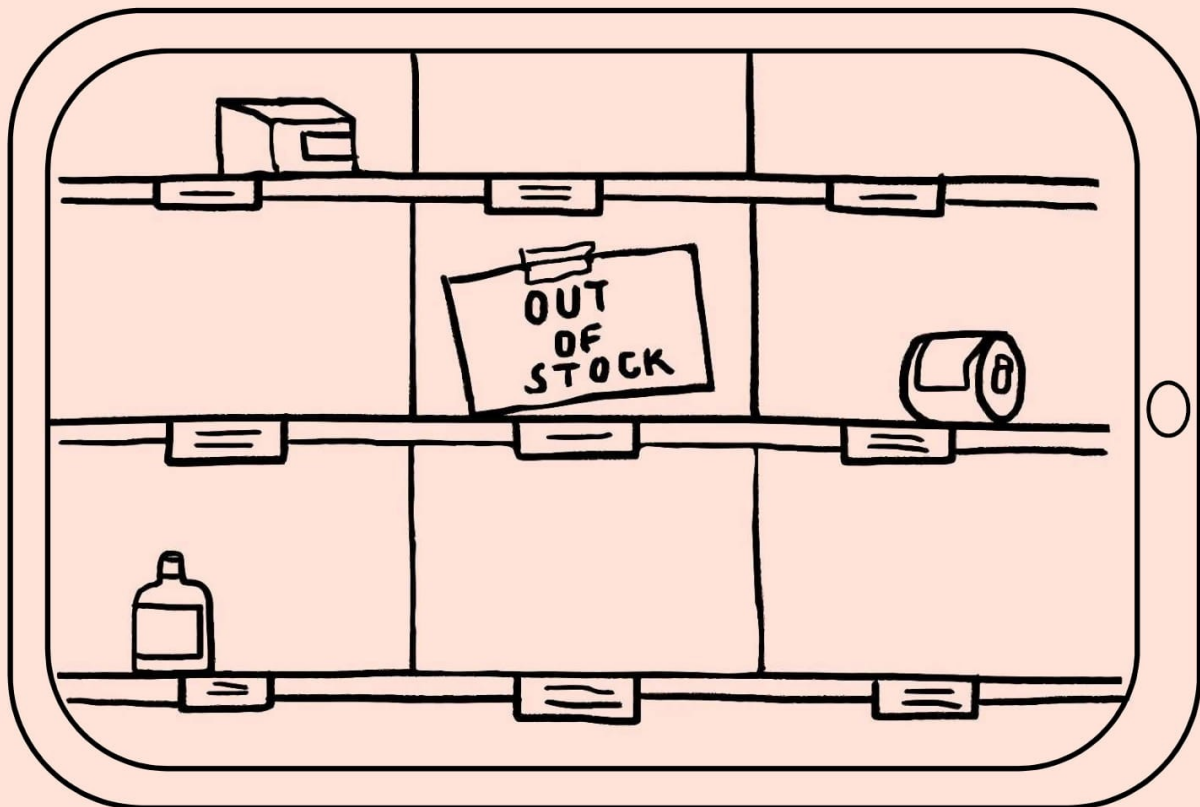


# Empirical Essays on Retail Logistics and Customer Behavior

Christoph Baldauf





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Christoph Baldauf

Academic dissertation for the Degree of Doctor of Philosophy in Business Administration at Stockholm University to be publicly defended on Friday 27 January 2023 at 13.00 in room 4204, house 3, Stockholm University Conference Center, Albanovägen 29.

## Abstract

Retail logistics is responsible for making products available to end customers. Traditionally, this was facilitated through a network of brick and mortar stores that customers visit to buy items. However, the advent of online and omnichannel retail started to challenge this established system. Modern-day customers increasingly buy a product not solely for its features but also for how, and how fast, the item is delivered and/or returned. Such customer behavior shows that retail logistics often is the decisive factor when searching for, purchasing, and using goods and services. Consequently, logistics performance has become increasingly important for marketing performance. This is in stark contrast to logistics (often) outdated characterization as a back-office operation focusing on cost-effectiveness and lead-time reductions. To overcome the prevailing cost focus, more knowledge is needed that is based on the incorporation of customer behavior into operations management models to demonstrate to retailers the elevated role of logistics in retail today. *Therefore, the overall purpose of this dissertation is to contribute to a better understanding of the relevance of logistics in online and omnichannel retail, and its impact on customer behavior.*

This purpose is explored in four research articles that examine the relevance of logistics from various angles. Article I is a systematic literature review synthesizing empirical literature on the impact of logistics on customer purchase, repurchase, and return behavior in online and omnichannel retail. Article II analyzes how carrying a stock-keeping unit in inventory at the warehouse affects its sales in online retail. Article III investigates how an online retailer's change in return policy to free returns increases purchases from customers, but also the volume of items being returned to the retailer. Finally, Article IV examines how a buy-online-return-to-store policy in omnichannel retail impacts store performance.

The theoretical contributions to the literature are as follows. First, the dissertation illustrates the relevance of logistics in retail today by showing how logistics does not only impact the cost side of a business but also customer behavior and, hence, the demand side. Second, the research highlights the integrative approach that retailers need to adopt between the marketing and operations functions to operate successfully, as action taken by one business function increasingly impacts the other. Third, the dissertation accentuates the role of people in operations management research. It emphasizes how customer behavior is impacted by retail logistics, and thus adds to a better understanding of how people affect real-life operational processes.

