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Order Fulfilment and Consumer Behaviour in Online Retailing

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Chapter 5: Order fulfilment, trust, and repurchase intention in online retailing: An empirical analysis

Abstract

Order fulfilment plays an important role in contributing to retailers' profitability and in delivering value to consumers in online retailing. In modern retailing, online retailers offer a wide range services to fulfil consumers' orders. However, little is known about the impact of order fulfilment aspects on online consumer behaviour in the extant literature. The purpose of this study is to empirically study the impacts of order fulfilment factors (including inventory management, last-mile delivery, and returns management) on consumer repurchase intention across product categories. In doing so we examine how trust in an online retailer mediates the relationships between order fulfilment factors and repurchase intention. Using structural equation modeling and survey data of online consumers in the UK, the study reveals that inventory management is positively related with repurchase intention; but surprisingly, last-mile delivery and returns management are not. Moreover we show that trust in an online retailer partially mediates the relationship between inventory management and repurchase intention and fully mediates the relationship between returns management and repurchase intention. The results support retailers and logistics service providers in providing better and more effective services in fulfilling consumers' online orders from both marketing and operations perspectives.

1. Introduction

Online retailing has been growing significantly due to the rapid proliferation of the use of Internet and mobile devices. Global B2C e-commerce sales have increased every year from \$1,193 billion in 2012 to an expected \$2,671 billion in 2016 (Ecommerce Foundation, 2016a). Retailers have recognized the importance of the contribution of order fulfilment to profitability and in delivering value to consumers in an online context (Agatz et al., 2008). Yet, Nguyen et al. (2018) showed that the academic literature on relationships between order fulfilment and consumer behaviour is fragmented. Previous studies either examined how individual order-fulfilment factors influence consumer behaviour or have indicated order-fulfilment as a key driver of consumer purchase and repurchase intentions.

The relationship between order fulfilment and online consumer behaviour has gained increasing attention in recent literature, as outlined by Nguyen et al. (2018). In order to operationalize this relationship, Xing et al. (2010) develop a framework of electronic physical distribution service quality (e-PDSQ) that consists of order fulfilment dimensions such as order timeliness, product availability, order condition, and return. Several studies show that improving elements of this e-PDSQ leads to increased consumer satisfaction and repurchase intention. Griffis et al. (2012b) for example find that order-fulfilment in terms of order cycle time between placement and receipt of an online order has a positive and significant impact on purchase satisfaction. Using a framework of order fulfilment service quality Koufteros et al. (2014) find that order fulfilment constructs are positively associated with the extent to which consumers are satisfied with a transaction, which in turn affects repurchase intention. Based on a systematic literature review between 2000 and September 2015 Nguyen et al. (2018) find that no paper includes an encompassing overview of order fulfilment factors. The authors therefore propose an integrative framework of fulfilment dimensions consisting of three order fulfilment constructs (inventory management, last-mile delivery, and returns management). In the current study we build on this framework from their extensive literature review.

Several studies in e-commerce literature focus on the effect of actions on consumer repurchase intention as this dimension of consumer behaviour is considered an important factor in improving profit of online retailers (Qureshi et al., 2009). More specifically, several dimensions of order fulfilment (e.g., product availability in the study by Kim and Lennon (2011), delivery options in the study by Otim and Grover (2006), on-time delivery in the

study by Rao et al. (2011b), or returns options in the study by Mollenkopf et al. (2007)) have a significant impact on consumer repurchase intention. Trust is particularly important in the online context as there is a separation between retailers and consumers in terms of space and time. Trust in online transactions can be classified into different categories such as dispositional trust, institutional trust, system trust, and process-based trust, to name just a few, depending on transactional attributes and context (Li et al., 2012). As online retailers offer order fulfilment services to consumers, we adopt the concept of trust in an online retailer in our study. A significant amount of related research investigated impacts of order fulfilment on repurchase intention with specific product types.

The purpose of the current study is to empirically investigate the impact of order fulfilment factors (i.e. inventory management, last-mile delivery, and returns management) on consumer repurchase intention in online retailing. In doing so we examine how trust in an online retailer mediates the relationships between order fulfilment constructs and repurchase intention. Our research investigates the relationships across three types of products (i.e. convenience goods, shopping goods, and specialty goods), thus answering the call by Nguyen et al. (2018) to investigate multiple product types and enhance external validity concerns of other work in the both marketing and operations domains. Specifically, our research questions are: (1) How do order fulfilment constructs influence trust in an online retailer and repurchase intention?; (2) Does trust in an online retailer mediate the relationships between these constructs and repurchase intention?; and (3) How do the role of the antecedents and the role of trust vary by product categories? We performed an empirical analysis among 500 online consumers in the UK using structural equation modeling. As the largest e-commerce B2C market in Europe (Ecommerce Europe, 2016a), the UK is a relevant context. Our results indicate significant impacts of order fulfilment factors on repurchase intention across product categories and how trust in an online retailer mediates the relationships. We thus contribute to the currently under-represented body of academic literature linking marketing and operations in the context of online retailing. Findings in this study provide online retailers with insights into their order fulfilment activities in order to strengthen this operations capability, which can contribute to the building of trust and enhance consumer repurchase intention.

The remainder of this paper is organized as follows. First, we outline prior research that addresses the important role of order fulfilment and trust in online retailing. Next, we examine the literature on order fulfilment constructs and develop a number of hypotheses for testing.

The research methodology is detailed then, followed by the results. Last, general discussion, research contributions, implications, and future research are presented.

2. Literature review and theoretical background

Online order fulfilment (also known as e-fulfilment) mainly includes the logistics activities (e.g., inventory management, warehousing, delivery, and return) related to providing physical products to online consumers. Being regarded as the most expensive and critical operations of online retailers (Agatz et al., 2008), online order fulfilment has been an important research topic in the marketing and operations literature. In this section, we examine how order fulfilment is conceptualized as a crucial factor of service quality in online retailing and why trust is important to online consumers.

Successful order fulfilment is a critical component for obtaining high levels of service quality for an online retailer. As such, order fulfilment is one of the key constructs in models of e-SQ, a measurement for service quality in online retail (Collier and Bienstock, 2006; Parasuraman et al., 2005; Wolfinbarger and Gilly, 2003; Zeithaml et al., 2002). Wolfinbarger and Gilly (2003) develop a framework of online retailing quality which includes four factors: website design, fulfilment/reliability, privacy/security, and customer service. They indicate three necessary dimensions of order fulfilment: the accuracy of product descriptions on the retailer's website, the accuracy of the order, and on-time delivery. In a more detailed framework of e-SQ, Parasuraman et al. (2005) present a four-dimension scale of core service quality (including efficiency, fulfilment, system availability, and privacy) and a three-dimension scale of recovery service quality (including responsiveness, compensation, and contact). They find that efficiency and fulfilment are the most important factors of online quality. Both scales in their model have positive and significant impacts on loyalty intentions. Building on previous work of e-SQ, Collier and Bienstock (2006) extend the previous e-SQ frameworks by adding new fairness dimensions of return (i.e. interactive fairness, procedural fairness, and outcome fairness).

Whereas studies of e-SQ include order fulfilment as well as a wide array of additional factors, studies of e-PDSQ, e.g., Rabinovich and Bailey (2004), Xing et al. (2010), and Rao et al. (2011a), focus on aspects of the order fulfilment process only. The e-PDSQ model is mainly based on the physical distribution service quality (PDSQ) concept from traditional retailing that has been developed by Bienstock et al. (1996) and Mentzer et al. (1999, 2001).

Rabinovich and Bailey (2004) use transactional data to indicate significant impacts of PDSQ determinants (including shipping and handling charges, order size, and transaction net price) on e-PDSQ. In this article e-PDSQ is operationalized in terms of inventory availability, delivery timeliness, and reliability. Xing and Grant (2006) propose an amended e-PDSQ framework with a broader range of order fulfilment elements. Their framework consists of four main constructs: order timeliness, availability, order condition, and returns. In subsequent work, Xing et al. (2010) empirically test this framework from a consumer's perspective. They indicate that order condition, order confirmation, and ease of return are all correlated with consumer evaluation. Order fulfilment is also conceptualized in terms of service cost and quality to measure the e-PDSQ (Rao et al., 2011a). Satisfaction with the two-dimensional e-PDSQ turns out to positively affect consumer purchase satisfaction and retention. We find that the conceptualization of order fulfilment varies in the studies of e-PDSQ; a variety of order fulfilment elements is taken into account in these studies though there is no study that collectively takes all elements into account.

