0.898	
	EL4	0.795				
	EL5	0.845				

The CR and AVE values of each scale have also been computed in Table 5-11. And the equations of CR and AVE are as follows derived from Hair et al. (2010).

$$CR = \frac{(\sum_{i=1}^n \lambda_i)^2}{(\sum_{i=1}^n \lambda_i)^2 + (\sum_{c=1}^n \delta_i)} \quad (\text{where: } \lambda \text{ is factor loading and } \delta \text{ is error variance});$$

$$AVE = \frac{\sum_{i=1}^n \lambda_i^2}{n} \text{ (where } \lambda \text{ is factor loading and } n \text{ is number of observed variables)}$$

The AVE values of each construct have exceeded 0.6, suggesting good convergent validity of the proposed measurement model. Furthermore, the CA values of each construct are 0.893, 0.840, 0.882, 0.866, 0.869, 0.879, and 0.898, respectively, above the proposed 'good' level of 0.8. The calculated CR values of each construct are 0.898, 0.840, 0.883, 0.867, 0.870, 0.880 and 0.899, respectively, which are far greater than the standardized value of 0.6. These excellent CA values reveal high internal consistency, which indicate high reliability of measurement items when combined with the excellent CR values.

Following the analysis of reliability and convergent validity, the discriminant validity index summary is developed in Table 5-12, based on the computed AVE value and the correlation analysis of each construct. The diagonal values (in bold) are the square root of the AVE of each construct, while the other values are the correlation between each construct. The value of the latent variable is displayed as the mean value of all its observed variables. As depicted in Table 5-12, the value in bold is greater than the other values in the same row and column. Moreover, the highest correlation coefficient of each construct is the correlation between e-satisfaction and e-loyalty, with a value of 0.511, which is far less than 0.85. Therefore, discriminant validity for all seven constructs is achieved.

Table 5-12 Correlation matrix between the constructs

	OLSM	MS	ES	ET	EC	EL	SC
OLSM	0.799						
MS	0.312**	0.797					
ES	0.360**	0.336**	0.809				
ET	0.393**	0.408**	0.400**	0.788			
EC	0.413*	0.299**	0.414**	0.424**	0.832		

EL	0.308**	0.323**	0.511**	0.451**	0.464**	0.801	
SC	0.005	-0.104*	-0.239**	-0.257	-0.155**	-0.223**	0.804

**Correlation is significant at the 0.01 level (2-tailed)

*Correlation is significant at the 0.05 level (2-tailed)

5.6 Common method bias

According to Gorrell et al. (2011), common method bias (CMB) happens when variations in responses are caused by the instrument, rather than the predispositions of the respondents that the instrument is attempting to uncover. In other words, the instrument introduces a bias. Consequently, the results obtained are contaminated by the 'noise' stemming from the biased instrument. Podsakoff et al. (2003) also claimed that CMB can be traced back to the use of a common rater, a common measurement context, a common item context, or from the characteristics of the items themselves. To reduce the CMB, several measures can be taken including 1) obtaining measures of the predictor and criterion variables from different sources, 2) separating the measurement of the predictor and criterion variables, 3) protecting the participants' anonymity and reducing evaluation apprehension, 4) counterbalancing question order and 5) improving scale items (Podsakoff et al., 2003). Although measures such as collecting the questionnaires anonymously and improving scale items are used in this study, CMB still exists, as the participants were all online shoppers and the instruments used in the study were the same. It is still necessary to test the common method variance.

In this study, the most frequently and widely used technique, Harman's single factor test, will be used. In this test, all items are loaded into one common factor. If the total variance for the single common factor is less than 50%, it indicates that the common method bias will not affect the data (Podsakoff et al., 2012). The single factor analysis is employed by SPSS 24.0, extracting only one fixed number of factors and no rotation. The results in appendix D show that the common factor could explain 32.11% of the total variance, which is below 50%, suggesting that the CMB does not affect the data and the results. Hence, there is no need to control the CMB.

5.7 Structural equation model

After evaluating the pooled measurement model and the CMB, the next step is to evaluate the depicted structural models through structural equation modelling, to determine the relationship between the variables. Figure 5-2 below depicts the structural model of the relationship. As seen in the figure, e-loyalty is the dependent variable; OLSM is an independent variable; and e-satisfaction, e-trust and e-commitment are independent variables in relation to e-loyalty, but dependent variables in relation to OLSM. The model includes five factors, with a total of 21 items.

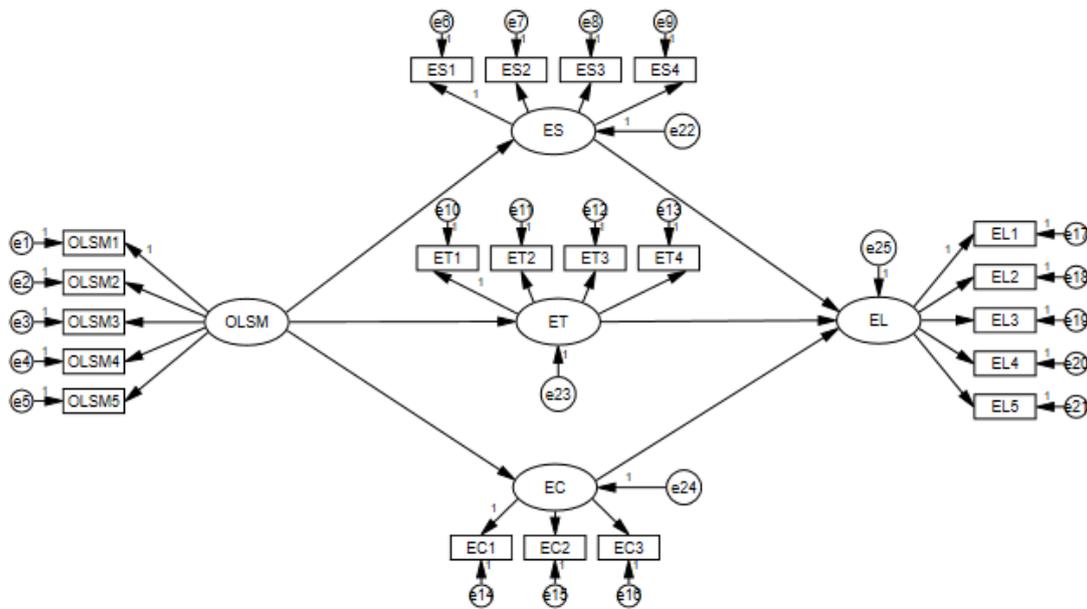


Figure 5-2 The structural model of the relationship among OLSM, e-satisfaction, e-trust and e-commitment

Table 5-13 below demonstrates the goodness-of-fit statistics of the above structural model. The results indicate a good-fit to data: $\chi^2/df = 2.596$, RMSEA=0.053, SRMR=0.087, GFI=0.924, AGFI=0.904, NFI=0.935, IFI=0.959, TLI=0.953 and CFI=0.959. Although the values of AGFI and SRMR are only slightly greater than the threshold of 0.9 and 0.1 respectively, the values of the other indices appear to be far above the desired level, indicating that the initial pooled measurement model fits the data reasonably well.

Table 5-13 Goodness-OF Fit Statistic for a Structural Model of the Relation among OLSM, E-satisfaction, E-trust and E-commitment

Fit Indices	CMIN	DF	CMIN/DF	RMR	GFI	AGFI	NFI	IFI	TLI	CFI
Recommended Value	—	—	<5	<0.1	<0.1	>0.9	>0.9	>0.9	>0.9	>0.9
Model results	475.150	183	2.596	0.053	0.087	20.924	0.904	0.935	0.959	0.959
Qualified or not	—	—	✓	✓	✓	✓	✓	✓	✓	✓

Having evaluated the goodness-of-fit of the structural model, the next step is to test the hypotheses - H1 and H2. Table 5-14 presents the path analysis results of this model. More specifically, the pathways in the table reflect the hypothesized relationships between the independent variables and the dependent variables.

Table 5-14 Path analysis results of the structural model

Path	Standardized Estimate	Estimate	S.E.	C.R.	P	Hypothesis
ES <--- OLSM	0.438	0.378	0.040	9.405	***	✓
ET <--- OLSM	0.465	0.410	0.043	9.582	***	✓
EC <--- OLSM	0.484	0.486	0.047	10.388	***	✓
EL <--- ES	0.381	0.380	0.043	8.754	***	✓
EL <--- ET	0.244	0.238	0.042	5.67	***	✓
EL <--- EC	0.270	0.232	0.037	6.322	***	✓

* p<0.05 ** p<0.01 *** p<0.001

5.7.1 The testing of H1 (H1a, H1b, H1c)

As illustrated in Chapter 3, the study hypothesized that:

H1: OLSM has a positive influence on relationship quality.

H1a: OLSM has a positive influence on customer e-satisfaction.

H1b: OLSM has a positive influence on e-trust.

H1c: OLSM has a positive influence on e-commitment.

As demonstrated in Table 5-14, the path from OLSM to e-satisfaction has a positive standardized estimate, with a β of 0.438, and a good level of meaningfulness ($p < 0.001$). This implies that the OLSM has a strong positive effect on e-satisfaction, thus hypothesis H1a is proved. The path from OLSM to e-trust has a positive standardized estimate, with a β of 0.465, and a good level of meaningfulness ($p < 0.001$). This implies that the OLSM has a strong positive effect on e-trust, thus hypothesis H1b is proved. The path from OLSM to e-commitment has a positive standardized estimate, with a β of 0.484, and a good level of meaningfulness ($p < 0.001$). This indicates that the OLSM has a strong positive effect on e-commitment, thus hypothesis H1c is accepted.

5.7.2 The testing of H2 (H2a, H2b, H2c)

The hypothesis 2 proposed in Chapter are as follows

H2: Relationship quality plays a positive role in e-loyalty.

H2a: E-satisfaction plays a positive role in e-loyalty.

H2b: E-trust plays a positive role in e-loyalty.

H2c: E-commitment plays a positive role in e-loyalty.

As shown in Table 5-14 above, the path from e-satisfaction to e-loyalty has a positive standardized estimate, with a β of 0.381, and a good level of meaningfulness ($p < 0.001$). This implies that e-satisfaction has a positive influence on e-loyalty, thus hypothesis H2a is proved. The path from e-trust to e-loyalty has a positive standardized estimate, with a β of 0.244, and a good level of meaningfulness ($p < 0.001$). This implies that e-trust has a positive influence on e-loyalty, thus hypothesis H2b is proved. The path from e-commitment to e-loyalty has a positive standardized estimate, with a β of 0.270, and a good level of meaningfulness ($p < 0.001$). This implies that e-commitment has a positive influence on e-loyalty, thus hypothesis H2c is proved.

