Analysis of customers' return behaviour after online shopping in China using SEM

Danping Lin
Shanghai Maritime University, Pudong, China

Carman Ka Man Lee
Hong Kong Polytechnic University, Kowloon, Hong Kong

M.K. Siu
*Department of Industrial and Systems Engineering,
Hong Kong Polytechnic University, Kowloon, Hong Kong*

Henry Lau
Western Sydney University, Sydney, Australia, and

King Lun Choy
Hong Kong Polytechnic University, Kowloon, Hong Kong

Abstract

Purpose – The purpose of this paper is to examine the potential impacts of various variables on product return activities after online shopping. Previous studies on customer behaviour have been predominantly concerned with return on used products and other product-quality-related constructs in the model. This study aims to specially examine the logistics service-related and customer intention–related variables for general products under the e-commerce circumstance.

Design/methodology/approach – Structured questionnaire data for this study were collected in the two southeast cities of China (162 useable responses). Structural equation modelling was used to examine the latent variables.

Findings – The results confirmed that product return intention has the greatest impact on online shopping returns with a direct effect of 0.63, followed by the flexibility in return (logistics service) with a direct effect of 0.49.

Originality/value – Such a model not only enriches the theoretical understanding of customer behaviour studies but also offers online shopping stores and platforms a quantitative benchmark and new perspective on the design of online shopping supply chains by considering product returns so as to improve the customer satisfaction.

Keywords Online shopping, Product return, Customer behaviour, Structural equation modelling

Paper type Research paper

1. Introduction

The global surge of e-commerce has been an ongoing phenomenon (AI-Qirim, 2006). Despite efforts to apply multiple approaches to stimulate customer shopping desire, the product return is a common concern for many countries. Research analysis pointed out that the worldwide spurt of product/service return after purchasing has been increased due to the explosive growth of world e-commerce on the one hand and the adversity of consistently appealing to and satisfying variable customers on the other. World e-commerce trading volume increased from US$1,336 billion in 2014 to US$2,842 billion in 2018, representing an average growth of 20 per cent in this five-year period (Statista, 2019). Based on a net increase

of US$1,506 billion in this period without considering discount and currency inflation, the e-retail revenues are expected to grow to US$4.88 trillion in 2021 (Statista, 2019). In addition to the sheer figures, different nations have their own concerns about the return issues. For some countries, the major concern is the return procedure management (e.g. the United Kingdom, United States), while for others, the high return portion is the main consideration (e.g. China).

There are three reasons explaining why this research emphasized on the e-commerce situation in China: (1) Statista (2019) reported Internet shopping accounted for about 19 per cent of all retail sales in China, and a large volume of the Chinese online shopping and its rapid growth represented it as a typical case; (2) the extraordinary increment of the e-commerce trading volume in the last 10 years and China's position in the international online business share because of the massive size of China's market; and (3) the rapidly increasing popularity of mobile payment in China that has been greatly stimulating consumption and representing people's affluent and sophisticated lifestyles in many significant aspects. As stated earlier, a concise study of the e-commerce situation in China and exploration of the potential reasons behind it would help to understand the customer behaviour so as to decrease the return actions as well as evaluating the commercial performance. Comparing the two shopping holidays (i.e. Black Friday vs 11.11) will benchmark the condition of the retail industry given their significance in the business and social perspectives. Created in 2009, 11.11 represents a new e-commerce holiday that boosted sales to US$7.8 million in gross merchandise value (GMV). In 2012, the sale of 11.11 surpassed that of Black Friday. In 2017, the number of GMV reached US$25.3 billion versus US$11.62 billion for Black Friday. The number has been updated to US$31.81 billion. Despite the global bloom of e-commerce, CBRE Group has released a report that estimated a total US$37 billion for 2018 (Berman, 2019). Moreover, according to the U.S. Census report (CBRE report), the e-commerce share and e-commerce sales have increased from 4.5 per cent of the total retail sale and $169.9 billion in year 2010 to 8.9 per cent and $453.5 billion in 2017. Similar booming phenomenon happens in China and other countries. This calls for a financial and logistics commitment to keep pace with returns.

Online shopping provides convenience, variety, price comparison, fewer purchasing costs, no crowds and more attention (Akroush and Aldebei, 2015). Because of the unique shopping approach, online vendors are under more pressure to assure a full demonstration of a product's appearance, flavor, quality, safety, taste and add-on services, particularly logistics service. There is also pressure from government legislation and consumers' concerns about price discrimination generated from online shopping (Borgesius and Poort, 2017). The aforementioned factors influence not only online shopping intention but also post-sales customer satisfaction, which may further lead to a product return. Past studies examined what factors that influence the online purchasing action, whether it is a single impact of a particular factor (Close and Kukarkinney, 2010; Ganesh et al., 2010) or combined action of factors (Akroush and Aldebei, 2015; Dakduk et al., 2017). However, past studies did not fully extend the study to the return action analysis. There lacks enough evidence on what are the factors and how these factors collectively impact consumers' return behaviour and their relationship between the online purchasing and return action. This may be due to that the electronic trade volume and e-commerce share at that time are not big enough. Faced with the booming e-commerce and the increased online shopping volume, the study of customer return becomes a crucial problem. Because the large volume of return packages not only represents a waste of forward logistics resources but also arises challenges to the management of reverse logistics. Sometimes retailers are left with little choice but to get rid of large swaths of inventory at a cost.

Several impact factors that are used to analyse the online purchasing behaviour can be interpreted and investigated for return action as well. The existing literature explores the reasons of return from several angles, such as online product review (Sahoo et al., 2018), customer value framework (Minnema et al., 2018), buy-online-and-pick-up-in-store strategy (Shi et al., 2018) and price competition (Zheng et al., 2018). As a result, this paper will

take reference to some impact factors for return behaviour and analyse them under the e-commerce scenario. In addition, in the summarized literature review on product return in the supply chain (Table I), it is found that most of the studies focused on the consequences and effect of product return on the supply chain, while this study will be conducted from the angle of effect factor of the product return.

This study is of high managerial implications because the customer return behaviour problem in the Chinese e-retail industry is a comprehensive expression of multiple reasons. Apart from a large population base in China, the ever-changing consumption habits, such as mobile payment and flexible return policy, have posed a big challenge to the product return management. To understand customer return behaviour after electronic shopping in China, this paper tries to answer the following questions:

(1) What are the factors affecting customers' choice of product/service return after purchasing from the Internet?

(2) How did these factors affect the return decision?

(3) What are the practical implications after interpreting these factors?

A structural equation modelling (SEM) approach is applied to investigate the respondent's opinions towards e-commerce and analyse customer return behaviour in service industries. The rest of the paper is organized as follows: Section 2 presents the literature review. Section 3 describes the SEM methodology in detail. Section 4 explains the path analysis. Section 5 covers the discussion, and conclusions are made in Section 6.