Also other studies investigate order fulfilment measures and the relationships between order fulfilment and online consumer behaviour (Bart et al., 2005; Cao et al., 2003; Chiu et al., 2009; Cho, 2015; Heim and Sinha, 2001; Koufteros et al., 2014; Liao et al., 2010; Qureshi et al., 2009; Thirumalai and Sinha, 2005; Zhang et al., 2011), albeit with a focus on different elements. For example, Griffis et al. (2012b) focus on timeliness, order cycle time, and product assortment to evaluate impacts of order fulfilment performance on consumers' satisfaction and referral while Koufteros et al. (2014) measure order fulfilment in terms of timeliness, product availability, and order condition in an investigation of the relationship between order fulfilment service quality and encounter satisfaction. We notice that order fulfilment dimensions were examined in some studies, e.g., Bart et al. (2005), Chiu et al. (2009), and Qureshi et al. (2009), primarily in association with a set of other antecedents, such as privacy, retailer reputation, and website characteristics.

Recently, Nguyen et al. (2018) systematically reviewed the literature on the relationships between order fulfilment and consumer behaviour in online retailing and presented an integrative theoretical framework consisting of three main order fulfilment dimensions. First, inventory management basically addresses the product availability of online retailers to online consumers. This dimension also consists of product assortment for consumer selection and the physical condition of products delivered to consumers. Second, last-mile delivery

encompasses timeliness, delivery information and options, shipping and handling charges and order tracking. Timeliness is often the primary dimension in previous studies in order fulfilment. However, as online retailers offer a variety of delivery methods and shipping fee policies in modern online retailing, the other listed delivery dimensions are also important to online consumers. Last, returns management refers to the process whereby products are returned because they are damaged, unwanted or faulty. It includes returns procedure, returns preparation, returns options, refund, and returns handling.

Trust is an important factor when observing consumer behaviour in the context of B2C e-commerce due to the higher degree of uncertainty and risk compared to the offline channel (Gefen et al. 2003; Pavlou and Fygenon 2006; Li et al. 2012). Trust is defined as “the willingness of a party to be vulnerable to the actions of another party based on the expectation that the other will perform a particular action important to the trustor” (Mayer et al., 1995). In e-commerce context, trust can be conceptualized into two dimensions: trust in the control mechanisms in Internet and trust in the online retailer (Pavlou 2003; Gefen et al. 2003). The first dimension is trust in technological attributes of the retailers’ website such as website’s usability, encrypted transactions, authentication mechanisms, and privacy seals. The second dimension is trust in transactions with an online retailer. Consumers are unlikely to transact with an online retailer who fails to deliver online orders as promised. Therefore, positive experience with fulfilled online orders would generate consumer trust in the online retailer. The current study examines impacts of order fulfilment on consumer repurchase intention in online retailing, thus we focus on trust in an online retailer instead of trust in the control mechanism, without loss of generality. Prior studies have found that trust mediates the relationships between trust antecedents (e.g., website characteristics, retailer reputation and order fulfilment) and repurchase intention (Bart et al., 2005; Chiu et al., 2009; Qureshi et al., 2009).

Based on the literature discussions above we notice that studies incorporate only parts of the order fulfilment elements in relation to consumer attitudes and evaluations. Instead, our study builds on the integrative framework of Nguyen et al. (2018) and aims to empirically test the relationships between the three order fulfilment dimensions and consumer repurchase intention. We also examine the mediating role of trust and comparisons among product categories in the current study.

3. Hypotheses development

Figure 1 shows the research model for our study. It depicts the direct effects of order fulfilment factors using the literature review and model of Nguyen et al. (2018) as a starting point. Based on this paper we differentiate order fulfilment into inventory management, last-mile delivery, and returns management. The hypothesized relationships in the model are explained below.

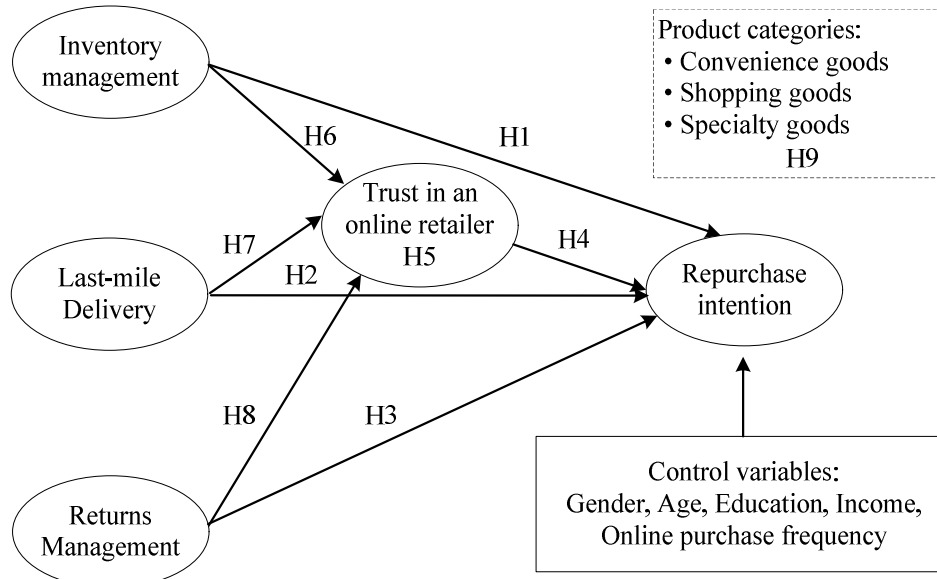


Figure 1: Research model

3.1. Order fulfilment and repurchase intention

In our study we use the constructs of order fulfilment by Nguyen et al. (2018) for investigating impacts of order fulfilment on consumer repurchase intention. In this classification, inventory management, last-mile delivery, and returns management cover all order fulfilment dimensions in relation to consumer behaviour in online retailing.

Inventory management includes product assortment and selection, product availability, and product condition. Product assortment and selection refers to the breadth and the depth of merchandise offered by online retailers. As consumers often assess an online retailer first based on the wide range of products, this dimension is expected to significantly influence repeat purchase intention (Cao et al., 2003; Cho, 2015; Heim and Sinha, 2001; Otim and Grover, 2006). Consumers tend to prefer larger product assortments over smaller ones based on their functional/rational considerations and their experience utility in reviewing large assortments (Aydinli et al., 2017). Maintaining inventory at sufficient levels is key for online

retailers because stock-outs have a negative impact on consumer repurchase intention (Dadzie and Winston 2007; Jing and Lewis 2011). Stock-outs cause consumers to experience negative emotions, and hence negatively affect consumer satisfaction and repurchase intention (Kim and Lennon, 2011). Consumers tend to continue their online purchases if they are satisfied with order accuracy in terms of quality and quantity (Collier and Bienstock, 2006; Parasuraman et al., 2005; Thirumalai and Sinha, 2005). Taken together, we reason that a consumer's perception of the inventory management practices of an online retailer will positively affect consumers repurchase intention.

H1. Perceived value of inventory management practices of an online retailer is positively related to repurchase intention.