5.8 The mediating effect of relationship quality

Having evaluated the hypotheses on the direct relationships between the dependent and independent variables, the next step is to test the proposed mediating roles that e-satisfaction, e-trust and e-commitment play in the relationship between OLSM and e-loyalty. In this section, the bootstrapping method will be used to test each mediating effect. The mediating effect exists if the value of zero is not included in the confidence interval, while the mediating effect does not exist if the confidence interval contains a value of zero. In AMOS 24.0, 5000 numbers of bootstrap samples were performed to obtain the lower and upper values of the percentile confidence interval and the bias-corrected confidence intervals under a 95% confidence level. If the value of zero does not exist in the confidence interval under this confidence level, it means that the result is significant, at a level of $p < 0.05$ (Greenland et al., 2016).

5.8.1 The testing of H3 (H3a, H3b, H3c)

The detailed descriptions of H3 are as follows:

H3: OLSM has a positive and indirect influence on e-loyalty through relationship quality.

H3a: OLSM has a positive and indirect influence on e-loyalty through e-satisfaction.

H3b: OLSM has a positive and indirect influence on e-loyalty through e-trust.

H3c: OLSM has a positive and indirect influence on e-loyalty through e-commitment.

Table 5-15 below shows the standardized value of the specific mediating effect and the value of the confidence intervals, based on AMOS 24.0.

Table 5-15 Specific mediation effect of ES, ET and EC

Mediating effect	SE	Bias-Corrected		Percentile	
		95%CI		95%CI	
		Lower	Upper	Lower	Upper

OLSM-ES-EL	0.167	0.034	0.105	0.241	0.103	0.237
OLSM-ET-EL	0.113	0.034	0.054	0.187	0.051	0.183
OLSM-EC-EL	0.131	0.034	0.071	0.202	0.07	0.201
OLSM-EL	0.411	0.042	0.327	0.493	0.326	0.492

As illustrated in the table above, the value of the specific mediating effect of e-satisfaction, between OLSM and e-loyalty, is 0.167. The value of zero is not included between the lower and upper intervals of both bias-corrected and percentile confidence intervals, under a 95% confidence level. Hence, OLSM could positively affect e-loyalty through the mediating effect of e-satisfaction. In other words, OLSM has a positive and indirect influence on e-loyalty, through e-satisfaction, thus hypothesis H3a is proved. The value of the specific mediating effect of e-trust, between OLSM and e-loyalty, is 0.113. The value of zero is not included between the lower and upper intervals of both bias-corrected and percentile confidence intervals, under a 95% confidence level. Therefore, OLSM has a positive and indirect influence on e-loyalty, through e-satisfaction, thus hypothesis H3b is proved. The value of the specific mediating effect of e-commitment, between OLSM and e-loyalty, is 0.167. The value of zero is not included between the lower and upper intervals of both bias-corrected and percentile confidence intervals, under a 95% confidence level. Hence, OLSM could positively affect e-loyalty through the mediating effect of e-commitment, which means OLSM has a positive and indirect influence on e-loyalty through e-satisfaction, thus hypothesis H3c is proved. The value of the total mediating effect of e-satisfaction, e-trust and e-commitment, between OLSM and e-loyalty, is 0.411, and the value of zero is not contained in the confidence intervals, meaning the total mediating effect exists.

5.9 Moderation effects

5.9.1 Simple moderation effects

According to Fairchild and MacKinnon (2009), “the moderation model tests whether the prediction of a dependent variable from an independent variable

differs across levels of a third moderator variable". The moderator variables influence the strength and/or direction of the relationship between the independent and dependent variables, enhancing, decreasing or changing the influence of the independent variables. Fairchild and McQuillin (2010) also state that moderation effects are always regarded as statistical 'interactions' in the literature associated with social science. This section aims to test whether the moderators, signal credibility and switching cost, could influence the relationship between OLSM and relationship quality and the relation between the relationship quality and online customer loyalty.

Hierarchical multiple regression analysis is always adopted to test the moderation effect (Fairchild and McQuillin, 2010). In the progress of hierarchical regression analysis, each variable is referred to the mean of all measurement items associated with this variable. All continuous variables will be centered to avoid multicollinearity issues and to increase the interpretability of various parameters in the models that contain interaction terms, before running the regression model (Muller et al., 2005). Based on the hierarchical regression analysis derived from Pallant (2010), the steps to test the simple moderation model, in which only predictors, outcomes and the moderators are included, are as follows. First, the target dependent variable is entered and the demographic predictor variables are block-entered, providing the variance accounted for in this group of independent variables. Second, the targeted independent variable is entered into the model as a block. Third, the targeted moderating variable is entered. Fourth, the interaction terms formed by multiplying the dependent and independent variables are entered. To test moderation, the focus is on the coefficient of the interaction terms, and whether this effect is significant.

5.9.2 The simple moderation effect of signal credibility (the testing of H4)

In this simple moderation model, age, gender, shopping experience, education level and monthly income are the control variables. OLSM is an independent variable, e-satisfaction, e-trust and e-commitment are dependent variables, and the signal credibility is the moderator. The detailed description of H4 are as follows.

H4: Signal credibility positively moderated the influence of OLSM on relationship quality.

H4a: Signal credibility positively moderated the influence of OLSM on e-satisfaction.

H4b: Signal credibility positively moderated the influence of OLSM on e-trust.

H4c: Signal credibility positively moderated the influence of OLSM on e-commitment.

5.9.2.1 The testing of H4a

To test hypothesis H4a, a hierarchical multiple regression analysis was used. E-satisfaction was entered as the dependent variable and the control variables (gender, age, education, monthly income and shopping years) were entered as a block, to exclude the possible influence of the control variables on the independent variables. OLSM was entered as a block, as was signal credibility. The interaction term OLSMXMS, formed by multiplying OLSM and signal credibility, was entered as a block. Table 5-16 below illustrates the results from the hierarchical regression analysis in respect to OLSM, e-satisfaction and signal credibility.

Table 5-16 Results of Hierarchical regression analysis (ES as the dependent variable)

Independent Variables	Dependent Variables: ES							
	Step1		Step 2		Step3		Step 4	
	β	t	β	t	β	t	β	t
Gender	-0.004	-0.080	-0.013	-0.304	0.001	0.026	0.000	0.002
Age	-0.083	-1.947	-0.101*	-2.534	-0.118**	-3.044	-0.116**	-3.013
Education	-0.128**	-2.932	-0.114**	-2.777	-0.128**	-3.234	-0.127**	-3.220
Monthly income	0.126**	2.645	0.089*	1.989	0.098*	2.269	0.086*	1.980
Shopping years	0.075	1.630	0.036	0.845	0.026	0.631	0.020	0.491
OLSM mean			0.350***	8.823	0.270***	6.714	0.304***	7.031
MS mean					0.260***	6.529	0.263***	6.623

OLSMxMS				0.086*	2.099
R Square	0.036	0.154	0.215	0.221	
Adjusted R Square	0.027	0.145	0.205	0.209	
F	4.136**	16.898***	21.657***	19.617***	

Note: *p<0.05 **p<0.01 ***p<0.001

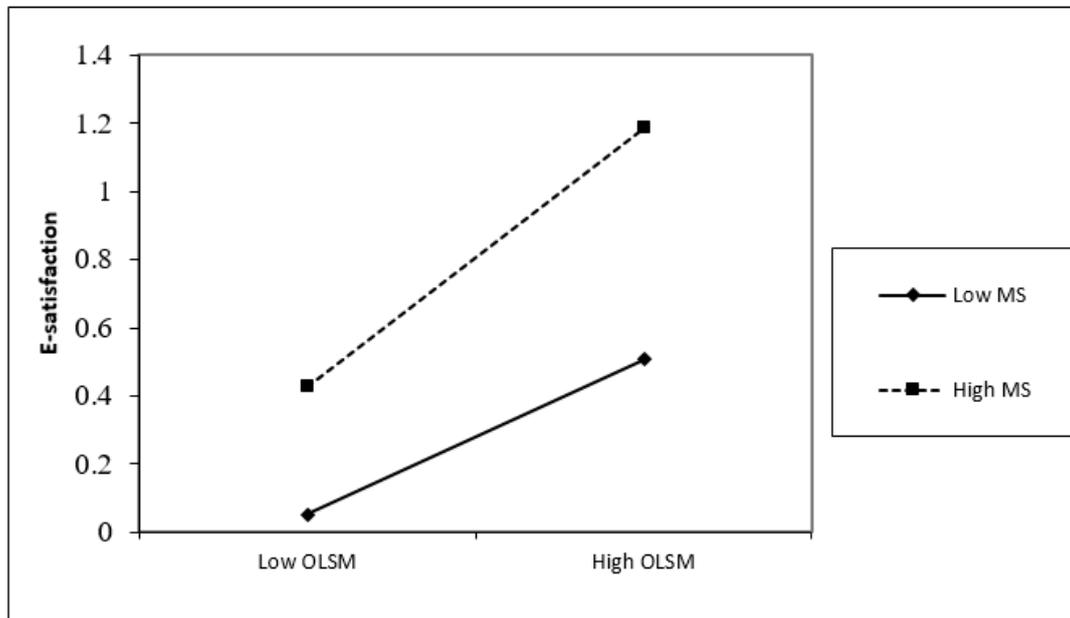


Figure 5-3 Signal credibility as the moderator between OLSM and e-satisfaction

As displayed in Table 5-16, the coefficient of the interaction term OLSMXMS is 0.086 and the interaction effect is significant ($p < 0.05$). This indicates that the signal credibility could positively influence the relation between OLSM and online customer satisfaction, thus hypothesis H4a is accepted. Figure 5-3 above depicts the moderation effect of the signal credibility between OLSM and e-satisfaction. As shown in the figure, the influence of OLSM on e-satisfaction is enhanced with the rise of signal credibility. In the situation of high signal credibility, the influence of OLSM on e-satisfaction is relatively stronger (the slope of the curve is relatively steep), while the influence of OLSM on e-satisfaction is relatively weaker (the slope of the curve is relatively gentle) in the situation of low signal credibility.

5.9.2.2 The testing of H4b

E-trust was entered as a dependent variable, with the control variables (gender, age, education, monthly income and shopping years) entered as the independent variables. OLSM was entered as a block, as was signal credibility. The interaction term OLSMXMS was then also entered as a block. Table 5-17 below illustrates the results from the hierarchical regression analysis in respect with OLSM, e-trust and signal credibility.