2. Literature review
This paper contributes to the study of customer behaviour in the e-commerce background from the supply chain process management. As the first step of process management, analysing the customer behaviour especially the return action would provide the foundation for streamlining the business process and continual optimization. Online shopping consists of

Paper	Under e-commerce (Y/N)?	Applied models	Analysed factors
Chen and Guo (2013)	N	Fuzzy mathematical programming models	Effect of product return on the optimal ordering decisions
Maity and Arnold (2013)	Y	Statistical model	Different forms of pre-purchase information search
Dailey (2015)	N	N	Restrictiveness and variation of restrictiveness of product return policies
Pei (2015)	N	N/A	Internal (e.g. variety seeking, impulsiveness) and external (e.g. product compatibility, returning cost)
Fu *et al.* (2016)	Y	Fused latent model	User profiles, product features, return propensity
Gelbrich *et al.* (2017)	Y	N/A	Reinforcement of keep rewarding policy
Shaharudin *et al.* (2017)	N	Structural equation modelling	The impact of product return on the effectiveness of reverse supply chain
Zailani *et al.* (2017)	N	Partial least squares	Barriers to carrying out product return management in the automotive industry
Zheng *et al.* (2018)	N	N/A	Return rate, price competition

Table I.
Recent literature on product return

operations such as website visiting, consulting, selecting, paying, delivering, consumption and disposal. Like normal purchasing in stores, an online shopping supply chain is also composed of several participants such as suppliers, manufacturers, logistics service providers, online retailers and end customers. The manufacturers produce products based on the raw materials offered by suppliers. After that, logistics providers transfer the products to online retailers in large batches. When online shopping is finalized, logistics providers transfer the product to the end customer, depending on their orders. End customers take responsibility for return actions by sending the products either to the collection centre or to dedicated locations. Any discordant link in the chain would dissatisfy customers and sometimes cause product/service return. In order to be more competitive, online retailers have to provide excellent products in the right place, at the right time, with the right cost (Ayers and Odegaard, 2008), as well as incorporate other considerations such as good packaging, fast logistics delivery, nice after-sale service and so on.

To identify the factors that impact customer's return action, impact factors are extracted by systematic literature review from well-known databases such as EBSCO, ScienceDirect, Engineering Village, Taylor and Francis and Springer. The articles are restricted to journal articles or book chapters published in the English language within 2010–2017. Meanwhile, the filtered keywords including the return, reverse logistics, online, shopping, behavio(u)r, factors, impact, influence and other equivalent meaning words were applied to extract the relevant articles. More than 600 papers were initially obtained whose domains are spread through economics, engineering, finance and computer science. Preliminary filtering was applied to rule out duplicated papers and irrelevant studies, and this narrowed down the total number to 274 articles. Full-text analysis continued to eliminate those articles whose return action was beyond the e-commerce boundary, which means online purchase involvement. As a result, 86 relevant articles were used in our research.

In addition to the earlier exhaustive article analysis, interviews with customers from supermarkets, online stores and campus talks, the third-party logistics service providers and prominent academics working in the domain of customer behaviour were conducted through which seven variables are generated and listed in Table II. Drawn lessons from the classification of Close and Kukarkinney (2010) and Akroush and Aldebei (2015), the framework of Table II attributes the attitudes towards an action to "what they expected/ actually perceived" and "what motivates them to do". These are factors that influence customer satisfaction and even trigger a decision to return the products. The extracted factors are as follows:

2.1 Online shopping service
2.1.1 Quality. The International Standards Organization (ISO) defines quality as the generic features of products/services that meet the basic requirements of customers (ISO 9001). As quality is peculiar to identifying characteristics of a particular item that are organized in a

Observable variables			Unobservable variable		
Online shopping service	Quality	→	Customer satisfaction	→	Return action
	Price				
	Promotion				
Logistics provider service	Packaging				
	Delivery				
Motivation	Terms & conditions		Return intention		
Flexibility	Collection service				

logical proposition, product quality is the foremost thing that may cause customers to return a product, which includes defects, wrong product description, decay, wrong product, damage, misinterpretation of the product value and so on. Inferior quality would downgrade the customer satisfaction rate and restrain sales. It may increase the return rate especially for online shopping because customers place an order without physical contact with the product (Yoo, 2014). Besides, the return may be caused by the deviation of the expected quality of the product from the image or video presented in the online shop. Therefore, the quality of a product purchased online also plays an important role in deciding whether the product will be returned by a customer.

2.1.2 Price. Price plays a vital role in attracting customers to purchase a product as well as the assessment of the product. Price can be explained as an amount of money which the customer paid to obtain the product (Schindler, 2012). The price of a product purchased online is affected by the selling price, the internal product value, logistics price and searching price. Though a higher price may indicate better quality (Chen *et al.*, 2017), due to the online shopping approach, customers have a higher chance to find products that contain a better price–quality ratio. On the other hand, the price can be a crucial factor affecting customers' decision to return the product, especially taking return cost into consideration. If the return procedure is easy and the return cost is low, customers are more likely to return the products.

2.1.3 Promotion. In marketing, promotion is defined as any type of marketing communication used to attract or persuade target users to try or buy particular products or services (Perreault and McCarthy, 2002). The aim of promotion is to increase sales or brand loyalty; thus, a close association has been built between customer behaviour and different promotion approaches (Zhou *et al.*, 2017). These studies analysing promotion have gained wide interest in the era of e-commerce (Jiang and Liu, 2012), and researchers attempt to test the relationship and effectiveness between multiple factors and online sales. Though promotion encourages online shopping, it also affects a customer's decision to return the product due to the suggested purchase quantity or new promotion or even impulse buying.

2.2 Logistics provider service

2.2.1 Packaging. Packaging plays a vital role in reducing the cost of fulfilment and improving customer satisfaction. Good packaging can give a good impression to the customers (Schueneman, 2004). Wyrwa and Barska (2017) further extended the role of packaging to protect, preserve, transport, inform and sell products, which includes the process of designing, evaluating and producing packaging. Various studies are dedicated to analyse the meaning of packaging from the perspectives of prolonging the life cycle (Licciardello, 2017; Jose *et al.*, 2018), assessing environmental effect (William *et al.*, 2012; Franey *et al.*, 2010), building corporate image (Shnayder *et al.*, 2016) and measuring customer satisfaction (Sanye *et al.*, 2012; Pousette *et al.*, 2014). With regard to the online purchased items, the packaging is the first impression when customers receive a product; thus, the impact of packaging on customer satisfaction would be more significant. Moreover, packaging encourages online purchasing intentions when transportation is reliable and fast (Taghavi and Seyedsalehi, 2015). Due to the importance of packaging to the online market, packaging may increase the intention of return when the products are damaged in transportation or in late delivery.

2.2.2 Delivery. Delivery refers to the process of transporting the purchased goods from a source location to a predetermined destination. In electronic commerce, the service in delivering the order is usually treated as the last mile of logistics service (Huang *et al.*, 2009a, b). No matter whether the delivered products are physical goods or intangible services, the arrangement of delivery affects the received quality and further influences customer satisfaction. Therefore, research has tried to improve the logistics service from different perspectives, such as figuring out and modelling the determinants (Huang and Feng, 2007),

applying new information technologies (Choi *et al.*, 2003; Li *et al.*, 2008; Lorenc and Szkoda, 2010), route planning (Cao and Glover, 2010) and even logistics service evaluation (Huang and Kuo, 2008; Huang *et al.*, 2009a, b). The bad delivery service may cause customers to return the product because of either the short shelf-life or annoyance of waiting.

2.3 Motivation

According to Webster's Dictionary (2013), motivation refers to the reasons for people's actions, desires and needs. It is the result of comprehensive interactions of both intrinsic and extrinsic factors. The psychological theory explains the relationship between motivation and action as a cycle. Thus, understanding of customers' motivation would help us to exert influence over customers to reduce product return in e-commerce. Because motivation involves the biological, emotional, social and cognitive forces (Morris *et al.*, 2007), it is difficult to observe directly and most of the approaches use indirect ways such as observing how it stimulates, directs and sustains behaviour. Generally, motivation can be divided into intrinsic motivation and extrinsic motivation. Intrinsic motivation describes the desire for self-fulfilment, enjoyment and mastery. Extrinsic motivation shows the sake of accomplishing a specific result or outcome. So far, most of the studies on customers' motivation are conducted from the purchasing perspective, which recognized it as an important determinant (Pappas *et al.*, 2017). The found motivations for purchasing include best price, promotion, information richness and density, the convenience of online interactivity, shopping ubiquity, social network impact and personalized service (Close and Kukarkinney, 2010; Ganesh *et al.*, 2010). Few pieces of research were dedicated to analysing the return motivation, though return decision is the combination of several motivation aspects as well. Ingham and Cadieux (2016) measured eight factors (i.e. perceived benefits, social awareness, post-purchase behaviour, perceived risk, market characteristics, subjective norm and return product knowledge) that affect consumers' return intention towards used products. Kamyar *et al.* (2017) classified that three categories, attitude, perceived behavioural control and subjected norm, influence consumers' intention to return end-of-life (EOL) electronic products. Similar approaches can be found in Lu and Zhu (2015), Garrouch *et al.* (2012), and Dixit and Badgaiyan (2016). However, these works focused on the EOL or used products rather than general items. General items here mean all types of products, tangible and intangible, EOL products, used products, newly launched products and matured products. Besides, the impact of return terms and conditions is always ignored. To sum up, the analysis of such return motivation would help better understand online shopping behaviour and eventually lead to more sales.