Last-mile delivery is the final leg of a supply chain in which products are delivered to consumers via different delivery methods. The cost of last-mile delivery is estimated to account for 50 percent of the total supply chain cost (Hübner et al., 2016). Although this concept primarily refers to physical delivery of consumer orders (i.e. timeliness), there are other important last-mile delivery dimensions from a consumer perspective such as delivery information and options, shipping and handling charges and order tracking. A number of studies indicated that timeliness has a significant impact on repurchase intention (Collier and Bienstock, 2006; Liao et al., 2010; Otim and Grover, 2006). Any failure or delay in delivery can affect a consumer's online ordering behaviour (Rao et al., 2011b). In modern online retailing, retailers offer a variety of delivery methods (e.g., home delivery and delivery to a retail store or collection point) and shipping fee structures (e.g., unconditional free shipping, threshold-based free shipping, or flat-rate shipping). These delivery dimensions may influence consumers in making an online purchase decision as well. Rao et al. (2011a) found that satisfaction with the variety of shipping options as a dimension of e-PDSQ leads to consumer purchase satisfaction, which in turn positively affects repurchase intention. Surprisingly, providing options for different speeds of delivery does not have a significant impact on repurchase intention (Otim and Grover, 2006). Shipping and handling fees are an important means by which online retailers recover fulfilment costs (Lewis, 2006). At the same time, charging low (or no) shipping and handling fees can be an effective tool to influence consumer behaviour from a marketing perspective. Shipping fee structures are known to significantly affect consumer purchase patterns in terms of order incidence and size, thus influencing consumer acquisition and retention (Becerril-Arreola et al., 2013; Lewis et al.,

2006). Rao et al. (2011a) indicated that satisfaction with physical distribution service price (i.e. with shipping and handling fees and online presentation of fees prior to purchase) is positively related to consumer retention. Order tracking is a useful tool to reduce consumer anxiety level as consumers often expect to know order status immediately after placing an order online. This feature has a significant impact on repurchase intention (Cao et al., 2003; Cho, 2015; Otim and Grover, 2006; Rao et al., 2011a; Thirumalai and Sinha, 2005). Based on these findings regarding last-mile delivery, we expect a positive relationship between perceived value of last-mile delivery practices of an online retailer and consumer repurchase intention.

H2. Perceived value of last-mile delivery practices of an online retailer is positively related to repurchase intention.

Online retailers face higher product returns than traditional retailers because consumers are unable to check products physically (Griffis et al., 2012a; Pei et al., 2014). This results in high handling costs of returns for the online retailers. Although tightening returns policies would be used to deal with this issue (de Leeuw et al., 2016), this way may influence online consumer behaviour. Returns management becomes important to online retailers from marketing and operations perspectives. It specifically refers to returns procedures, returns preparation, returns options, returns handling, and refunds. Returns procedures describe necessary steps through which an online consumer goes to return a product. The clarity of the procedures and the ease of locating them on the retailer's website are critical for consumers as prior studies showed that these attributes have significant impacts on purchase and repurchase intentions (Bart et al., 2005; Dadzie et al., 2005; Heim and Sinha, 2001; Janda et al., 2002). Another aspect of returns management is returns preparation that refers to the supply of return labels, forms, and packing materials to consumers in case of returns. Returns options refer to available channels (e.g., via post or a pick-up point) for consumers when returning a product to online retailers. Returns handling depicts how well and promptly an online retailer takes care of a returns request from consumers. Mollenkopf et al. (2007) found that the listed returns aspects are positively related with consumer perception of the value of the return offer and consumer satisfaction, which subsequently significantly influence consumer repurchase intention. Refunds are compensations made to consumers in case they do not take or exchange a product. The level of compensation given a condition reflects the leniency or strictness of a returns policy. Bower and Maxham III (2012) proved that free returns will increase post-

return repurchases. We argue that perceived value of returns management practices of an online retailer in terms of the aforementioned dimensions positively relates consumers repurchase intentions.

H3. Perceived value of returns management practices of an online retailer is positively related to repurchase intention.

3.2. Trust in an online retailer and repurchase intention

Trust is viewed as a multi-dimensional concept in e-commerce (McKnight et al., 2002). It basically encompasses three attributes: competence, benevolence, and integrity (Mayer et al., 1995). Competence is the belief in the online retailer's ability to deliver products to consumers at the right place, at the right time, in the right quantity, and in the right condition. Benevolence refers to the belief that the online retailer will not act opportunistically against consumers. Integrity is the belief that the online retailer will be honest, fair, and responsible for committing to a transaction agreement with consumers. Trust in an online retailer not only leads to consumer purchase intention but also affects consumer repurchase intention as the beliefs are strengthened through experience (Gefen et al., 2003; Qureshi et al., 2009). We therefore argue that trust enhances repurchase intentions. In addition, trust mediates the relationship between a number of e-commerce factors such as website quality, privacy, responsiveness, order fulfilment, and reputation and repurchase intention (Bart et al., 2005; Chiu et al., 2009; Qureshi et al., 2009). Since we hereby focus on order fulfilment role's in customer relationships, we posit trust is the underlying mechanism that creates effective order fulfilment efforts. That is, we note that previous studies examined the association between trust in an online retailer and repurchase intention given these other trust antecedents. Our study provides additional insights into the association and the mediation of trust by only focusing on order fulfilment. Thus, we propose the following hypotheses:

H4. Trust in an online retailer is positively related to consumer repurchase intention.

H5. Trust in an online retailer mediates the relationships between perceived value of order fulfilment practices of an online retailer (including inventory management, last-mile delivery, and returns management) and consumer repurchase intention.

3.3. Order fulfilment and trust in an online retailer

Order fulfilment reflects the commitments of an online retailer in delivering a product to consumers in a good order. In online retailing, the role of order fulfilment from a consumer's point of view is crucial. Once a consumer places an order on a retailer's website, a psychological contract between the two parties is made. A psychological contract violation will negatively affect the consumer's trust in the online retailer (Chiu et al., 2009; Robinson and Rousseau, 1994). Trust in an online retailer refers to consumers' trust in the ability to provide the expected goods and services in an agreed-upon quantity, price, time, and condition (Hong and Cho, 2011; Park et al., 2012). An online transaction has many attributes that affect the level of trust perceived by online consumers (Li et al., 2012). One of these attributes is the relationship-specific attribute. It is the relationship between the actors involved in the online transaction. Collaborative services in providing good logistics and supply chain management (e.g., transport arrangement, track and trace, and inventory management) instill significant trust in an online transaction (Li et al., 2012). Thus by fulfilling online orders as promised, retailers will increase the level of consumers' trust in an online retailer. Trust in an online retailer in the first purchase can enhance the trust in the next purchase (Qureshi et al., 2009). The positive impact of specific order fulfilment factors on trust in an online retailer has been found by Bart et al. (2005), Chiu et al. (2009), and Qureshi et al. (2009). Our study adds further insights regarding these impacts by taking a comprehensive look at order fulfilment aspects. We therefore postulate that:

H6. Perceived value of inventory management practices of an online retailer is positively related to trust in an online retailer.

H7. Perceived value of last-mile practices of an online retailer is positively related to trust in an online retailer.

H8. Perceived value of returns management practices of an online retailer is positively related to trust in an online retailer.

3.4. The effects of product categories

Previous studies, which have studied the impacts of order fulfilment on consumer behaviour, focused on a single product or a product category. Few studies have investigated these impacts across product types (Nguyen et al., 2018). It has been recognized in the literature

that the relative importance of order fulfilment differs across product categories (Cho, 2015; Ramanathan, 2011; Thirumalai and Sinha, 2005). Thirumalai and Sinha (2005) indicated that online consumers are satisfied most with order fulfilment for convenience goods (e.g., groceries), followed by shopping goods (e.g., apparel) and specialty goods (e.g., electronic devices). The authors explained that consumers have different expectations of order fulfilment in relation to characteristics of product types in terms of order values and quantities. Cho (2015) classified two product types according to the electronic product identifiability (EPI), i.e. the extent to which a product's features identified on an online channel: high EPI products (e.g., clothing) and low EPI products (e.g., electronics). This author found that the effects of order fulfilment (including order tracking, on-time delivery, and consumer support) on repurchase intention are different between these product types. Ramanathan (2010, 2011) showed that product categories based on risk characteristics influence the impacts of two order fulfilment elements (on-time delivery and returns handling) on repurchase intention. Heim and Sinha (2001) also indicated that the relationship between order fulfilment and repurchase intention might be affected by different product categories. Thus understanding consumer expectations of order fulfilment across product categories helps online retailers customize suitable order fulfilment strategies to achieve consumer satisfaction and loyalty. In our study, we used the product classification by Thirumalai and Sinha (2005). The product classification in their study is based on the volume and the unit value of the product that consumers tend to purchase. They argued that these product characteristics lead to different consumer expectation of order fulfilment. For example, consumers tend to buy convenience goods with high volumes and low unit costs. Consumer expectations of order fulfilment hence tend to be lower than that of shopping goods (moderate volumes and unit costs) and specialty goods (small volumes and high unit costs). In sum, we propose the last hypothesis:

H9. The impacts of perceived value of online order fulfilment practices of an online retailer (i.e. inventory management, last-mile delivery, and returns management) on trust in an online retailer and on repurchase intention and the impacts of trust in an online retailer on repurchase intention decrease moving from convenience goods to specialty goods.

