Omni-channel retailing research – state of the art and intellectual foundation

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Abstract

Purpose – The purpose of this paper is twofold: to identify, evaluate and structure the research that focusses on omni-channel retailing from the perspective of logistics and supply chain management; and to reveal the intellectual foundation of omni-channel retailing research.
Design/methodology/approach – The paper applies a multi-method approach by conducting a content-analysis-based literature review of 70 academic papers. Based on the reference lists of these papers, the authors performed a citation and co-citation analysis based on the 34 most frequently cited papers. This analysis included multidimensional scaling, a cluster analysis and factor analysis.
Findings – The study reveals the limited consideration of logistics and supply chain management literature in the foundation of the omni-channel retailing research. Further, the authors see a dominance of empirical research as compared to conceptual and analytical research. Overall, there is a focus on the Western retail context in this research field. The intellectual foundation is embedded in the marketing discipline and can be characterised as lacking a robust theoretical foundation.
Originality/value – The contribution of this research is identifying, evaluating and structuring the literature of omni-channel research and providing an overview of the state of the art of this research area considering its interdisciplinary nature. This paper thus supports researchers looking to holistically comprehend, prioritise and use the underpinning literature central to the phenomena of omni-channel retailing. For practitioners and academics alike, the findings can trigger and support future research and an evolving understanding of omni-channel retailing.
Keywords Operations, Retailing, Supply chain, Distribution, Omni-channel, Multi-channel,
Co-citation analysis, Content-analysis based literature review
Paper type Research paper

1. Introduction

Arguably the most significant change in retailing has been the integration of physical and virtual worlds due to the emergence of internet-based marketing channels (e.g. Brynjolfsson *et al.*, 2013). Retailers provide different channel services, such as "click and collect", "order in-store, deliver to home", "order online, return to store", "showrooms", and other combinations of online and traditional retail activities (Piotrowicz and Cuthbertson, 2014) which enable customers to utilise multiple distribution channels.

If retailers want to succeed, the question is no longer either clicks or bricks, it is more or less clicks and bricks, including all other potential possibilities for getting in touch with the end users (Gulati and Garino, 2000). Such an omni-channel strategy requires decisions in key areas of retailing like marketing, logistics, supply chain and/or operations, since those areas significantly shape business activities and thus determine the channel structure/strategy of retailers (Cao, 2014; Cao and Li, 2015; Kotzab and Bjerre, 2005; Kotzab and Madlberger, 2001; Kotzab and Teller, 2003).

As retail organisations have been evolving rapidly from single-channel to multi-channel, and subsequently omni-channel, operations (e.g. Cao, 2014), and thus the research on this contemporary phenomenon has developed a significant body of knowledge, we identified a need to examine the state of the art of omni-channel retailing research and reveal the intellectual underpinning of this relatively new research area, the questions being the following: Where does the knowledge that drives the field of omni-channel retailing come from? What kind of research has influenced this particular research domain so far? Literature reviews such as the one by Beck and Rygl (2015) and systematic reviews as suggested by Denyer and Tranfield (2009) analyse the context, interventions, mechanisms and outcomes of research studies but they do not examine the foundations of this research. Consequently, such approaches have not provided sufficient answers to our two questions, as these authors do not study the research on the basis of what has been used within this discipline. In regards to Persson (1994), any kind of systematic literature review focusses on the research front (= citing research) and not on the intellectual base (= cited reserach).

Thus, the aims of this paper are to: identify the research front of omni-channel retailing from the perspective of logistics and supply chain management; and reveal the intellectual pillars or base of omni-channel retailing literature. In achieving these aims, we answer the following research questions:

RQ1. What characterises the key contributions to the research area of omni-channel retailing and what is the intellectual foundation supporting these key contributions?

The answer to these questions provides an understanding of the relationships between the various research topics related to omni-channel retailing that have been addressed so far, as well as a description of the applied methodological approaches. This ultimately leads to the identification of research gaps for future research.

The main contribution of this research is to establish a structured overview of the existing knowledge related to omni-channel retailing. We thus support researchers looking to holistically comprehend, prioritise and use the underpinning literature central to the phenomena of omni-channel retailing. Furthermore, this research provides researchers, academics and practitioners with a foundation for designing new, and discussing existing, omni-channel research results in the context of distribution, logistics, operations and supply chain management.

To answer the research questions and achieve our research aims, we conducted a content-analysis-based literature review (Seuring and Gold, 2012) and subsequently a bibliometric analysis, including a citation and co-citation analysis (see, e.g. Garfield, 1979; Georgi *et al.*, 2010; Hoffman and Holbrook, 1993; Smith, 1981). This multi-method approach consists of a structured process of evaluating a research area, its evolvement, and theoretical and conceptual underpinning.

The rest of the paper is structured as follows: the next section discusses our theoretical understanding of omni-channel retailing. Then, we present our multi-method design for our empirical study. Thereafter, the main findings of the analyses are discussed. We then present the main implications for theory and practice. The paper concludes with a limitations and outlook section.

2. Managing customers and distribution channels in a multi, omni and cross-channel manner

Looking into the relevant sources on omni-channel retailing, management and/or distribution, we found that – in order to offer a comprehensive understanding of the research phenomenon – it would be necessary to widen the perspective towards multi-channel as well as cross-channel retailing. Thereby, we are able to observe that the terms multi- and cross-channel are used interchangeably in the literature, despite being different in scope.

Furthermore, we see an interchangeable use of the terms "-retailing", "-management" and "-distribution" in the omni-channel context. In the following, we are going to clarify the differences between multi-, cross- and omni-channel retailing and discuss the varying understandings of distribution and management.

Multi-channel retailing comprises a set of activities aimed at selling merchandise and services through more than one channel, whereby these channels co-exist and neither allow any interaction between them to be triggered by a customer nor the possibility for a retailer to control their integration (Beck and Rygl, 2015). Multi-channel distribution includes various ways to reach various customer segments with different channels. In this context, individual distribution channels in a multi-channel system operate in a merely parallel but rather uncoordinated manner (Ahlert *et al.*, 2003).

Cross-channel retailing, on the other hand, integrates the different channels to realise a synergetic channel strategy (Schramm-Klein *et al.*, 2011; Schwerdt, 2013). In contrast to multi-channel retailing, a cross-channel environment allows customers to initiate channel interaction and/or the retailer to command partial integration (Beck and Rygl, 2015).

This difference between the cross- and multi-channel perspectives shows the importance of the integration and coordination of channels (Wagner *et al.*, 2013; Yan *et al.*, 2011). Functional integration, channel synergy, brand management, information management, logistics management, customer management and active scanning have been identified as success factors for a multi-channel e-commerce strategy (Tate *et al.*, 2005).

Omni-channel retailing is the synergetic management of numerous available channels and customer touch points, in such a way that the customer experience and the performance over all channels are optimised (Verhoef *et al.*, 2015, p. 3). The so-called touch points refer to points or moments of contact and/or communication between an organisation and a stakeholder, here an end-user (Jenkinson, 2007). Channels, as well as touch points, represent components of an omni-channel strategy while, in a multi-channel context, each single (e-) channel is part of a multi-channel (e-)commerce system (Wagner *et al.*, 2013).

Omni-channel retailing evaluates every touch point and channel alternative to enrich the customer experience, and provides an integrated sales experience that combines the advantages of physical stores with the enhanced information level provided by online shopping (Rigby, 2011). To improve the logistics-related channel performance of an omni-channel system, 3PL service providers are integrated into the distribution processes (Fairchild, 2014). Hübner, Kuhn, and Wollenburg (2016) further structure omni-channel retailing-related logistics processes into back-end fulfilment and last-mile distribution concepts, structures that apply to certain contingencies, such as country characteristics (e.g. population density), retailer characteristics (e.g. capability for channel integration) and/or consumer characteristics (e.g. consumer behaviour, possibility of unattended home delivery). While traditional multi-channel retailers have separate inventory, picking, organisational and IT systems for each channel, omni-channel retailers pursue an integration of these fields of action across all available channels (Hübner, Wollenburg, and Holzapfel, 2016).

With the advances in social media, mobile internet, and location-based technologies, the paradigm social, local and mobile commerce has evolved, representing a new channel approach.