2.4 Flexibility

The right logistics service accounts for an important portion for attracting customers. The right logistics service includes the right time, right cost, right route and other right processes (Wu, 2003). Meanwhile, the right processes imply the flexibility to arrange a proper logistics service. It not only enhances the experience of receiving products and increases satisfaction but also encourages customers to place more orders. Similarly, with regard to return analysis, flexibility refers to the degree of how customers can select their desired returning method or process. Fu *et al.* (2015) analysed the correlation between return frequency and return features. They found that females are more intent to return product, and the increase of product return is positively related to return flexibility such as higher credit earning, no warranty/invoice. Stock and Mulki (2009) indicated that higher flexibility of product return will increase firms' competitiveness, as the customers will form a better perception of the firms. Oppositely, Richey *et al.* (2005) mentioned that restrictive return policy, for example, limitation on the return amount and return authorization, would negatively influence the return intention as well as the procurement.

3. Methodology

3.1 Model explanation

Methodologies used on customer behaviour topics in the past years are mainly quantitative attempts including modelling (e.g. Cavoski and Markovic, 2015; Platzer and Reutterer, 2016; Dakduk *et al.*, 2017; Shah *et al.*, 2017; Zhang and Zhang, 2017; Lin *et al.*, 2018) and empirical analysis (e.g. Ballestar *et al.*, 2017; Zhang *et al.*, 2018), with some qualitative methods (e.g. Levy, 2005; Sasu and Ichim, 2016). The popularity of quantitative methods is due to the greater accuracy of the results which is obtained based on large information and elimination of more biases via standardized steps. Some research studies combining quantitative methods with empirical data offer a general insight into modelling issues of complicated social event. SEM is acknowledged for its ability to interpret certain variables which do not load on certain factors, such as the pattern of behaviour, thought and emotion. As a form of causal modelling, SEM explains relationships between unobserved constructs (latent variables) and observable variables (Ramlall, 2016). Their relationships are interpreted as the construct equations whose principles are based on variance and covariance. The estimated parameters of the equation are generated according to the maximum likelihood estimation method (Eliason, 1993) by representing the whole population with sample data which follows a normal distribution. To simplify the convergence of the data, this paper adopts the improved SEM version which constructs the measurement variables into groups. Therefore, the relationships between measurement variables and latent factors are annotated as

$$a_i = w_i F_k + e_i \tag{1}$$

$$F_k = \sum_{k \in K} F_K w_{i,j} + \xi_k \tag{2}$$

Equation (1) is the measurement model equation where a_i is the measurement variables, w_i is the factor loading score, F_k is the latent variable under the kth group and e_i represents the measurement error. Equation (2) represents the attributes of the latent variable which is composed of the sum of the character of the hypothesized latent variable (i.e. the product of the latent variable and the hypothesized relationship $w_{i,j}$ among latent factors) and the residual error ξ_k.

In general, we will use 25 measurement variables that are distributed into six groups to impute the potential causes to return action after electronic purchase. In detail, there are four exogenous latent variables and three endogenous latent variables. Exogenous latent variables are online shop service (OSS) f_1, logistics provider service f_2, motivation f_3 and flexibility f_4. Endogenous latent variables are customer satisfaction η_1, product return intention η_2 and product return behaviour η_3.

3.2 Hypotheses

Unlike a product which has a clear outcome dimension, service is measured by its process dimension (Voss and Hsuan, 2009) and creates an interaction between service providers and customers. Service from the online channel, both tangible and intangible, can be described by the outcome dimension (Grönroos, 2000). The activities need to be carried out to figure out why the supply does not match the demand or eventually leads to return action after e-purchase. The classification of potential factors will contribute to a better understanding of the service concept and provide insight into how to design service processes in practice, especially in fast-changing customer demand circumstances.

Based on the previous literature reviews, product return behaviour in online shopping was accessed using the categories of customer satisfaction and product return intention. From the

perspective of the customer, the satisfaction influencers include the OSS and logistics provider service, because the online purchased products rely on the logistics provider to transport the items. With regard to the product return intention, flexibility may be one of the factors affecting the intensity of return (Zheng *et al.*, 2018). From an online shopping perspective, a better online shopping experience, which including the investment of search would decrease the mismatching of product expectations (Maity and Arnold, 2013). In addition, a smoother transportation service would enhance the satisfaction as well as avoid returns. It shows that the ability to execute better online shopping management and creating the right purchasing environment can lower the motivation of online shopping product return intention and increase the reliability of purchasing online. Therefore, flexibility is an important factor for backward supply chains, and Madaan *et al.* (2016) proposed an integrated flexible recovery system to deal with the return performance evaluation.

Built on the aforementioned reviews, the following six hypotheses are made:

H1. Online shop service has a positive effect on customer satisfaction.

H2. The better the logistics provider service, the more positive the effect on customer satisfaction.

H3. Motivation plays a positive role in customer product return intention.

H4. Flexibility positively affects customer product return intention.

H5. Customer satisfaction negatively affects customer product return behaviour.

H6. Product return intention positively affects customer product return behaviour.

On the basis of hypotheses 1–6, an online shopping return analysis framework was developed, as shown in Figure 1.

3.3 Data collection
We collected data from China to empirically examine the conceptual model. Compared to other regions, economic zones of the Yangtze River Delta (YRD) and Pearl River Delta (PRD) represent fairly good logistics bases, with booming logistics market and matured logistic network (Xu and Wang, 2017). In addition, these two economic zones take the lead in the support of industry development (Ryser and Fritsche-Sterr, 2012). These characteristics make these two economic zones an appropriately representative research setting for
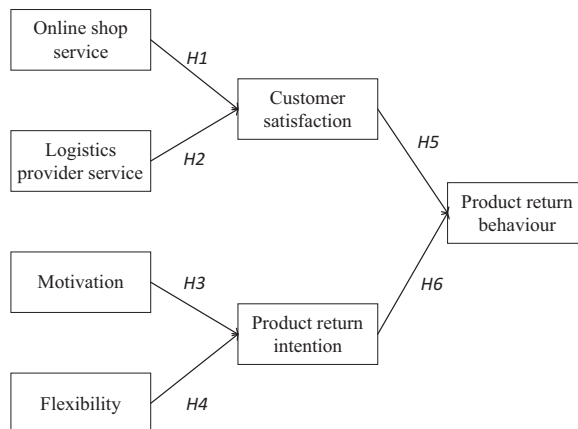

Figure 1.
Causal model

exploring the potential effects that impact customers to return the products after online shopping. Due to the difficulty of obtaining samples from all cities in these two economic zones, we strategically choose Shanghai and Hong Kong as our focus for the data collection.