3.5. Control variables

We include several variables in our model to control possible spurious effects on repurchase intention. They are demographical variables (gender, age, education, and annual income) and online purchase frequency. Previous studies suggest that these variables may affect online transaction intentions (Chiu et al. 2014; Qureshi et al. 2009; Pavlou 2003).

4. Method

The hypotheses were empirically tested using data collected from an online survey by an online panel of a market research service in the UK. The 500 participants in the study all had ordered at least one product online in the three months prior to the questionnaire answering date. They were instructed to complete the survey questionnaire that consists of three main parts: (i) questions about repurchase intention and trust in an online retailer; (ii) questions about their perceptions on three order fulfilment dimensions; (iii) classification questions about demographics and online purchase frequency. Each respondent was asked to indicate the name of the last online retailer from which he or she had purchased and returned a product before answering survey questions. This practice is to ensure high name familiarity (Xie et al., 2015). In addition, respondents were also asked to specify the name of product that they had purchased and returned. Table 1 reports descriptive statistics of the sample. Of this, male was less than female (44.4% vs. 55.6%). Most participants (97.8%) were under 65 years old.

Measure	Frequency	Percent
Gender		
Female	278	55.6
Male	222	44.4
Age		
Young (Under 35)	287	57.4
Adult (35 -64)	202	40.4
Old (65+)	11	2.2
Education		
GCSE Level education	115	23.0
A-Level education	132	26.4
Undergraduate education	56	11.2
Vocational education	41	8.2
Degree or Graduate education	101	20.2
Post-graduate education	55	11.0
Annual income		
Low (£0 - £29,999)	244	48.8
Medium (£30,000 - £79,999)	201	40.2
High (£80,000 and over)	23	4.6
Prefer not to state	32	6.4
Online purchase frequency per year		
Low (1-10 times)	152	30.4
Medium (11-50 times)	293	58.6
High (over 50 times)	55	11.0
Product categories^a		
Convenience goods	79	15.9
Shopping goods	310	62.2
Specialty goods	109	21.9

^aTwo respondents did not specify the bought product names

Table 1: Sample profile

We used multiple imputation to deal with non-response cases for the annual income (32 cases or 6.4%) and for the product categories (2 cases or 0.4%). This technique is strongly recommended to fill in the missing values (Barbara, 2016; Enders, 2010; Meyers et al., 2013). We used the IBM® SPSS® Statistics Version 21 for the multiple imputation.

5. Measures

The measurement items for the examined scales were mostly borrowed from the previous literature and adapted wherever possible. Instruments were measured by seven-point scales ranging from 1 (strongly disagree) to 7 (strongly agree). Appendix A lists the questionnaire items and their sources. As retailing is moving into an omni-channel world (Verhoef et al., 2015), online retailers offer various options to consumers. Based on the industry report by Global Webshop Logistics (2014), we also developed new measurement items of *delivery information/options* (three items), *shipping and handling charges* (two items), *order tracking* (one item), and *returns options* (two items). These new items will be discussed in the next paragraphs. *Inventory management*, *last-mile delivery*, and *returns management* are second-order latent scales involving respective first-order scales (Nguyen et al., 2018).

Product selection and assortment, *product availability*, and *product condition* represent first-order scales of *inventory management*. *Product selection and assortment*, developed by Boyer and Hult (2005), includes four items assessing the breadth and depth of merchandise offered by an online retailer (composite reliability [CR] = 0.90; e.g., “This online retailer has a sufficient range of product choices [I can get what I want]”). *Product availability*, based on the work of Koufteros et al. (2014), employs a six-item scale to measure the availability of physical products in stock upon consumer request (CR = 0.93; e.g., “This online retailer accurately delivers in the first attempt the products I request”).¹ *Product condition* was measured using five items that correspond with those in Collier and Bienstock (2006) to assess the order condition and order accuracy when consumers receive an order (CR = 0.84; e.g., “All orders by this online retailer are delivered undamaged”).

Last-mile delivery includes four first-order scales: *delivery information and options*, *shipping and handling charges*, *delivery*, and *order tracking*. *Delivery information and options* was assessed with two items developed by Collier and Bienstock (2006) and three new items to

¹ We originally included an item about “the online retailer never delivers some of products requested,” but we dropped it because of its low contribution to the measure.

capture the consumer's perceptions of the available services, i.e. delivery speeds, delivery methods, and the presentation of shipping costs and carriers' names (CR = 0.75, e.g., "This online retailer provides sufficient delivery methods [e.g., home delivery or delivery at a pickup point]"). *Shipping and handling charges* comprises one item from Cao et al. (2003) and two new items measuring the reasonability of the charges applied by the online retailer (CR = 0.83, e.g., "Shipping and handling charges of this online retailer are reasonable"). *Delivery*, developed by Koufteros et al. (2014), consists of six items assessing timeliness quality perceived by consumers (CR = 0.93, e.g., "This online retailer is timely in delivering all the products I request").² *Order tracking* used one item from Collier and Bienstock (2006), one item from Bart et al. (2005), and a new item measuring the capability of an online retailer to provide order status to consumers after placing an order (CR = 0.86, e.g., "The online retailer provides accurate information about when orders will be received").

Returns management comprises five first-order scales: *returns procedure* (CR = 0.93, e.g., "It is easy to get this online retailer's website to do what I want it to do when I return products"), *returns preparation* (CR = 0.91, e.g., "Filling out the online return forms to return the products is easy"), *returns options* (CR = 0.74, e.g., "This online retailer provides me with convenient options for returning items"), *refund* (CR = 0.79 e.g., "This online retailer compensates me for problems when returns occur"), and *returns handling* (CR = 0.89, e.g., "This online retailer handles product returns well"). All the scales except *returns options* were borrowed from Mollenkopf et al. (2007). *Returns options* includes one item from Parasuraman et al. (2005) and two new items to capture the consumer's perceptions of different returns channels.

The model outcome measures consist of two scales. We used eight items developed by Qureshi et al. (2009) to measure *trust in an online retailer* (CR = 0.94, e.g., "I believe that this online retailer is honest"). *Repurchase intention* (CR = 0.82, e.g., "I would consider this online retailer my first choice if I buy the same product again") was assessed with three items adopted from Koufteros et al. (2014).³

² We originally included an item about "the online retailer is not timely in delivering all the products as requested," but we dropped it because of its low contribution to the measure.

³ We originally included an item about "switching to a competitor for a future online purchase," but we dropped it because of its low contribution to the measure.

The descriptive information of the measures (including means, standard deviations, and correlations) are presented in the Table 2.

Variables	M	SD	1	2	3	4	5	6	7	8	9	10
1. Inventory management	0.0003	1.0422	1.00									
2. Last-mile delivery	0.0012	1.0010	.74**	1.00								
3. Returns management	0.0009	1.0365	.72**	.80**	1.00							
4. Trust in online retailer	0.0008	1.1356	.80**	.66**	.66**	1.00						
5. Repurchase intention	0.0020	1.3802	.68**	.56**	.56**	.73**	1.00					
6. Gender	1.5560	0.4974	0.07	0.02	-0.01	0.06	0.06	1.00				
7. Age	1.4480	0.5403	.11**	0.05	0.00	0.08	0.08	-0.03	1.00			
8. Education	3.0920	1.7498	-0.03	0.05	0.03	-0.04	-0.02	-0.05	0.01	1.00		
9. Annual income	1.5278	0.5901	0.06	0.05	0.06	-0.02	0.02	0.00	0.02	.144**	1.00	
10. Online purchase frequency	1.8060	0.6141	.17**	.14**	.10*	.16**	.20**	.09*	-0.05	.09*	.15**	1.00

Notes: N=500 (Pairwise). Inventory management, last-mile delivery, returns management, trust in online retailer, and repurchase intention use the average and mean-centered values.

