

Consumer Behaviour and Order Fulfilment in Online Retailing: A Systematic Review

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This paper provides a systematic review of consumer behaviour and order fulfilment in online retailing. The objective of this review is threefold: first, to identify elements of order-fulfilment operations that are relevant to online consumer behaviour (purchase, repurchase, product return); second, to understand the relationship between order-fulfilment performance and consumer behaviour; and third, to inspire future research on developing consumer service strategies that takes account of these behavioural responses to order-fulfilment performance outcomes. The paper is based on a systematic review of literature on online consumer behaviour and order-fulfilment operations, mainly in the fields of marketing and operations, published in international peer-reviewed journals between 2000 and September 2015. This study indicates that the current literature on online consumer behaviour focuses mainly on the use of marketing tools to improve consumer service levels. Very little research has been conducted on the use of consumer service instruments to steer consumer behaviour or, consequently, to manage related order-fulfilment activities better. The study culminates in a framework that encompasses elements of order-fulfilment operations and their relationship to online consumer behaviour. This paper is the first comprehensive review of online consumer behaviour that takes aspects of order-fulfilment operations into account from both marketing and operations perspectives.

Introduction

The Internet and the development of mobile devices have not only attracted a considerable number of consumers who search for and buy products online, but also created opportunities for retailers to increase online sales. In 2014, more than 46% of European shoppers used the Internet to buy products; moreover, European online business-to-consumer (B2C) sales grew by 14%, culminating at around €424 billion in 2014 (EcommerceEurope 2015). Organizations face a variety of challenges in fulfilling online consumer orders, including on-time and efficient transportation and delivery, accurate inventory management and efficient warehouse design and management (Agatz

et al. 2008; De Koster 2003; Fernie and McKinnon 2009; Hays *et al.* 2005; Maltz *et al.* 2004). Online order fulfilment (also called e-fulfilment when referring to the delivery of goods to consumers (Agatz *et al.* 2008)) is considered to be a critical part of Internet sales (De Koster 2003; Lummus and Vokurka 2002).

The separation between retailers and their consumers, in terms of both space and time, has made online retailing different from traditional retailing in various aspects, including consumer behaviour and order fulfilment (Grewal *et al.* 2004). For example, consumers have different needs and wants with regard to product searching, purchasing or consumer support when shopping on the Internet compared with shopping in a physical retail store

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(Burke 2002; Monsuwe *et al.* 2004). Rose *et al.* (2011) indicated four main differences between online consumer experience and offline consumer experience: personal contact; information provision; time period for interactions; and brand presentation. There are also differences between the two contexts in terms of order-fulfilment aspects, including: product assortment; inventory management; last-mile delivery; and returns management (Agatz *et al.* 2008). Online channels, for example, tend to carry a broader product assortment than physical stores do; thus, they are better able to meet consumer demand in the long end of the tail (Brynjolfsson *et al.* 2011).

In this paper, we focus specifically on the interrelationship between online consumer behaviour and order-fulfilment operations. Consumer behaviour in online environments has received significant attention in the fields of marketing, information systems, psychology and management (Cheung *et al.* 2005). In line with Hoyer and MacInnis (2010), we define consumer behaviour as ‘the totality of consumers’ decisions with respect to the acquisition, consumption and disposition of goods, services, time and ideas by human decision making units’. In a review of the literature on online consumer behaviour, Cheung *et al.* (2005) found that order fulfilment is one of the key factors that has an impact on consumer behaviour; specifically, it may affect loyalty and repurchasing behaviour. As such, fulfilment operations have been recognized as a vital driver of the growth of the e-commerce sector (Maltz *et al.* 2004). Moreover, recent industry reports on online retailing indicate the key role of order-fulfilment operations in relation to consumer experience and expectation (comScore 2013; Deloitte 2014; DHL 2014; Drapers 2014; PwC 2014).

A significant number of studies in the fields of psychology, marketing, information systems and operations management have identified various factors that encourage consumers to shop online (Cheung *et al.* 2005; Darley *et al.* 2010; Monsuwe *et al.* 2004). Unfortunately, the literature on the relationship between consumer behaviour and order-fulfilment operations in online retailing is fragmented. Prior research either has examined how separate order-fulfilment factors (e.g. on-time delivery, stock-outs) affect consumer behaviour, or has indicated an order-fulfilment factor as a key driver of consumer purchase and repurchase intentions (e.g. Bart *et al.* 2005; Otim and Grover 2006). From a managerial standpoint, it is important to understand which aspects of order-fulfilment operations significantly affect consumer behaviour

in order to implement successful e-commerce strategies. To the best of our knowledge, no review paper has addressed this issue. This literature review aims to contribute to the fields of marketing and operations by identifying and describing this research gap and pointing out the need for future research.

We review literature using a systematic approach. The systematic review approach offers a reproducible and transparent process to minimize research bias (Tranfield *et al.* 2003), which has contributed to its growing use in management and organization studies (Klang *et al.* 2014; Nijmeijer *et al.* 2014; Thorpe *et al.* 2005; Xiao and Nicholson 2013). By using the systematic review approach, we aim to (i) identify order-fulfilment elements relevant to online consumer behaviour from pre-purchase to post-purchase, (ii) understand the relationship between order-fulfilment performance and consumer behaviour, and (iii) inspire future research on developing consumer service strategies that take into account these behavioural responses to order-fulfilment performance outcomes.

After introducing order fulfilment and consumer behaviour in online environments in the next section, we explain how we conducted the systematic review. We then present descriptive results of the review and discuss the main findings. We propose and discuss an integrative framework to guide further research. Lastly, we conclude with a summary of the contribution, future directions and limitations of this review.

Consumer behaviour and order fulfilment from Brick to Click

Online consumer behaviour involves the stages of a consumer decision-making process, including problem recognition (i.e. identifying a consumption problem), information search (i.e. searching for information to solve the problem), evaluation (i.e. judging the likelihood of an outcome or event), choice (i.e. deciding which products to purchase) and outcomes (i.e. experiencing satisfaction/dissatisfaction with the product, or disposing of the product) (Darley *et al.* 2010). Consumers tend to behave heterogeneously in an online buying environment. Rohm and Swaminathan (2004) found four types of online grocery shoppers with differing shopping behaviours: convenience shoppers; variety seekers; balanced buyers; and store-oriented shoppers. For example, while convenience shoppers aim for time savings in an

online purchase, variety seekers desire the new or novel in choosing brands, products or stores; these different behaviours lead to different choices. Nunes and Cespedes (2003) found that individual consumers behave differently across five stages of the buying process: awareness, consideration, preference, purchase and post-sale service. Order fulfilment operations can significantly contribute to handling this heterogeneity. Order fulfilment encompasses all activities from the moment a consumer makes an online purchase until the product is delivered to the consumer (Lummus and Vokurka 2002; Pyke *et al.* 2001). It can determine the success or failure of an online business. For example, in online retailing, a failure to live up to order-fulfilment promises can be detrimental to online sales, as out-of-stocks correlate strongly and negatively with a consumer's loyalty to a webshop (Rao *et al.* 2011b). Given the importance of order fulfilment in the online retail supply chain, online retailers need to implement specific methods and strategies with respect to the design of distribution networks, inventory management and delivery (Maltz *et al.* 2004).

In this paper we also refer to supply chain management. In line with Mentzer *et al.* (2001), we consider this to be a management philosophy with three characteristics: (1) a systems approach with managing the flow from raw materials to consumers; (2) a strategic orientation towards cooperation between entities involved in managing this flow; and (3) a consumer focus. As such, supply chain management is a part of operations management that focuses on such transformation processes as design engineering, facility design, production management, inventory management, and sales and operations planning (to name but a few) (Frankel *et al.* 2008). Logistics activities are a major part of supply chain management. According to CSCMP (2013), logistics management '... relates to that part of supply chain management that plans, implements, and controls the efficient, effective forward and reverse flow and storage of goods, services and related information between the point of origin and the point of consumption in order to meet customers' requirements'. As a result, logistics activities are a major part of order fulfilment, including inventory management, last-mile delivery and returns management.