It is omni-channel and involves the integration of various direct-to-consumer channels to provide cross-channel consumer interaction (Dorman, 2013).

Overall, omni-channel retailing is considered less focussed on the channel used and more interactive between customer and brand, which requires a focus on involving mobile and social networks and serving different customer needs (Piotrowicz and Cuthbertson, 2014).

In the following, we develop a wider understanding of the research phenomenon by including multi- and cross- to our omni-channel retailing research evaluation.

3. Methodology
The methodology of this research encompassed three stages: we first surveyed the relevant literature and identified a sample of articles of key relevance to omni-channel retailing research (= research front). We then extracted the relevant bibliographic information from the sample and finally we conducted a bibliometric analysis (= intellectual base/foundation). In the following, all three steps are explained in more detail.

3.1 Literature search
Due to the interdisciplinary character of omni-channel retailing research, we surveyed the literature without focussing on specific journals. For that, we used EBSCO's Business Source Complete (BSC), one of the world's largest electronic databases covering nearly 2,000 peer-reviewed academic journals (EBSCO, 2016), and searched for scholarly articles published in peer-reviewed journals, as we were interested in how academic research deals with these issues. This survey included a title, keyword and abstract search. We limited the results to articles published in English based on the language proficiency of the researchers involved. This approach is in accordance with other recent literature reviews, as for example Narayanamurthy and Gurumurthy (2016).

As omni-channel retailing has started to evolve since the advent of digital communication channels, we focussed on articles published in 2000 onwards, and our search identified only eight papers published before then. This limitation on the research front does not, however, limit the intellectual foundation, as influential papers from the 1990s, when ecommerce and new distribution channels emerged, were considered in the second step of our methodological approach.

In line with Beck and Rygl (2015), we considered the synonymous use of the terms "omni-", "cross-" and "multiple-channel retailing" in the literature. Thus, we applied the keyword group containing "omni", "cross", "multi" and "multiple" channel in all our searches, and combined this with a second keyword group encompassing "logistics", "supply chain", "operation" and "retail", also including plural forms (e.g. "operations"), suffixes (e.g. "retailing") and delimiters (e.g. "omnichannel", "omni-channel" and "omni channel"). All possible combinations of both keyword groups were applied in our searches.

The literature search and selection was conducted by two researchers individually, and resulted in 543 articles that were critically evaluated with regard to their relevance to the topic of omni-channel retailing. Next, we excluded those articles representing different, off-topic, research fields, such as biology, chemistry or engineering. Then, we checked the titles and the abstracts of the identified articles with regard to their relevance. We excluded articles with no context of logistics, operations, retail or supply chain management, and those that did not match our understanding of multi/omni-channel, namely retailing through multiple channels. Thus, we deemed relevant only those articles focussing on more than one channel in the context of retailing or logistics. We ended up with a set of 70 articles.

3.2 Extraction of bibliographic data and analysis of the research front
In an initial step, we conducted a structured content-analysis-based literature review, following the procedure outlined by Seuring and Gold (2012) and Seuring and Müller (2008).

Thereby, we examined the aim of the research, and methodological considerations in the data gathering and analysis, and evaluated our material by identifying research themes. Further, we retrieved bibliographic data from our final sample of articles, as provided in the BSC's "cited references" section. These data include all sources in the reference sections of each article. In the case of the required data being unavailable, it had to be collected and added into our data set manually. The data set was transferred to an Excel data file and there arranged so that each reference was linked with its source, i.e. article. Next, we checked for duplicates and misspellings of authors' names. The final data set of 70 articles represents the research front, which is built upon an intellectual base of more than 3,000 citations that were then used for further analysis.

3.3 Identification and evaluation of the intellectual foundation using bibliometric analyses

We started by identifying the key contributions, and thereby had to agree on a minimum threshold of citations to be considered in the analysis. We took into account the available sample size in order to allow for a reasonable representation of papers. By following the notions of Georgi et al. (2010) and Ramos-Rodríguez and Ruíz-Navarro (2004), we applied Kruskal's stress when analysing the data. Krukal's stress represents a goodness-of-fit measure of a multidimensional scaled (MDS) representation of data (Hair et al., 2014; Kruskal, 1964a, b). In our case, the Kruskal's stress value was 0.1149, which represents a satisfactory goodness of fit (Kruskal, 1964b).

Consequently, we included only those publications that were referenced at least six times. Applying this citation threshold reduced the database from more than 3,000 publications to 34, with a total citation frequency of 278. A lower number of included publications would have adversely affected the clarity of the representation and thus the goodness of fit. By means of a self-developed computer programme, we subsequently set up a co-citation matrix of the 34 papers. The co-citation matrix shows the relations between the analysed papers in terms of citation frequency.

In a second step, a co-citation analysis was conducted that followed the notions of Eom (2008), McCain (1990), White and Griffith (1981) and White and McCain (1998). Here, in the MDS analysis we applied the PROXSCAL routine and utilised Pearson's r for the purpose of measuring similarity between citation pairs. This routine identifies the "*likeness in shape* of […] co-citations' count profiles" (White and McCain, 1998, p. 331) as compared to other papers in our data set.

Additionally, and in line with (Georgi et al., 2010, 2013), a cluster analysis and principal component analysis were performed on the correlation matrix. Both methods provided additional support for the interpretation of the MDS results. In terms of the cluster analysis, the hierarchical agglomerative clustering procedure with complete-linkage algorithm was used. In terms of the principal component analysis, we used Varimax rotation and Kaiser normalisation and extracted all factors with an eigenvalue larger than one (Hair et al., 2014).

According to the suggestions of Hill et al. (1997, 2005), the interpretation of all results (both literature review and bibliometric analyses) was first done individually by all authors. Subsequently, the interpretations were compared and differences discussed between the research team members, leading to the final interpretation as presented below.

4. Results

4.1 Characterisation of research front by means of content-analysis-based literature review

Development of research front of multi/omni-channel retailing over time. Our results show that the academic discussion on multi/omni-channel retailing has increased over the past 17 years (see Figure 1).

Between 2000 and 2002, we could not identify any articles. During each of the periods 2003-2005 and 2006-2008 only 6 relevant articles were published, compared to 19 in

2009-2011, 16 in 2012-2014, and 23 in 2015-2016. The number of publications increased significantly in the second half of the examined time frame, with a peak in 2015 (12 articles). It is important to note that we conducted the literature search in the middle of 2016 and identified 11 relevant articles during that partial year.

Regarding the methodological background of the examined articles, we observe a broad repertoire of different methodological approaches, including empirical, conceptual, and combined empirical/conceptual works, as well as formal-analytical publications (see Table AI). The majority of papers in our sample (39 articles) combine conceptual and empirical elements, e.g. development and empirical testing of multi-channel strategies, and apply qualitative and quantitative primary as well as secondary research methods (including customer surveys, observations and experiments, analysis of shopping receipts, inventory data and/or annual reports, as well as expert, customer and group interviews).

Research themes of research front of multi/omni-channel retailing. Overall, we distinguish between three main research areas, namely channel demand side, channel supply side, and channel management and strategy (Chopra and Meindl, 2015); see Table I. Although our focus in the literature search was on articles in the field of logistics and supply chain management, the diversity of research themes is high. Channel management and strategy (32 articles) has dominated the past research scene, followed by channel supply side (30 articles) and channel demand side (8 articles).

Within these three main research areas, we further differentiated between more specific subfields, which we assigned to each paper. The assignment of the articles to a distinct research theme was not always easy but we limited ourselves to one key theme per article.