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

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

Table 2: Descriptive information of the measures

6. Measure validation

In order to ensure content validity and face validity, we have piloted the questionnaire with five colleagues experienced in online shopping and with two e-fulfilment providers, following Boyer and Hult (2006) and Griffis et al. (2012b). We have made modifications to the questionnaire before publishing the final version. We used confirmatory factor analysis (CFA) to assess the psychometric properties of the measures. We assess the measurement models using AMOS (version21) with maximum likelihood estimation. We chose a sub-model approach to cope with the measurement model complexity (Campbell and Fiske, 1959; Rindfleisch and Moorman, 2001). Specifically, we performed CFA for each of the three measurement models of three second-order scales with their respective first-order scales and for a measurement model of *trust in online retailer* and *repurchase intention*.

6.1. CFA for inventory management and its first-order scales

The standardized loadings exceeding 0.50 (ideally 0.70) confirm the convergent validity (Hair et al., 2010). The loading for the sixth item of *product availability* (“This online retailer never delivers some of the products I request”, the loading score=0.08) was dropped because it did not meet the threshold of 0.50. After deleting this item, all the loadings were greater than 0.50 and significant at $p < 0.05$. The measurement model showed an acceptable fit ($\chi^2=406.88$, degrees of freedom [df]=74, $p < 0.001$; root mean square error of approximation [RMSEA]=0.09; 90% confidence interval [CI]=0.08,0.10; comparative fit index [CFI]=0.94; standardized root mean square residual [SRMR]=0.04; minimum discrepancy, divided by

degrees of freedom [CMIN/DF]=5.5). Also, the results provided an evidence of convergent validity as all average variance extracted (AVE) values passed the threshold of 0.50 and all CR scores exceeded 0.70. All constructs, except *product condition*, exhibited discriminant validity. That is, all AVEs were larger than the squared correlations for all constructs except for *product condition*. However, the AVE of this item (i.e. *product condition*) was not significantly smaller than its squared correlations with the other constructs (0.518 vs. 0.653 and 0.654). Thus it does not indicate a discriminant validity problem. The AVE and CR of the second-order scale (*inventory management*) also exceeded the thresholds (0.79 and 0.92 respectively).

6.2. CFA for last-mile delivery and its first-order scales

The loadings for the second item of *delivery information and options* (“This online retailer provides information on how much an item costs with shipping costs included”, the loading score=0.42) and the sixth item of *delivery* (“This online retailer is not timely in delivering all the products I request”, the loading score=0.13) should be dropped due to below 0.50. However, the loading of the second item of *delivery information and options* was significant and very close to the cut-off value of 0.50 and a considerable number of online shoppers needed this piece of information (63% of respondents in a survey by comScore and UPS (2014)). Therefore, we kept this item in the construct. After deleting the sixth item of *delivery*, all the loadings were greater than 0.50 and significant at $p < 0.05$ (except the loading of the second item with value of 0.42). The measurement model showed an acceptable fit ($\chi^2=426.38$, $df=100$, $p < 0.001$; RMSEA=0.08; 90% CI=0.07,0.09; CFI=0.93; SRMR=0.05; CMIN/DF=4.2). Also, the results provided an evidence of convergent validity as all AVEs passed the 0.50 guideline except the AVE of *delivery information and options* (0.38) and all CRs exceeded 0.70. All constructs, except *delivery information and options* and *shipping and handling charges*, exhibited discriminant validity. The AVE of *delivery information and options* is lower than the squared correlations of this construct with other constructs of *last-mile delivery* (i.e. *shipping and handling charges*, *delivery*, and *order tracking*). The AVE of *shipping and handling charges* is lower than the squared correlations of this construct with *delivery information and options*. The presence of cross-loadings could exist. However, according to the results of testing for common method bias (discussed later), we observed the presence of distinct factors. The AVE and CR of the second-order scale (*last-mile delivery*) also exceeded the thresholds (0.76 and 0.93 respectively).

6.3. CFA for returns management and its first-order scales

Based on the 0.50 guideline, the loading for the third item of *returns options* (“This online retailer provides returns service via an automatic locker”, the loading score=0.46) is the candidate for removal. However, the loading of this item was significant and very close to the cut-off value of 0.50 and this item represented the increasing demand and supply of this returns channel in the UK (IMRG, 2015a). Thus we kept this item in the construct. All the loadings were greater than 0.50 and significant at $p < 0.05$ (except the loading of the item 3 with value of 0.46). The measurement model showed an acceptable fit ($\chi^2=780.13$, $df=165$, $p < 0.001$; RMSEA=0.08; 90%CI=0.08,0.09; CFI=0.91; SRMR=0.06; CMIN/DF=4.7). Also, the results provided an evidence of convergent validity as all AVEs passed the 0.50 guideline and all CRs exceeded 0.70. All constructs, except *returns preparation* and *returns handling*, exhibited discriminant validity. The AVE of *returns preparation* is lower than the squared correlations of this construct with other constructs of *returns management* (i.e. *returns procedure*, and *returns handling*). The AVE of *returns options* is lower than the squared correlations of this construct with *returns procedure*, *returns preparation*, and *returns handling*. The AVE of *returns handling* is lower than the squared correlations of this construct with *returns preparation*. However, the differences are relatively small. The AVE and CR of the second-order scale (*returns management*) also exceeded the thresholds (0.72 and 0.93 respectively).

6.4. CFA for trust in online retailer and repurchase intention

Based on the 0.50 guideline, the loading for the third item of *repurchase intention* (“I would switch to a competitor in making future online purchases”, the loading score=0.186) is the candidate for removal. After deleting this item, all the loadings were ideally greater than 0.70. The measurement model showed a reasonably good fit ($\chi^2=266.99$, $df=34$, $p < 0.001$; RMSEA=0.11; 90% CI=0.10,0.13; CFI=0.94; SRMR=0.035; CMIN/DF=7.8). The results provided an evidence of convergent validity as all AVEs and CRs exceeded 0.50 and 0.70 respectively. The results exhibited discriminant validity as the AVE value of *trust in online retailer* or *repurchase intention* was greater than its squared correlations with the other construct. We noted that the correlation between *trust in online retailer* or *repurchase intention* was high at 0.82. Thus we fix the covariance between the two constructs to one and used the χ^2 difference test to check if the model fit is significantly different. The result

indicated that there is no significant difference, meaning that the two constructs can be examined as two distinct constructs.

6.5. Testing for common method bias

As we collected data from a single source, common method bias (CMB) could be a potential problem in our data (Malhotra et al., 2006; Podsakoff et al., 2003). To examine the extent of the bias, we followed Harman's one-factor test for three main order fulfilment factors. For the Harman's one-factor test, all the manifest variables to measure the three factors of interest (inventory management, last-mile delivery, and returns management) were included in a single explanatory factor analysis (EFA). The EFA results indicated that CMB is not a problem because less than 50% of total variance was explained by a single factor (46.25%). In addition, following an approach by Conway et al. (2016), we further performed CFAs for the measurement models that had combined factors between the three factors. Results of χ^2 difference tests indicated that the model fits of the alternative models were significantly worse than the full measurement model (Table 3). Both tests suggest that the independent variables in the study are distinct.

Models	χ^2 (df)	CFI	RMSEA	SRMR	χ^2_{diff}	χ^2_{diff}
Full measurement model ^a	3546.14 (1160)	0.880	0.064	0.058	-	-
Model 1 ^b	3649.29 (1162)	0.875	0.065	0.060	103.150	2***
Model 2 ^c	3689.58 (1062)	0.873	0.066	0.062	143.440	2***
Model 3 ^d	3648.49 (1062)	0.875	0.065	0.060	102.350	2***
Model 4 ^e	3766.851 (1163)	0.869	0.067	0.063	220.710	3***

Notes: *** $p < 0.001$; χ^2_{diff} = difference in chi-square; χ^2_{diff} = difference in degrees of freedom. All the models are compared to the full measurement model

^ainventory management, last-mile delivery, and returns management are separate factors

^binventory management and last-mile delivery combined into a single factor

^cinventory management and returns management combined into a single factor

^dlast-mile delivery and returns management combined into a single factor

^einventory management, last-mile delivery, and returns management combined into a single factor.