Table 5-17 Results of Hierarchical regression analysis (ET as the dependent variable)

Independent Variables	Dependent Variables: ET							
	Step1		Step 2		Step3		Step 4	
	β	t	β	t	β	t	β	t
Gender	-0.012	-0.266	-0.021	-0.525	-0.005	-0.121	-0.006	-0.146
Age	-0.029	-0.685	-0.049	-1.241	-0.069	-1.851	-0.068	-1.817
Education	-0.090*	-2.065	-0.075	-1.847	-0.092*	-2.413	-0.092*	-2.397
Monthly income	0.061	1.278	0.021	0.478	0.032	0.771	0.020	0.485
Shopping years	0.160**	3.495	0.119**	2.786	0.106**	2.639	0.101*	2.498
OLSM mean			0.378***	9.634	0.279***	7.173	0.312***	7.476
MS mean					0.321***	8.335	0.324***	8.437
OLSMxMS							0.085*	2.145
R Square	0.036		0.174		0.266		0.272	
Adjusted R Square	0.027		0.165		0.256		0.261	
F	4.127**		19.474***		28.673***		25.827***	

Note: *p<0.05 **p<0.01 ***p<0.001

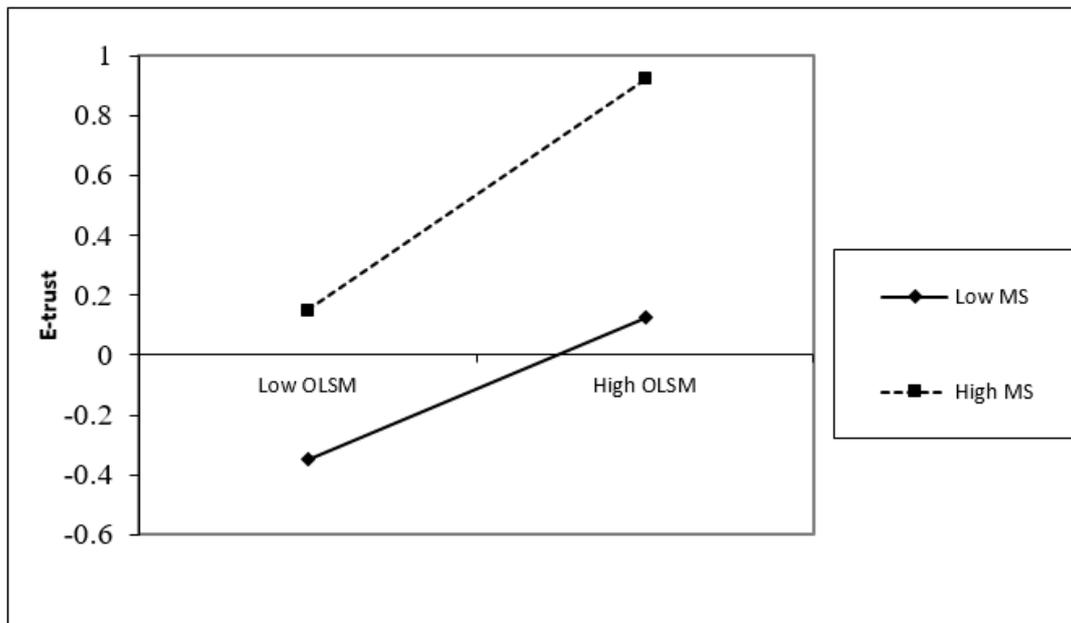


Figure 5-4 Signal credibility as the moderator between OLSM and e-trust

As shown in the table 5-17, the coefficient of the interaction term OLSMXMS is 0.085 and the interaction effect is significant ($p < 0.05$). This indicates that signal credibility could positively influence the relationship between OLSM and online customer trust, thus hypothesis H4b is accepted. Figure 5-4 depicts the moderation effect of signal credibility between OLSM and e-trust. As shown in the figure, the influence of OLSM on e-trust is enhanced with the rise of signal credibility. In the situation of high signal credibility, the influence of OLSM on e-trust is relatively stronger (the slope of the curve is relatively steep), while the influence of OLSM on e-trust is relatively weaker (the slope of the curve is relatively gentle) in the situation of low signal credibility.

5.9.2.3 The test of H4c

The steps used to test H4a and H4b were then repeated with e-commitment as the dependent variable. The table records the results from the hierarchical regression analysis in respect to OLSM, e-commitment and signal credibility. As shown in Table 5-18, the coefficient of the interaction term OLSMXMS is 0.096 and the interaction effect is significant ($p < 0.05$). This indicates that signal credibility could positively influence the relation between OLSM and e-commitment, thus hypothesis H4c is accepted.

Table 5-18 Results of Hierarchical regression analysis (EC as the dependent variable)

Independent Variables	Dependent Variables: EC							
	Step1		Step 2		Step3		Step 4	
	β	t	β	t	β	t	β	t
Gender	-0.003	-0.060	-0.013	-0.316	-0.003	-0.077	-0.004	-0.104
Age	0.031	0.727	0.010	0.260	-0.002	-0.039	0.000	0.004
Education	-0.046	-1.041	-0.030	-0.732	-0.040	-1.003	-0.039	-0.980
Monthly income	0.093	1.942	0.051	1.159	0.058	1.330	0.044	1.018
Shopping years	0.106*	2.294	0.062	1.464	0.055	1.314	0.048	1.161
OLSM mean			0.397***	10.153	0.339***	8.412	0.376***	8.702
MS mean					0.188***	4.697	0.191***	4.800
OLSMxMS							0.096*	2.325
R Square	0.026		0.179		0.210		0.218	
Adjusted R Square	0.018		0.170		0.200		0.206	
F	3.012*		20.149***		21.077***		19.264***	

Note: *p<0.05 **p<0.01 ***p<0.001

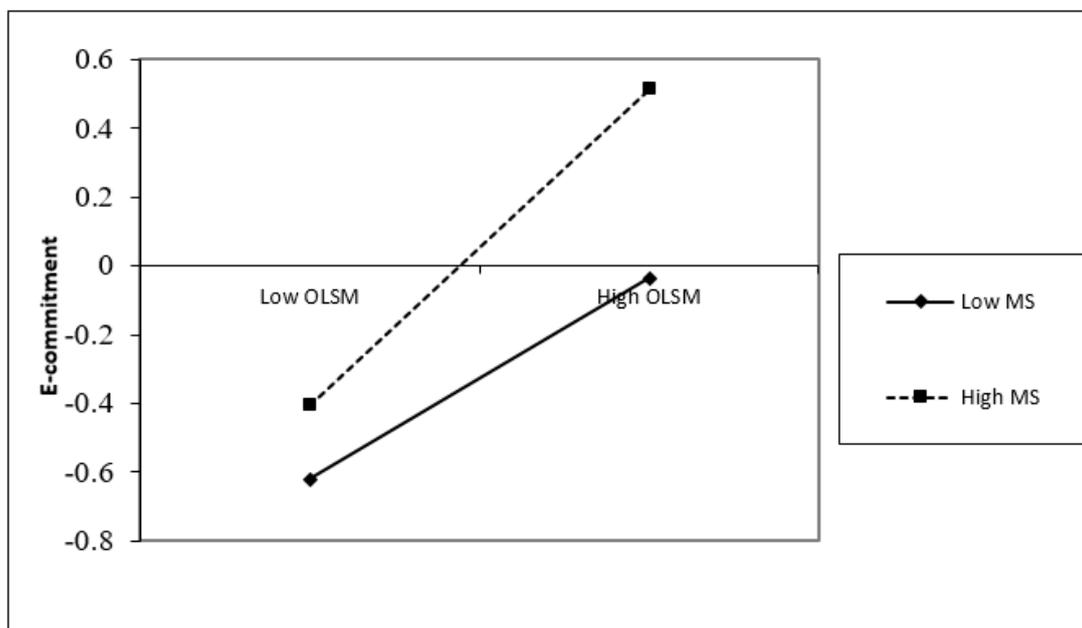


Figure 5-5 Signal credibility as the moderator between OLSM and e-commitment

Figure 5-5 reveals the moderation effect of the signal credibility between OLSM and e-commitment. As suggested in the figure, the influence of OLSM on e-commitment increases with the growth of signal credibility. In the situation of high signal credibility, the influence of OLSM on e-commitment is relatively stronger, while the influence of OLSM on e-commitment is relatively weaker with low signal credibility.

5.9.3 The simple moderation effect of switching cost (testing H6)

In this simple moderation model, age, gender, shopping experience, education level and monthly income are control variables. The relationship qualities of e-satisfaction, e-trust and e-commitment are the independent variables and online customer loyalty is the dependent variable. The switching cost is the moderator. The detailed description of H6 are as follows.

H6: Switching cost negatively moderate the impact of relationship quality on e-loyalty.

H6a: Switching cost negatively moderate the impact of e-satisfaction on e-loyalty.

H6b: Switching cost negatively moderate the impact of e-trust on e-loyalty.

H6c: Switching cost negatively moderate the impact of e-commitment on e-loyalty.

5.9.3.1 The testing of H6a

In the process of conducting hierarchical multiple regression analysis to test H6a, e-loyalty was entered as a dependent variable and the control variables (gender, age, education, monthly income and shopping years) were entered as independent variables. E-satisfaction was entered as a block, as was switching cost. The interaction term ESXSC was formed by multiplying e-satisfaction and switching cost, and was entered as a block. Table 5-19 below illustrates the results from the hierarchical regression analysis in respect to e-satisfaction, e-loyalty and switching cost. As displayed in the table, the coefficient of the interaction term ESXSC is -0.107 and the interaction effect is significant ($p < 0.01$). This indicates that switching cost could negatively influence the

relationship between e-satisfaction and e-loyalty, thus hypothesis H6a is accepted.

Table 5-19 Results of Hierarchical regression analysis (ES as the independent variable)

Independent Variables	Dependent Variables: EL							
	Step1		Step 2		Step3		Step 4	
	β	t	β	t	β	t	β	t
Gender	-0.069	-1.580	-0.067	-1.771	-0.059	-1.562	-0.051	-1.335
Age	-0.050	-1.171	-0.009	-0.237	0.001	0.036	0.000	0.001
Education	-0.138**	-3.159	-0.074	-1.948	-0.070	-1.832	-0.065	-1.723
Monthly income	0.060	1.278	-0.002	-0.036	-0.001	-0.026	-0.004	-0.095
Shopping years	0.147**	3.226	0.111**	2.775	0.101*	2.540	0.100*	2.527
ES mean			0.494***	13.439	0.473***	12.628	0.515***	12.797
SC mean					-0.094*	-2.503	-0.079*	-2.092
ESXSC							-0.107**	-2.756
R Square	0.042		0.277		0.285		0.295	
Adjusted R Square	0.034		0.269		0.276		0.285	
F	4.905***		35.509***		31.619***		28.945***	

Note: *p<0.05 **p<0.01 ***p<0.001

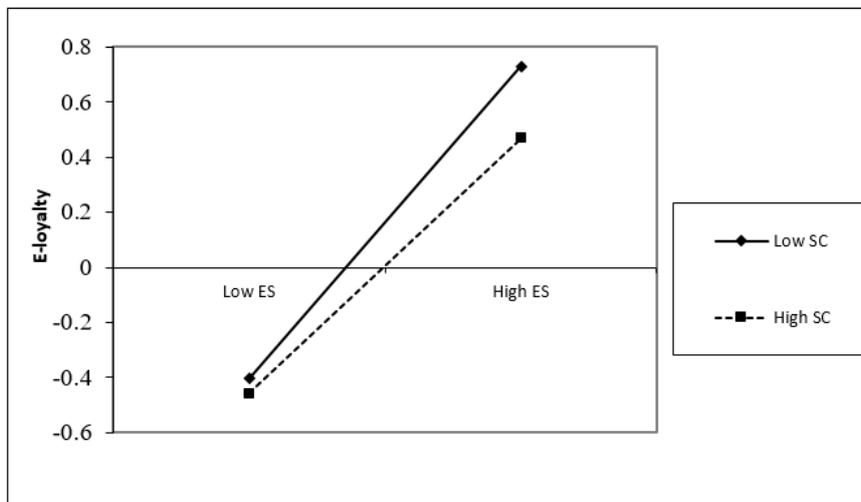


Figure 5-6 Switching costs as the moderator between OLSM and e-satisfaction

Figure 5-6 reveals the moderation effect of the switching cost between e-satisfaction and e-loyalty. As illustrated in the figure, the influence of e-satisfaction on e-loyalty is reduced with the growth of switching cost. In the situation of high switching cost, the influence of e-satisfaction on e-loyalty is relatively weaker, while the influence of e-satisfaction on e-loyalty is relatively stronger with low signal credibility.