In regards to the area of channel management and strategy, transformation to multi/omni-channel retailing is the focus of academic discussion (12 articles). These papers encompass the investigation of activities, technologies and strategies for the multi/omni-channel transformation of retailers (e.g. Bell *et al.*, 2014; Brynjolfsson *et al.*, 2013; Hansen and Sia, 2015). Another group of articles deals with the impact of digitisation on multi/omni-channel retailing, e.g. the use of mobile payment technologies in retail (Taylor, 2016) or the effects of retail channel integration through the use of information technologies, on firm performance (Oh *et al.*, 2012).
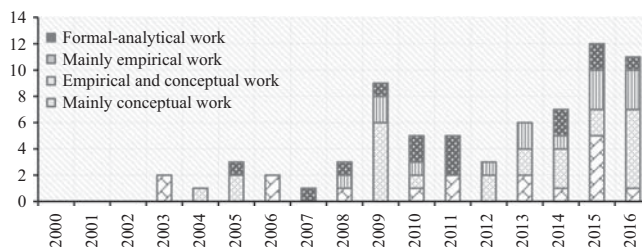

Figure 1.
Distribution of articles' methodological backgrounds per year

Research area	No.	Research theme	No.
Channel demand side	8	Characteristics/profile of multi/omni-channel shoppers	8
Channel supply side	30	Multi/omni-channel retail logistics	30
Channel management and strategy	32	The impact of digitisation on multi/omni-channel retailing	7
		Transformation to multi/omni-channel retailing	12
		Influential factors in selecting multi-channel strategies	6
		Comparison of multi-channel strategies	7
Total	70		70

Table I.
Distribution of articles across research areas and themes

Other themes in the area of channel management and strategy address influential factors for selecting multi-channel strategies, e.g. retailers' motives for going multi-channel and the constraints holding them back (Zhang *et al.*, 2010), or challenges retailers must address to manage the multi-channel environment more effectively (Neslin *et al.*, 2006). Finally, a group of articles deals with the comparison of different multi-channel strategies, such as Beck and Rygl (2015), who categorise and define different forms of multi-channel strategies, such as multi-, cross- and omni-channel retailing, or Griffiths and Howard (2008), who deal with pricing, online strategy, new media, online transactional barriers and social commerce within multi-channel retailing.

Articles within the field of channel supply side focus on multi/omni-channel retail logistics, where they deal with issues regarding the physical distribution process in multi/omni-channel retailing. Articles on this topic address in detail fulfilment and transportation (e.g. Agatz *et al.*, 2008; Ishfaq *et al.*, 2016), returns management (Bernon *et al.*, 2016; Brusch and Stüber, 2013), inventory management (Geng and Mallik, 2007; Kull *et al.*, 2013), supply chain processes (e.g. Angeleanu, 2015; Shao *et al.*, 2011), environmental issues (Mangiaracina *et al.*, 2015; Wiese *et al.*, 2012) and capacity planning and allocation in the context of multi/omni-channel retailing (e.g. Alptekinoglu and Tang, 2005; Mahar and Wright, 2009).

A small group of articles is assigned to the research area of the channel demand side, dealing with the characteristics and, respectively, the profile of multi/omni-channel customers. Articles within this topic encompass the shopping behaviour and loyalty intentions of multi/omni-channel customers (Chatterjee, 2010; Lee and Kim, 2010), the factors influencing their shopping behaviour (e.g. Dennis *et al.*, 2016; Rudolph and Emrich, 2009) and their perceptions of service quality (Herhausen *et al.*, 2015).

Geographical and sectoral focus of academic discussion on multi/omni-channel retailing. Our results show the academic discussion has its geographical focus on investigations of multi/omni-channel retailing in Europe (18 articles) and North America (15 articles). About 85 per cent of all of the empirical investigations of multi/omni-channel retailing were conducted on these continents. The phenomenon was investigated empirically just two times each in Asia and Australia. Empirical data from South America and Africa have not been considered in the academic discussion yet. Thus, it can be assumed that multi/omni-channel retailing is mainly discussed from a first-world perspective, having been investigated mainly in highly developed contexts such as Europe and North America. If we look at the sectoral focus of the academic discussion on multi/omni-channel retailing, we see that the apparel/accessory (16 articles), grocery (12), consumer electronics (8), home furniture (7) and book (4) sectors were chosen most frequently as the empirical research setting. Other sectors, such as eyewear, drugs, toys, gifts and flowers, and health and beauty, with less than four occurrences each, are consolidated under "miscellaneous", while eight articles had no explicit industry focus. The empirical examination was often done in a cross-sectoral manner and only some studies were exclusively done in the grocery (five articles) and apparel/accessory sector (four articles). This might be due to the fact that these two sectors differ greatly from others in terms of logistical processing and associated challenges such as the retention of the cold chain and perishability in the grocery sector, or the high rate of product returns due to non-fitting dress sizes in the apparel sector.

Finally, due to the small number of empirical studies in this field, no conclusions can be made regarding the link between geographic and sectoral focus.

4.2 Characterisation of intellectual foundation based on co-citation analysis
Having identified the research front of omni-channel retailing, we are next going to examine the 34 most cited works by means of co-citation analysis, in order to establish the current intellectual base of the field (see Table II).

No.	Cited publication	Year	Source	Title	C_A	C_R
1	Gulati and Garino	2000	*Harvard Business Review*	Get the right mix of bricks and clicks	13	4.68
2	Zhang *et al.*	2010	*Journal of Interactive Marketing*	Crafting integrated multichannel retailing strategies	13	4.68
3	Verhoef *et al.*	2007	*International Journal of Research in Marketing*	Multichannel customer management: understanding the research-shopper phenomenon	12	4.32
4	Neslin and Shankar	2009	*Journal of Interactive Marketing*	Key issues in multichannel customer management: current knowledge and future directions	12	4.32
5	Chiang *et al.*	2003	*Management Science*	Direct marketing indirect profits a strategic analysis of dual-channel supply-chain design	11	3.96
6	Neslin *et al.*	2006	*Journal of Service Research*	Challenges and opportunities in multichannel customer management	10	3.6
7	Deleersnyder *et al.*	2002	*International Journal of Research in Marketing*	How cannibalistic is the internet channel? A study of the newspaper industry in the UK and the Netherlands	9	3.24
8	Avery *et al.*	2012	*Journal of Marketing*	Adding bricks to clicks: predicting the patterns of cross-channel elasticities over time	9	3.24
9	Venkatesan *et al.*	2007	*Journal of Marketing*	Multichannel shopping: causes and consequences	9	3.24
10	Ansari *et al.*	2008	*Journal of Marketing Research*	Customer channel migration	9	3.24
11	Agatz *et al.*	2008	*European Journal of Operational Research*	E-full fillment and multichannel distribution – a review	8	2.88
12	Tsay and Agrawal	2004b	*Handbook of Quantitative Supply Chain Analysis*	Modelling conflict and coordination in multi-channel distribution systems: a review	8	2.88
13	Kumar and Venkatesan	2005	*Journal of Interactive Marketing*	Who are multichannel shoppers and how do they perform? Correlates of multichannel shopping behaviour	8	2.88
14	Wallace *et al.*	2004	*Journal of Retailing*	Customer retailer loyalty in the context of multiple channel strategies	8	2.88
15	Tang and Xing	2001	*Journal of Retailing*	Will the growth of multi-channel retailing diminish the pricing efficiency of the web?	8	2.88
16	Bendoly *et al.*	2005	*Journal of Service Research*	Online/in-store integration and customer retention	8	2.88
17	Montoya-Weiss *et al.*	2003	*Journal of the Academy of Marketing Science*	Determinants of online channel use and overall satisfaction with a relational, multichannel service provider	8	2.88
18	Biyalogorsky and Naik	2003	*Marketing Letters – A Journal of Research in Marketing*	Clicks and mortar: the effect of online activities on offline sales	8	2.88
19	Brynjolfsson *et al.*	2013	*MIT Sloan*	Competing in the age of omnichannel retailing	8	2.88
20	De Koster	2002	*International Journal of Physical Distribution and Logistics Management*	Distribution structures for food home shopping	7	2.52
21	Balasubramanian *et al.*	2005	*Journal of Interactive Marketing*	Consumers in a multichannel environment: product utility process utility and channel choice	7	2.52

Table II.
The intellectual base of omni-channel research 2000-2016

(*continued*)