Table 3: Fit statistics from measurement model comparison

6.6. Multicollinearity

We assessed multicollinearity using the variance inflation factor (VIF) method in multiple regression analysis. We used the average and mean-centered scores across the items of all constructs of order fulfilment (Cohen et al., 2003). Order fulfilment variables were used as independent variables. *Trust in an online retailer* and *repurchase intention* were used as

dependent variables. The results showed that multicollinearity was not a problem as all tolerance values are greater than 0.10 and VIF values are below 10 (Hair et al., 2010).

7. Results

7.1. Tests of the hypothesized model

We simultaneously tested the nine hypotheses illustrated in Figure 1 using structural modeling (SEM) and using AMOS (version 21). The fit statistics for the structural model presented in Table 4 (see the first column) indicate acceptable model fit ($\chi^2=6258.03$, $df=1996$, $p<0.001$; RMSEA=0.065; 90%CI=0.064,0.067; CFI=0.83; SRMR=0.30; CMIN/DF=3.1). *Online purchase frequency* is the only control variable which had a significant relationship with *repurchase intention* ($p<0.05$), suggesting that this variable plays a role in consumer repurchase intention. The results of the hypothesis tests (H1-H4, H6-H8) appear in Figure 2. We discuss these results in detail as follows.

As predicted, perceived value of *inventory management* practices of an online retailer has a significantly positive relationship with *repurchase intention* ($\beta=0.246$, $p<0.05$), in support of H1. H2, which stated that perceived value of *last-mile delivery* practices of an online retailer would positively predict *repurchase intention*, was not significant ($p>0.05$). The hypothesized effect of perceived value of *returns management* practices of an online retailer on *repurchase intention* (H3) was not supported ($p>0.05$).

H4 proposed the positive relationship between *trust in an online retailer* and *repurchase intention*. H4 was supported: *trust in online retailer* had a positive relationship ($\beta=0.558$, $p<0.05$).

In support of H6 and H8, perceived value of *inventory management* practices of an online retailer ($\beta=0.800$, $p<0.05$) and perceived value of *returns management* practices of an online retailer ($\beta=0.235$, $p<0.05$) positively predicted *trust in an online retailer*. In contrast, perceived value of *last-mile delivery* practices of an online retailer did not show positive relationship with *trust in an online retailer* ($p>0.05$). Therefore, we found no support for H7.

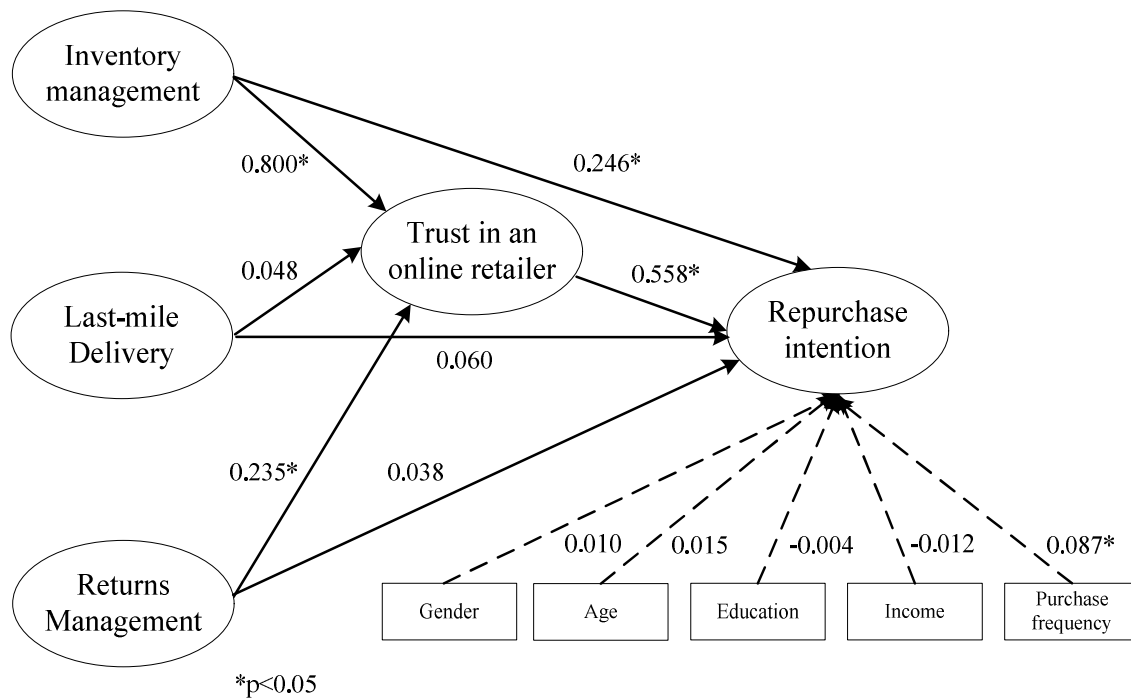


Figure 2: Structural model results

7.2. Tests of mediation

To test the mediating effects of trust on the relationships between order fulfilment constructs and repurchase intention in our model (H5), we followed an approach of using asymmetric confidence intervals with a biased-correct bootstrap in AMOS (Qureshi et al., 2009; Shrout and Bolger, 2002). Four models were created for the tests of mediation of *trust in an online retailer*. The base model includes all the direct and indirect paths. Model 1 based on the base model constrained the coefficient between *inventory management* and *repurchase intention* to zero. Model 2 based on the base model constrained the coefficient between *last-mile delivery* and *repurchase intention* to zero. Model 3 based on the base model constrained the coefficient between *returns management* and *repurchase intention* to zero. Model 1, 2, and 3 were compared to the based model, using χ^2 difference tests.

The fit indices for Model 1 were acceptable ($\chi^2=6262.88$, $df=1997$, $p<0.001$; RMSEA=0.065; 90% CI=0.064,0.067; CFI=0.830; SRMR=0.303). Fixing the coefficient to zero significantly deteriorated the model ($\Delta\chi^2=4.85$, $df=1$, $p=0.03$). As the indirect paths and the direct path were significant ($p<0.05$), it suggested the presence of partial mediation of *trust in an online retailer* on the relationship between *inventory management* and *repurchase intention*.

Model 2 showed acceptable fit ($\chi^2=6258.70$, $df=1997$, $p<0.001$; RMSEA=0.065; 90% CI=0.064,0.067; CFI=0.831; SRMR=0.303). The difference of the χ^2 value was not significant ($\Delta\chi^2=0.67$, $df=1$, $p=0.41$), indicating that the presence of the path between *last-mile delivery* and *repurchase intention* did not provide any additional information. As direct path and indirect paths were not significant, there was no ground for mediation.

The fit indices for Model 3 were acceptable ($\chi^2=6258.28$, $df=1997$, $p<0.001$; RMSEA=0.065; 90% CI=0.064,0.067; CFI=0.831; SRMR=0.303). Fixing the coefficient to zero did not significantly deteriorate the model ($\Delta\chi^2=0.25$, $df=1$, $p=0.62$). As the indirect paths were significant ($p<0.05$) and the direct path was not significant ($p>0.05$), *trust in an online retailer* fully mediates the relationship between *returns management* and *repurchase intention*. Table 4 provides all of the results of tests of mediation. In sum, H5 is partially supported.