1) Test of H6b

Repeating the steps in test of H6a but using ET and ETXSC to replace ES and ESXSC respectively, the table shows the results from the hierarchical regression analysis in which e-trust is regarded as the predictor, e-loyalty is the outcome and switching cost is the moderator. As shown in the table 5-20, the coefficient of the interaction term OLSMXMS is 0.043 but the interaction effect is non-significant ($p > 0.05$), which in turn indicates that the signal credibility could not significantly influence the relation between e-trust and e-satisfaction, thus the hypothesis H6b is rejected.

Table 5-20 Results of Hierarchical regression analysis (ET as the independent variable)

Independent Variables	Dependent Variables: EL							
	Step1		Step 2		Step3		Step 4	
	β	t	β	t	β	t	β	t
Gender	-0.069	-1.580	-0.064	-1.622	-0.056	-1.412	-0.06	-1.508
Age	-0.050	-1.171	-0.037	-0.969	-0.025	-0.655	-0.024	-0.63
Education	-0.138**	-3.159	-0.099*	-2.502	-0.093	-2.367	-0.095*	-2.408
Monthly income	0.060	1.278	0.034	0.804	0.034	0.788	0.031	0.731
Shopping years	0.147**	3.226	0.079	1.882	0.071	1.698	0.076	1.805
ET mean			0.43***	11.273	0.406	10.391	0.391***	9.416
SC mean					-0.101	-2.574	-0.106**	-2.687
ETxSC							0.043	1.08
R Square	0.042		0.220		0.230		0.231	
Adjusted R Square	0.04		0.212		0.220		0.220	
F	4.905***		26.193***		23.625***		20.824***	

Note: *p<0.05 **p<0.01 ***p<0.001

2) Test of H6c

Repeating the steps in test of H6a but using EC and ECXSC to replace ES and ESXSC respectively, the table shows the results from the hierarchical regression analysis in which e-commitment is regarded as the predictor, e-loyalty is the outcome and switching cost is the moderator. As shown in the table 5-21, the coefficient of the interaction term OLSMXMS is -0.048 but the interaction effect is non-significant ($p>0.05$), which in turn indicates that the signal credibility could not significantly influence the relation between e-commitment and e-satisfaction, thus the hypothesis H6c is rejected.

Table 5-21 Results of Hierarchical regression analysis (EC as the independent variable)

Independent Variables	Dependent Variables: EL							
	Step1		Step 2		Step3		Step 4	
	β	t	β	t	β	t	β	t
Gender	-0.069	-1.580	-0.068	-1.740	-0.056	-1.455	-0.053	-1.367
Age	-0.050	-1.171	-0.064	-1.681	-0.046	-1.221	-0.053	-1.383
Education	-0.138**	-3.159	-0.117***	-3.008	-0.108**	-2.786	-0.107**	-2.764
Monthly income	0.060	1.278	0.019	0.444	0.018	0.419	0.018	0.432
Shopping years	0.147**	3.226	0.100*	2.439	0.086*	2.121	0.084*	2.049
EC mean			0.450***	11.992	0.430***	11.468	0.437***	11.543
SC mean					-0.134***	-3.559	-0.140***	-3.685
ECxSC							-0.048	-1.283
R Square	0.042		0.239		0.256		0.258	
Adjusted R Square	0.034		0.231		0.247		0.247	
F	4.905***		29.105***		27.280***		24.103***	

Note: *p<0.05 **p<0.01 ***p<0.001

5.9.4 Moderated mediation effects

Apart from the single moderation effect, this dissertation also assumes two moderated mediation effects in the proposed structure. To test whether signal

credibility and switching costs will moderate the mediation effect of relationship quality, this section adopts PROCESS v3.0 to solve this issue.

5.9.5 Moderated mediation effect of signal credibility (the testing of H5)

The detailed description of H5 are as follows.

H5: Signal credibility positively moderates the indirect influence of relationship quality on the relationship between OLSM and e-loyalty.

H5a: Signal credibility positively moderates the indirect influence of e-satisfaction on the relationship between OLSM and e-loyalty.

H5b: Signal credibility positively moderates the indirect influence of e-trust on the relationship between OLSM and e-loyalty.

H5c: Signal credibility positively moderates the indirect influence of e-commitment on the relationship between OLSM and e-loyalty.

In PROCESS, the mean value of e-loyalty is entered as the Y variable and OLSM is used as the X variable. Three mediators (e-satisfaction, e-trust and e-commitment) are entered into the box mediators and signal credibility is selected as the moderator variable. The Model 7, proposed by Hayes, is utilized in the process.

Table 5-22 presents the results of the moderated mediation of signal credibility. As shown in the table, when signal credibility is high, the indirect influence of e-satisfaction is significant ($r=0.1282$, BootLCI [0.0657,0.2012]), while the indirect influence of e-satisfaction is also significant when signal credibility is low ($r=0.1069$, BootLCI [0.0610, 0.1610]). The difference of the mediation effect between the high and low groups appears to be significant ($r=0.0284$, BootLCI [0.0064, 0.0646]). Therefore, signal credibility could positively moderate the mediation effect of e-satisfaction between OLSM and e-loyalty. Likewise, the mediation effect of e-trust and e-commitment are also positively moderated by signal credibility. Hence, the hypotheses H5a, H5b, and H5c are proved.

Table 5-22 Results of moderated mediation of signal credibility

Mediator	Moderator	Indirect Effect	BootSE	BootLLCI	BootULCI
E-satisfaction	Low MS	0.1069	0.0253	0.0610	0.1610
	High MS	0.1282	0.0344	0.0657	0.2012
	Difference	0.0284	0.0179	0.0064	0.0646
E-trust	Low MS	0.0747	0.0224	-0.0348	0.1218
	High MS	0.0890	0.0287	0.0398	0.1489
	Difference	0.0190	0.0133	0.0040	0.0482
E-commitment	Low MS	0.0945	0.0258	0.0466	0.1478
	High MS	0.1113	0.0325	0.0527	0.1788
	Difference	0.0223	0.0130	0.0009	0.0499

5.9.6 Moderated mediation effect of switching costs (the testing of H7)

The detailed description of H7 are as follows.

H7: Switching cost negatively moderates the indirect influence of relationship quality on the relationship between OLSM and e-loyalty.

H7a: Switching cost negatively moderates the indirect influence of e-satisfaction on the relationship between OLSM and e-loyalty.

H7b: Switching cost negatively moderates the indirect influence of e-trust on the relationship between OLSM and e-loyalty.

H7c: Switching cost negatively moderates the indirect influence of e-commitment on the relationship between OLSM and e-loyalty.

The procedure was then repeated to test the moderated mediation effect of switching costs, in place of signal credibility, as the moderator variable. The

results are demonstrated in Table 5-23. As depicted in the table, when the switching cost is high, the indirect influence of e-satisfaction is significant ($r=0.1295$, BootLCI [0.0794,0.1870]), while the indirect influence of e-satisfaction is also significant when signal credibility is low ($r=0.1475$, BootLCI [0.0885, 0.2163]). Meanwhile, the difference of the mediation effect between the high and low groups appears to be significant ($r=-0.0360$, BootLCI [0.0120, 0.0638]). Therefore, the switching costs could negatively moderate the mediation effect of e-satisfaction between OLSM and e-loyalty. However, although the indirect influence of e-trust and e-commitment is significant when the switching costs variable is high or low separately, the difference between these two groups is not significant ($r=0.0130$, BootLCI [-0.0068, 0.0363] and $r=-0.0099$, BootLCI [-0.0317, 0.0098], respectively). Hence, the switching costs variable is not able to significantly moderate the mediation effect of e-trust and e-commitment. To summarize, the hypothesis H7a is proved, while H7b and H7c failed to be proved.

Table 5-23 Results of moderated mediation of switching costs

Mediator	Moderator	Indirect Effect	BootSE	BootLLCI	BootULCI
E-satisfaction	Low SC	0.1475	0.0323	0.0885	0.2163
	High SC	0.1295	0.0274	0.0794	0.1870
	Difference	-0.0360	0.0135	0.0120	0.0638
E-trust	Low SC	0.0908	0.0257	0.0433	0.1452
	High SC	0.0973	0.0288	0.0455	0.1592
	Difference	0.0130	0.0110	-0.0068	0.0363
E-commitment	Low SC	0.0929	0.0252	0.0474	0.1459
	High SC	0.0879	0.0257	0.0427	0.1444
	Difference	-0.0099	0.0103	-0.0317	0.0098

5.10 Summaries of all the hypotheses

Table 5-24 concluded the results of the test for hypothesized direct, mediation and moderation effects.