No.	Cited publication	Year	Source	Title	C_A	C_R
22	Van Baal and Dach	2005	*Journal of Interactive Marketing*	Free riding and customer retention across retailers' channels	7	2.52
23	Barney	1991	*Journal of Management*	Firm resources and sustained competitive advantage	7	2.52
24	Geyskens *et al.*	2002	*Journal of Marketing*	The market valuation of internet channel additions	7	2.52
25	Zettelmeyer	2000	*Journal of Marketing Research*	Expanding to the internet: pricing and communications strategies when firms compete on multiple channels	7	2.52
26	Konus *et al.*	2008	*Journal of Retailing*	Multichannel shopper segments and their covariates	7	2.52
27	Balasubramanian	1998	*Marketing Science*	Mail vs mall: a strategic analysis of competition between direct marketers and conventional retailers	7	2.52
28	Tsay and Agrawal	2004a	*Production and Operations Management*	Channel conflict and coordination in the e-commerce age	7	2.52
29	Porter	2001	*Harvard Business Review*	Strategy and the internet	6	2.16
30	Berman and Thelen	2004	*International Journal of Retail and Distribution Management*	A guide to developing and managing a well-integrated multi-channel retail strategy	6	2.16
31	Alba *et al.*	1997	*Journal of Marketing*	Interactive home shopping: consumer, retailer, and manufacturer incentives to participate in electronic markets	6	2.16
32	Brynjolfsson and Smith	2000	*Management Science*	Frictionless commerce: a comparison of internet and conventional retailers	6	2.16
33	Lal and Sarvary	1999	*Marketing Science*	When and how is the internet likely to decrease price competition?	6	2.16
34	Cattani *et al.*	2006	*Production and Operations Management*	Boiling frogs: pricing strategies for a manufacturer adding an internet channel	6	2.16

Notes: C_A, absolute number of citations received; C_R, relative number of citations received based on 70 "mother" articles

Table II.

Table II shows that 33 of the 34 publications appeared in more or less highly ranked academic journals (according to the Academic Journal Guide Ranking 2015 produced by the Chartered Association of Business Schools; see also Table III), while one was a monograph. The citations' publication dates range between 1991 and 2013, and the average age of these citations is about 12 years. Overall, 32 out of 34 papers deal explicitly with omni-channel retailing issues.

Furthermore, we observe that the majority of these papers come from the field of Marketing, with five papers from the *Journal of Interactive Marketing* (van Baal and Dach, 2005; Balasubramanian *et al.*, 2005; Kumar and Venkatesan, 2005; Neslin and Shankar, 2009; Zhang *et al.*, 2010), followed by four from the *Journal of Marketing* (Alba *et al.*, 1997; Ansari *et al.*, 2008; Avery *et al.*, 2012; Geyskens *et al.*, 2002; Venkatesan *et al.*, 2007). The remainder were published in *Marketing Science* (Balasubramanian, 1998), *Marketing Letters* (Biyalogorsky and Naik, 2003), the *Journal of the Academy of Marketing Science* (Montoya-Weiss *et al.*, 2003), the *Journal of Marketing Research* (Ansari *et al.*, 2008; Zettelmeyer, 2000) or the *International Journal of Research in Marketing* (Deleersnyder *et al.*, 2002; Verhoef *et al.*, 2007).

The next largest group of articles were published in journals in the field of Production and Operations Management (POMS), including Logistics as well as Operations Research (OR)-focussed journals. When it comes to POM/OR, two publications stem from *Management*

Journal title	Abbr.	ABS AJG ranking 2015[a]	C_A	C_R
Journal of Interactive Marketing	*J. Interact Mark*	3*	5	15.2
Journal of Marketing	*J. Marketing*	4*	4	12.1
Journal of Retailing	*J. Retailing*	4*	3	9.1
Management Science	*MS*	4*	2	6.1
Marketing Science	*MKTSCI*	4*	2	6.1
Harvard Business Review	*HBR*	3*	2	6.1
Journal of Marketing Research	*J. Marketing Res*	4*	2	6.1
Journal of Service Research	*J. Serv Res-US*	4*	2	6.1
International Journal of Research in Marketing	*Int J. Market Res*	4*	2	6.1
Production and Operations Management	*POMS*	4*	2	6.1
European Journal of Operation Research	*EJOR*	4*	1	3.0
Marketing Letters – A Journal of Research in Marketing	*Mark. Let.*	3*	1	3.0
International Journal of Physical Distribution and Logistics Management	*IJPDLM*	2*	1	3.0
International Journal of Retail & Distribution Management	*IJRDM*	2*	1	3.0
Journal of Management	*J. Manage*	4*	1	3.0
MIT Sloan Management Review	*SMR*	3*	1	3.0
Journal of the Academy of Marketing Science	*JAMS*	4*	1	3.0

Table III.
The intellectual base of omni-channel research in terms of cited journals

Notes: C_A, absolute number of citations received; C_R, relative number of citations received based on 34 most cited works. [a]Academic Journal Guide Ranking 2015 produced by the Chartered Association of Business Schools

Science (Brynjolfsson and Smith, 2000; Chiang *et al.*, 2003), while the other journals involved are the *European Journal of Operational Research* (Agatz *et al.*, 2008) and *POMS* (Cattani *et al.*, 2006; Tsay and Agrawal, 2004a).

Only one citation stems from a logistics/supply-chain-related journal, which is the *International Journal of Physical Distribution and Logistics Management* (de Koster, 2002). The only cited source that was published in a handbook also belongs to the *POMS*/research category (Tsay and Agrawal, 2004b).

Another four citations were either published in general management journals such as the *Harvard Business Review* (Gulati and Garino, 2000; Porter, 2001) or *MIT Sloan Management Review* (Brynjolfsson *et al.*, 2013), or in retail journals, of which three were published in the *Journal of Retailing* (Konuş *et al.*, 2008; Tang and Xing, 2001; Wallace *et al.*, 2004) and one in the *International Journal of Retail and Distribution Management* (Berman and Thelen, 2004). The remaining two sources were published in the *Journal of Service Research* (Bendoly *et al.*, 2005; Neslin *et al.*, 2006).

Taking into account that the *Journal of Service Research* as well as both the *Journal of Retailing* and the *International Journal of Retail and Distribution Management* can also be considered to be in the field of Marketing, we can observe that the intellectual foundation is strongly based on marketing thoughts, rather than *POMS*. This is surprising as we focussed on logistics, operations and/or supply-chain-related work in the field. Overall, the quality of the papers, based on the Academic Journal Guide Ranking 2015 produced by the Chartered Association of Business Schools, is quite high, with three-to-four-star journals dominating.

The only handbook contribution was published in (Simchi-Levi *et al.*, 2004), which can be considered a standard text in the area of formal-analytic supply chain research in the field of e-business.

4.3 Characterisation of citation themes

Figure 2 plots the relationship between the 34 publications on a two-dimensional MDS map. The numbers in the bubbles represent the citation rank of each publication (see also Table II).
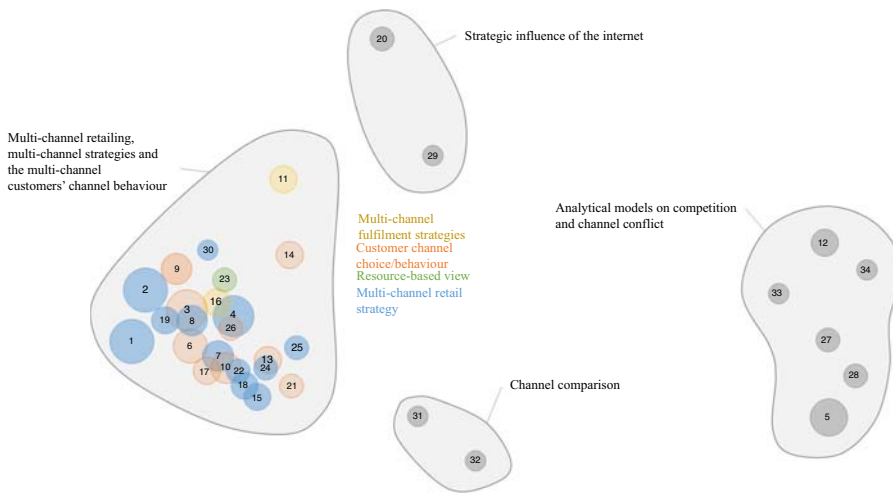
The diameter of the circles represents the citation frequency, whereas the proximity of the bubbles indicates the similarity of the citation profile. The MDS results, together with the results of the cluster and factor analyses, reveal the distinct specialties in the field (McCain, 1990; White and McCain, 1998). In our case, we are able to identify at least two and a maximum of five thematic citation areas or groups. Based on our assessment, we grouped them into four themes visualised by circles also shown in Figure 2.