There are a number of studies on consumer behaviour in an online environment that have examined antecedents and dimensions of consumer behaviour (Cheung *et al.* 2005; Dennis *et al.* 2009; Dholakia *et al.* 2010; Ranaweera *et al.* 2005). Identified antecedents include, but are not limited to, consumer

characteristics, website characteristics, product characteristics and order fulfilment. Dimensions of consumer behaviour identified in these studies included purchase, repurchase, product return and positive word-of-mouth. However, we did not find any studies that investigated order-fulfilment aspects in relationship to online consumer behaviour. In line with the literature on antecedents and dimensions of online consumer behaviour identified above, we focus on three core dimensions of online consumer behaviour that have gained significant attention from both scholars and practitioners in this study: purchase, repurchase (including both behavioural intention and actual behaviour) and product return. Purchase intention is commonly defined as the consumers' willingness to purchase products shown on a website (Esper *et al.* 2003). Repurchase intention is viewed as the likelihood that a consumer will continue to purchase products from the same online retailers and the same website (Dadzie *et al.* 2005; Otim and Grover 2006). In a broader context, these studies also indicate that purchase and repurchase intentions include making recommendations to other consumers, information sharing, saying positive things about an online retailer and spending more with an online retailer (e.g. Bart *et al.* 2005; Boyer and Hult 2005b; Dadzie and Winston 2007). In a marketing context, consumer satisfaction is recognized as an important factor that positively influences consumers' repurchasing intentions; and some research has focused on identifying factors that affect consumer satisfaction in online shopping (e.g. Cao *et al.* 2003; Collier and Bienstock 2006; Rao *et al.* 2011a; Xing *et al.* 2010).

Furthermore, our review considers online consumer behaviour within the context of returning products after purchase. Although we found only three studies examining consumer product-return behaviour (Lantz and Hjort 2013; Li *et al.* 2013; Rao *et al.* 2014), we contend that this activity is important, given increases in both the volume of returns and the costs of reverse logistics (De Leeuw *et al.* 2016; Mollenkopf *et al.* 2007).

By examining relevant literature, mainly from the fields of marketing and operations, we present and detail an integrative framework encompassing order-fulfilment aspects and consumer behaviour in online retailing, as visualized in Figure 1. This framework identifies three major order-fulfilment processes interacting with online consumer behaviour. Our analysis and synthesis will be structured around these fulfilment processes.

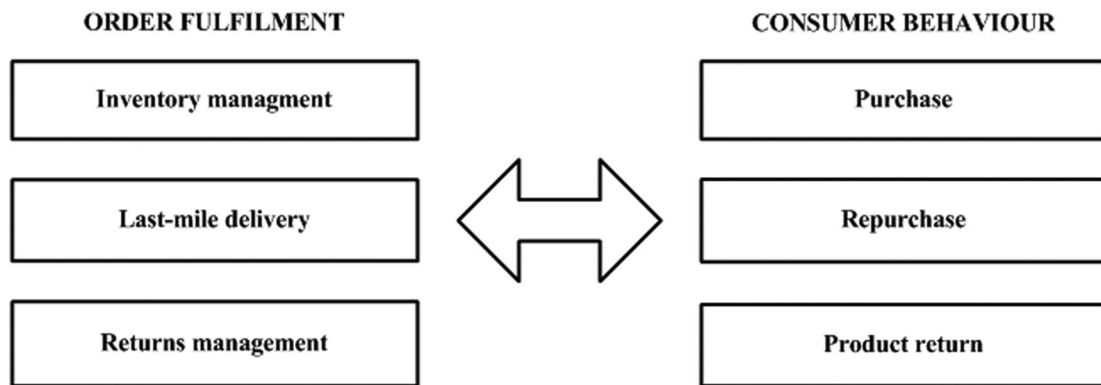


Figure 1. Framework for research

Method

We followed the five-step approach to a systematic review as outlined by Denyer and Tranfield (2009): (1) formulate one or more research questions; (2) locate studies; (3) select and evaluate studies; (4) analyse and synthesize studies; and (5) report and use the results.

Question formulation

A successful review hinges on clear research questions being formulated at the beginning of the process. When formulating our research questions we focused on the interface of operations and marketing in online retailing. Through discussions with colleagues in the logistics and marketing departments of our university and with several e-fulfilment providers, we identified two questions for our study: (1) Which order-fulfilment elements influence consumer behaviour related to purchasing, repurchasing, and returning products online? and (2) What is the relationship between online consumer behaviour and order fulfilment performance?

Locating, selecting and evaluating studies

We applied three techniques to locate references to ensure that our review results took into account all available studies: a search of electronic databases; a manual search of peer-reviewed journals; and snowballing.

This systematic review was restricted to peer-reviewed (scholarly) journals listed in the Web of Science, ScienceDirect and ABI/INFORM (ProQuest) between 2000 and September 2015. Given that the context for this review is operations and marketing, these three databases were suitable because of

their large coverage and frequent use in conducting systematic literature reviews: e.g. Klang *et al.* (2014), Nijmeijer *et al.* (2014), Xiao and Nicholson (2013). Web of Science covers more than 12,000 of the highest impact journals in a variety of disciplines from around the world.¹ ScienceDirect covers around 2500 peer-reviewed journals in 24 major scientific disciplines.² ABI/INFORM (ProQuest) has in-depth coverage from thousands of publications in business research.³ The keywords used in searching the databases were divided into three groups: online context; consumer behaviour; and order-fulfilment operations. Wildcard characters in keywords varied, depending on the database being used. The keywords in each group were linked by the Boolean OR operator to create a search string for the respective group. Group search strings were linked by the Boolean AND operator to make combined search strings. We used two combined search strings: a combined String 1 between the group 'online context' and the group 'consumer behaviour'; and a combined String 2 including all three groups. The combined String 1 was used to search for titles in each database. Using a combined string for the first two groups ensured that the search would not miss articles that did not contain terms of order-fulfilment operations in their titles, but which did indicate order-fulfilment elements in relation to online consumer behaviour in their abstracts. Appendix S1 lists the keywords and search strings

¹Source: <http://thomsonreuters.com/web-of-science-core-collection> (accessed 29 September 2015).

²Source: <http://info.sciencedirect.com/content/journals> (accessed 29 September 2015).

³Source: <http://search.proquest.com/abiglobal/productfulldescdetail?accountid=10978> (accessed 29 September 2015).

Table 1. Inclusion and exclusion criteria

	Inclusion criteria	Exclusion criteria
Title screening	<p>Combined String 1: title about factors influencing consumer behaviour in online retailing (purchase, repurchase, product return)</p> <p>Combined String 2: title about relationship between order-fulfilment elements and consumer behaviour in online retailing</p>	<ol style="list-style-type: none"> 1. Article focuses on antecedents of consumer behaviour in online retailing that are not related to order fulfilment, e.g. website design, privacy, information technology, security concerns, gender, personality traits, culture and company reputation 2. Article focuses on electronic transactions other than B2C (e-tailing) in physical products, e.g. C2C, B2B and banking services 3. Article in language other than English
Abstract screening	<p>Indicates a relationship between order-fulfilment elements and consumer behaviour in online retailing</p> <p>Indicates order-fulfilment initiatives in relation to online consumer behaviour</p>	

that were used in the three databases respectively. We used explicit inclusion and exclusion criteria for title screening and abstract screening (Table 1). These criteria were derived from the objectives of our study and were guided by the two research questions formulated in the first step of the systematic review method.

The relevant articles, retrieved using the two combined search strings and selection criteria for title screening, were exported to a reference management software package (Mendeley). After the elimination of duplicates, the three databases contained a total of 216 articles. We then conducted a thorough review of the abstracts, using the inclusion criteria for abstract screening. This process resulted in a total of 44 articles. Appendix S2 shows the full selection map that describes the process of retrieving papers from the three databases.

To ensure that the searchy was exhaustive, we conducted a manual search of selected journals to complement the search of electronic databases (Suarez-Almazor *et al.* 2000). In this review, the manual search was limited to the top-tier journals in the fields of operations and marketing, as witnessed by their rankings in international journal lists. We selected Grade 3 and Grade 4 journals in the categories Marketing and Operations (i.e. 'Operations and Technology Management' and 'Operations Research and Management Science') from the Association of Business Schools' academic journal guide 2015 (ABS 2015). Furthermore, we included the top journals from similar domains in the ranking published by the German Academic Association for Business Research (VHB-JOURQUAL3),⁴ the Comité National de la Recherche Scientifique (Categorization of Journals in Economics and Management, section 37, July 2015,

⁴Source: <http://vhbonline.org/en/service/jourqual/vhb-jourqual-3/#c5968> (accessed 3 June 2016).

Table 2. Results of search techniques

Search technique	The number of retrieved papers	Total
Electronic database	44	44
Peer-reviewed journals	12	56
Snowballing	11	67

version 4.04)⁵ and the Australian Business Deans Council (ABDC Journal Quality List in 2013).⁶ We took equivalent proportions of the top-rank journals from the four journal ranking lists in related categories for our manual search. Appendix S3 lists the 106 journals included in the manual search. Although narrowing our search to the top grades of journals in the field limits review coverage, it mitigates review reliability concerns (Matthews and Marzec 2012). The manual selection of articles in each journal between 2000 and September 2015 was checked against the above inclusion and exclusion criteria for title screening and abstract screening. A total of 12 additional articles were included, after excluding 14 duplicates that had been retrieved during the electronic database search. The search of electronic databases and peer-reviewed journals resulted in a total of 56 articles.