People who have rich experience in e-commerce purchasing are our questionnaire targets. Considering the great difficulty of contacting all people with our limited time and resources, we targeted only those aged between 15 and 45 because they are the leading players for e-commerce. For the purpose of verifying the proposed hypotheses, pre-research about customers' opinions was initially collected from Taobao App. After that, a questionnaire was designed accordingly which used a seven-point Likert scale (that ranged from "strongly disagree" to "strongly agree") and handed out to a small group of experts and related personnel to validate the questions in the first round. In this round, some experts advised us to summarize those questions reflecting the unmatched perceived benefits questions and to add more about the return logistics. Based on the feedback, the questionnaire questions were improved based on SEM (Henseler *et al.*, 2015), and the data was summarized in the second round. The questionnaires were designed in English and targeted to the study sample focusing on experienced e-commerce customers. The questionnaires are printed in hard copy and distributed in the return collection stations and the intelligent express cabinet points in some randomly selected districts. For each respondent, the questionnaire highlighted the objectives and potential contributions to our research. Meanwhile, student volunteers can help explain the questions for each respondent that agreed to participate. Throughout this study, from March 27, 2016 to April 5, 2016, 250 copies of the final version of the questionnaires were handed out and 187 responses were received, of which 162 were valid for this study. The research sample was representative as 89 per cent of respondents had more than five-year online shopping experience. Among them, 65 per cent were less than 20 years old. With regard to the respondents' education background, 34 per cent had a bachelor's degree, 9 per cent obtained a diploma or equivalent and the others belong to secondary school or below. Exploring their online experience, 89 per cent of them enjoyed the purchasing experience online and 59 per cent had return experience.

As the measurement variable is unable to be observed directly, latent variables are assumed to be linked to measurement variables and their behaviours are used to interpret measurement variables. Table III lists 25 indicators that form the six premier variables.

The reliability of the research was validated by using Cronbach's α. According to the α values derived from the pre-tested data, a total of three items (i.e. Mot2, Flex 1 and Flex 2) had to be excluded from the framework as their corrected item-total statistics were below the threshold value 0.3. Thus, the reliability test was performed after eliminating those items. The results obtained using SPSS 19.0 are shown in Table IV. It can be seen that each alpha value is above 0.70, which indicates the authenticity of relationships between measured and latent variables. The coefficients of composite reliability ranged from 0.802 to 0.930, indicating high reliability. The average variance extracted (AVE) coefficients were also higher than 0.50, showing good convergent validity. With regard to the discriminate validity, the χ^2 difference method was applied to test whether the correlations between paired constructs were close to 1.0 (Fornell and Larcker, 1981). The results showed that even though two paired constructs (logistics provider service and motivation; flexibility and production return intention) were similar at the 0.05 level, the connotation of these factors was distinct; thus, discriminant validity was assured.

Furthermore, structural validation was conducted to test whether the collected data are suitable to be analysed by SEM. The results in Table V proved this statement as the KMO values were higher than 0.70. Theoretically, an examination of the fitness of the model can be analysed from several indexes, such as the goodness of fit index (GFI), normed fit index (NFI) and so on. Table VI provides the benchmark values of such indexes. From Table V, it is clear that the test data is applicable for SEM, though the value of NFI slightly exceeds 0.9. All other indicators passed the benchmark threshold (Huber-Carol *et al.*, 2002).

No.	Premier variables	Indicators	Variable
1	Online shop service	Sufficient product description	OSS1
		Friendly website interface	OSS2
		Secure and convenient payment process	OSS3
		Better online experience	OSS4
		Clear information on after-sale service	OSS5
		Good response time of inquiry	OSS6
2	Logistics provider service	Professional delivery service	LPS1
		Useful response from the logistics provider	LPS2
		Convenient collection procedure	LPS3
		Easy delivery status checking	LPS4
		Acceptable lead time	LPS5
		Reasonable transportation cost	LPS6
3	Motivation	Full return refund	Mot1
		Credit reward from the online shop	Mot2
		Extra fee for door collection	Mot3
		Discount for pre-assigned location collection	Mot4
4	Flexibility	The nearby collection point	Flex1
		Convenient return service office hour	Flex2
		Optional return points	Flex3
		30 days' return period	Flex4
		Prefer to-door collection to the pre-assigned return location	Flex5
5	Customer satisfaction	Satisfied overall service from the online shop and logistics provider	CS1
		Satisfied product quality	CS2
6	Product return intention	Return due to out-of-expectation	PRI1
		Necessary return service	PRI2

Table III.
List of variables influencing consumer's return behaviour after online shopping

Latent variables	Cronbach's alpha	Number	Composite reliability	AVE
Online shop service (OSS)	0.747	6	0.802	0.651
Logistics provider service (LPS)	0.892	6	0.824	0.502
Motivation (Mot)	0.753	3	0.851	0.631
Flexibility (Flex)	0.734	3	0.930	0.643
Customer satisfaction (CS)	0.837	2	0.817	0.739
Product return intention (PRI)	0.722	2	0.863	0.548

Table IV.
Reliability analysis

Subscale	KMO	χ^2	df	Sig	Standardized regression weight	p-value
Online shop service (OSS)	0.721	166.552	5	0.000	0.405	0.001
Logistics provider service (LPS)	0.746	384.721	5	0.000	0.429	***
Motivation (Mot)	0.762	652.551	4	0.000	0.359	0.007
Flexibility (Flex)	0.739	400.936	4	0.000	0.491	***
Customer satisfaction (CS)	0.742	572.216	3	0.000	0.162	0.226
Product return intention (PRI)	0.711	249.734	3	0.000	0.630	***

Table V.
KMO and Bartlett's test

4. Path analysis

Via SPSS 19.0 software, the maximum likelihood method was applied to validate the proposed model's fitness. After fittings, the structural equation path diagram was developed, as shown in Figure 2. The analysis was carried out to identify the effect of the measurement variables on the corresponding latent variables.

Indicators	χ^2/df	GFI	RMSEA	PNFI	PGFI	NFI
Benchmark	<3	>0.9	<0.08	>0.5	>0.5	>0.9
Tested value	2.447	0.924	0.072	0.531	0.607	0.902
Qualified or not (Y/N)	Y	Y	Y	Y	Y	Y

Note(s): χ^2: Chi-squared index; df: degree of freedom; GFI: Goodness of Fit Index; RMSEA: Root Mean Square Error of Approximation; PNFI: Parsimony Normed Fit Index; PGFI: Parsimony Goodness of Fit Index; NFI: Normed Fit Index

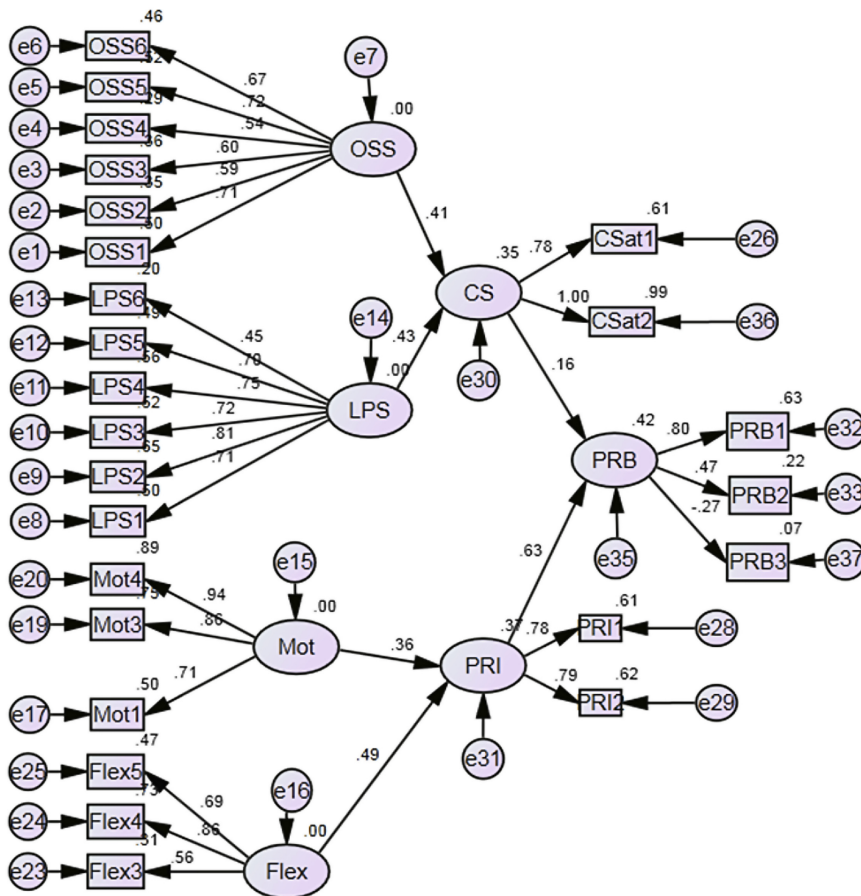**Table VI.**
The goodness-of-fit analysis