The results of the MDS represent a heterogeneous picture as the citations are differently grouped as well as differently positioned in the map. There are two more or less homogeneous citation groups at the right and left sides of the map and outliers at the bottom and top of the map. Such a result is, according to Cornelius *et al.* (2006), typical for a field in an emerging stage, where there is no overall agreement on the core, and influential outliers are used to inspire the research field. When analysing the content of the citation groups quantitatively (using cluster as well as factor analyses) and qualitatively (based on content), we linked the individual groups to citation themes. In the following, we discuss each of the identified citation themes in accordance with Cornelius *et al.* (2006) or Åström (2007).

Strategic influence of the internet. Starting with the upper-middle section of the MDS, we see two publications. They are (de Koster, 2002), cited seven times, and (Porter, 2001), with a citation frequency of six. Both publications discuss the influence of the internet on competitive strategies and distribution structures. Generic strategic implications of the internet are discussed by Porter (2001), along the well introduced five forces and value chain models. The strategic implications of the internet that are more specific to logistics are discussed by de Koster (2002). His article deals with the distribution practices of grocery e-tailers and analyses how the distribution structures vary among them. Based on the analysis of more than 30 retailers, he develops a model showing that the complexity of handling internet orders leads companies to establish internet-specific distribution structures for their order handling and fulfilment.

Channel comparison. In the lower-middle part of the MDS, we identify a group of two sources (Alba *et al.*, 1997) (Brynjolfsson and Smith, 2000), each cited six times. Both publications present comparisons of traditional and electronic (i.e. the internet) distribution channels. These studies emphasise that the internet channel influences consumer behaviour, as decision making during the search for and comparison of products and services becomes relatively easier and less costly (Alba *et al.*, 1997).

They also show that the online channel exhibits a lower price level and allows for more fine-grained and flexible price adjustments than store-based channels (Brynjolfsson and Smith, 2000).

Analytical models on competition and channel conflict. A rather large group of six works is represented in the left-middle part of the MDS (Balasubramanian, 1998; Cattani *et al.*, 2006; Chiang *et al.*, 2003; Lal and Sarvary, 1999; Tsay and Agrawal, 2004a, b). Their citation frequencies range between 6 and 11. These papers exclusively represent formal-analytical content, published in *POM*, *POMS*, *MS* as well as MKTSCI (for these abbreviations see Table III). Among others, they cover topics (e.g. competition, strategy, and channel comparison and conflict) that were also covered by the previous groups, but examine them with this specific methodological approach only, not relying on actual empirical data. They look at price models and how new direct channels can be entered.

One central theme of this group is the influence of multiple retail channels on competition and subsequently on organisational strategy, especially through the formulation of so-called dual-channel strategies. Lal and Sarvary (1999) come to the conclusion that the impact of the internet on competition can differ radically depending on the shopping and distribution context. In specific contexts, it is found that the internet can even lead to higher prices and customer disengagement from search, making this an attractive channel for leveraging profitability and loyalty. Balasubramanian (1998) develops a model of the competition between direct marketers and conventional retailers. They especially shed light on the influence of direct marketers' entry into saturated retail markets, and the role of information as a strategic lever in a multi-channel market. Chiang *et al.* (2003) show that a dual strategy can be very profitable for manufacturers, and can even be profitable for retailers, due to the fact that manufacturers can share profits with retailers (i.e. cooperative profits).

The second central theme of this group is channel conflicts. Tsay and Agrawal (2004a) investigate channel conflicts that may occur when applying a dual strategy, and analyse how pricing can serve as a coordination instrument for coping with this. In another work of this group, we found that an equal price strategy can lead to channel conflicts with the traditional partners (Cattani *et al.*, 2006). Finally, Tsay and Agrawal (2004b) provide a review of various issues with multi-channel strategies in the internet age. Their work represents a comprehensive contribution to the field of omni-channel retailing research and discusses distribution channels in general. It also analytically examines the case of manufacturer-controlled direct channels that include independent retailers as intermediaries, and discusses coordination strategies for dealing with channel conflicts.

Multi-channel retailing, multi-channel strategies and multi-channel customers' channel behaviour. This group includes 24 papers, making it the largest of our citation themes. However, looking at the research topics with which these papers are dealing, we can identify four different research themes: multi-channel retail strategy (Avery *et al.*, 2012; van Baal and Dach, 2005; Berman and Thelen, 2004; Biyalogorsky and Naik, 2003; Brynjolfsson *et al.*, 2013; Deleersnyder *et al.*, 2002; Geyskens *et al.*, 2002; Gulati and Garino, 2000; Tang and Xing, 2001; Zettelmeyer, 2000; Zhang *et al.*, 2010); multi-channel customer channel choice/ behaviour (Ansari *et al.*, 2008; Balasubramanian *et al.*, 2005; Konuş *et al.*, 2008; Kumar and Venkatesan, 2005; Montoya-Weiss *et al.*, 2003; Neslin *et al.*, 2006; Neslin and Shankar, 2009; Venkatesan *et al.*, 2007; Verhoef *et al.*, 2015; Wallace *et al.*, 2004); multi-channel fulfilment strategies (Agatz *et al.*, 2008; Bendoly *et al.*, 2005); and the resource-based view (Barney, 1991). The citation frequency across these papers ranges from 6 to 13.

When it comes to multi-channel (retailing/distribution) strategy, the different issues covered in this work are multi-channel retail strategies (Berman and Thelen, 2004; Brynjolfsson *et al.*, 2013; Gulati and Garino, 2000; Zhang *et al.*, 2010), new channel introduction

(Avery *et al.*, 2012) and issues of channel cannibalisation (Biyalogorsky and Naik, 2003; Deleersnyder *et al.*, 2002). We also found papers dealing with the consequences for marketing mix and price decisions if multiple channels are installed (Tang and Xing, 2001; Zettelmeyer, 2000) and with segmentation problems in a multi-channel retail environment (van Baal and Dach, 2005). The paper by Geyskens *et al.* (2002), though, examines how investment in internet-driven distribution channels affects firm performance and stock markets.

The particular research issues of the group of papers examining multi-channel customer channel behaviour include multi-channel customer management (e.g. Neslin *et al.*, 2006), channel behaviour and channel choice in a multi-channel environment (see Ansari *et al.*, 2008; Konuş *et al.*, 2008; Neslin and Shankar, 2009; Verhoef *et al.*, 2007), channel loyalty and customer satisfaction with a channel (Montoya-Weiss *et al.*, 2003; Wallace *et al.*, 2004) and channel adoption (Venkatesan *et al.*, 2007). All of these papers look at the final consumers, while only (Kumar and Venkatesan, 2005) focus on business markets.

Two papers deal with important logistical issues of omni-channel retailing and management, which is the question of how order fulfilment is executed in an e-commerce setting (Agatz *et al.*, 2008), as well as what is the appropriate level of product availability in an online channel, how a company can use its existing channels to ensure a promised availability, and how it can deal with out-of-stock situations (Bendoly *et al.*, 2005). Looking at the MDS position of Agatz *et al.* (2008), we can see that the citation is a little bit of an outlier from the entire group and connects to the two citation themes of distribution structures and internet strategy. The paper offers a comprehensive review of e-fulfilment and multi-channel distribution as well as the state of the art of existing research and its quantitative modelling approaches.

The paper by Barney (1991), representing the resource-based view, is the only general source in the whole citation structure, proving that this paper is typically used by research dealing with resources, capabilities and sustained competitive advantage.

5. Conclusion and outlook
With respect to the emerging field of omni-channel retailing, this paper explores the questions of: where the knowledge that drives the field of omni-channel retailing comes from; and what kind of research has influenced this particular research domain so far. The results show that the number of articles has been increasing over time, demonstrating the continuing research interest in the topic area and the increased research interest in overall technological development and greater use of this technology by consumers. The ability to use a mobile phone for shopping allows retailers to become ubiquitous, and we can see that this started in 2007 (also the year in which the Apple iPhone was introduced).

Our research provides insight into the research area from two perspectives: the kind of research published (the research front); and the kind of research that constitutes the published research (the intellectual base). Consequently, the contributions of our study relate to the research front as well as the intellectual foundation.