Next, we used the snowball method to identify additional articles. For backward snowballing, we applied inclusion and exclusion criteria for title and abstract screening to references in each of the retrieved articles. For forward snowballing, we used the Web of Science to find studies that cited the retrieved article. If an article was not found on the Web of Science, we performed forward snowballing, using Google Scholar database. The snowball method resulted in 11 additional articles. In summary, three literature search

⁵Source: <https://www.gate.cnrs.fr/spip.php?article973&lang=fr> (accessed 3 June 2016).

⁶Source: <http://www.abdc.edu.au/pages/abdc-journal-quality-list-2013.html> (accessed 3 June 2016).

Table 3. Quality assessment criteria

Content	Level			
	0 = Absent	1 = Low	2 = Medium	3 = High
Theory	The article does not provide enough information to assess this criterion	Inadequate literature review	Acceptable literature review	Excellent literature review
Methodology and methods	The article does not provide enough information to assess this criterion	Not fully explained, difficult to replicate	Acceptable explanation and replicability	Clear explanation and excellent records for audit trail
Analysis	The article does not provide enough information to assess this criterion	Insufficient data Weak connection in research design	Appropriate data sample Adequate analysis but weak explanation	Adequate data sample Data and results strongly support arguments Good explanation
Relevance (findings, theories, methods)	The article does not provide enough information to assess this criterion	Little relevance	Broad relevance	Integration of the findings, theories and methods
Contribution	The article does not provide enough information to assess this criterion	Makes little contribution to the body of knowledge	Makes an important contribution to the body of knowledge	Makes a highly significant contribution to the body of knowledge

Source: Combined and adapted from Macpherson and Holt (2007) and Wong *et al.* (2012).

techniques – electronic search of databases, manual search of peer-reviewed journals and snowballing – produced 67 relevant articles (Table 2).

Quality assessment

In order to select the final articles for analysis and synthesis in this systemic review, we conducted a full text review of the 67 articles. Following the approach to full text review suggested by Wong *et al.* (2012), we assessed each article based on two sets of criteria: relevance to the topic and quality. Once again, we used the inclusion and exclusion criteria for abstract screening to check whether an article was relevant to the research questions. We based our quality criteria on the combination of quality assessment criteria used by Macpherson and Holt (2007) and Wong *et al.* (2012). Their assessment process includes a review of theory, methodology and methods, analysis, relevance and contribution (Table 3). According to Wong *et al.* (2012), an article has to meet the first set of criteria and satisfy at least one of the quality criteria at Level 3 to be retained for further analysis. The application of these criteria excluded 15 articles, leaving 52 articles for data extraction and synthesis. The final list of articles retrieved is shown in Appendix S5.

Analysis and synthesis

Since the quality assessment method described above required an in-depth reading of the articles, we extracted information from each article during

the quality assessment, as suggested by Booth *et al.* (2011). This resulted in a spreadsheet linking extracted information from each article to the formulated research questions. Using such a data extraction form facilitates synthesis and serves as an historical record (Appendix S4). The papers retrieved were heterogeneous in terms of study data; therefore, we determined that it was more appropriate to use interpretative and inductive methods of synthesis (e.g. realist synthesis and meta-synthesis) rather than statistical methods (e.g. meta-analysis) (Tranfield *et al.* 2003). This review used a meta-synthesis approach, as described by Sandelowski *et al.* (1997) and Walsh and Downe (2005). The final articles were imported into ATLAS (a qualitative analysis software package) to code and identify the concepts and themes relating to order fulfilment and dimensions of online consumer behaviour. The remainder of this paper is dedicated to reporting the results of the systematic review, including a general description and detailed findings of the meta-synthesis analysis.

Descriptive results

The articles selected mainly cover the fields of operations and marketing (51% and 24% of articles, respectively).⁷ Five articles (10%) concerned information management (IM). A pattern in publication

⁷The descriptive results are based on subject categories from ABS (2015).

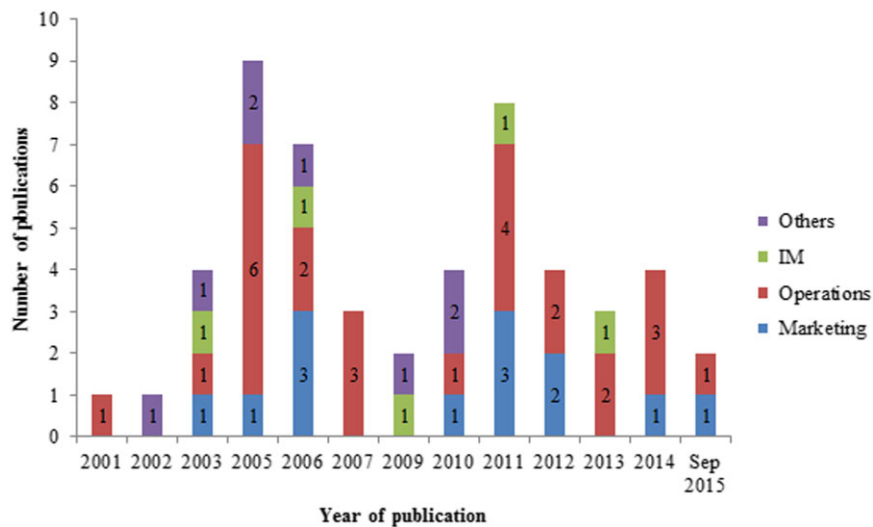


Figure 2. Number of publications, by research field, from 2000 to September 2015. [Colour figure can be viewed at wileyonlinelibrary.com]

was not evident; however, the number of publications peaked in 2005, with nine articles, and increased again in 2011, with eight articles (Figure 2).

A majority of articles were published in marketing and operations journals, which indicates that academics have a particular interest in the interface between marketing and operations. Figure 2 also shows that studies in these two fields were generally published every year during the period 2000–September 2015. Operations journals that appear in the review (operations and technology management: 37%; operations research and management science: 13%) include *Journal of Operations Management* (6 articles), *Transportation Science* (4 articles), *Decision Sciences* (2 articles), *Journal of Business Logistics* (6 articles) and *International Journal of Physical Distribution & Logistics Management* (2 articles). Several articles in this review were published in leading marketing journals, such as: *Journal of Marketing* (2 articles), *Journal of Retailing* (3 articles), *Journal of Marketing Research* (1 article), *Marketing Science* (1 article) and *Psychology and Marketing* (1 article). In terms of methods represented by the studies, 79% (41 articles) used statistical analyses, 11% (6 articles) used experiments, while the remaining 10% (5 articles) used modelling and simulation. Given the dominance of empirical studies, it is unsurprising that studies were based mainly on survey data (67%). Online-rating data, used in surveys and primarily obtained from a well-known site (www.bizrate.com), was used in 14% of the articles. Notably, ten articles (19%) used transactional and archival data in longitudinal research that examined the actual behaviour

of online consumers. Analysing actual behaviour can bring additional insights into consumers' purchase decisions. A number of studies used transactional or archival data on order size, order frequency and item value to investigate actual purchase and repurchase (e.g. Becerril-Arreola *et al.* 2013; Jing and Lewis 2011; Rao *et al.* 2011a). Use of such transactional and archival data, rather than survey data, to measure consumer-level impacts could be quite beneficial for future operations management research (Griffis *et al.* 2012a). In terms of regional focus, a large majority of studies were from developed countries (US, 73%; EU states, 21%), while the rest (6%) were from Taiwan, Saudi Arabia and New Zealand. Reflecting the significant rise in e-commerce in many developing countries (Kearney 2013), several studies focused on these countries; however, research on emerging markets remains limited.

Following the meta-synthesis approach, we categorized papers according to three common order-fulfilment themes and their sub-themes, reflecting three operational processes of order fulfilment (Appendix S5): inventory management, last-mile delivery and returns management. In the following section, we discuss the findings for each of these main themes.

Discussion

Inventory management

The theme inventory management basically describes whether an online retailer has physical products in stock on consumer request (e.g. Jing and Lewis

2011; Kim and Lennon 2011). In our review, this theme also encompasses the assortment of products for consumer selection and the physical condition of products delivered to consumers (Cao *et al.* 2003). Online consumers can encounter stock-outs during the pre-purchase or post-purchase stages, depending on the actual stock position of an online retailer (Breugelmans *et al.* 2006). These authors essentially defined stock-out policies as ways to inform consumers of the status of stock-outs and replacement products. Online retailers use such policies to control which information to show to consumers, and when to show it, if a stock-out situation occurs during the online buying process. Product selection and assortment describes the breadth and the depth of merchandise offered by an online retailer. It also relates to the number of substitutions from which consumers can choose in the case of a stock-out. Product condition indicates whether the product received meets consumer expectations (i.e. is as described on the retailer's website), reflects order accuracy in terms of quality and quantity, and conveys that products were not damaged on receipt.