Figure 2.
SEM path graph

4.1 Measurement model path analysis

4.1.1 Online shop service. The exogenous latent variables system's measurement variable path coefficients are 0.67, 0.72, 0.54, 0.60, 0.59 and 0.71. They all exceed 0.50, supporting the statement that OSS has an obvious impact on customer satisfaction. Among these latent variables, the variables "friendly website interface" and "fast response time of inquiry" have a higher influence than other OSS variables. This reflects the more interactive advantage of online shopping than in the traditional shopping approach.

4.1.2 Logistics provider service. In the exogenous latent variable logistics provider service, most indicator coefficients are relatively high. The path coefficients, from high to low, are useful responses at 0.81, acceptable lead time at 0.79, easy delivery status checking at 0.75, convenient collection procedure at 0.72, professional delivery service at 0.71 and reasonable transportation cost at 0.45.

The useful response has the highest coefficient. This indicator represents the connection between online stores and customers as the response involves purchasing inquiry, service commitment, data security, payment fabrication, transportation policy and quality standards. In addition, a better useful response demonstrates an effective logistics service which is the comprehensive result of lead time, collection procedure and transportation costs.

4.1.3 Motivation. Reaching 0.94, the discount for pre-assigned location collection has the biggest relationship with the endogenous measurement variables from the motivation perspective. Compared with other variables, a full return refund policy and an extra fee for door collection are important factors in motivating customers to return the online shopped products.

4.1.4 Flexibility. In the endogenous latent variable flexibility, each indicator's path coefficients, from high to low, are the 30 days' return period at 0.86, prefer to-door collection at 0.69 and optional return points at 0.56.

4.1.5 Customer satisfaction. With regard to the customer satisfaction variable, the indicator's path coefficients are 0.78 and 1.00, which all exceed 0.50. Therefore, it supports the notion that satisfactory product quality has a higher impact on preventing customer return action than that of satisfactory overall service from the online shop and logistics provider. The path coefficient of the satisfied product quality is one that may be due to the sample source of 15–45-year-old customers. As the main players for e-commerce, this age range of customers not only purchase more and frequently but also enjoy mature purchasing skills such as extensive searching and comment reviewing. This shows that customers focus more on the product itself while the logistics service adds more value to the product quality.

4.1.6 Product return intention. There is not much impact difference for the endogenous measurement variables for the product return intention, as their variable coefficients are 0.78 and 0.79. This shows that product return intention has an obvious impact on product return behaviour.

4.2 Structure model path analysis

To further test the impact of latent variables on each other, a study of the structure model's path coefficient is conducted where the relationships between the variables are interpreted as the direct effect, indirect effect and total effect. The analysis results are shown in Table VII.

In Table VII, the largest direct effect value of the six assumptions is the product return intention at 0.63. It indicates that via analysis of return intention, the return mechanism can be designed to control the return behaviour. This would greatly influence the return action via transferring product quality, designing return procedures and providing return services. While the relationship between customer satisfaction and product return behaviour is marginally significant, it shows that it is more important to analyse the product return intention than improve customer satisfaction. Generally, the presented six paths, which were tested under a 5 per cent significance level, all passed the tests, and therefore, all hypotheses were supported.

5. Discussion

5.1 Reducing product return by providing delicate return service

In accordance with the existing literature and with the extensive background of e-commerce, we develop a theoretical framework to analyse the return action after online shopping. Covariance SEM is adopted as this study attempts to study psychometric analysis which is purchase return attention. Indeed, covariance and variance SEM both have reflector indicators as latent measures. Covariance SEM is more of a confirmatory technique while variance SEM is for prediction. The results in Table VII reveal that the most significant direct effect of return action in e-commerce is the product return intention, followed by the flexibility and logistics provider service variables. One reason is that flexibility and logistics provider service would directly promote buying as well as return behaviour. The accumulation effect narrows the discrepancy between return intention and return behaviour. With regard to the other variables, they are less significant in impacting the return action in e-commerce. Part of the explanation is that the relaxed regulations on return and the convenient return logistics can tolerate regret after e-commerce which further induces return. For example, the full return refund policy may feed on the temporary mastery decision of the product before e-commerce. The express logistics service on one side weakens the yearning of the product, and on the other side, cheap return logistics service aggravates the regret after receiving the product. Therefore, logistics provider should delicately make the rules about the return standard and return procedure.

The empirical results of the product return influencing factor loading values range from 0.45 to 1.00 (see Figure 2) and more than 68 per cent are over 0.7. These values indicate that the outputs of all loading factors are significantly correlated to the online shopped product return behaviour. Going through the logistics-related factors, their factor loading values are in the range of 0.45 and 0.81. Based on these values, it is reasonable to argue that the logistics-related measurement needs to be addressed in future return policy so as to encourage more sales. This is in compliance with Griffis *et al.* (2012), who argued that proper return management will engender repeated and increased purchasing behaviour. The traditional approach to return analysis mainly focused on the product quality (Li *et al.*, 2013); however, the findings from this research suggest that the quality from the logistics service also works. Thus, future return policy should be wider in scope and more practicable in content. It is better to track a longer period of the product life cycle and cover more convenient considerations from the customers' perspective. Moreover, the return policy should be built based on a learning mechanism that can continuously reflect the customer shopping requirements and enact service improvements along the product life cycle.

Though the customer satisfaction variable has the lowest direct effect on the product return behaviour, it calls for clear classification of customer satisfaction as the product itself or collateral service. For instance, the efficiency of mobile payment will influence the established product image. In contract, most of the research studies (e.g. Zhu *et al.*, 2016; Choi *et al.*, 2018) refer to customer satisfaction as the final latent variable instead of higher-order latent variable. Another problem that occurs in the SEM building is the correlated

Assumption	Relationships	*p* value	Direct effect	Indirect effect	Total effect
H1	OS → CS	0.001	0.41	0	0.41
H2	LPS → CS	***	0.43	0	0.43
H3	Mot → PRI	0.007	0.36	0	0.36
H4	Flex → PRI	***	0.49	0	0.49
H5	CS → PRB	0.226	0.16	0	0.16
H6	PRI → PRB	***	0.63	0	0.63

Table VII.
Results of model path
analysis

relationship of measurement. An example is a relationship between logistics provider service and flexibility in return. In our paper, we assume that there is no direct link between them because the logistics provider service is measured from the perspective of forward supply chain in e-commerce while flexibility in return is conducted from the reverse logistics point of view. This setting is in accordance with the supply chain management life cycle that lasts from the suppliers to the customers.