5.1 Peripheral role of logistics/supply chain management research
When it comes to the research front of omni-channel retailing, the first contribution of our work is the identification of the low importance of logistics and supply chain management for omni-channel retailing, as we identified only a limited number of papers on multi/omni-channel retail logistics but comparably more contributions relating to multi/omni-channel retailing and strategy. Here, we expect more research to evolve, once retailers have adopted multi/omni-channel strategies with the respective logistics solutions. Consequently, multi/omni-channel retail logistics is considered a very

promising research topic for the future. The practical implications of omni-channel management, in particular the use of electronic channels, show an increase in home deliveries. This impacts significantly the traffic situation in many cities and challenges the existing logistics structures of urban freight flows (see Anderson *et al.*, 2005; Russo and Comi, 2010).

5.2 Empirical focus and limited theoretical underpinning
The next contribution of our work relates to the identification of theoretical as well as empirical deficits in the research front. We reveal that the literature on multi/omni-channel retailing is dominated by empirical research. The identified conceptual papers are typically literature reviews aimed at enhancing the overall understanding of the research phenomenon as well as decreasing the fuzziness in the existing definitions. Formal-analytical papers focus on the development of fundamental algorithms that can be used to solve certain multi/omni-channel-related problems. However, existing research is not closely linked to grand theories, as for example is presented by Halldorsson *et al.* (2007, 2015). This represents a theory deficiency in the state of the art of omni-channel research, as the field is rather answering "what" questions, instead of the "why" questions which, according to Sutton and Staw (1995), are necessary for establishing a theory. Consequently, one future research avenue in regards to the research front would be to work out a theory of omni-channel retailing, as well as theories for solving typical omni-channel retailing-related logistics and supply chain problems. Our findings in regards to the intellectual foundation shows that there is a need for a theory development when it comes to the identification of the particular service output level (Palmatier *et al.*, 2016) omni-channels offer to consumers. So far, research dealt with comparison between different channels and not by comparing different simultaneous use of channels (see Alba *et al.*, 1997).

5.3 Emphasis on selected geographical and sectoral contexts
It is also worth noting that the empirical projects report exclusively on multi/omni-channel retail experiences in European and North American contexts. This is in line with the latest reports on the Pricewaterhousecoopers global omni-channel index but there are also signs of the emerging importance of omni-channel retailing in Asian countries that need to be taken into consideration (Bovensiepen *et al.*, 2015). We see this finding as proposing another avenue for future research, namely as a call for more empirical research to be done in other geographic regions so as to determine whether different channel choice patterns from customers could be identified.

The identified multi/omni-channel literature predominantly focusses on phenomena in the grocery and fashion retail industries. Thus, we also interpret this deficit as a call for more omni-channel retailing-related research in other retail sectors.

5.4 Characterising the intellectual foundation
The third contribution of our work relates to, besides the identification of the research front, the characterisation of the current intellectual base of the omni-channel retailing research field. Here, again, we can identify a mix of conceptual, empirical and formal-analytical papers. The conceptual papers deal with overviews of research themes and issues, as well as managerial insights and experiences related to multi/omni-channel retailing.

The current intellectual foundation of omni-channel retailing is also rather recent, with only 4 out of the 34 papers published before 2000. Furthermore, the frequent use of non-logistical sources is remarkable, and probably due to the interdisciplinary character of omni-channel retailing. Many of the sources used originate from the fields of marketing, especially the marketing channel field.

Another significant finding is that the most frequently cited sources do not refer to methodological works underpinning a particular empirical research approach. Only one paper states that a particular theory, the resource-based view, has been used. This is interesting, as we were expecting many more citations of theoretical papers involving Transaction Cost Theory, a widely accepted theory in the field of marketing channels.

Putting both results together, we can see the interrelation between the state of the art of the research and its intellectual foundation. This is visualised in our Figure 3.

So far, omni-channel retailing is intellectually based on analytical models, the strategic influence of the internet, channel and multi-channel management/retailing as well as channel- and multi-channel customer behaviour. These areas build the foundations for the
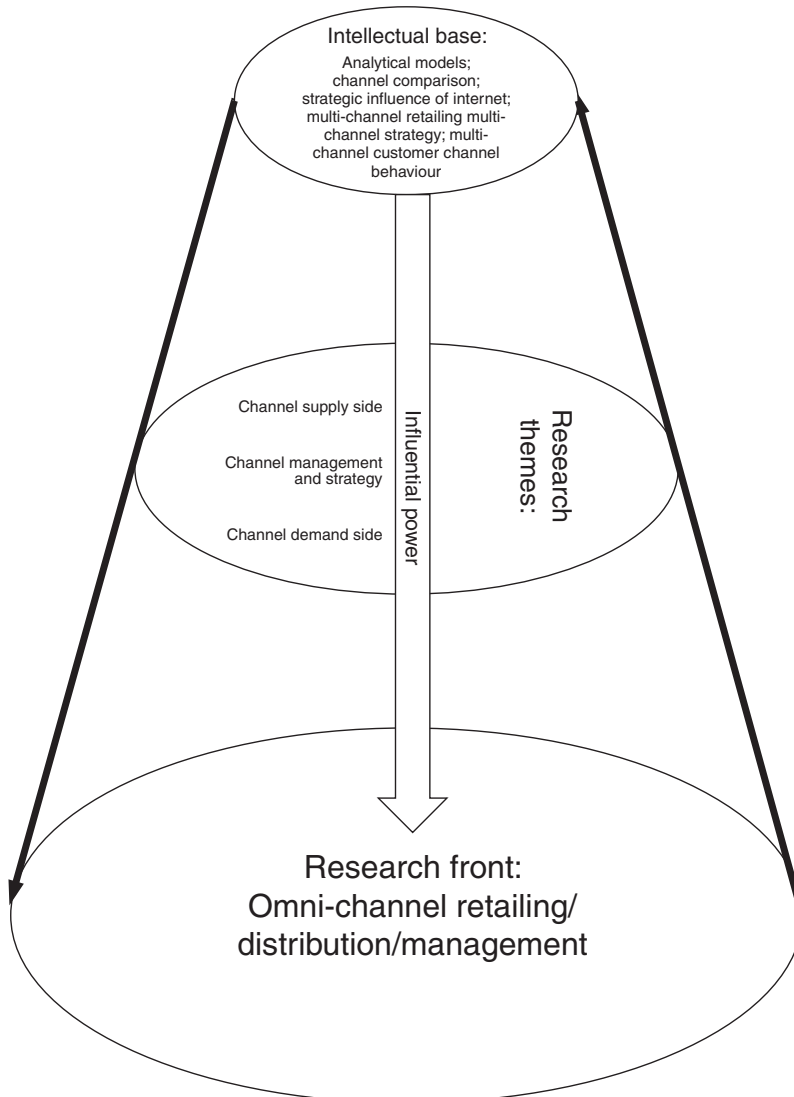
Intellectual base:
Analytical models;
channel comparison;
strategic influence of internet;
multi-channel retailing multi-channel strategy; multi-channel customer channel behaviour

Influential power

Research themes:

Channel supply side

Channel management and strategy

Channel demand side

Research front:
Omni-channel retailing/
distribution/management

Figure 3.
Omni-channel
retailing, its
intellectual base
and theme-driven
research front

identified research themes of channel supply and demand side (including logistics and supply chain and operations) as well as channel management and strategy (including customer channel behaviour and channel choice). Here we see that, so far, a lack of theoretical embeddedness of the research activities.

5.5 Limitations and outlook
Finally, we need to address some limitations that could spark future research. The first refers to our choice of perspective, namely logistics and supply chain management or operations. As our results show, there might be work in the field of marketing (other than channel choice and/or behaviour) that we have not considered. Thus, future research could include work from other disciplines investigating omni-channel retail phenomena.

Another limitation regarding our literature search was the choice to look at peer-reviewed articles in academic journals published in English. Future research should include work in different languages, as well as that published in monographs or other forms of grey literature. This could reveal insights complementary to those presented in our research.