Table 5-24 Results of hypotheses test

Number	Detailed Hypotheses	Results
H1	OLSM has a positive influence on relationship quality.	-----
H1a	OLSM has a positive influence on customer e-satisfaction.	Accepted
H1b	OLSM has a positive influence on e-trust.	Accepted
H1c	OLSM has a positive influence on e-commitment.	Accepted
H2	Relationship quality plays a positive role in e-loyalty.	-----
H2a	E-satisfaction plays a positive role in e-loyalty.	Accepted
H2b	E-trust plays a positive role in e-loyalty.	Accepted
H2c	E-commitment plays a positive role in e-loyalty.	Accepted
H3	OLSM has a positive and indirect influence on e-loyalty through relationship quality.	-----
H3a	OLSM has a positive and indirect influence on e-loyalty through e-satisfaction.	Accepted
H3b	OLSM has a positive and indirect influence on e-loyalty through e-trust.	Accepted
H3c	OLSM has a positive and indirect influence on e-loyalty through e-commitment.	Accepted
H4	Signal credibility positively moderated the influence of OLSM on relationship quality.	-----
H4a	Signal credibility positively moderated the influence of OLSM on e-satisfaction.	Accepted
H4b	Signal credibility positively moderated the influence of OLSM on e-trust.	Accepted
H4c	Signal credibility positively moderated the influence of OLSM on e-commitment.	Accepted
H5	Signal credibility positively moderates the indirect influence of relationship quality on the relationship between OLSM and e-loyalty.	-----
H5a	Signal credibility positively moderates the indirect influence of e-satisfaction on the relationship between OLSM and e-loyalty.	Accepted
H5b	Signal credibility positively moderates the indirect influence of e-trust on the relationship between OLSM and e-loyalty.	Accepted
H5c	Signal credibility positively moderates the indirect influence of e-commitment on the relationship between OLSM and e-loyalty.	Accepted

H6	Switching cost negatively moderate the impact of relationship quality on e-loyalty.	-----
H6a	Switching cost negatively moderate the impact of e-satisfaction on e-loyalty.	Accepted
H6b	Switching cost negatively moderate the impact of e-trust on e-loyalty.	Rejected
H6c	Switching cost negatively moderate the impact of e-commitment on e-loyalty.	Rejected
H7	Switching cost negatively moderates the indirect influence of relationship quality on the relationship between OLSM and e-loyalty.	-----
H7a	Switching cost negatively moderates the indirect influence of e-satisfaction on the relationship between OLSM and e-loyalty.	Accepted
H7b	Switching cost negatively moderates the indirect influence of e-trust on the relationship between OLSM and e-loyalty.	Rejected
H7c	Switching cost negatively moderates the indirect influence of e-commitment on the relationship between OLSM and e-loyalty.	Rejected

Chapter 6 Discussion on the findings

6.1 Introduction

The aim of this chapter is to discuss the results of the data analysis described in Chapter 5. It contains three main sections: the first section views and presents the results and rationale behind the confirmatory factor analysis of the entire sample, the second section includes a discussion of the results of the structural equation modeling and the relationship between online logistics service mode (OLSM), relationship quality, and online customer loyalty, and the third section includes a discussion of the moderation effect of signal credibility and the moderation effect of switching cost.

6.2 Discussion of the proposed conceptual model: Confirmatory factor analysis

The results of the confirmatory factor analysis for the whole sample show good model fit indices and excellent standardized estimates greater than 0.50, with corresponding significant p-values. Moreover, the calculated average variance explained (AVE) value and composite ratio (CR) value of each scale are much higher than the expected criteria. Therefore, no validity issues are reported (see Table 5-11, Chapter 5). The validity tests are necessary as they indicate the validity of the conceptual framework and prove that the results are reliable and valid across samples (Padenga, 2016). Padenga (2016) and Podsakoff et al. (2003) stated that the process of confirmatory factor analysis could be underpinned and assisted by checking for common method bias (CMB). The results of the CMB test in Chapter 5 indicate that CMB does not affect the data and the results.

6.3 Discussion of the proposed conceptual model: Structural equation modeling

The model fit results for the proposed structural model confirm a fit to the data (see Table 5-13: Chapter 5). This shows that the structural model is suitable for both obtaining the path coefficients between latent variables (i.e., OLSM, E-satisfaction, E-trust, E-commitment, and E-loyalty) and testing the mediation effect of relationship quality. The discussion in this section is sub-divided into three parts: 1) a discussion of the relationship between OLSM and relationship quality; 2) a discussion of the relationship between relationship quality and electronic customer loyalty; 3) a discussion of the mediation effects of

relationship quality. Crosby (1990) stated that relationship quality is the ability of the salesman to reduce customers' perceived uncertainty. This report applies this definition to the relationship between customers and online retailers. Relationship quality consists of three dimensions: customer satisfaction, trust, and commitment.

6.3.1 Discussion of the relationship between OLSM and relationship quality

Hypothesis H1a examined whether OLSM influences electronic customer satisfaction.

H1a: OLSM has a positive influence on customer e-satisfaction.

The results of this study suggest that there is a positive relationship between OLSM and customer e-satisfaction ($r=0.438$, $p<0.001$). This result is expected as it is in accordance with the definition of customer satisfaction. According to Chang and Chen (2009), customer satisfaction refers to an affective response associated with customers' experiences during the process of purchasing and an overall evaluation of the product or service that is purchased from the last online retailer.

The adoption of OLSM makes it possible for customers to choose their preferred logistics mode in terms of delivering or returning purchased goods. Consequently, the use of OLSM could meet customers' personalized demands relating to logistics services. This would, in turn, enhance the satisfaction associated with their shopping experiences. The provision of a series of third-party logistics service providers and delivery time slots for customers may also contribute to an increase in customers' perceived control of the logistics service, which in turn may decrease customers' anxiety associated with the uncertainty of the logistics and increase their satisfaction.

Hypothesis H1b examined whether OLSM influences online customer trust.

H1b: OLSM has a positive influence on e-trust.

The results of this study suggest that there is a positive relationship between OLSM and customer e-trust ($r=0.465$, $p<0.001$). According to Morgan and Hunt (1994), customer trust refers to the perceived reliability and integrity of the exchange partner. This means that OLSM could help to increase the perceived

reliability and integrity of online retailers when customers purchase goods or services from them. According to Wirtz and Lihotzky (2003), customers cannot judge whether an online retailer is trustworthy or not as there is a lack of information.

In a sense, the adoption of OLSM could reflect the willingness of online retailers to provide personalized services to customers and would allow customers to obtain information about the logistics service. In addition, the provision of OLSM will increase both the cost and the complexity of e-commerce supply chain management, which in turn requires more investment from the online retailer. To some extent, OLSM reflects the operational ability of an online retailer to achieve its personalized service.

The results of this study not only agree with the findings of Dooney and Cannon (1997), i.e., the willingness of an offline company to provide personalized service positively affects customers' trust, but also supports the findings of Koufaris and Hampton-Sosa (2004) that online enterprise ability appears to be a critical factor that helps develop customer trust.

Hypothesis H1c examined whether OLSM influences online customer commitment.

H1c: OLSM has a positive influence on e-commitment.

The results of this study indicate that there is a positive relationship between OLSM and customer e-commitment ($r=0.484$, $p<0.001$). The provision of OLSM enables customers to select their preferred delivery method, time slot, and the third-party logistics service provider, all of which is perceived as value-added services. The results of this study support the findings of Hsieh et al. (2005) that the offer of value-added services positively influences customer commitment. OLSM, as a value-added service, makes customers feel respected and valued by online retailers, leading to emotional or psychological dependence on the retailers and a willingness to maintain a relationship with them.

With the development of the online market, online shopping has become more and more popular. Customers pay more attention to the quality of products and logistics services. Logistics services are becoming an increasingly significant

part of customers' shopping experiences and re-purchasing intentions. The provision of OLSM aims to improve the whole logistics service to reduce customers' perceived uncertainty of logistics services, subsequently improving the relationship between customers and online retailers. The results of this research also reveal that OLSM could positively affect relationship quality. Therefore, online retailers should provide OLSM and optimize the elements of OLSM to increase online customer satisfaction, trust, and commitment.

6.3.2 Discussion of the relationship between relationship quality and e-loyalty

Hypothesis H2a examined whether online customer satisfaction influences online customer loyalty.

H2a: E-satisfaction plays a positive role in e-loyalty.

The results of this study suggest that there is a positive relationship between e-satisfaction and e-loyalty ($r=0.381$, $p<0.001$). This result supports the findings of Anderson and Srinivasan (2003) and Safa and Ismail (2013), who argued that dissatisfied customers do not establish deep relationships with companies and that customer satisfaction has a positive effect on the development of customer loyalty.

Typically, if online customers feel satisfied with their most recent shopping experience, they are more likely to recommend the retailer to their friends. They may also be willing to repurchase from the same retailer, resulting in the development of loyalty. If a customer's demands are not met, however, they may seek alternative retailers and even complain about the retailer who let them down to their friends. Therefore, customer satisfaction is a necessary ingredient when cultivating loyal customers and it is vital for online retailers to pay attention to customers' demands and expectations to increase customer satisfaction.

Hypothesis H2b examined whether online customer trust influences online customer loyalty.

H2b: E-trust plays a positive role in e-loyalty.

The results of this study indicate that there is a positive relationship between e-trust and e-loyalty ($r=0.244$, $p<0.001$). This supports the findings of Wang et al. (2006) and Palvia (2009). Compared to traditional retailing market, more risks

and uncertainties exist in the e-commerce market as customers cannot observe or pre-use the products or services provided by the online retailers. Consequently, it is difficult for customers to judge the online retailer based on standardized criteria due to the lack of available information. This prevents the development of customer trust. Once consumers trust an online retailer, however, they may have more confidence in the quality of products or services provided by them. They will, therefore, be more willing to maintain the buyer-seller relationship with the retailer rather, leading to the development of customer loyalty.

Hypothesis H2c examined whether online customer commitment influences online customer loyalty.

H2c: E-commitment plays a positive role in e-loyalty.

The results of the study suggest that there is a positive relationship between e-commitment and e-loyalty ($r=0.270$, $p<0.001$). This finding is consistent with the previous literature in relationship marketing (Morgan and Hunt, 1994; Bendapudi and Berry, 1997). This result demonstrates that customers with high levels of commitment to the online retailer are more likely to say positive and meaningful things about the retailer and to recommend and encourage friends to use this retailer. This implies that customer commitment not only results in frequent repurchase behavior, but also contributes to positive customer attitudes.

Customer commitment refers to the customer's belief that their ongoing relationship with the retailer is worth maintaining (Tsao and Hsieh, 2012). Committed customers have favorable attitudes towards the online retailer and are willing to become advocates for the store and promote their products or services. Therefore, online retailers need to encourage customer commitment by rewarding loyal customers and providing excellent after-sale service.

The results of this study show that all three hypotheses, H2a, H2b, and H2c, are correct and that relationship quality (e-satisfaction, e-trust, and e-commitment) plays a positive role in the development of online customer loyalty. Higher relationship quality prompts positive customer attitudes towards the online retailer and contributes to repurchase behavior, resulting in the

development of customer loyalty. Therefore, it is important for online retailers to improve the quality of their relationships with customers in order to gain their loyalty.

6.3.3 Discussion of the mediation effect of relationship quality

Hypothesis H3 examined whether the quality of the relationship between online retailers and customers mediates the relationship between OLSM and online customer loyalty. H3 contains three parts:

H3a: OLSM has a positive and indirect influence on e-loyalty through e-satisfaction.

H3b: OLSM has a positive and indirect influence on e-loyalty through e-trust.

H3c: OLSM has a positive and indirect influence on e-loyalty through e-commitment.