	Base model (90%CI)	Model 1 (90%CI)	Model 2 (90%CI)	Model 3 (90%CI)
Trust → Repurchase Intention	0.558* (0.356,0.737)	0.736* (0.637,0.829)	0.546* (0.351,0.709)	0.564* (0.362,0.738)
Inventory Management → Trust	0.800* (0.716,0.864)	0.807* (0.728,0.872)	0.800* (0.716,0.865)	0.800* (0.717,0.866)
Inventory Management → Repurchase Intention	0.246* (0.01-0.499)	@	0.264* (0.061,0.504)	0.250* (0.014,0.485)
Last-mile Delivery → Trust	0.048 (-0.087,0.185)	0.042 (-0.096,0.178)	0.050 (-0.087,0.189)	0.048 (-0.091,0.182)
Last-mile Delivery → Repurchase Intention	0.060 (-0.064,0.195)	0.103 (-0.014,0.244)	@	0.079 (-0.012,0.204)
Returns Management → Trust	0.235* (0.124,0.358)	0.230* (0.118,0.352)	0.234* (0.121,0.357)	0.236* (0.122,0.364)
Returns Management → Repurchase Intention	0.038 (-0.124,0.188)	0.057 (-0.111,0.208)	0.070 (-0.054,0.198)	@
χ^2	6258.027	6262.884	6258.699	6258.278
df	1996	1997	1997	1997
RMSEA	0.065	0.065	0.065	0.065
90% CI for RMSEA	[0.064-0.067]	[0.064-0.067]	[0.064-0.067]	[0.064-0.065]
SRMR	0.303	0.303	0.303	0.303
CFI	0.830	0.830	0.831	0.831
$\Delta\chi^2$	-	4.850	0.670	0.250
p-value	-	0.028	0.413	0.617

@: the path is constrained to zero; * $p<0.05$

Table 4: Results of tests of mediation of trust in an online retailer (nested model comparison)

7.3. Multi-group analyses

We used multi-group analyses in AMOS to examine whether there were significant differences in the structural parameters across the three product groups (H9). The unconstrained model (in which the product groups are hypothesized to have different

regression weights) has 447 parameters to be estimated and also yielded a significant χ^2 value ($\chi^2=14679.87$, $df =5988$, $p<0.0001$). The structural weights model (in which the product groups are hypothesized to have the same regression weights) has 423 parameters to be estimated and yielded a significant χ^2 value ($\chi^2=14695.60$, $df=6000$, $p<0.0001$). Although the significant χ^2 values showed a poor fit, the other fit indices for both models are acceptable (the unconstrained model: CFI=0.707, RMSEA=0.054, 90% CI=0.053-0.055, SRMR=0.355, CMIN/DF=2.452; the structural weights model: CFI=0.707, RMSEA=0.054, 90% CI=0.053-0.055, SRMR=0.350, CMIN/DF=2.449). The statistics of nested model comparisons showed that the χ^2 difference value was not significant ($\chi^2_{diff}=15.73$, $df=12$, $p>0.05$). It means that the two models do not differ significantly in their goodness-of-fit. The AIC (Akaike Information Criterion) measure for the structural weights model (15565.605) is lower than that for the unconstrained model (15573.874), indicating that the former is more parsimonious and better fitting than the latter one.

To determine which path coefficients are significantly different, we looked at pairwise parameter comparisons. The test of critical ratios for differences between parameters obtained from the unconstrained model showed significant differences among path coefficients of the product groups ($>|1.96|$, $p<0.05$). Specifically, we found a significant difference (critical ratio=2.249) for the relationship between *trust in an online retailer* and *repurchase intention* for the comparison between convenience goods and shopping goods (-0.027 vs. 0.590). The results also showed a significant difference (critical ratio=2.424) for this relationship between convenience goods and specialty goods (-0.027 vs. 0.790). When comparing the relationship between *inventory management* and *repurchase intention* for convenience goods (0.727) and for specialty goods (0.087) we found a significant difference (critical ratio=-1.971). Thus H9 is partially supported.

7.4. Additional tests

As the research model depicted in Figure 1 was complex, we used average scores across the items of all the constructs of order fulfilment with a path analysis to test the possible interactions between these constructs. The averages scores were mean-centered to reduce non-essential multicollinearity. Based on the research model, three interaction models were created, adding respective interaction variables: an interaction between *inventory management* and *last-mile delivery*, an interaction between *inventory management* and *returns*

management, an interaction between *last-mile delivery* and *returns management*. The results showed that all of the interaction coefficients were not significant ($p > 0.05$).

8. Discussion

Using data from 500 online consumers in the UK this study examines the effects of order fulfilment factors on *repurchase intention* through the mediation of *trust in an online retailer* and investigates how the effects differ across three product categories. The theoretical and practical contributions can be summarized as follows.

8.1. Theoretical contributions

First, our study reveals that only *inventory management* directly influences *repurchase intention*. Previous studies indicated that individual elements of *last-mile delivery* reportedly were significantly related to *repurchase intention*. Examples are the variety of delivery options presented (Rao et al., 2011a), delivery charges (Rao et al., 2011a), on-time delivery (Collier and Bienstock, 2006; Otim and Grover, 2006), and order tracking (Cho, 2015). Previous studies also found that the individual elements of *returns management*, including refunds, returns options and returns handling are positively related with consumer return satisfaction, which each subsequently significantly affect consumer repurchase intentions (cf. Mollenkopf et al., 2007). Our study reveals that perceived value of *inventory management* practices is positively related with *repurchase intention*, confirming previous studies, e.g., product assortment and selection (Cao et al., 2003; Heim and Sinha, 2001), product availability (Boyer and Hult, 2005a), and product condition (Collier and Bienstock, 2006). Surprisingly, we found that the two order fulfilment factors that we incorporated (*last-mile delivery* and *returns management*) do not have a significant and direct impact on *repurchase intention*. This may relate to the fact that the market of online delivery service offerings has changed rapidly over time. These days, webshops already have a variety of competitive offerings in last mile delivery and in returns management (de Leeuw and Spiliotopoulou, 2017), making these fulfilment factors less discriminating factors to compete with these days.

Second, we find that *trust in an online retailer* mediates the relationship between *inventory management* and *repurchase intention* and between *returns management* and *repurchase intention*. Consistent with previous research (Bart et al., 2005; Chiu et al., 2009; Qureshi et al., 2009), our study shows that trust plays a mediating role in the relationship between order

fulfilment and *repurchase intention*. By focusing on order fulfilment factors in relation to *repurchase intention*, we move beyond the previous studies by indicating the extent to which trust mediates the relationships between order fulfillment factors and *repurchase intention*. Specifically, our findings extend the study by Qureshi et al. (2009) which only indicates the full mediation of trust in the relationship between order fulfilment and *repurchase intention*. We particularly point out relationships between order fulfilment and *repurchase intention* that were partially or fully mediated by *trust in an online retailer*. The presence of *trust in an online retailer* hence supports the earlier discussion about direct effects of order fulfilment dimensions on *repurchase intention*. The results of mediation showed that perceived value of *inventory management* practices in an online retailer has a stronger influence on *trust in an online retailer* than *returns management* (see Table 4), suggesting that online retailers should pay more attention to the former than the latter in developing the consumer trust. As such the current findings add to the literature stream about the important role of *inventory management* (Jing and Lewis, 2011; Kim and Lennon, 2011) and *returns management* (Mollenkopf et al., 2007) in relation to consumer behaviour.

Third, the influence of order fulfilment, and specifically *inventory management*, on *trust in an online retailer* and *repurchase intention* differ when comparing convenience goods with shopping goods and specialty goods. The impact of *inventory management* on *repurchase intention* for convenience goods is higher than that for specialty goods, consistent with the findings of Thirumalai and Sinha (2005). The results of multi-group analyses across three product categories indicated that there is a significant difference between convenience goods and shopping goods and between convenience goods and specialty goods in regard to the impact of *trust in an online retailer* on *repurchase intention*.

8.2. Practical contributions

The findings from the paper have practical implications, particularly for online retailers, from both a marketing and operations perspective. As consumers have little control over order fulfilment activities they have to believe in three attributes of trust in the online context: retailer competence, benevolence, and integrity. Previous studies have shown that order fulfilment plays an influential role in consumer trust, hence affecting consumer behaviour. A service failure in order fulfilment will lead to a bad experience and thus lower level of trust. This is likely to encourage consumers to switch to the other retailers for future purchases (Rao

et al., 2011b). Our findings suggest that online retailers should place a special emphasis on *inventory management* and *returns management* instead of *last-mile delivery* in order to build and maintain consumer trust. Specifically, online retailers should focus on improving elements of *inventory management* such as *product selection and assortment*, *product availability* and *product condition*. For example, online retailers should maintain inventory at sufficient levels in offering a wide range of products and subsequently show this information to consumers. Online retailers should take care of operational excellence in inventory management (rather than for example further extending their service offerings). In fact, delivery and returns options are already at a high standard with for example next day delivery being a standard already in many countries in Western Europe (cf. de Leeuw and Spiliotopoulou, 2017).