5.2 Theoretical contributions and managerial implications

This study provides answers to philosophical questions about the concept of intention, psychological questions about human behaviour and the linking questions about how intention produces action. To be exact, this paper makes theoretical contributions in two aspects: first, this study expands theory of the supplier–buyer relationship with respect to psychological contract upon trust and commitment (Kingshott, 2006). This study highlights the importance of customer satisfaction in contributing to less product return, which reflects the changing nature of expectations and obligations that would structure an open-ended relationship. From the suppliers' point of view, the presence of the product return acts as a short-term outcome expected from the relation, and the proper treatment of the return would indicate building a long-term association over a general time frame. From the buyers' perspective, the experience of product return may stimulate a wide range of emotions such as brand image, customer loyalty and constructive trust. Second, no default model of SEM allows us to recognize the imperfect nature of our measures on return action. For example, we initially assume that credit reward would positively impact the return behaviour according to the traditional analysis. The result specifies the error with regard to this sub-factor, and it underlines the ability of SEM in solving the problems of multicollinearity. The proposed conceptual model is a useful theoretical framework for explaining determinants that affect product return and product supply chain management.

The practical implication of this paper is that: first, this study describes the final return action in terms of two psychological expressions: customer satisfaction and product return intention. The results found that return logistics service can improve customer satisfaction and push e-retailers to explore additional value because of the scale effect of large volume of return. In the context of China, this study figures out that the current Chinese consumers set high priority on the products' value than its collateral service. Perhaps market practitioners can draw upon the mutual ranking mechanism which allows suppliers and buyers to adjust their expectations and obligations to the purchasing business. With regard to the product return decision, in collectivist cultures like China, people tend to act within the norm. Customers may abuse the return rights as long as the penalty is not big enough. This calls for legitimate to regulate the return terms and build the standard return procedure. It is better to clearly explain the intention of the return clauses and both sides should act according to the agreement.

Second, the samples tested here were the representatives for return in e-commerce because the southeast cities in China enjoy matured logistics service with the scale of economics (Gob et al., 2010). Most of the tested samples represent a new breed of well-educated and fashion-reliant young men who have changing interests and finicky service desire. Their variable consumption requirements may cause volatile product returns, and this calls for flexible service offerings. E-retailers face conflicting interests of flexible return logistics service. More flexible return policies stimulate impulsive purchasing decisions, while rigid return policies may bring in a negative effect on customer satisfaction. Coping with this kind of issue requires efforts from e-retailer, logistics service providers and customers. On the one hand, the return policy should be closely monitored by online platform and return report could be generated to e-retailers such that they can realize the root cause behind the product return. The measurement of the performance cost of flexible return logistics shall be carefully

designed and standardized. On the other hand, both consumers and e-retailers need to build mutual trust and understanding and emphasize long-term partnership to achieve a win-win situation. Therefore, the return policy may be set based on the theoretical models of product prices and quality and customer's purchase and return decisions (Li *et al.*, 2008, 2013).

Third, this study leads to an implication for society. The third-party logistics service providers plays an important role in forward and reverse logistics for online platform. Effective logistics operation not only leads to cost-effective and good customer experience but also enables low carbon emission and sustainable closed-loop supply chain.

6. Conclusions

This study identifies several impact factors that affect online shopping return behaviour using SEM. In addressing this issue, exhaustive article analysis and discussion with target customers were conducted to determine different variables that influence the return behaviour, including the OSS, logistics provider service, motivation and flexibility. Analysis of the findings revealed that the developed SEM framework can reflect customers' intention in product return after online shopping. The proposed framework incorporates logistics service measurement to analyse the return process from the customer perspective as well as covering the product life cycle. After all the variables were extracted, SEM was applied to analyse the effect value of each variable.

The results of this study indicate that product return intention was the biggest impact on return behaviour. The second loading factor is the flexibility of return. The results further indicate that traditional customer behaviour analysis focuses more on physical product quality, while the intangible logistics service plays an important role in current product return intention. Therefore, a continuous learning mechanism for designing a return policy for enabling the return activities under certain terms and conditions is necessary. The result and the managerial implications will help the online retailer to achieve long-term success by thoroughly understanding online shopping return behaviour and increasing customer satisfaction. Return behaviour affects logistics service providers in terms of service design, operation and measurement. These can contribute to increasing customer satisfaction, decreasing the number of product returns and enabling the online shops to survive.

The research presented in this paper not only contributes to the body of customer behaviour analysis of e-commerce but also supports the development of policymaking for flexible reverse logistics services provided after e-commerce. The proposed framework can provide government and industrial entities with a tool to realize the factors of product return. Future research can be developed to incorporate the green supply chain concept and accommodate more environmental variables in the model, such as biodegradable packaging material and recycling trade-in. In addition, emphasis can be placed on developing economic mechanisms to control return incentives and therefore improve the supply chain performance. Moreover, more recent tests such as HTMT criterion test can be added to reduce the common method bias and enhance the result statement. To overcome common method bias, future work can include common method factor analysis and Harman's single-factor analysis.

References

Akroush, M.N. and Aldebei, M.M. (2015), "An integrated model of factors affecting consumer attitudes towards online shopping", *Business Process Management Journal*, Vol. 21 No. 6, pp. 1353-1376.

Al-Qirim, N. (2006), *Global Electronic Business Research: Opportunities and Directions*, IGI Global, Hershey, PA.

Ayers, J.B. and Odegaard, M.A. (2008), *Retail Supply Chain Management*, Auerbach Publications, Boca Raton, FL.

Ballestar, M.T., Graucarles, P. and Sainz, J. (2017), "Customer segmentation in e-commerce: applications to the cashback business model", *Journal of Business Research*, Vol. 88, pp. 407-414.

Berman, J. (2019), "CBRE report: online returns expected to total \$37 billion for 2018 holiday season", *Modern Materials Handing*, Vol. 74 No. 1, pp. 9-10.

Borgesius, F.J. and Poort, J.P. (2017), "Online price discrimination and EU data privacy law", *Journal of Consumer Policy*, Vol. 40 No. 3, pp. 347-366.

Cao, B. and Glover, F. (2010), "Creating balanced and connected clusters to improve service delivery routes in logistics planning", *Journal of Systems Science and Systems Engineering*, Vol. 19 No. 4, pp. 453-480.

Cavoski, S. and Markovic, A. (2015), "Analysis of customer behaviour and online retailers strategies using the agent-based simulation", *Management: Journal for Theory and Practice Management*, Vol. 20 No. 77, pp. 13-24.

Chen, L. and Guo, P. (2013), "Optimal ordering decision in low carbon supply chain with fuzzy demand, allowable shortage and product return", *International conference on management science and engineering*, Harbin, China, pp. 547-554.

Chen, Y., Hu, X. and Li, S. (2017), "Quality differentiation and firms' choices between online and physical markets", *International Journal of Industrial Organization*, Vol. 52, pp. 96-132.

Choi, D.W., Jin Gyu, S. and Jong Myung, K. (2003), "Virtually integrated logistics information system for pickup and delivery of EC commodities", in *SCI 2003. 7th World Multiconference on Systemics, Cybernetics and Informatics Proceedings*, 27-30 July 2003, Orlando, FL, IIIS, Vol. 16, pp. 73-76.

Choi, C.W., Greenwell, T.C. and Lee, K. (2018), "Effects of service quality, perceived value, and consumer satisfaction on behavioural intentions in virtual golf", *7th Journal of Physical Education and Sport*, Vol. 18 No. 3, pp. 1459-1468.

Close, A.G. and Kukarkinney, M. (2010), "Beyond buying: motivations behind consumers' online shopping cart use", *Journal of Business Research*, Vol. 63 No. 9, pp. 986-992.

Dailey, L. (2015), "How and why restricting product returns and varying product return policies impact consumers", *Advances in Consumer Research*, Vol. 43, p. 783.

Dakduk, S., Horst, E.T., Santalla, Z., Molina, G. and Malave, J. (2017), "Customer behavior in electronic commerce: a Bayesian approach", *Journal of Theoretical and Applied Electronic Commerce Research*, Vol. 12 No. 2, pp. 1-20.