The results of this study indicate that online customer satisfaction, trust, and commitment mediates the relationship between OLSM and online customer loyalty. The specific mediating effect coefficients of e-satisfaction, e-trust, and e-commitment are 0.167, 0.113, and 0.131, respectively (all $p < 0.05$). This indicates that OLSM has a positive and indirect influence on e-loyalty by positively impacting relationship quality (e-satisfaction, e-trust, and e-commitment).

According to signaling theory, the market signal is released to help reduce consumers' perceived uncertainty. The provision of OLSM makes it possible for customers to choose their preferred logistics service, thus enhancing their perceived control and decreasing their perceived uncertainty regarding the logistics service. OLSM can, therefore, be regarded as a kind of market signal that improves the quality of customer-retailer relationships.

In addition, the results of this research support the findings of Verma et al. (2015) regarding relationship investment. Relationship investment refers to the resources and efforts that customers think online retailers invest in the maintenance or enhance of their relationships with them. Relationship investment could impact customer loyalty by influencing relationship quality.

As discussed previously, the provision of OLSM requires more investment from online retailers to meet customers' demands and expectations. Therefore, OLSM can be treated as a specific relationship investment that affects the quality of the relationship between the online retailers and customers, thus influencing online customer loyalty.

What is more, by comparing the specific mediating effect coefficient of these three variables, it can be seen that the mediating effect of customer satisfaction is the highest, followed by the effect of customer commitment, and finally the mediating effect of customer trust. This provides online retailers with an insight into how they can influence e-loyalty by affecting the different dimensions of relationship quality.

Customer loyalty plays a vital role in successful businesses. Compared to customer loyalty in the traditional retail market, it is more difficult, but more meaningful, to develop customer loyalty in the e-commerce market. OLSM could positively influence the development of e-loyalty by positively affecting relationship quality (e-satisfaction, e-trust, and e-commitment). This means that OLSM is very important in the online market. Therefore, to maintain their relationships with existing customers and attract new customers, online retailers should provide OLSM. They should also optimize OSLM by providing selected third-party logistics service providers and offering detailed delivery time slots.

6.4 Discussion of the moderation effect

This section discusses the proposed moderation effect in this study and is divided into two sub-sections: a discussion of the moderation effect of signal credibility and a discussion of the moderation effect of switching costs.

6.4.1 Discussion of the moderation effect of signal credibility

Hypothesis H4 examined whether signal credibility moderates the relationship between OLSM and relationship quality, while hypothesis H5 examined whether signal credibility moderates the mediation effect of relationship quality on OLSM and online customer loyalty. Each hypothesis consists of three parts:

H4a: Signal credibility positively moderates the influence of OLSM on e-satisfaction.

H4b: Signal credibility positively moderates the influence of OLSM on e-trust.

H4c: Signal credibility positively moderates the influence of OLSM on e-commitment.

H5a: Signal credibility positively moderates the indirect influence of e-satisfaction on the relationship between OLSM and e-loyalty.

H5b: Signal credibility positively moderates the indirect influence of e-trust on the relationship between OLSM and e-loyalty.

H5b: Signal credibility positively moderates the indirect influence of e-commitment on the relationship between OLSM and e-loyalty.

The results of this study suggest that signal credibility positively moderates online customer satisfaction, trust, and commitment, and that signal credibility positively moderates the mediation effect of relationship quality on OLSM and online customer loyalty. In other words, an increase in signal credibility leads to an increase in the positive influence of OLSM on relationship quality and the mediation effect of relationship quality.

The verification of H4 and H5 indicates that the influence of OLSM on relationship quality and the indirect influence of OLSM on e-loyalty through relationship quality are both affected by a change in logistics service price. The higher the logistics service price, the higher the influence. The logistics service price could refer to the integrity of the online retailer and the logistics service quality to some extent.

It is better for online retailers to provide free delivery services when customers spend a certain amount rather than providing free delivery services without any specific requirements. For online shoppers, although some third-party logistic providers offer a low delivery price, these providers are not the shoppers' preferred choice as they are perceived to be of low quality. This could also explain why some online retailers with high delivery prices have so many loyal customers.

6.4.2 Discussion of the moderation effect of switching costs

Hypothesis H6 examined whether switching costs moderate the relationship between relationship quality and e-loyalty, while hypothesis H7 examined whether switching costs moderate the mediation effect of relationship quality on OLSM and online customer loyalty. Each hypothesis consists of three parts:

H6a: Switching costs negatively moderate the impact of e-satisfaction on e-loyalty.

H6b: Switching costs negatively moderate the impact of e-trust on e-loyalty.

H6c: Switching costs negatively moderate the impact of e-commitment on e-loyalty.

H7a: Switching cost negatively moderates the indirect influence of e-satisfaction on the relationship between OLSM and e-loyalty.

H7b: Switching cost negatively moderates the indirect influence of e-trust on the relationship between OLSM and e-loyalty.

H7c: Switching cost negatively moderates the indirect influence of e-commitment on the relationship between OLSM and e-loyalty.

The results of this study suggest that switching costs negatively moderate online customer satisfaction and the mediation effect of e-satisfaction on OLSM and online customer loyalty. These results agree with the findings of Ranaweera and Prabhu (2000) and Aydin et al. (2005), who argued that the perceived switching costs reduce customers' sensitivity to the level of customer satisfaction. This could be due to the fact that if customers perceive the switching costs to be higher than the potential benefits of changing online retailers, they may decide to stay with the previous retailer even if they were not satisfied with them.

Hypotheses H6b, H6c, H7b, and H7c are rejected, however, as the influence of OLSM on e-trust (e-commitment) and the mediation effect of e-trust (e-commitment) are not significantly moderated by switching costs. One of the possible reasons for this may be that when customers believe that an online retailer is trustworthy and have strong confidence in the retailer, they may be firmly loyal to them, thus the impact of switching costs weakens.

According to Tulin et al. (2002), brand trust contributes to the reduction of customers' price sensitivity. A retailer can be regarded as a type of brand and customer trust could reduce the impact of external rational factors, such as switching costs. Likewise, committed customers may have the emotional and psychological dependence on a retailer and believe that their chosen supplier is the best in its field, thus the impact of rational factors like switching costs weakens. Hofmeyr and Rice (2003) argued that the more committed a consumer is to a brand or retailer, the less important price becomes in their purchase decision.

Chapter 7 Conclusions

7.1 Overview

Due to the development of the Internet and technology in recent years, more and more customers choose to shop online. Fierce competition exists in the online retail market, which forces online retailers to try their best to meet customers' demands. Logistics services play a significant role in customers' intentions and behaviors. Therefore, meeting customers' demands and expectations regarding logistics services is an important way of developing customer loyalty and increasing a retailer's competitiveness.

To obtain new customers and improve relationships with existing customers, online retailers integrate several kinds of logistics service elements to provide a particular kind of customized service: OLSM. The provision of OLSM makes it possible for customers to choose their preferred estimated delivery time, their preferred third-party logistics providers and so on. It also seems that OLSM impacts customer loyalty, however, how OLSM influences customer loyalty remains unidentified, and the proposed strategies of online retailers that are associated with logistics services lack theoretical foundations. Therefore, this study aimed to identify the mechanism of how OLSM affects customer loyalty.

By referring to signaling theory and relationship marketing theory, this study puts forward a proposed theoretical model containing several variables, such as OLSM, relationship quality, e-loyalty, signal credibility, and switching costs. In this model, relationship quality is assumed to have a mediating effect and signal credibility and switching costs are assumed to have a moderating effect. In this study, relationship quality consists of customer satisfaction, trust, and commitment, and signal credibility refers to the logistics service price. The main findings are as follows:

(1) OLSM could affect online customer loyalty through relationship quality.

OLSM positively influences three dimensions of relationship quality (i.e. e-satisfaction, e-trust, and e-commitment), and these three dimensions have a positive influence on online customer loyalty. It is worth noting that online customer loyalty can also be positively and indirectly affected by OLSM through these three dimensions as relationship quality mediates the relationship

between OLSM and online customer loyalty. In addition, the greatest mediation influence of OLSM on e-loyalty appears to exist in online customer satisfaction, followed by e-commitment and then e-trust.

(2) Signal credibility positively moderates the influence of OLSM on e-loyalty.

Signal credibility, which in this study refers to the logistics service price, could positively moderate the relationship between OLSM and relationship quality (e-satisfaction, e-trust and e-commitment). This means that the higher the signal credibility, the stronger the positive impact of OLSM on relationship quality. Furthermore, signal credibility could positively moderate the indirect influence of OLSM on e-loyalty by positively affecting relationship quality. In other words, the indirect influence of OLSM on e-loyalty through relationship quality also increases if signal credibility increases, while the mediation effect of relationship quality weakens with a decrease in signal credibility.

(3) Switching costs negatively moderate the influence of OLSM on e-loyalty.

Switching costs negatively moderate the relationship between OLSM and online customer satisfaction. This means that the higher the switching costs, the weaker the positive impact of OLSM on e-satisfaction. In addition, switching costs can negatively moderate the indirect influence of OLSM on e-loyalty by positively affecting e-satisfaction. This means that the indirect influence of OLSM on e-loyalty through e-satisfaction weakens if the switching costs increase, while the mediation effect of e-satisfaction increases with a decrease in switching costs.

7.2 Theoretical contributions

This dissertation highlights some of the limitations of previous studies. The theoretical contributions of this thesis are as follows:

Firstly, there is limited knowledge about the integration of logistics service elements. Previous research has tended to focus on single logistics service elements such as logistics service price, logistics service quality, lead time, etc. This thesis comprehensively considers the main elements in terms of logistics service and integrates these elements to put forward a new term 'OLSM', which is regarded as a kind of personalized service to meet customers' specific needs. The impact of OLSM was then considered and studied from the perspective of

personalized service. Therefore, this research has conducted a more comprehensive investigation and expanded the research field of logistics services.

Secondly, this research makes a significant contribution in terms of how OLSM influences online customer loyalty. Previous studies relating to personalized service, signaling theory, relationship marketing theory, and so on were used by this study to highlight a number of significant relationships between OLSM, relationship quality (e-satisfaction, e-trust, and e-commitment), switching costs, signal credibility, and e-loyalty that were not confirmed empirically in the extant literature, i.e.:

- (1) The mediation effect of relationship quality (e-satisfaction, e-trust and e-commitment) on the relationship between OLSM and e-loyalty.
- (2) The catalytic effect of signal credibility on the influence of OLSM on e-loyalty.
- (3) The moderation effect of switching costs on weakening the impact of OLSM on e-loyalty.

Thirdly, this thesis provides a new viewpoint regarding the investigation of logistics service price. Different from the previous research related to logistics service price, which mainly investigated the price from the perspective of economics, this thesis regards OLSM as the released market signal and the logistics service price as the signal credibility for OLSM. The moderation effect of the logistics service price is then investigated from the perspective of signaling theory and the moderation effect of the logistics service price on the influence of OLSM on e-loyalty is highlighted.