We found that trust fully mediates the relationship between *returns management* and *repurchase intention*. Thus online retailers particularly need to improve returns services through providing clear steps of a returns procedure, a good support for consumers in preparing returns, convenient and appropriate returns channels, and a lenient returns policy. Because of the consumers' inability to physically check products when buying online, well-managed returns processes may enhance trust in the online retailer, which increases the consumers' repurchase intention. Based on the results of multi-group analyses, we suggest online retailers customize their order fulfilment strategies across product categories to meet consumer expectations. Specifically, online retailers should place more attention to inventory management for convenience goods than other product categories. In sum, findings in this study will help online retailer better allocate resources based on the relative importance that consumer assign to order fulfilment factors to enhance consumer trust, and ultimately to influence consumer repurchase behaviour. Put differently, online retailers should not use a "one-size-fits-all" strategy of order fulfilment to build and maintain trust when selling a wide range of products online.

9. Limitations and future research

Our study provides several avenues for future research, in part inspired by the limitations of this study. First, we focused the analysis on a single country. Cross-border e-commerce is increasing globally (Deloitte, 2014) and international online consumers possess very diverse shopping habits and preferences. Hence an investigation of the model from this paper in a cross-border setting or in other countries can reveal new and interesting findings for further

research. Second, as the study is cross-sectional, the hypothesized causal relationships are inferred rather than proven. We therefore acknowledge the need of conducting a longitudinal study with longitudinal and transactional data. Last, although we controlled for demographic variables in our analyses, the further research can enhance the understanding of the impacts of order fulfilment on repurchase intention if consumer types is taken into account. Consumer types in online retailing for example based on shopping motivations tend to react differently to order fulfilment (Nguyen et al., 2018; Rohm and Swaminathan, 2004).

10. Conclusion

Our study answers the call by Qureshi et al. (2009), Rao et al. (2011a), and Nguyen et al. (2018) to examine the relationship between order fulfilment and consumer behaviour across different product types. This study shows the mediating role of trust in the relationship between order fulfilment and consumer behaviour in online retailing. Only *inventory management* and *returns management* have direct and indirect effects on *trust in an online retailer* and *repurchase intention* whereas *last-mile delivery* does not have these effects. The current study also investigated the impacts across three product categories. The findings provide evidence for the importance of integrating operations and marketing. Online retailers can use the findings of this research to gain more insight in consumer perceptions in order to arrange logistics operations more effectively to better fulfill consumer demands and improve the e-commerce success.

Appendix A. Measures

Respondents were asked to rate their opinion about the order fulfilment service provided by the online retailer they dealt with. Scale was 1=Strongly disagree to 7=Strongly agree (unless otherwise indicated)

Inventory management

Product selection and assortment

(AVE = 0.70; Boyer and Hult, 2005)

1. This online retailer has prestigious (high-quality) products.
2. This online retailer has an excellent assortment of products.
3. This online retailer's products are among the best.
4. This online retailer has a sufficient range of product choices (I can get what I want).

Product availability

(AVE = 0.73; Koufteros et al., 2014)

1. This online retailer accurately fulfills my order with one and only one delivery attempt.
2. This online retailer accurately delivers in the first attempt the products I request.
3. All of the products I receive in the first delivery attempt are the ones I request.
4. All of the products I request are delivered in the first attempt.
5. All the products I request are delivered as promised.
6. This online retailer never delivers some of the products I request.(R; Item deleted during the CFA)

Product condition

(AVE = 0.52; Collier and Bienstock, 2006)

1. This online retailer's orders are protectively packaged when shipped.
2. All orders by this online retailer are delivered undamaged.
3. Damage rarely occurs during transportation of my order from this online retailer.
4. My orders from this online retailer rarely contain the wrong items.
5. My orders from this online retailer rarely contain incorrect quantities.

Last-mile delivery

Delivery information and options

(AVE = 0.38; Items 1-2 from Collier and Bienstock (2006); Items 3-5 are new)

1. This online retailer gives me multiple delivery time options (e.g., next day, 3- to 5-day delivery, or 5-to 7-day delivery).
2. The online retailer provides me a choice of timeslots to receive an order (e.g., 2-hour, 4-hour, or morning/evening).
3. This online retailer provides sufficient delivery methods (e.g., home delivery or delivery at a pickup point).
4. This online retailer provides information on how much an item costs with shipping costs included.
5. The online retailer discloses carriers who deliver the online orders.

Shipping and handling charges

(AVE = 0.62; Item 1 from Cao et al. (2003); Items 2-3 are new)

1. Shipping and handling charges of this online retailer are reasonable.
2. Shipping and handling charges of this online retailer are low compared to other online

retailers.

3. This online retailer provides free shipping (shipping is free for orders with a value above a threshold or shipping is free for all orders).

Delivery

(AVE = 0.73; Koufteros et al., 2014)

1. This online retailer is timely in delivering all the products I request.
2. This online retailer delivers on time all the products I request.
3. I receive all the products I request by the scheduled delivery time.
4. This online retailer delivers all the products I request in a timely fashion.
5. This online retailer is on time in delivering all the products I request.
6. This online retailer is not timely in delivering all the products I request. (R; Item deleted during the CFA)

Order tracking

(AVE = 0.66; Item 1 from Collier and Bienstock (2006); Item 2 from Bart et al. (2005); Item 3 is new)

1. The online retailer provides accurate information about when orders will be received.
2. Once an order is placed, it can be tracked to see where it is in the shipping process.
3. The online retailer updates automatically when order status changes.

Returns management

Returns procedure

(AVE = 0.76; Mollenkopf et al., 2007)

1. It is easy for me to remember how to perform return tasks using this online retailer's website.
2. It is easy to get this online retailer's website to do what I want it to do when I return products.
3. My interaction with this online retailer's website during the return process is clear and understandable.
4. Overall, I believe that this online retailer's website is easy to use during the return process.

Returns preparation

(AVE = 0.60; Mollenkopf et al., 2007)

1. Filling out the online return forms to return the products is easy.
2. Preparing the products for return shipment or pickup is easy.
3. This online retailer's requirements on the condition of products returned are appropriate.
4. Getting the products physically to the pickup/return point is easy.
5. The product is easy to repack so that it is properly packaged and ready to send.
6. Appropriate packing materials (carton, filler, tape) are easily available to me.
69. It is convenient to print out the online retailer return label.

Returns options

(AVE = 0.51; Item 1 from Parasuraman et al. (2005); Item 2-3 are new)

1. This online retailer provides me with convenient options for returning items.
2. This online retailer provides returns service via a retail store or a manned collection point.
3. This online retailer provides returns service via an automatic locker.

Refund

(AVE = 0.56; Mollenkopf et al., 2007)

1. This online retailer compensates me for problems when returns occur.
2. This online retailer compensates me when what I order/return doesn't arrive on time.
3. This online retailer arranges for the pickup of items I want to return from my home or business.

Returns handling

(AVE = 0.72; Mollenkopf et al., 2007)

1. This online retailer handles product returns well.
2. This online retailer offers a meaningful guarantee.
3. This online retailer takes care of problems promptly.

Trust in the online retailer

(AVE = 0.68; Qureshi et al., 2009)

1. I believe that this online retailer is consistent in quality and service.
2. I believe that this online retailer is keen to fulfill my needs and wants.
3. I believe that this online retailer is honest.
4. I believe that this online retailer wants to be known as one that keeps promise and commitments.
5. I believe that this online retailer has my best interests in mind.
6. I believe that this online retailer is trustworthy.
7. I believe that this online retailer has high integrity.
8. I believe that this online retailer is dependable.

Repurchase intentions

(AVE = 0.70; Koufteros et al., 2014)

1. I would consider this online retailer my first choice if I buy the same product again.
2. I would do more business with this online retailer in the next few years.
3. I would switch to a competitor in making future online purchases. (R; Item deleted during the CFA)

^aR indicates that the scale is reversed.