When searching for a product in a webshop, consumers often will assess an online retailer first based on the variety of products offered. Product selection and product range investigated, among other operational factors, have an impact on repeat purchase intentions (Cao *et al.* 2003; Cho 2015; Heim and Sinha 2001; Janda *et al.* 2002; Liao *et al.* 2010; Otim and Grover 2006). Consumer satisfaction and perception are significantly influenced by the breadth and depth of products at a retailer's website. However, retailers face a trade-off between higher consumer satisfaction resulting from offering a wide range of products and higher inventory costs resulting from offering this wider range. Because product availability has an impact on consumer loyalty and repurchase intention, maintaining inventory at sufficient levels is a challenge to online retailers (Cho 2015; Heim and Sinha 2001; Parasuraman *et al.* 2005; Rao *et al.* 2011a). Since online retailers want to ensure that there is a wide range of products on their website, as in a traditional shop, they seek to maintain substitutions and not to exceed stock-out rates generally found across various product categories (Boyer and Hult 2005b). Breugelmans *et al.* (2006) found that the stock-out policies offered by online retailers have a significant impact on consumer purchase and choice decisions.

If online retailers inform consumers of stock-outs only after they have placed an order (known as a

non-visible policy), this tends to reduce the probability of a purchase. A similar finding by Dadzie and Winston (2007) revealed that stock-outs have a negative impact on a consumer's repurchase intentions. A stock-out led to three possible outcomes, dependent on a consumer's judgements of the website attributes and consumer service functions: item substitution; switching to another website; or exit from the Internet. In another study by Rao *et al.* (2014) on the relationship between order-fulfilment elements and product return behaviour, the disclosure to consumers of inventory scarcity conditions in the pre-purchase stage increased the likelihood of products being returned. Thus, while the disclosure may help online retailers generate sales, it may also significantly affect the risk of product returns.

Based on transactional data from an online grocer, Jing and Lewis (2011) found that stock-outs have a tendency to increase purchases in the short run, since new consumers are more tolerant of this situation than existing ones; however, they found that stock-outs have a negative impact on repurchases by loyal consumers in the long run. In addition, the effects of stock-out were found to vary across product categories. Kim and Lennon (2011), who used experiments to investigate how consumers react to online apparel stock-outs, showed that stock-outs cause consumers to experience negative emotions, which adversely affect the online retailer's image, consumer satisfaction, and consumer repurchase intentions. Peinkofer *et al.* (2015) showed that price promotions could be used to lower consumer dissatisfaction due to online stock-outs of consumer electronics products. However, cycle time and in-stock availability surprisingly do not have a significant impact on the tendency of online consumers to repurchase (Dadzie *et al.* 2005). In this study, the same logistics consumer service construct was used for cycle time, in-stock availability, as well as for a consumer responsiveness factor that was investigated. Thus, the failure to find an association could be due to the effects of website attributes on these three factors or to a lack of other operational fulfilment factors in the model.

A number of studies found that the degree of satisfaction with a product on receipt has an impact on repurchase intentions (Cao *et al.* 2003; Collier and Bienstock 2006; Liao *et al.* 2010; Parasuraman *et al.* 2005; Thirumalai and Sinha 2005; Wolfenbarger and Gilly 2003). Online consumers tend to rate an online retailer highly and tend to continue purchasing if they receive products that accurately reflect the description given on the retailer's website.

Table 4. Inventory management vs. consumer behaviour in online retailing

Inventory management	Consumer behaviour		
	Purchase	Repurchase	Product return
Product selection/assortment		Cao <i>et al.</i> (2003); Cho (2015); Heim and Sinha (2001); Janda <i>et al.</i> (2002); Liao <i>et al.</i> (2010); Otim and Grover (2006)	
Product availability	Breugelmans <i>et al.</i> (2006); Jing and Lewis (2011); Kim and Lennon (2011); Peinkofer <i>et al.</i> (2015)	Boyer and Hult (2005b); Breugelmans <i>et al.</i> (2006); Cho (2015); Dadzie <i>et al.</i> (2005); Dadzie and Winston (2007); Heim and Sinha (2001); Jing and Lewis (2011); Kim and Lennon (2011); Parasuraman <i>et al.</i> (2005); Peinkofer <i>et al.</i> (2015); Rao <i>et al.</i> (2011a)	Rao <i>et al.</i> (2014)
Product condition		Cao <i>et al.</i> (2003); Collier and Bienstock (2006); Liao <i>et al.</i> (2010); Parasuraman <i>et al.</i> (2005); Thirumalai and Sinha (2005); Wolfenbarger and Gilly (2003)	

Table 4 summarizes the aspects of inventory management and consumer behaviour discussed in the papers reviewed above. From this table it is evident that most papers focus on repurchase and that attention to product returns is relatively limited (which is in line with the finding of De Leeuw *et al.* (2016) that product returns management has received comparably little research attention in online retail).

Last-mile delivery

Last-mile delivery, the final leg of a supply chain in which products are delivered to consumers, is a critical link between retailers and consumers in online retailing. The theme last-mile delivery in our review encompasses not only physical delivery, but also delivery information and options, shipping and handling charges and order tracking (e.g. Cao *et al.* 2003; Collier and Bienstock 2006; Esper *et al.* 2003; Lewis 2006). Depending on the situation, online retailers and consumers may agree on a delivery window or not. We can distinguish between three primary last-mile delivery methods in online retailing. The first is attended home delivery, where consumers must be present for taking delivery. The second is unattended delivery, where the consignment is left on the premises of the intended delivery address using a reception box or other safe place. The third method, which is increasingly adopted by online retailers, is delivery via manned or unmanned pickup points, including postal offices, lockers, shops or supermarkets. Regardless of the delivery methods used, online retailers need to ensure the timeliness of delivery, since this will contribute significantly to the success of their online business. Prior to placing an order,

consumers are often provided with delivery information and options, such as carriers, shipping dates, timeslots, delivery time or fees. Shipping and handling charges are offered under different structures: unconditional free shipping; flat-rate shipping; and threshold-based free shipping. Consumers respond variously to these shipping fee structures by making a purchase decision, purchasing more products or abandoning the online shopping cart. Order tracking is an online service whereby consumers can track and trace the status of their orders. Order tracking is particularly important to online consumers when they cannot see a product physically before buying and, therefore, perceive the purchase to be high risk.

Esper *et al.* (2003) found that carrier disclosure on retail websites increased consumers' delivery-related perceptions and expectations and, thus, positively affected consumers' willingness to purchase. Further examination in the same study revealed that consumers demonstrate a greater willingness to buy if they are allowed to choose a shipment carrier. The results suggest that retailers who outsource transportation to third parties should consider a proper 'disclosure' or 'choice' delivery strategy if they want to increase trust and, thereby, attract and retain consumers. Bart *et al.* (2005) found that order fulfilment that includes delivery options has an indirect effect on consumer willingness to buy, as trust plays a mediating role between order fulfilment and behavioural intent. Specifically, including delivery options helps to build online trust, which subsequently influences willingness to buy. The authors also demonstrated that this indirect impact varies across a range of websites and consumer characteristics. Rao *et al.* (2011a) used the concept of electronic logistics

service quality (e-LSQ), including physical distribution service quality (PDSQ) and physical distribution service price (PDSP), to measure consumer purchase satisfaction through structural equation modelling. Shipping options are also included in PDSQ. The results revealed that consumers satisfied with PDSQ tend to repurchase products. However, variety of delivery options does not have a significant impact on repurchase intention (Otim and Grover 2006).

Shipping and handling fees are particularly important for online retailers, as pricing serves as an effective marketing tool for influencing a consumer's purchase decision. In addition, such fees may be used to recover fulfilment costs (Lewis 2006). Through an examination of actual data for an internet retailer, Lewis (2006) and Lewis *et al.* (2006) found that shipping fees and promotions significantly affect a consumer's purchase pattern in terms of order incidence and size. While new consumers are more responsive to incentives that charge the lowest fee for the largest order size, existing consumers are more responsive to a base level of shipping fees. Shipping-fee structure thus affects consumer acquisition and retention. Accordingly, a retailer's logistics system should be designed to respond to demand fluctuations. Another study by Becerril-Arreola *et al.* (2013), which used simulation and sensitivity analysis, also proved that consumer purchase amounts are affected by applying a threshold to free shipping.