Dixit, S. and Badgaiyan, A.J. (2016), "Towards improved understanding of reverse logistics-Examining mediating role of return intention", *Resources, Conservation and Recycling*, Vol. 107, pp. 115-128.

Eliason, S.R. (1993), *Maximum Likelihood Estimation: Logic and Practice*, Sage, Newbury Park, CA.

Fornell, C. and Larcker, D.F. (1981), "Evaluating structural equation models with unobservable variables and measurement error", *Journal of Marketing Research*, Vol. 18 No. 1, pp. 39-50.

Franey, J.P., Okrasinski, T. and Schaeffer, W.J. (2010), "Reducing environmental impact and increasing reliability through packaging: a lifecycle assessment approach", *Bell Labs Technical Journal*, Vol. 15 No. 2, pp. 193-204.

Fu, Y., Liu, G., Papadimitriou, S., Xiong, H., Li, X. and Chen, G. (2016), "Fused latent models for assessing product return propensity in online commerce", *Decision Support Systems*, Vol. 91, pp. 77-88.

Ganesh, J., Reynolds, K.E., Luckett, M. and Pomirleanu, N. (2010), "Online shopper motivations, and e-store attributes: an examination of online patronage behavior and shopper typologies", *Journal of Retailing*, Vol. 86 No. 1, pp. 106-115.

Garrouch, K., Mzoughi, M.N. and Tritar, N. (2012), "Impact of the perceived crowding, emotions and perceived values on the return intention: evidence from Tunisia", *International Journal of Business and Emerging Markets*, Vol. 4 No. 2, pp. 143-159.

Gelbrich, K., Gäthke, J. and Hübner, A. (2017), "Rewarding customers who keep a product: how reinforcement affects customers' product return decision in online retailing", *Psychology and Marketing*, Vol. 34 No. 9, pp. 853-867.

Gob, M.-F., Wang, T., Gan, C.W. and Yu, Z. (2010), *China 2015: Transportation and Logistics Strategies*, Vol. 10, A.T, Kearney.

Griffis, S.E., Rao, S., Goldsby, T.J. and Niranjan, T.T. (2012), "The customer consequences of returns in online retailing: an empirical analysis", *Journal of Operations Management*, Vol. 30 No. 4, pp. 282-294.

Grönroos, C. (2000), *Service Management and Marketing: A Customer Relationship Management Approach*, Wiley, Chichester, NY.

Henseler, J., Ringle, C.M. and Sarstedt, M. (2015), "A new criterion for assessing discriminant validity in variance-based structural equation modeling", *Journal of the Academy of Marketing Science*, Vol. 43 No. 1, pp. 115-135.

Huang, Y.K. and Feng, C.M. (2007), "Modeling the determinants of logistics service quality on retailing delivery service for online shopping", in *2007 International Conference on Wireless Communications, Networking and Mobile Computing, WiCOM 2007*, September 21, 2007 - September 25, 2007, Shanghai, China, Inst. of Elec. and Elec. Eng. Computer Society, pp. 3338-3341.

Huang, Y. and Kuo, Y. (2008), "The evaluation of logistics service quality on home delivery service for online auction", in *2008 IEEE International Conference on Service Operations and Logistics, and Informatics, IEEE/SOLI 2008*, October 12, 2008 - October 15, 2008, Beijing, China, IEEE Computer Society, Vol. 1, pp. 1343-1348.

Huang, Y., Feng, C. and Wu, P.J. (2009a), "A structural equation model of management strategies and firm performance: a case study of logistics service quality on home delivery", *International Journal of Electronic Customer Relationship Management*, Vol. 3 No. 3, pp. 281-300.

Huang, Y.-K., Kuo, Y.-W. and Xu, S.-W. (2009b), "Applying importance-performance analysis to evaluate logistics service quality for online shopping among retailing delivery", *International Journal of Electronic Business Management*, Vol. 7 No. 2, pp. 128-136.

Huber-Carol, C., Balakrishnan, N., Nikulin, M. and Mesbah, M. (2002), Birkhäuser, Boston, MA.

Ingham, J. and Cadieux, J. (2016), "From E-shopping system quality to the consumer's intention to return: a meta-analytic study of the mediation of attitude, usefulness, enjoyment, and trust", *2016 49th Hawaii International Conference on System Sciences (HICSS)*, System Sciences (HICSS), pp. 3556-3564.

Jiang, Y. and Liu, Y. (2012), "Optimization of online promotion: a profit-maximizing model integrating price discount and product recommendation", *International Journal of Information Technology and Decision Making*, Vol. 11 No. 05, pp. 961-982.

Jose, C.G., Jacob, R.H., Pethick, D.W. and Gardner, G.E. (2018), "A supply chain approach to improving the shelf life of lamb meat; vitamin E concentration, electrical stimulation, ageing period and packaging system", *Meat Science*, Vol. 139, pp. 65-73.

Kamyar, K., Ahmad, J., Abbas, M., Dalia, S., Fausto, C., Khalil, Md. N. and Edmundas Kazimieras, Z. (2017), "Factors influencing consumers' intention to return the end of life electronic products through reverse supply chain management for reuse", *Repair and Recycling, Sustainability*, Vol. 9 No. 9, pp. 1657-1679, Directory of Open Access Journals, EBSCOhost, viewed 25 April 2018.

Kingshott, R.P. (2006), "The impact of psychological contracts upon trust and commitment within supplier–buyer relationships: a social exchange view", *Industrial Marketing Management*, Vol. 35 No. 6, pp. 724-739.

Levy, S.J. (2005), "The evolution of qualitative research in consumer behavior", *Journal of Business Research*, Vol. 58 No. 3, pp. 341-347.

Li, X., Peng, L., Zhong, K. and Huang, J. (2008), "Based on 3G and RFID logistic delivery management system application and practice analysis", in *Geoinformatics and Joint Conference on GIS and Built Environment: Geo-Simulation and Virtual GIS Environments*, 28 June 2008, USA, SPIE - The International Society for Optical Engineering, Vol. 7143, 71432L, p. 71438.

Li, Y., Xu, L. and Li, D. (2013), "Examining relationships between the return policy, product quality, and pricing strategy in online direct selling", *International Journal of Production Economics*, Vol. 144 No. 2, pp. 451-460.

Licciardello, F. (2017), "Packaging, blessing in disguise. Review on its diverse contribution to food sustainability", *Trends in Food Science & Technology*, Vol. 65, pp. 32-39.

Lin, A.J., Li, E.Y. and Lee, S.-Y. (2018), "Dysfunctional customer behavior in cross-border e-commerce: a justice-affect-behavior model", *Journal of Electronic Commerce Research*, Vol. 19 No. 1, pp. 36-54.

Lorenc, A. and Szkoda, M. (2010), "The study on the determinants of the online consumers' intention to return", in *2010 IEEE/ACIS International Conference on Computer and Information Science*, pp. 289-294.

Lu, C. and Zhu, D. (2015), "Customer logistic service in the automotive industry with the use of the SAP ERP system", in *2015 4th International Conference on Advanced Logistics and Transport (ICALT)* , 20-22 May 2015, NJ, IEEE, 18-23 Piscataway.

Madaan, J., Chan, F.T. and Niu, B. (2016), "Strategies for evaluating performance of flexibility in product recovery system", *International Journal of Production Research*, Vol. 54 No. 10, pp. 2895-2906.

Maity, D. and Arnold, T.J. (2013), "Search: an expense or an experience? Exploring the influence of search on product return intentions", *Psychology and Marketing*, Vol. 30 No. 7, pp. 576-587.