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Appendix

Authors	Title	Year	Publication
Shao, Bin	Cross-sale in dual-channel decentralized distribution system	2013	*Academy of Information and Management Sciences Journal*, Vol. 16 No. 1, pp. 67-74
Shao, Bin; Wu, Chongqi; Li, Kunpeng	Competition in multi-channel supply chains	2011	*Academy of Information and Management Sciences Journal*, Vol. 14 No. 2, pp. 65-77
Lee, Hyun-Hwa; Kim, Jihyun	Investigating dimensionality of multichannel retailer's cross-channel integration practices and effectiveness: shopping orientation and loyalty intention	2010	*Journal of Marketing Channels*, Vol. 17 No. 4, pp. 281-312
Tarn, J. Michael; Razi, Muhammad A.; Wen, H. Joseph; Perez, Angel A. Jr	E-fulfillment: the strategy and operational requirements	2003	*Logistics Information Management*, Vol. 16 No. 5, pp. 350
Zhang, Jie; Farris, Paul W.; Irvin, John W.; Kushwaha, Tarun; Steenburgh, Thomas J.; Weitz, Barton A.	Crafting integrated multichannel retailing strategies	2010	*Journal of Interactive Marketing* (Mergent, Inc.), Vol. 24 No. 2, pp. 168-180
Xing, Yuan; Grant, David B.	Developing a framework for measuring physical distribution service quality of multi-channel and "pure player" internet retailers	2006	*International Journal of Retail and Distribution Management*, Vol. 34 Nos 4/5, pp. 278-289
Agatz, Niels A.H.; Fleischmann, Moritz; van Nunen, Jo A.E.E.	E-fulfillment and multi-channel distribution – a review	2008	*European Journal of Operational Research*, Vol. 187 No. 2, p. 339-356
Agnihotri, Arpita	Can brick-and-mortar retailers successfully become multichannel retailers?	2015	*Journal of Marketing Channels*, Vol. 22 No. 1, pp. 62-73
Alptekinoglu, Aydin; Tang, Christopher S.	A model for analyzing multi-channel distribution systems	2005	*European Journal of Operational Research*, Vol. 163 No. 3, pp. 802-824
Anderson, William P.; Chatterjee, Lata; Lakshmanan, T.R.	E-commerce, transportation, and economic geography	2003	*Growth and Change*, Vol. 34 No. 4, pp. 415-432
Angeleanu, Andra	New technology trends and their transformative impact on logistics and supply chain processes	2015	*International Journal of Economic Practices and Theories*, Vol. 5 No. 5, pp. 413-419
Balakrishnan, Anantaram; Sundaresan, Shankar; Zhang, Bo	Browse-and-switch: retail-online competition under value uncertainty	2014	*Production and Operations Management*, Vol. 23 No. 7, pp. 1129-1145
Beck, Norbert; Rygl, David	Categorization of multiple channel retailing in multi-, cross-, and omni-channel retailing for retailers and retailing	2015	*Journal of Retailing and Consumer Services*, Vol. 27, pp. 170-178
Bell, David R.; Gallino, Santiago; Moreno, Antonio	How to win in an omnichannel world	2014	*MIT Sloan Management Review*, Vol. 56 No. 1, pp. 45-53
Bernon, Michael; Cullen, John; Gorst, Jonathan	Online retail returns management	2016	*International Journal of Physical Distribution and Logistics Management*, Vol. 46 Nos 6/7, pp. 584-605

Table AI.
List of 70 articles analysed in content-analysis-based literature review

Authors	Title	Year	Publication
Boyer, Kenneth K.; Prud'homme, Andrea M.; Chung, Wenming	The last mile challenge: evaluating the effects of customer density and delivery window patterns	2009	*Journal of Business Logistics*, Vol. 30 No. 1, pp. 185-201
Brusch, Michael; Stüber, Eva	Trends in logistics in the German e-commerce and the particular relevance of managing product returns	2013	*Log Forum – Scientific Journal of Logistics*, Vol. 9 No. 4, pp. 293-300
Brynjolfsson, Erik; Hu, Yu Jeffrey; Rahman, Mohammad S.	Competing in the age of omnichannel retailing	2013	*MIT Sloan Management Review*, Vol. 54 No. 4, pp. 23-29
Brynjolfsson, Erik; Hu, Yu (Jeffrey); Rahman, Mohammad S.	Battle of the retail channels: how product selection and geography drive cross-channel competition	2009	*Management Science*, Vol. 55 No. 11, pp. 1755-1765
Cao, Lanlan	Business model transformation in moving to a cross-channel retail strategy: a case study	2014	*International Journal of Electronic Commerce*, Vol. 18 No. 4, pp. 69-96
Cao, Lanlan; Li, Li	The impact of cross-channel integration on retailers' sales growth	2015	*Journal of Retailing*, Vol. 91 No. 2, pp. 198-216
Cao, Yong; Zhao, Hao	Evaluations of e-tailers' delivery fulfillment: implications of firm characteristics and buyer heterogeneity	2004	*Journal of Service Research*, Vol. 6 No. 4, pp. 347-360
Chatterjee, Patrali	Causes and consequences of "order online pick up in-store" shopping behaviour	2010	*International Review of Retail, Distribution and Consumer Research*, Vol. 20 No. 4, pp. 431-448
Chopra, Sunil	How omni-channel can be the future of retailing	2016	*Decision* (0304-0941), Vol. 43 No. 2, pp. 135-144
Chou, Yen-Chun; Chuang, Howard Hao-Chun; Shao, Benjamin B.M.	The impact of e-retail characteristics on initiating mobile retail services: a modular innovation perspective	2016	*Information and Management*, Vol. 53 No. 4, pp. 481-492
Colla, Enrico; Lapoule, Paul	E-commerce: exploring the critical success factors	2012	*International Journal of Retail and Distribution Management*, Vol. 40 No. 11, pp. 842-864
Dennis, Charles; Alamanos, Eleftherios; Papagiannidis, Savvas; Bourlakis, Michael	Does social exclusion influence multiple channel use? The interconnections with community, happiness, and well-being	2016	*Journal of Business Research*, Vol. 69 No. 3, pp. 1061-1070
Emrich, Oliver; Paul, Michael; Rudolph, Thomas	Shopping benefits of multichannel assortment integration and the moderating role of retailer type	2015	*Journal of Retailing*, Vol. 91 No. 2, pp. 326-342
Enders, Albrecht; Jelassi, Tawfik	Leveraging multichannel retailing: the experience of Tesco.com	2009	*MIS Quarterly Executive*, Vol. 8 No. 2, pp. 89-100
Farahani, Reza Zanjirani; Elahipanah, Mahsa	A genetic algorithm to optimize the total cost and service level for just-in-time distribution in a supply chain	2008	*International Journal of Production Economics*, Vol. 111 No. 2, pp. 229-243
Geng, Qin; Mallik, Suman	Inventory competition and allocation in a multi-channel distribution system	2007	*European Journal of Operational Research*, Vol. 182 No. 2, pp. 704-729