Based on the previously mentioned studies by Lewis (2006) and Lewis *et al.* (2006), Koukova *et al.* (2012) showed that online consumers had different evaluations and perceptions of two available shipping structures: flat-rate and threshold-based free shipping. Their experiments revealed that a consumer's response to shipping-fee structures is based mainly on order value. The importance of shipping and handling fees in retaining online consumers was confirmed in a study by Rao *et al.* (2011a). They showed that satisfaction with PDSP (i.e. with shipping and handling fees and online presentation of fees prior to purchase) is positively related to consumer purchase satisfaction and consumer retention. Their study also indicated a strong correlation between PDSP and PDSQ. Thus, improving order-fulfilment performance by increasing shipping fees may not improve purchase satisfaction. However, Cao *et al.* (2003) identified a negative and significant effect of price satisfaction (concerning product price, as well as shipping and handling charges) on satisfaction with the order-fulfilment process. They found a difference in consumer price tolerance when consumers bought

products from high-priced vs. low-priced e-tailers, which led to different expectations and levels of satisfaction regarding fulfilment processes. An alternative explanation offered for the negative correlation between order-fulfilment satisfaction and price satisfaction was that logistics cost-cutting by low-priced e-tailers resulted in a lack of follow-up service, meaning that consumers may have been satisfied with prices, but unhappy with after-sales services.

The sub-theme delivery is a critical factor, since it directly relates to the 'last mile' challenge for online retailers. In a study of successful online businesses, Reichheld and Schefter (2000) identified on-time delivery as one of the key drivers of consumer repurchase and found that any failure or delay in delivery can give online consumers a bad impression and result in diminished repurchases. Similarly, using archival data from an online retailer, Rao *et al.* (2011b) found that delays in the delivery of consumer orders have a significant impact on consumers' future purchase patterns. More specifically, an order-fulfilment glitch increases consumer order anxiety and decreases order frequency and size. The results suggest that minimizing order tardiness is as important as improving order-fulfilment performance. A number of studies in this review indicated that delivery time, when weighed alongside other operational factors, significantly affects online consumer behaviour. Since online consumers are quite sensitive to delivery time, this factor has the strongest impact on their satisfaction and hence repurchase intentions (Collier and Bienstock 2006) – a finding supported by other studies (Abdul-Muhmin 2011; Liao *et al.* 2010; Janda *et al.* 2002; Otim and Grover 2006).

However, when viewed separately from other operational factors, on-time delivery does not have a significant impact on the likelihood that a consumer will make a repurchase (Ramanathan 2010). Furthermore, the Ramanathan (2010) study showed that risk is not a moderator between on-time delivery and repurchase intention. Arguably, risk may play a mediating role if on-time delivery is investigated alongside other fulfilment factors. Based on a core model of consumers' behavioural intentions, Boyer and Hult (2005a, b, 2006), and Hult *et al.* (2007) showed that quality constructs of online grocers (namely e-business, service quality and product quality) have a significant effect on consumer repurchase intentions. However, the importance of these constructs depended on the delivery strategies used by the grocers in question. The delivery strategies (which were determined by delivery method or

picking method) included semi-extended, fully extended, decoupled, and centralized-extended. On-time delivery influences not only purchase and repurchase intentions, but also product return behaviour. The failure of on-time delivery negatively affects the likelihood of products being returned (Rao *et al.* 2014). However, the findings of Rao *et al.* (2014) also indicate that the impact can be reduced if the initial consumer expectation of delivery timeliness is high.

It is interesting to note that few authors proposed methods or models to help online retailers reduce delivery costs and maximize profit by influencing consumer behaviour. Analysing routing and scheduling problems in attended home delivery services, Campbell and Savelsbergh (2005) developed methodologies for profit maximization that retailers can use to decide whether to accept or reject a time slot requested by consumers. Campbell and Savelsbergh (2006) propose the use of incentives (e.g. a discount) to guide consumers to choosing expected delivery time windows. These incentive schemes can substantially reduce the total distances of delivery tours and, thereby, reduce delivery costs and enhance profits. Although their models were based on a number of simplifying assumptions (e.g. equal probabilities for time slots), their findings have raised an interesting research stream in the interactions between order fulfilment and consumer behaviour. In a similar study of time-slot management, Agatz *et al.* (2011) found that changing the time-slot template (e.g. the number of time slots or delivery time windows) over spatial areas influences consumer choice of time slots. Offering narrow delivery time slots meets consumer expectation, but it reduces routing efficiency. In other words, there is a trade-off between delivery costs and service. The study by Agatz *et al.* (2011) had built-in assumptions of expected consumer demand by zip code area, which may have limited their model. Building on work by Campbell and Savelsbergh (2006), Yang *et al.* (2014) used a multinomial logit model to estimate consumer choice probability for time slot and delivery costs, based on historical and current data of consumer choices. Their framework for the dynamic pricing of delivery time slots for home delivery services produced a larger increase in profits compared with current delivery pricing policies in practice.

The last sub-theme of the last-mile delivery identified in our literature review was order tracking. Consumers often expect to know order status immediately after placing an order on a retailer's website. This feature has a significant impact on

repurchase intentions (Cao *et al.* 2003; Cho 2015; Liao *et al.* 2010; Otim and Grover 2006; Rao *et al.* 2011a; Thirumalai and Sinha 2005). Order tracking tools help to remove delivery uncertainty and give consumers a sense of control over their orders during the delivery period. The number of times a consumer tracks the status of an order online increases with order delivery delays (Rao *et al.* 2011b).

Table 5 summarizes how aspects of last-mile delivery relate to elements of consumer behaviour in the papers reviewed above. Here again we observe less attention given to consumer behaviour related to product returns compared with consumer behaviour related to (re)purchases.

Returns management

Returns management refers to the process whereby products are returned from consumers to retailers because they are damaged, unwanted or faulty. Frequently, this process is described in a returns policy. The theme returns management in our review relates to returns procedures, returns preparation, returns options, refunds, and returns handling (e.g. Smith (2005); Mollenkopf *et al.* (2007); Lantz and Hjort (2013)). The returns procedure consists of the necessary steps through which an online consumer must go in order to return a product to a retailer. Ease of locating returns procedures is critical for consumers, as is clarity of the procedures. Returns preparation is the first physical step in the procedure and relates to the availability of return labels and forms, as well as the supply of appropriate packing materials. Returns options refers to the available channels for returning products, for example, picking up returned products at home or sending back the returned product via post. Refunds are compensations made to consumers if they do not take a product, or if they exchange a product. The level of compensation for shipping fees, the required condition of the returned product, and whether a consumer will receive a full or partial refund all reflect the leniency or strictness of a returns policy. For example, Zappos.com has a lenient policy that allows up to 365 days for the return of an item in its original condition.⁸ Importantly, the leniency of a returns policy also depends on local laws: e.g. consumers in the EU are entitled by law to a minimum 14-day return policy ('cooling-off period') with full refund of product costs and forward shipping

⁸Source: <http://www.zappos.com/shipping-and-returns> (accessed 29 September 2015).

Table 5. Last-mile delivery vs. consumer behaviour in online retailing

Last-mile delivery	Consumer behaviour		
	Purchase	Repurchase	Product return
Delivery information/options	Bart <i>et al.</i> (2005); Esper <i>et al.</i> (2003)	Otim and Grover (2006); Rao <i>et al.</i> (2011a)	
Shipping/handling charges	Becerril-Arreola <i>et al.</i> (2013); Koukova <i>et al.</i> (2012); Lewis (2006); Lewis <i>et al.</i> (2006)	Cao <i>et al.</i> (2003); Rao <i>et al.</i> (2011a)	
Delivery	Agatz <i>et al.</i> (2011); Campbell and Savelsbergh (2005); Campbell and Savelsbergh (2006); Yang <i>et al.</i> (2014)	Abdul-Muhmin (2011); Boyer and Hult (2005a,b, 2006); Hult <i>et al.</i> (2007); Collier and Bienstock (2006); Janda <i>et al.</i> (2002); Liao <i>et al.</i> (2010); Otim and Grover (2006); Ramanathan (2010); Rao <i>et al.</i> (2011b)	Rao <i>et al.</i> (2014)
Order tracking		Cao <i>et al.</i> (2003); Cho (2015); Liao <i>et al.</i> (2010); Otim and Grover (2006); Rao <i>et al.</i> (2011a,b); Thirumalai and Sinha (2005)	

costs. Returns handling describes how well an online retailer responds to a consumer's return request. The way in which a retailer addresses returns problems is a good indicator of its returns service quality.

Since consumers are unable to check products physically when buying online, online retailing tends to experience higher product returns than traditional retailing (Griffis *et al.* 2012a). Returns policies may influence consumer behaviour, while returns handling may have an impact on an online retailer's reverse logistics. Several studies in this review showed that the presentation of a returns policy on a website (Bart *et al.* 2005; Janda *et al.* 2002) or offering ease of return (Dadzie *et al.* 2005; Heim and Sinha 2001) have significant impacts on purchase and repurchase intentions. These studies investigated the impact of returns factors in correlation with other operational factors in the same models. Examining reverse logistics separately, Smith (2005) also confirmed that (i) ease of finding returns procedures on a retailer's website and (ii) ease of returning products significantly affected consumer purchase decisions. Bonifield *et al.* (2010) found that consumer purchase intentions are influenced by the interaction between returns policy characteristics, perceived control of the website and consumer trust. Returns-related factors such as returns procedures, returns preparation, returns options and returns handling are positively associated with consumer perception of the value of the return offer and consumer return satisfaction, which subsequently significantly affect consumer repurchase intentions (Mollenkopf *et al.* 2007). The findings suggest ways of improving returns management and satisfying consumers. Notably, ease of return does not significantly affect a consumer's likelihood of repurchase when

viewed in isolation (Ramanathan 2011). However, this factor will significantly affect the repurchase intention for both low-risk products (i.e. low-price and low-ambiguity products) and high-risk products (i.e. high-price and high-ambiguity products).