Fourthly, this thesis supports two theories adopted in this study, namely signalling theory and relationship marketing theory. According to relationship marketing theory, relationship investment through activities or services by the suppliers could enhance the relationship between suppliers and customers. In this study, OLSM is a kind of investment by the online retailers, and the result shows that OLSM could enhance relationship quality, which means that the provision of OLSM enhances the relationship between online retailers and customers. In addition, signalling theory pointed out that the release of credible

market signal could help reduce customers' perceived uncertainty about the products or services, which in turn enhance the relationship between suppliers and customers. OLSM can be regarded as a market signal to help reduce customers' uncertainty about the logistics service quality, and the results prove that the signal OLSM could contribute to the enhancement of relationship between customers and retailers.

7.3 Managerial contributions

Apart from the theoretical contributions for future research, this dissertation also provides a number of practical implications for online retailers that will be discussed in this section. The previous findings indicate that OLSM could positively influence e-loyalty by positively influencing relationship quality (e-satisfaction, e-trust, and e-commitment), that signal credibility could positively moderate the mediation effect of relationship quality on OLSM and e-loyalty, and that switching costs could negatively moderate the mediation effect of e-satisfaction on OLSM and e-loyalty. Based on these findings, some practical applications are put forward to provide online retailers with clearer insights into operational management in terms of logistics services.

7.3.1 Optimization of OLSM

The research reveals that the provision of OLSM could reduce customers' perceived uncertainty of logistics services, which improves the quality of the relationships between customers and online retailers and increases customer loyalty. Referring to the definition of OLSM, in this study it is defined as a kind of personalized service provided by online retailers, in which the online retailers integrate several logistics service elements. In forward logistics, the logistics service elements consist of self-pick-up, delivery time slots, and logistics service providers, while other logistics service elements, including exchange or return in nearby retail stores, pick up from customers' homes, and customer returns, can be selected by customers in reverse logistics.

This means that online retailers could integrate different logistics service elements to optimize OLSM, thus increasing customer satisfaction, customer trust, and subsequently, customer loyalty. Three suggestions are described in detail based on the definition of OLSM:

1) To design and refine the delivery time slot.

Compared to the traditional retail market, the online retail market appears to be more complicated and uncertain. The uncertainty of the process of online shopping prevents customers from using online retailers. In China, the delivery times of many online retailers are uncertain and customers often have to wait for their products. The uncertainty of the estimated delivery time may increase customer anxiety and disappointment and even result in customer complaints, especially if the customer misses their delivery.

In addition, if customers miss their package, the couriers have to deliver again on another day, which is a waste of times and resources. Therefore, it would be beneficial to design shorter and clearer delivery time slots so customers can know exactly when they have to stay at home and wait for their package. Shorter delivery time slots reduce the uncertainty of delivery times, which in turn enhances the relationship between customers and online retailers. Customers may be more likely to choose online retailers who provide a selection of clear delivery time slots and maintain a stable buyer-seller relationship. Online retailers could also coordinate with third-party logistics service providers if they want to set up more precise estimated delivery time slots.

2) To provide a greater selection of third-party logistics providers.

The quality of logistics services differs among providers, and different customers may have different perceived values for the same providers. In China, most online retailers in Taobao only provide one or two fixed logistics service providers for customers to choose from as this helps online retailers reduce their costs due to scale effect and makes it more convenient to manage their business. If customers think the provided third-party logistics providers are too slow or are not their preferred choice, however, they may feel emotional or psychological rejection towards the online retailer and seek alternatives. Therefore, it is important for online retailers to offer a greater range of third-party logistics providers to choose from.

As brand effect exists for third-party logistics providers, customers could select their most familiar and favorite brand, which reduces the uncertainty of delivery.

Although coordination with more third-party logistics providers will weaken the scale effect, resulting in rising operational costs, it could increase customer loyalty by making customers feel more in control. Furthermore, the provision of different third-party logistics providers may intensify the competition among providers, leading to an improvement in logistics service quality.

3) To coordinate with the offline retail stores.

The integration of online and offline channels makes it possible for customers to collect their purchased goods from nearby stores and exchange or return goods they are not satisfied with. This reduces customers' anxiety regarding uncertain delivery times as they could choose to collect their goods after receiving an email or message saying that their purchased items have arrived. Moreover, they could choose to check the quality of the items in the store and return them immediately if the items do not match their expectations. Therefore, online retailers should coordinate with offline retail stores to provide collection, exchange, and return services in nearby stores. This could result in improved relationship quality and customer commitment.

7.3.2 Improvement of the signal credibility of OLSM

The release of market signals could be useful for reducing customers' perceived uncertainty and thus increasing their pre-purchasing and post-purchasing intention and behaviors. Signal credibility plays a vital role in making the signal an effective mechanism for conveying high product quality. In this study, logistics service price is defined as the credibility of the released signal OLSM. The results of this study indicate that logistics service price positively moderates the mediation effect of relationship quality on OLSM and e-loyalty. This means that setting up low logistics service prices would not make sense as if the logistics service price is very low, the logistics service quality cannot be guaranteed, which may delay the estimated delivery time or damage the delivery items. This could lead to the collapse of the relationship between customers and online retailers.

In addition, it is not wise to attract customers by decreasing the logistics service price. Customers who choose to use an online retailer due to its low logistics service price are price-sensitive and likely to seek alternative online retailers if

they think they can find a lower price. As many online retailers have not recognized the positive moderation effect of logistics service price, many of them prefer to reduce the logistics service price at the cost of decreasing its quality. This negatively impacts customers' shopping experiences. Several pricing strategies for logistics services should be considered by online retailers:

1) Different prices for different third-party logistics providers.

Online retailers could set up different prices for different third-party logistics providers. Online retailers could charge higher prices for high quality third-party logistics providers, such as ShunFeng, and relatively lower prices for lower quality third-party logistics providers, such as BaiShi and Tiantian Express.

2) Different prices for different delivery times.

The earlier the estimated delivery time, the higher the logistics service price, and the later the estimated delivery time, the lower the logistics service price. For example, the next day delivery service provided by ShunFeng Express is higher than the normal delivery service.

7.3.3 Taking advantage of the moderation effect of switching costs

The results indicate that the influence of OLSM on e-satisfaction and the indirect influence of OLSM on e-loyalty through e-satisfaction are negatively moderated by switching costs. In other words, when the switching costs are perceived as high, the effect of customer satisfaction on customer loyalty is reduced and the indirect effect of OLSM on customer loyalty is also low. And there is low possibility for customers to switch to other online retailers regardless of the optimization of OLSM, and it may be not wise to choose to optimize OLSM since the possible benefits of optimizing OLSM might be less than the required investment. On the contrary, when the switching costs are relatively low, the indirect effect of OLSM on e-loyalty is enhanced, and customers' switching behaviours will be influenced by the provision of OLSM. In this situation, it is considerable to optimize OLSM.

In a word, online retailers could slightly decrease switching costs to enhance the effect of OLSM on customer loyalty. For instance, online retailers could slightly reduce negative switching costs such as fees to join in as the members,

value card and so on. In this sense, the effect of OLSM is enhanced. Moreover, if the fees to join in the retailer as members are relatively high, although dissatisfied customers may still choose to stay in this online retailer, customers may complain about it, and the bad word of mouth may affect the patronisation of future potential customers.

7.4 Limitations and future directions.

This research has a number of limitations and flaws that could be improved in the future.

Firstly, this thesis adopts non-probability convenience sampling technique and it is argued that a convenience sample is not able to represent the characteristics inherent in the general population. Hence, it seems that it is difficult to generalize the results of this study. Future empirical work is needed to demonstrate whether or not these findings are not unique to this particular sample. Quota and snowball sampling methods can be used to make sure that the collected sample characteristics could represent the target population to more extent.

Secondly, this research is conducted exclusively on online shoppers in China, it is possible that this brings a bias. For example, the field of the study is restricted to those Chinese customers who shop online. It is unclear at this stage whether the same pattern would occur in online retailing market in other cultures. Future research could conduct across-cultural study on this topic to investigate whether or not the influence of OLSM on online customers is affected by the culture and find out to what extent these results are country specific or can be generalized to other countries.

Thirdly, this study mainly focuses on the investigation of the relationships between online retailers and customer, and how OLSM affect the relationships. Future research could invest the mechanism about how OLSM affect the relationships between online retailer and online logistics service provider.

Fourthly, the categories of purchased goods can be considered in the future to discover whether or not it will affect the influence of OLSM on customer loyalty.

Fifthly, this study shows that the online retailers could adopt strategy like different prices for different third-party logistics providers and Different prices for different delivery times. Future research could invest how different logistics service price strategies affect customer behaviours.

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Appendix (A)

Participant Information Sheet

My name is Yingqiao He. I am a postgraduate student studying at the University of Liverpool. We are working on a project looking at the influence of online logistics service mode on online customer loyalty. The online logistics service mode includes forward and reverse logistics. In terms of forward logistics, the provision of logistics service mode includes self-pick-up, delivery time slot and logistics service provider, while the reverse logistics contains pick up, refund in the nearby store and self-redelivery.

You are being invited to participate in a research study. Before you decide whether to participate, it is important for you to understand why the research is being done and what it will involve. Please take time to read the following information carefully and feel free to discuss this with your friends and relatives if you wish. We would like to stress that you do not have to accept this invitation and should only agree to take part if you want to.

This study aims to invest the relationship between online logistics service mode and online customer loyalty, providing theoretical and practical insight for future online logistics service.

We invited you to take part in this study because you are in the data base of the online retailers who are interested in knowing the relationship of the provision of logistics service mode and customer loyalty. More than 1000 participants are expected to receive this questionnaire.

Taking part is voluntary. If you don't want to take part, you are free to reject to fill the questionnaire. And once you choose to start the questionnaire, you are also free to suspend it at any time until you choose to submit the completed answers.

The information will be collected anonymously. And all the information you give us will be confidential and used for the purposes of this study only. More specifically, the data will be collected through the online questionnaire, all you have to do is just to fill out the questionnaire, and there is no need for you to submit the questionnaire to the author's Wechat specially. Hence, the

information you provided will not be identified by any people. In addition, the data will be stored in the secured server of wenjuanxing. The server is based on Elastic Compute Service (ALi Cloud), which is famous for its stability and security. And wenjuanxing adopts Reduntant Array of independent Disks storage to store data and install enterprise-level firewall to protect the data. In short, the data is stored safely. Furthermore, only Yingqiao He and his supervisor Dr DongLi have access to the data with the account number and password of wenjuanxing. However, since the data is stored by a third company, there is still low probability of data leak. Finally, the data is planned to be stored for about 6 months. As long as the analysis of data is finished, the author will delete all histories of the questionnaire in the platform and request wenjuanxing to destroy the back-up information simultaneously.

Thank you very much for your help!

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APPENDIX (B)

Survey Questionnaire-In English

Dear Participants,

Thanks very much for participating this survey about 'the influence of online logistics service mode on customer loyalty'. This survey aims to discover the relationship between online logistics service mode and online customer loyalty. It will take approximately 5 minutes to be completed. Thanks very much for your participation again.