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Authors	Title	Year	Publication
Gorczynski, Thomas; Kooijman, Dion	The real estate effects of e-commerce for supermarkets in the Netherlands	2015	*International Review of Retail, Distribution and Consumer Research*, Vol. 25 No. 4, pp. 379-406
Griffiths, G. H.; Howards, A.	Balancing clicks and bricks – strategies for multichannel retailers	2008	*Journal of Global Business Issues*, Vol. 2 No. 1, pp. 69-75
Hansen, Rina; Sia, Siew Kien	Hummel's digital transformation toward omnichannel retailing: key lessons learned	2015	*MIS Quarterly Executive*, Vol. 14 No. 2, pp. 51-66
Herhausen, Dennis; Binder, Jochen; Schoegel, Marcus; Herrmann, Andreas	Integrating bricks with clicks: retailer-level and channel-level outcomes of online-offline channel integration	2015	*Journal of Retailing*, Vol. 91 No. 2, pp. 309-325
Hsiao, Lu; Chen, Ying-Ju	Strategic motive for introducing Internet channels in a supply chain	2014	*Production and Operations Management*, Vol. 23 No. 1, pp. 36-47
Hübner, Alexander; Kuhn, Heinrich; Wollenburg, Johannes	Last mile fulfilment and distribution in omni-channel grocery retailing	2016	*International Journal of Retail and Distribution Management*, Vol. 44 No. 3, pp. 228-247
Hübner, Alexander; Wollenburg, Johannes; Holzapfel, Andreas	Retail logistics in the transition from multi-channel to omni-channel	2016	*International Journal of Physical Distribution and Logistics Management*, Vol. 46 Nos 6/7, pp. 562-583
Ishfaq, Rafay; Defee, C. Clifford; Gibson, Brian J.; Raja, Uzma	Realignment of the physical distribution process in omni-channel fulfillment	2016	*International Journal of Physical Distribution and Logistics Management*, Vol. 46 Nos 6/7, pp. 543-561
Jeanpert, Sophie; Paché, Gilles	Successful multi-channel strategy: mixing marketing and logistical issues	2016	*Journal of Business Strategy*, Vol. 37 No. 2, p. 43800
Jeffers, Patrick I.; Nault, Barrie R.	Why competition from a multi-channel e-tailer does not always benefit consumers	2011	*Decision Sciences*, Vol. 42 No. 1, pp. 69-91
Khouja, Moutaz; Park, Sungjune; Cai, Gangshu (George)	Channel selection and pricing in the presence of retail-captive consumers	2010	*International Journal of Production Economics*, Vol. 125 No. 1, pp. 84-95
Kull, Thomas J.; Barratt, Mark; Sodero, Aníbal C.; Rabinovich, Elliot	Investigating the effects of daily inventory record inaccuracy in multichannel retailing	2013	*Journal of Business Logistics*, Vol. 34 No. 3, pp. 189-208
Lang, Gerald; Bressolles, Grégory	Economic performance and customer expectation in e-fulfillment systems: a multi-channel retailer perspective	2013	*Supply Chain Forum: International Journal*, Vol. 14 No. 1, pp. 16-26
Lewis, Julie; Whysall, Paul; Foster, Carley	Drivers and technology-related obstacles in moving to multichannel retailing	2014	*International Journal of Electronic Commerce*, Vol. 18 No. 4, pp. 43-68
Li, Zhaolin (Erick); Lu, Qiang; Talebian, Masoud	Online versus bricks-and-mortar retailing: a comparison of price, assortment and delivery time	2015	*International Journal of Production Research*, Vol. 53 No. 13, pp. 3823-3835
Liu, Kaijun; Zhou, Yonghong; Zhang, Zigang	Capacitated location model with online demand pooling in a multi-channel supply chain	2010	*European Journal of Operational Research*, Vol. 207 No. 1, pp. 218-231

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Authors	Title	Year	Publication
Lu, Qihui; Liu, Nan	Effects of e-commerce channel entry in a two-echelon supply chain: a comparative analysis of single- and dual-channel distribution systems	2015	*International Journal of Production Economics*, Vol. 165, pp. 100-111
Mahar, Stephen; Wright, P. Daniel	The value of postponing online fulfillment decisions in multi-channel retail/e-tail organizations	2009	*Computers and Operations Research*, Vol. 36 No. 11, pp. 3061-3072
Mangiaracina, Riccardo; Marchet, Gino; Perotti, Sara; Tumino, Angela	A review of the environmental implications of B2C e-commerce: a logistics perspective	2015	*International Journal of Physical Distribution and Logistics Management*, Vol. 45 No. 6, pp. 565-591
Moore, Marguerite; Carpenter, Jason M.; Fairhurst, Ann	Strategic integration of multi-channel retailing in the softgoods sector	2005	*Journal of Marketing Channels*, Vol. 12 No. 4, pp. 3
Neslin, Scott A.; Grewal, Dhruv; Leghorn, Robert; Shankar, Venkatesh; Teerling, Marije L.; Thomas, Jacquelyn S.; Verhoef, Peter C.	Challenges and opportunities in multichannel customer management	2006	*Journal of Service Research*, Vol. 9 No. 2, pp. 95-112
Nikolaeva, Ralitza; Kalwani, Manohar U.; Robinson, William T.; Sriram, S.	Survival determinants for online retailers	2009	*Review of Marketing Science*, Vol. 7 No. 1, p. 44197
Ofek, Elie; Katona, Zsolt; Sarvary, Miklos	"Bricks and Clicks": the impact of product returns on the strategies of multichannel retailers	2011	*Marketing Science*, Vol. 30 No. 1, pp. 42-60
Oh, Lih-Bin; Teo, Hock-Hai; Sambamurthy, Vallabh	The effects of retail channel integration through the use of information technologies on firm performance	2012	*Journal of Operations Management*, Vol. 30 No. 5, pp. 368-381
Pentina, Iryna and Hasty, Ronald W.	Effects of multichannel coordination and e-commerce outsourcing on online retail performance	2009	*Journal of Marketing Channels*, Vol. 16 No. 4, pp. 359-374
Pentina, Iryna and Pelton, Lou E. and Hasty, Ronald W.	Performance implications of online entry timing by store-based retailers: a longitudinal investigation	2009	*Journal of Retailing*, Vol. 85 No. 2, pp. 177-193
Picot-Coupey, Karine and Huré, Elodie and Piveteau, Lauren	Channel design to enrich customers' shopping experiences	2016	*International Journal of Retail and Distribution Management*, Vol. 44 No. 3, pp. 336-368
Piotrowicz, Wojciech and Cuthbertson, Richard	Introduction to the special issue information technology in retail: toward omnichannel retailing	2014	*International Journal of Electronic Commerce*, Vol. 18 No. 4, p. 42491
Rao, Shashank and Goldsby, Thomas J. and Iyengar, Deepak	The, marketing and logistics efficacy of online sales channels	2009	*International Journal of Physical Distribution and Logistics Management*, Vol. 39 No. 2, pp. 106-130
Rudolph, Thomas and Emrich, Oliver	Situation-related tasks for mobile services in retailing	2009	*International Review of Retail, Distribution and Consumer Research*, Vol. 19 No. 5, pp. 483-503

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Authors	Title	Year	Publication
Tate, Mary and Hope, Beverley and Coker, Brent	The buywell way: seven essential practices of a highly successful multi-channel e-tailer	2005	*Australasian Journal of Information Systems*, Vol. 12 No. 2, pp. 147-163
Taylor, Emmeline	Mobile payment technologies in retail: a review of potential benefits and risks	2016	*International Journal of Retail and Distribution Management*, Vol. 44 No. 2, pp. 159-177
Verhoef, Peter C. and Kannan, P. k. and Inman, J. Jeffrey	From multi-channel retailing to omni-channel retailing: introduction to the special issue on multi-channel retailing	2015	*Journal of Retailing*, Vol. 91 No. 2, pp. 174-181
Wagner, Gerhard and Schramm-Klein, Hanna and Steinmann, Sascha	Effects of cross-channel synergies and complementarity in a multichannel e-commerce system – an investigation of the interrelation of e-commerce, m-commerce and IETV-commerce	2013	*International Review of Retail, Distribution and Consumer Research*, Vol. 23 No. 5, pp. 571-581
Wang, Wei and Li, Gang and Cheng, T.c.e.	Channel selection in a supply chain with a multi-channel retailer: The role of channel operating costs	2016	*International Journal of Production Economics*, Vol. 173, pp. 54-65
Wiese, Anne and Toporowski, Waldemar and Zielke, Stephan	Transport-related CO_2 effects of online and brick-and-mortar shopping: a comparison and sensitivity analysis of clothing retailing	2012	*Transportation Research: Part D*, Vol. 17 No. 6, pp. 473-477
Xie, Wenming and Jiang, Zhibin and Zhao, Yingxue and Hong, Junjie	Capacity planning and allocation with multi-channel distribution	2014	*International Journal of Production Economics*, Vol. 147 (Part A), pp. 108-116
Yan, Ruiliang and Guo, Peijun and Wang, John and Amrouche, Nawel	Product distribution and coordination strategies in a multi-channel context	2011	*Journal of Retailing and Consumer Services*, Vol. 18 No. 1, pp. 19-26
Yoon, Eun Jung and Zhou, Wei	Mixed strategy multiple-channel retailing with RFID information	2011	*Journal of Organisational Computing and Electronic Commerce*, Vol. 21 No. 4, pp. 368-383

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