Consumers' assessments of returns shipping policies are not consistent with the normative assumptions of online retailers in light of attribution, equity and regret theories (Bower and Maxham 2012). Using both transactional data and survey data from online retailers, obtained by longitudinal research, Bower and Maxham (2012) demonstrated that consumers will adjust their post-return spending in response to returns policies regardless of attributions and cost fairness. This study proved that free returns lead to an increase in post-return repurchases, while fee-based returns decrease post-return repurchases. This suggests that online retailers should offer free returns to retain consumers in the long term. Lantz and Hjort (2013) similarly showed that a lenient returns policy also affects consumer behaviour: free returns lead to an increase in order frequency and to a decrease in the average value of orders and purchase items. Interestingly, this study notes that offering free delivery and free returns increases the probability of returns. Taking advantage of the incentives, shoppers tend to return a product shortly after its use. This type of return reflects an increasing trend towards what has been called 'retail borrowing' in the realm of commercial returns (Foscht *et al.* 2013). Based on archival data from an online retailer, Griffis *et al.* (2012a) pointed out that refund speed significantly affects consumer repurchase behaviour in terms of a percentage increase in order frequency, average number of items per order and average item value. Li

Table 6. Returns management vs. consumer behaviour in online retailing

Returns management	Consumer behaviour		
	Purchase	Repurchase	Product return
Returns procedure	Bonifield <i>et al.</i> (2010); Smith (2005)	Bart <i>et al.</i> (2005); Dadzie <i>et al.</i> (2005); Heim and Sinha (2001); Janda <i>et al.</i> (2002); Mollenkopf <i>et al.</i> (2007); Ramanathan (2010)	
Returns preparation	Bonifield <i>et al.</i> (2010)	Mollenkopf <i>et al.</i> (2007)	
Returns options	Bonifield <i>et al.</i> (2010)	Mollenkopf <i>et al.</i> (2007)	
Refund	Bonifield <i>et al.</i> (2010); Lantz and Hjort (2013); Li <i>et al.</i> (2013); Pei <i>et al.</i> (2014)	Bower and Maxham III (2012); Griffis <i>et al.</i> (2012a)	Lantz and Hjort (2013); Li <i>et al.</i> (2013)
Returns handling	Bonifield <i>et al.</i> (2010); Smith (2005)	Mollenkopf <i>et al.</i> (2007); Ramanathan (2011)	

et al. (2013) developed a joint-decision model for the pricing, returns and quality policy for a distributor involved in online direct selling. Product quality in their research refers to the consistency between consumer expectation of the purchased products and product characteristics associated with delivery speed and service quality. The goal of this study was to investigate specifically the impact of the pricing, returns and quality policy on consumer purchase and return decisions. The results show that a refund policy depends on a consumer's sensitivity to selling price, returns policy or product quality, while actual consumer returns depend on the refund and product quality. In addition, this study found that a lenient returns policy should be applied when the product quality is high and when the products have a high sales price. Similar results in a recent study by Pei *et al.* (2014) showed that a full return policy (i.e. a policy with 100% refund and free shipping on any size order) had a higher positive impact on consumer purchase intention than a partial return policy (i.e. a policy with restocking charges or handling fees).

Table 6 summarizes the aspects of returns management and consumer behaviour discussed in the papers reviewed above. Once more we observe that, for the most part, research is focused on the effect of returns processes on (re)purchasing elements of consumer behaviour.

Based on survey data, Xing *et al.* (2010) used factor analysis to confirm a framework for electronic physical distribution service quality (e-PDSQ). The framework consisted of several order-fulfilment elements such as order timeliness, order condition, product availability and return. Developed from a consumer's perspective, the framework reflects consumers' assessments of the order-fulfilment aspects of an e-commerce retailer. Improving e-PDSQ

will lead to consumer satisfaction and repurchase intention. Based on a similar framework of order-fulfilment service quality (OFSQ), Koufteros *et al.* (2014) investigated the role of encounter satisfaction (i.e. consumer satisfaction with the current transaction) on the relationship between order-fulfilment elements and repurchase intentions in online retailing. Similarly to Xing *et al.*'s (2010) study, the three OFSQ dimensions, including inventory availability and product condition, were found to have significant impacts on encounter satisfaction, which in turn affects repurchase intentions.

The findings from the above studies offer interesting insights into the interactions between individual order-fulfilment elements and consumer behaviour in online retailing. These studies also investigated order fulfilment as a whole process. In a study on the relationship between order-fulfilment quality and referrals in online retailing, Griffis *et al.* (2012b) showed that order cycle time has a direct, negative effect on purchase satisfaction. It also has an indirect, negative effect on purchase satisfaction through order-fulfilment quality. Furthermore, order fulfilment has positive and significant effects on overall consumer satisfaction and consumer behavioural intentions (Cho 2015; Parasuraman *et al.* 2005; Semeijn *et al.* 2005; Wolfinbarger and Gilly 2003; Zhang *et al.* 2011). Order fulfilment by an online retailer is also positively related to consumer trust, which is a critical determinant of repurchase intentions (Bart *et al.* 2005; Chiu *et al.* 2009; Qureshi *et al.* 2009). Online consumers normally experience the quality of order fulfilment after receiving products. Chen and Chang (2003) found that order fulfilment has a significant effect on the online shopping experience. Thus, if orders are delivered in a satisfactory manner and within the stated time, a relationship of trust

develops, and consumers will tend to make future purchases.

Notably, the impact of order fulfilment on consumer satisfaction varies across types of products and consumers. Thirumalai and Sinha (2005) found that consumer satisfaction with order fulfilment is greatest for convenience goods (e.g. groceries), lower for shopping goods (e.g. apparel) and lowest for specialty goods (e.g. computers). Consumer expectations of order fulfilment vary with respect to product type: their expectations are highest for specialty goods, owing to their higher average value and small order quantities, and lowest for convenience goods, owing to their lower average value and higher average volumes. The results of the research of Thirumalai and Sinha (2005) suggest that order-fulfilment strategies should be designed for different product types. To classify product types, Cho (2015) proposed the concept of electronic product identifiability (EPI), the extent to which characteristics of a product can be identified in an online channel. Low-EPI products (e.g. clothing and accessories) require less consumer web interaction for online shopping than high-EPI products (e.g. electronics and computers). Using survey data, the author found that the positive effect of order fulfilment (including order tracking, on-time delivery and consumer support) on repurchase intention is stronger for high-EPI products than for low-EPI products. Although this finding is interesting, we note that the concept of EPI does not seem relevant for studying the relationship between order fulfilment and repurchase intention. The relationship between order fulfilment and the likelihood of consumer repurchase also may be affected by online retailer service product categories, which are differentiated by volume, scope, online customization and joint-branding characteristics (Heim and Sinha 2001). In addition, Bart *et al.* (2005) suggest that the indirect impact of order fulfilment on consumer behavioural intent through online trust may differ across website categories and consumer characteristics, since the mediation of trust varies across these two features.

Theoretical perspectives from the evidence

As part of our synthesis, we identified various theories that were adopted by authors of the retrieved papers. Although individual researchers have developed own models containing similar factors to others, the factors often have been operationalized from different theoretical perspectives. A frequently used theory in papers from our review is the Expectation