Please answer the questions according to your last experience of online shopping, and rate the extent to which you agree with the following statements: (1=strongly disagree, 7=strongly agree).

Note: The online logistics service mode in this questionnaire includes both forward and reverse logistics. The selection of logistics service mode provided by the online retailers contains delivery time, the logistics service provider, self-pick-up and so on in the field of forward logistics, while the online logistics service mode in reverse logistics includes self-sent by consumer, exchange or refund in nearby stores and so on.

What is your gender?

Male Female

What is your age?

<18 18-24 25-34 35-44 45-54 >54

What is your education level?

Below undergraduate Undergraduate Postgraduate and Above

What is your monthly income?

<2000 2000-4000 RMB 4000-6000 6000-8000 >8000

What is your online shopping ages?

1 year and below 1-3 years 3-5 years Above 5 years

The online retailer provides me more selected ways of logistics service than other retailers.

Strongly disagree 1 2 3 4 5 6 7 Strongly agree

The online logistics service mode provide by this online retailer always meets my specific needs.

Strongly disagree 1 2 3 4 5 6 7 Strongly agree

Other online retailers could not provide me the logistics service mode that satisfy my specific needs.

Strongly disagree 1 2 3 4 5 6 7 Strongly agree

The provision of OLSM makes me feel that I am specially treated by the online retailer in this purchasing process.

Strongly disagree 1 2 3 4 5 6 7 Strongly agree

This online retailer always actively participates in satisfying my needs when I raise the requirement about the logistics service.

Strongly disagree 1 2 3 4 5 6 7 Strongly agree

Compared to other online retailer, the logistics service price of this online retailer is more expensive.

Strongly disagree 1 2 3 4 5 6 7 Strongly agree

I have to spend more on logistics service that matches my needs.

Strongly disagree 1 2 3 4 5 6 7 Strongly agree

I can only get free delivery as if the total value of purchased products is over a certain amount.

Strongly disagree 1 2 3 4 5 6 7 Strongly agree

I am overall satisfied with this online retailer.

Strongly disagree 1 2 3 4 5 6 7 Strongly agree

I am overall pleased with this online retailer.

Strongly disagree 1 2 3 4 5 6 7 Strongly agree

My expectations about the service and goods provided by the online retailer were satisfied, and even exceeded.

Strongly disagree 1 2 3 4 5 6 7 Strongly agree

My choice to purchase from this online retailer was a wise one.

Strongly disagree 1 2 3 4 5 6 7 Strongly agree

This online retailer is worthy and trustworthy.

Strongly disagree 1 2 3 4 5 6 7 Strongly agree

This online retailer is keen on fulfilling my needs and wants, and consistent in quality and service.

Strongly disagree 1 2 3 4 5 6 7 Strongly agree

This online retailer could successfully complete the transaction.

Strongly disagree 1 2 3 4 5 6 7 Strongly agree

I trust the claims and promises this online retailer makes about its logistics service.

Strongly disagree 1 2 3 4 5 6 7 Strongly agree

I have emotional and psychological dependence on this online retailer.

Strongly disagree 1 2 3 4 5 6 7 Strongly agree

I am willing to continue investing my time and effort on this online retailer.

Strongly disagree 1 2 3 4 5 6 7 Strongly agree

I intend to continue shopping at this online retailer over the next few years.

Strongly disagree 1 2 3 4 5 6 7 Strongly agree

This online retailer is my first choice when I want to purchase similar products.

Strongly disagree 1 2 3 4 5 6 7 Strongly agree

I will not change to other retailers as long as the current services continue.

Strongly disagree 1 2 3 4 5 6 7 Strongly agree

I am happy to recommend this online retailer to my friends.

Strongly disagree 1 2 3 4 5 6 7 Strongly agree

I keep visiting and prioritizing this online retailer whenever I need to make a purchase.

Strongly disagree 1 2 3 4 5 6 7 Strongly agree

To me this retailer is the best online retailer to do business with.

Strongly disagree 1 2 3 4 5 6 7 Strongly agree

Overall, it would cost me a lot of time and energy to find and get used to an alternative online retailer.

Strongly disagree 1 2 3 4 5 6 7 Strongly agree

I cannot be sure that the new online retailer can provide better service than the old one.

Strongly disagree 1 2 3 4 5 6 7 Strongly agree

It costs me too much to switch to another online retailer.

Strongly disagree 1 2 3 4 5 6 7 Strongly agree

In general, it would be a hassle switching to another online retailer.

Strongly disagree 1 2 3 4 5 6 7 Strongly agree

If you have any suggestion about this questionnaire, feel free to email to Y.He18@liv.ac.uk.

Thanks for your cooperation again.

APPENDIX (C)

Survey Questionnaire- In Chinese

网购物流服务方式与消费者忠诚

尊敬的参与者，您好：非常感谢您协助本课题研究，此次调查旨在挖掘网购环境下网购物流服务方式与消费者忠诚度的关系，从而为网购物流服务提供理论和实践依据。此次调查采用匿名方式，内容仅用于学术研究，且仅供本人与导师使用。我们郑重承诺对此次调查获取的信息完全保密，此调查中的题目无对错之分，请根据您的最近一次的网购真实体验，选择符合实际情况的选项（均为单选）。再次感谢您的参与与协助。本问卷涉及的网购物流服务方式包含正向物流中的配送服务方式和逆向物流中的退换商品的返还方式。网店为消费者提供的物流服务方式的选择，在配送服务方式方面，主要包含服务时间，快递商的选择（第三方快递服务商），以及消费者是否可以自提；在退换货商品返回方式方面，主要有消费者自寄（自己寄回给网店）、网店上门提取以及就近门店退换货。网店是网络商店的简称，如天猫商城的品牌旗舰店、淘宝卖家、京东商城等。

基本资料

您的性别：

男 女

您的年龄段：

18 岁以下 18~24 25~34 35~44 45~54 54 以上

您的学历

本科以下 本科 硕士及以上

您的月收入是多少？ *

2000 元以下 2000-4000 元 4000-6000 元 6000-8000 元 8000 元以上

您的网购年限？ *

1 年及以下 1-3 年 3-5 年 5 年以上

该网店能为我提供比其他网店更多样的物流服务方式。 *

非常不同意 1 2 3 4 5 6 7 非常同意

该网店所提供的物流服务方式（例如：物流服务商）总是能满足我的需求。 *

非常不同意 1 2 3 4 5 6 7 非常同意

其他网店没有满足我需求的物流服务方式。 *

非常不同意 1 2 3 4 5 6 7 非常同意

此次网购过程中，网店所提供的物流服务方式让我感受自己得到了特殊待遇。 *

非常不同意 1 2 3 4 5 6 7 非常同意

当提出物流服务需求时，该网店尽力满足了我。 *

非常不同意 1 2 3 4 5 6 7 非常同意

相比于其他网店，该网店的物流费用较高。 *

非常不同意 1 2 3 4 5 6 7 非常同意

我需要支付更高的物流费用以满足自己的物流需求。 *

非常不同意 1 2 3 4 5 6 7 非常同意

在该网店需要购买超过一定金额的商品才能获得免邮服务。 *

非常不同意 1 2 3 4 5 6 7 非常同意

总体而言，我对整个购物过程很满意。 *

非常不同意 1 2 3 4 5 6 7 非常同意

在该网店的网购经历使我愉悦。 *

非常不同意 1 2 3 4 5 6 7 非常同意

该商店提供的商品和服务符合甚至超过了我的期望。 *

非常不同意 1 2 3 4 5 6 7 非常同意

选择该网店是明智的。 *

非常不同意 1 2 3 4 5 6 7 非常同意

该网店是诚实并值得信任的。 *

非常不同意 1 2 3 4 5 6 7 非常同意

该网店致力于满足我的需求，并提供高质量的商品和服务。 *

非常不同意 1 2 3 4 5 6 7 非常同意

该网店能顺利地完成我们之间的交易。 *

非常不同意 1 2 3 4 5 6 7 非常同意

我相信该网店对他的物流服务和商品所做出的承诺。 *

非常不同意 1 2 3 4 5 6 7 非常同意

我对该网店有情感和心理上的依赖。 *

非常不同意 1 2 3 4 5 6 7 非常同意

我很愿意继续花费更多时间和精力在该网店上。 *

非常不同意 1 2 3 4 5 6 7 非常同意

我打算在未来的几年内继续在该网点消费。 *

非常不同意 1 2 3 4 5 6 7 非常同意

下次购买同类商品时，该网店是我的第一选择。 *

非常不同意 1 2 3 4 5 6 7 非常同意

只要该网店能继续提供当前的服务和商品，我不会考虑转移到其他网店。 *

非常不同意 1 2 3 4 5 6 7 非常同意

我很乐意推荐该网店给我的其他朋友。 *

非常不同意 1 2 3 4 5 6 7 非常同意

我会继续关注并浏览该网店。 *

非常不同意 1 2 3 4 5 6 7 非常同意

该网店是最好的卖家。 *

非常不同意 1 2 3 4 5 6 7 非常同意

如果舍弃该网店，我需要花费更多的时间和精力去寻找并适应新的满足我需求的网店。 *

非常不同意 1 2 3 4 5 6 7 非常同意

我不确定新的网店是否能提供比该网店更好的服务和商品。 *

非常不同意 1 2 3 4 5 6 7 非常同意

总而言之，从该网店转到其他网店的成本较高。 *

非常不同意 1 2 3 4 5 6 7 非常同意

转换到其他网店让我感到烦恼。 *

非常不同意 1 2 3 4 5 6 7 非常同意

如果您对该研究有更好的建议，或有任何疑问有任何疑问，请邮件联系我们：

Y.HE18@liv.ac.uk. 再次感谢您的配合！

APPENDIX (D)

Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	8.991	32.109	32.109	8.991	32.109	32.109
2	3.217	11.491	43.600			
3	2.174	7.763	51.364			
4	1.862	6.648	58.012			
5	1.680	6.001	64.013			
6	1.381	4.932	68.945			
7	1.355	4.840	73.784			
8	.548	1.956	75.741			
9	.507	1.812	77.552			
10	.484	1.730	79.282			
11	.475	1.698	80.980			
12	.428	1.528	82.508			
13	.404	1.443	83.950			
14	.402	1.436	85.387			
15	.385	1.374	86.761			
16	.379	1.355	88.116			
17	.358	1.278	89.393			
18	.341	1.217	90.610			
19	.313	1.118	91.728			
20	.308	1.099	92.827			
21	.300	1.072	93.899			
22	.291	1.041	94.940			
23	.277	.990	95.930			
24	.265	.946	96.876			
25	.239	.852	97.728			
26	.225	.802	98.530			
27	.209	.747	99.278			
28	.202	.722	100.000			

Extraction Method: Principal Component Analysis.