Minnema, A., Bijmolt, T.H.A., Petersen, J.A. and Shulman, J.D. (2018) Managing product returns within the customer value framework", in Palmatier, R., Kumar, V. and Harmeling, C. (Eds), *Customer Engagement Marketing*, Palgrave Macmillan, Cham.

Morris, C.G., Maisto, A.A. and Dunn, W. (2007), *Psychology: Concepts and Applications*, Pearson Prentice Hall, Upper Saddle River, NJ.

Pappas, I.O., Kourouthanassis, P.E., Giannakos, M.N. and Lekakos, G. (2017), "The interplay of online shopping motivations and experiential factors on personalized e-commerce", *Telematics and Informatics*, Vol. 34 No. 5, pp. 730-742.

Pei, Z. (2015), "Internal and external drivers of consumers' product return behaviors, dissertation, August 2015, University of North Texas Libraries, Digital Library, Denton, Texas, available at: https://digital.library.unt.edu/ark:/67531/metadc804862/ (accessed 26 August 2019).

Perreault, W.D. Jr and McCarthy, E.J. (2002), *Basic Marketing: A Global-Managerial Approach*, 14th ed., McGraw-Hill, Boston.

Platzer, M. and Reutterer, T. (2016), "Ticking away the moments: timing regularity helps to better predict customer activity", *Marketing Science*, Vol. 35 No. 5, pp. 779-799.

Pousette, S., Lofgren, M., Nilsson, B. and Gustafsson, A. (2014), "An extended method to measure overall consumer satisfaction with packaging", *Packaging Technology and Science*, Vol. 27 No. 9, pp. 727-738.

Ramlall, I. (2016), *Applied Structural Equation Modelling for Researchers and Practitioners: Using R and Stata for Behavioural Research*, Emerald Group Publishing Limited, Bingley.

Richey, R.G., Chen, H., Genchev, S.E. and Daugherty, P.J. (2005), "Developing effective reverse logistics programs", *Industrial Marketing Management*, Vol. 34 No. 8, pp. 830-840.

Ryser, C. and Fritsche-Sterr, Y. (2012), "Logistics in China: an all-inclusive market?", Retrieved from Frankfurt, German, available at: https://www.pwc.com/gx/en/transportation-logistics/global-transportation-logistics-publications/assets/logistics-in-china.pdf.

Sahoo, N., Dellarocas, C. and Srinivasan, S. (2018), "The impact of online product reviews on product returns", *Information Systems Research*, Vol. 29 No. 3, pp. 723-738.

Sanye, E., Oliversola, J., Gasol, C.M., Farreny, R., Rieradevall, J. and Gabarrell, X. (2012), "Life cycle assessment of energy flow and packaging use in food purchasing", *Journal of Cleaner Production*, Vol. 25, pp. 51-59.

Sasu, C. and Ichim, D. (2016), "Qualitative analysis of the digital marketing influence on the behaviour of the organizational consumer", *Management Science*, Vol. 11 No. 2, pp. 171-184.

Schindler, R.M. (2012), *Pricing Strategies: A Marketing Approach*, SAGE, Thousand Oaks, CA, pp. 1-3.

Schuenuman, H.H. (2004), "'Quality delivered' - the essential first step to customer satisfaction", *Test Engineering and Management*, Vol. 66 No. 4, pp. 10-12.

Shah, D., Kumar, V., Kim, K.H. and Choi, J.B. (2017), "Linking customer behaviors to cash flow level and volatility: implications for marketing practices", *Journal of Marketing Research*, Vol. 54 No. 1, pp. 27-43.

Shaharudin, M.R., Govindan, K., Zailani, S.H., Tan, K.C. and Iranmanesh, M. (2017), "Product return management: linking product returns, closed-loop supply chain activities and the effectiveness of the reverse supply chains", *Journal of Cleaner Production*, Vol. 149, pp. 1144-1156.

Shi, X., Dong, C. and Cheng, T.C.E. (2018), "Does the buy-online-and-pick-up-in-store strategy with pre-orders benefit a retailer with the consideration of returns?", *International Journal of Production Economics*, Vol. 206, pp. 134-145.

Shnayder, L., Van Rijnsoever, F.J. and Hekkert, M.P. (2016), "Motivations for Corporate Social Responsibility in the packaged food industry: an institutional and stakeholder management perspective", *Journal of Cleaner Production*, Vol. 122, pp. 212-227.

Statista (2019), "Global retail e-commerce sales 2014-2021", available at: https://www.statista.com/statistics/379046/worldwide-retail-e-commerce-sales/.

Stock, J.R. and Mulki, J.P. (2009), "Product returns processing: an examination of practices of manufacturers, wholesalers/distributors, and retailers", *Journal of Business Logistics*, Vol. 30 No. 1, pp. 33-62.

Taghavi, M. and Seyedsalehi, A. (2015), "The effect of packaging and brand on children's and parents' purchasing decisions and the moderating role of pester power", *British Food Journal*, Vol. 117 No. 8, pp. 2017-2038.

Voss, C.A. and Hsuan, J. (2009), "Service architecture and modularity", *Decision Sciences*, Vol. 40 No. 3, pp. 541-569.

Webster's Dictionary (2013), "Definition of motivation", available at: http://www.ewbsterdictionary.com.

Williams, H., Wikstrom, F., Otterbring, T., Lofgren, M. and Gustafsson, A. (2012), "Reasons for household food waste with special attention to packaging", *Journal of Cleaner Production*, Vol. 24, pp. 141-148.

Wu, G. (2003), "Optimisation of supply chain management in an electronic commerce environment (Master theses)", Retrieved from NTU DR-NTU Database. (Accession No. EEE-THESES_1595), available at: https://repository.ntu.edu.sg/handle/10356/3765.

Wyrwa, J. and Barska, A. (2017), "Innovations in the food packaging market: active packaging", *European Food Research and Technology*, Vol. 243 No. 10, pp. 1681-1692.

Xu, X. and Wang, Y. (2017), "Study on spatial spillover effects of logistics industry development for economic growth in the Yangtze River Delta City Cluster based on Spatial Durbin model", *International Journal of Environmental Research and Public Health*, Vol. 14 No. 12, pp. 1508-1520.

Yoo, S.H. (2014), "Product quality and return policy in a supply chain under risk aversion of a supplier", *International Journal of Production Economics*, Vol. 154, pp. 146-155.

Zailani, S.H., Govindan, K., Shaharudin, M.R. and Kuan, E.E. (2017), "Barriers to product return management in automotive manufacturing firms in Malaysia", *Journal of Cleaner Production*, Vol. 141, pp. 22-40.

Zhang, Y. and Zhang, J. (2017), "Strategic customer behavior with disappointment aversion customers and two alleviation policies", *International Journal of Production Economics*, Vol. 191 No. 1, pp. 170-177.

Zhang, D.J., Dai, H., Dong, L., Qi, F., Zhang, N., Liu, X. and Yang, J. (2018), "How do price promotions affect customer behavior on retailing platforms? Evidence from a large randomized experiment on alibaba", *Production and Operations Management*, Vol. 27 No. 12, pp. 2343-2345.

Zheng, Y., Shu, T., Wang, S., Chen, S., Lai, K.K. and Gan, L. (2018), "Analysis of product return rate and price competition in two supply chains", *Operational Research*, Vol. 18 No. 2, pp. 469-496.

Zhou, Y., Zeng, J., Zhang, M. and He, H. (2017), "Research on network equilibrium model of online shopping supply chain system in promotion based on customer behavior", *Procedia Engineering*, Vol. 174, pp. 1400-1409.

Zhu, D., Kuo, M. and Munkhbold, E. (2016), "Effects of E-customer satisfaction and E-trust on E-loyalty: Mongolian online shopping behavior", *International Conference on Advanced Applied Informatics*, pp. 847-852.

Corresponding author

Carman Ka Man Lee can be contacted at: ckm.lee@ployu.edu.hk