Confirmation Theory (ECT), which suggests that if consumers' expectations of service performance are met, confirmation is formed and consumers are satisfied. It is often used to explain post-purchase behaviour, e.g. repurchase or product return. Expectation Confirmation Theory has also helped researchers to predict the impacts on repurchase intention of cycle time, stock-outs, product assortment, order tracking or delivery failure (Dadzie and Winston 2007; Dadzie *et al.* 2005; Liao *et al.* 2010; Peinkofer *et al.* 2015; Rao *et al.* 2011b). Additionally, it has contributed to an understanding of the main effect of delivery reliability, as well as the moderation effect of delivery timeliness, on the likelihood of product return (Rao *et al.* 2014). Our review shows that the Theory of Reasoned Action (TRA) and Theory of Planned Behaviour (TPB) are also used to explain online consumer behaviour. According to these theories, consumer behaviour is determined by the intention to perform a particular behaviour; and behavioural intention is influenced by consumer attitude, perception and subjective belief. The TRA and the TPB have been used to examine how order-fulfilment elements (e.g. delivery and stock-outs) affect repurchase intention (Abdul-Muhmin 2011; Chiu *et al.* 2009; Collier and Bienstock 2006; Otim and Grover 2006). Drawing on Signalling Theory, Bonifield *et al.* (2010) and Pei *et al.* (2014) explain how the characteristics and extent of a return policy affect consumer purchase intention. Attribution Theory (Koukova *et al.* 2012) and Basic Price Theory (Lantz and Hjort 2013) have been used to explain how purchase intention is affected by shipping charges and lenient return policies, respectively. A review of the theoretical lenses applied to the remaining evidence revealed that multiple other perspectives were used to investigate the relationships between online consumer behaviour and order-fulfilment aspects, e.g. Adaption Theory (Koufteros *et al.* 2014), Discrepancy-Evaluation Theory of Emotion (Kim and Lennon 2011) and Transaction Costs Economics Theory (Griffis *et al.* 2012a). Given the diversity of theoretical perspectives, we propose the use of a combination of theories for further investigation within our integrative framework. The use of Expectancy Disconfirmation Theory, Distributive Justice and Transaction Cost Economics theories in the study by Rao *et al.* (2011b) is a good example. Notably, the dominant theories used were from psychology and marketing fields. Little of the examined research adopted theories from operations management or operations research. While linear

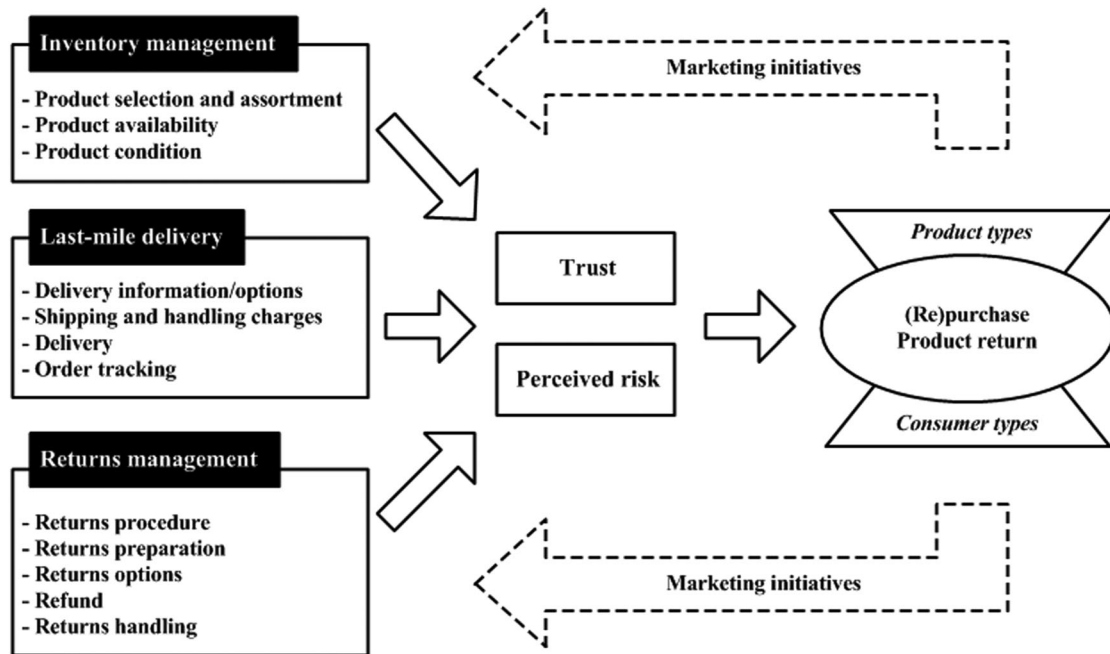


Figure 3. Integrative framework of order fulfilment and consumer behaviour in online retailing

and integer programming with a heuristic approach was used to solve vehicle routing problems related to consumer choice of time slots in home attended delivery (Agatz *et al.* 2011; Campbell and Savelsbergh 2006; Campbell and Savelsbergh 2005; Yang *et al.* 2014), the models in these studies were based on the theory of revenue management. Therefore, we call for the use of a combination of theories from operations, marketing and psychology to investigate the interface between marketing and operations in online retailing.

An integrative framework of order fulfilment and consumer behaviour in online retailing

Based on our review of the literature, we propose an integrative framework of order fulfilment and consumer behaviour in online retailing (Figure 3). This framework provides an overview of key elements of order fulfilment, as well as links between these elements and online consumer behaviour. It provides insight into the potential interactions between marketing and operations in order to provide opportunities to devise instruments that will influence consumer behaviour (as viewed through the dimensions purchase, repurchase and product return).

This framework considers three main operational processes of order-fulfilment: inventory management, last-mile delivery and returns management. Consumer behaviour consists of three main dimensions: purchase, repurchase and product return. Our review indicates that the impacts of order-fulfilment elements on repurchase intention differ across studies. For example, some studies indicate a positive impact of the availability of delivery options (Bart *et al.* 2005), on-time delivery (Otim and Grover 2006), in-stock availability (Heim and Sinha 2001) and ease of return (Mollenkopf *et al.* 2007) on repurchase intention; however, other research found that these order-fulfilment elements have no significant impact (Dadzie *et al.* 2005; Otim and Grover 2006; Ramanathan 2010, 2011). In addition, our review showed that trust and perceived risk can play a mediating or moderating role between online retailing order fulfilment and consumer behaviour (Bart *et al.* 2005; Bonifield *et al.* 2010; Chiu *et al.* 2009; Esper *et al.* 2003; Qureshi *et al.* 2009; Ramanathan 2011). Trust in online retailing consists of consumer perceptions of, or beliefs about, whether online retailers deliver on expectations and provide reliable information on their websites (Bart *et al.* 2005). Urban *et al.* (2000) insist that the most important element of consumer trust is order fulfilment (as cited in Esper *et al.* (2003)). Trust is often

Table 7. Product categories from the studies

Product categories	Frequency	%	Examples
Various online products (not stated)	25	48	n.a.
Groceries	8	15	food, non-food products
Printed material	4	8	books, magazines
Non-perishable grocery and drugstore items	3	6	pasta, noodles, face moisturisers
Consumer electronics	2	4	MP3 player, personal computers
Seasonal products and perishable products	1	2	Christmas trees, roses
Consumable and non-consumable products	2	4	consumable products: food, flowers, gifts, vitamins, perfume; non-consumable products: jewellery, furniture, clothes, electronics
Apparel	1	2	clothes
Home, garden, personal items	1	2	chairs, loppers, cosmetics
Margarine and cereals	1	2	margarine, cereals
Meat products	1	2	meat
Food products	1	2	meat, milk, vegetables
Flash drive and coffeemaker	1	2	flash drive, coffeemaker
Personal accessory (fashion intensive products)	1	2	jewellery, hand-watches

examined as a mediator between order fulfilment and purchase/repurchase intentions (Bart *et al.* 2005; Chiu *et al.* 2009; Qureshi *et al.* 2009). Trust in online retailers moderates consumers' reactions to return policies, which consequently affect consumers' purchase intentions (Bonifield *et al.* 2010). Some authors discuss perceived risk – the risk that consumers feel when they expect potentially undesirable consequences as a result of online purchases. Ramanathan (2011) found that risk, defined in terms of price and ambiguity of products (i.e. the degree to which a product's description is accurate), moderates the relationship between retailers' capability of handling product returns and repurchase intention. For further understanding of trust and perceived risk in an online environment, see related reviews of these two concepts by Rose *et al.* (2011) and Li *et al.* (2012).

Consumer purchase intentions are dependent on consumer types and product types (Bart *et al.* 2005; Heim and Sinha 2001; Thirumalai and Sinha 2005; Ramanathan 2010, 2011). Consumers have been classified based on several variables. Some classify online consumers based on website familiarity, online expertise, online shopping experience or online entertainment experience (Bart *et al.* 2005); while others classify consumers based on shopping motivations as convenience shoppers, variety seekers, balanced buyers or store-oriented shoppers (Rohm and Swaminathan 2004). These consumer types react differently to order-fulfilment options. Bart *et al.* (2005) suggest that improving order fulfilment creates consumer trust, which may consequently affect purchase and repurchase intentions in online retailing.

Consumer reactions to order-fulfilment options will also differ between product groups. In their research of impacts of order fulfilment on consumer satisfaction using three product groups, Thirumalai and Sinha (2005) found that the level of risk consumers perceive when they spend time and money searching for, evaluating and buying products is lowest for convenience goods (e.g. groceries), medium for shopping goods (e.g. apparel) and highest for specialty goods (e.g. electronics). Consequently, the authors suggest that consumer expectations of order fulfilment are likely to increase moving from convenience goods to specialty goods. Ramanathan (2010, 2011) investigated how risk characteristics of products influence the relationships between order-fulfilment elements (i.e. on-time delivery and returns handling) and repurchase intention. They devised four product categories based on a combination of low and high levels of price and product ambiguity and classified products into groups in terms of risks (high, medium or low). A relationship between order fulfilment and repurchase intention also differs between two EPI product groups that have different levels of web interaction, as discussed earlier (Cho 2015). Table 7 provides a list of product categories investigated by the authors incorporated in our literature review.

Table 7 reveals that half the studies did not specify a product category and that, when categories were indicated, groceries gained the most attention. However, specifying the product category is important, as the interaction between order-fulfilment aspects and online consumer behaviour differs between product groups. Kim and Lennon (2011) found, for example, that online apparel stock-outs negatively affect

consumer repurchase intention, while Dadzie *et al.* (2005) found no impact for different types of products, e.g. books, clothing and shoes, and electronic equipment. Rao *et al.* (2011a) found that the variety of delivery options for an online purchase (across various retail products) can increase repurchase intentions through increased consumer satisfaction; yet, according to Otim and Grover (2006), delivery options do not have a significant impact on repurchase intentions with personal computers. Therefore, we recommend further examination of the relationships between order-fulfilment aspects and online consumer behaviour in different types of products, with a specific emphasis on product and consumer group differences, following Kim and Lennon (2011), Peinkofer *et al.* (2015) and Rao *et al.* (2011a).

Furthermore, we observe that most of the studies do not examine interaction effects of order-fulfilment elements and consumer behaviour. We notice that order-fulfilment elements were examined primarily in association with a set of other antecedents, such as website characteristics, while several articles limited their study to selected elements (some as few as one). When individual order-fulfilment aspects are examined in isolation, correlations between constructs may be identified. For example, the findings of Rao *et al.* (2011a) indicated a strong correlation between PDSP and PDSQ – factors that influence consumer satisfaction and, thereby, loyalty. Order fulfilment appears to have both direct and indirect main effects on consumer behaviour in an online context. Following Heim and Sinha (2001), however, we would suggest investigating the interactions between these order-fulfilment elements as a promising area for future research.

Finally, we found that marketing initiatives in relation to order-fulfilment elements can be used to influence online consumer behaviour in order to achieve logistics objectives. Survey results from several studies in our review suggest a number of marketing incentives that may help retailers satisfy, attract and retain online consumers. More specifically, proper shipping-fee strategies influence consumers' order incidence and size (and, thus, retailers' revenue and profit) (Becerril-Arreola *et al.* 2013; Lewis 2006; Lewis *et al.* 2006). We contend that order-fulfilment services and related incentives offered (e.g. delivery options, the offering of free shipping with or without a threshold, and lenient returns policies) will all affect order-fulfilment performance.

Conclusions

Following a five-step approach for systematically reviewing literature, this paper analysed and synthesized findings from 52 peer-reviewed papers, primarily from literature on marketing and operations management, published between 2000 and September 2015. We focused our literature review on the relationship between order fulfilment and consumer behaviour in online retailing. Consumer behaviour has been interpreted as purchase, repurchase and product return. We summarized our findings along three order-fulfilment processes that influence consumer behaviour in online retailing: inventory management, last-mile delivery and returns management. By means of a systematic review, we aimed to (i) identify order-fulfilment elements that are relevant to online consumer behaviour, from pre-purchase to post-purchase, (ii) understand the relationship between order-fulfilment performance and consumer behaviour, and (iii) inspire future research on developing consumer service strategies that take into account these behavioural responses to order-fulfilment performance outcomes.

Regarding the first objective, we identified the following key elements for each of the three order-fulfilment processes: three elements for inventory management (i.e. product selection and assortment, product availability and product condition); four elements of last-mile delivery (i.e. delivery information and options, shipping and handling charges, delivery and order tracking); and five elements of returns management (i.e. returns procedure, returns preparation, returns options, refunds and returns handling). We found that all these elements influence one or more of the three dimensions of online consumer behaviour (purchase, repurchase and product return). We noted that, among consumer behaviour elements, product return has received the least attention in relation to order-fulfilment elements (Tables 4–6).

With regard to the second objective, we found that, although authors unanimously indicated significant impacts of order-fulfilment elements on consumer behaviour in online retailing, they typically focus on individual order-fulfilment elements (e.g. stock-outs by Jing and Lewis (2011), delivery by Rao *et al.* (2011b) or returns management by Mollenkopf *et al.* (2007)). While some authors investigated the relationship between order fulfilment and purchase or repurchase intentions (e.g. Griffis *et al.* (2012b) and Xing *et al.* (2010)), they missed other

order-fulfilment-related elements, such as shipping/handling charges and refunds (e.g. Lewis 2006; Pei *et al.* 2014). As a result, there is potential for a more integrated approach. Our integrative framework highlights key order-fulfilment elements and their relationship to online consumer behaviour and therefore may provide a good starting point for such research.

With regard to the third objective, this review inspires several areas of future research based on gaps identified in our study. We notice that there have been no papers that study order-fulfilment elements in relationship to consumer behaviour in online retailing in an integrative manner. As a step towards future research, we propose an integrative framework about relationships between order fulfilment and dimensions of consumer behaviour in online retailing. Future research on the relationship between order fulfilment and online consumer behaviour should preferably cover all the elements mentioned, using a combination of theories from operations, marketing and psychology. Attention also should be paid to interaction effects between order-fulfilment elements and online consumer behaviour, as this is lacking in the current literature, since only main effects are studied.

There are not many studies on steering online consumer behaviour in order to manage order-fulfilment activities better; exceptions are offering discounts (e.g. Campbell and Savelsbergh 2006) and using time-slot templates (e.g. Agatz *et al.* 2011) to influence consumer choice of time slots in an online purchase in order to affect delivery. Our review thus reveals opportunities for developing strategies and incentives to align consumer behaviour with expected order-fulfilment outcomes. While some researchers offer suggestions for how strategies may help businesses meet their logistics objectives (Boyer and Hult 2005b; Griffis *et al.* 2012b; Kim and Lennon 2011), the ways in which strategies are influenced by online consumer behaviour have not been investigated in depth in the literature. Campbell and Savelsbergh's (2006) paper is a good example of an in-depth study showing how delivery-fee discounts by online retailers may be used to steer consumer demand in order to reduce total delivery costs. Methods of guiding consumer behaviour to other order-fulfilment aspects such as inventory management and returns management could be investigated. In terms of our integrative framework, one may interpret these methods as marketing incentives that influence relationships between order-fulfilment aspects and consumer behaviour. Such studies require the availability of transactional and archival data

from retailers. As most of the studies in our review used survey data in statistical analyses (e.g. multiple regression or structural equation modelling), we suggest that further research also examine different types of data (e.g. transactional and archival data) in order to understand better the dynamics between marketing and operations (Griffis *et al.* 2012a).

Furthermore, we find that the number of studies focusing on product return as an element of consumer behaviour in online retailing is limited (Lantz and Hjort 2013; Li *et al.* 2013; Rao *et al.* 2014). This suggests the potential for developing research on the effects of order-fulfilment elements on product return and vice versa (e.g. the impacts of availability of different returns options or the quality of returns handling on product return; or a study on how product return may affect inventory management strategies by online retailers). Finally, internet shopping allows consumers to shop anytime from anywhere; however, a majority of studies in our review focused on a specific country. Cross-border e-commerce is developing quickly, especially in Europe (Accenture 2011; Deloitte 2014). Applying the framework for online transactions across countries may produce different results. This calls for further investigation of the aspects of our framework, and their interactions, in cross-border settings.

We acknowledge that our research has limitations. First, our review focused on online order fulfilment and its relation to three main dimensions of online consumer behaviour: purchase; repurchase; and product return. We could extend the model beyond online order fulfilment to include aspects such as 'showrooming' (i.e. evaluating a product through physical stores and buying it online) or 'reverse showrooming' (i.e. evaluating a product through online channels and buying it at a physical store). With the advent of mobile channel, tablets and social media, both retailers and consumers are moving from a multi-channel world to an omni-channel world (Bell *et al.* 2014; Verhoef *et al.* 2015). Future research may therefore focus explicitly on the interaction of online and offline channels. Second, like any other systematic review, our search is based on a limited set of keywords, as listed in Appendix S1. To the best of our knowledge, this study is the first systematic literature review of consumer behaviour and order-fulfilment aspects in online retailing. Although the proposed model needs empirical investigation, this study can contribute to better understanding and management of the relationship between order fulfilment and consumer behaviour in online retailing and, thereby,

contribute to better understanding and management of the operations vs. marketing interface.

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Supporting Information

Additional Supporting Information may be found in the online version of this article at the publisher's website:

Appendix S1. Keywords and search strings in electronic databases

Appendix S2. Selection map

Appendix S3. A list of journals in the manual search

Appendix S4. Data extract form

Appendix S5. Order fulfilment themes and sub-themes identified in each study