**Keywords:** *retail logistics, online retail, omnichannel retail, customer behavior, marketing-operations interface.*

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University**



EMPIRICAL ESSAYS ON RETAIL LOGISTICS AND CUSTOMER  
BEHAVIOR

Christoph Baldauf





Stockholm  
University

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To lida, my family, and  
good old Schwarta.



## Acknowledgments

When I attempt to explain to myself what I have got myself into by doing a Ph.D., I use to compare it to a wild roller coaster ride—in the dark, so you never really know where you are heading next. To see whether this makes any sense, I just took a moment to google “what makes a good ride?” One of the answers you get is “speeding up, slowing down, and turning tight corners all produce potentially thrilling sensations.” Spot on I thought, with some sensations being more thrilling than others. As with roller coaster rides, others usually accompany you during your Ph.D. With the following lines, I would like to thank them for taking this ride with me.

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Stockholm, December 2022—bound for the next thrilling sensation!

Christoph Baldauf

# Abstract

Retail logistics is responsible for making products available to end customers. Traditionally, this was facilitated through a network of brick and mortar stores that customers visit to buy items. However, the advent of online retail started to challenge this established system. With online retail, merchandise is sold on the internet, which enables customers to choose from a much wider range of products and retailers. In addition, online retail pronounces the importance of the fulfillment process (e.g., the last mile) to attracting and retaining customers. Modern-day customers increasingly buy a product not solely for its features but also for how, and how fast, the item is delivered and/or returned. Such customer behavior is emphasized in omnichannel retail, which is the dominant situation in many markets today. Omnichannel retail pursues the integration of (offline and online) retail channels to provide a seamless shopping experience. This has led to more interactions (e.g., touchpoints) between customers and retailers, to which customers bring expectations that are more sophisticated than ever. Omnichannel customers may buy a product online, but have it shipped to a store for pick-up. Or they get an order delivered to their home, but visit a store to return unwanted items. Examples such as these put customers into direct contact with logistics, and highlight the greater weight of logistics in online and omnichannel retail.

The elevated role of logistics in the modern retail industry is in stark contrast to its (often) outdated characterization as a back-office operation focusing on cost-effectiveness and lead-time reductions. Online and omnichannel retail speak to the relevance of logistics, and have moved it to the forefront of retailers' service offerings. For many customers, a retailer's logistics has evolved into the decisive factor when searching for, purchasing, and using goods and services. Developments such as these demonstrate that logistics performance also has become increasingly important for marketing performance. To overcome the prevailing cost focus, more knowledge is thus needed that is based on the incorporation of customer behavior into operations management models, to demonstrate to retailers the elevated role of logistics in retail today. *Therefore, the overall purpose of this dissertation is to contribute to a better understanding of the relevance of logistics in online and omnichannel retail, and its impact on customer behavior.*

This purpose is explored in four research articles that examine the relevance of logistics from various angles. Article I is a systematic literature review synthesizing empirical literature on the impact of logistics on customer purchase, repurchase, and return behavior in online and omnichannel retail. The article assesses the current state of knowledge and builds the foundation for the three other empirical articles that use statistical and econometric methods. Article II analyzes how carrying a stock-keeping unit in inventory affects its sales in online retail. Findings show that online sales increase, on average, by 65% for products that are stored in the retailer's warehouse. The study goes beyond the common practice of relying on past sales (or revenues) when deciding whether or not to

carry an item in stock, and demonstrates how the effect of availability on sales differs among products. Article III investigates how a change in return policy to free returns increases purchases from customers (+9%), but also the volume of items returned to the retailer (+8%). Therefore, the paper highlights the importance of retailer return policy in leveraging sales and returns in online retail, and provides insight into the economic value of offering free returns. Finally, Article IV examines the impact of online returns on store performance. Results show that retailers benefit from a buy-online-return-to-store policy. On average, customers who visit the store to return an online item spend 40% (€13) more than the average basket value. However, the revenue potential also depends on stores' ability to manage online returns, which is why the focus is directed toward implications of the policy for store execution.

The theoretical contributions to the literature are as follows. First, the dissertation illustrates the relevance of logistics in retail today by showing how logistics not only impacts the cost side of a business but also customer behavior and, hence, the demand side. Second, the research highlights the integrative approach that retailers need to adopt between the marketing and operations functions to operate successfully, as action taken by one business function increasingly impacts the other. Third, the research accentuates the role of people in operations management research. It emphasizes how customer behavior is impacted by retail logistics, and thus adds to a better understanding of how people affect real-life operational processes. The dissertation concludes with a presentation of the managerial implications, and the limitations and suggestions for future research.

Keywords: retail logistics, online retail, omnichannel retail, customer behavior, marketing-operations interface

## Sammanfattning

Logistiken inom detaljhandeln har till uppgift att göra produkter tillgängliga för slutkunderna. Traditionellt stöds denna funktion av ett butiksnätverk som kunderna besöker för att köpa sina varor. Men uppkomsten av näthandeln har utmanat detta etablerade system. Inom näthandeln säljs varorna på internet, vilket gör det möjligt för kunderna att välja bland ett mycket bredare utbud av produkter och återförsäljare. Dessutom lägger näthandeln vikt vid att uppfylla hela processen (t.ex. den sista sträckan) för att locka och behålla kunder. Dagens kunder köper inte längre en produkt enbart baserat på dess egenskaper, men också beroende på hur, och hur snabbt, varan levereras och/eller returneras. Detta kundbeteende betonas i omnikanalshandeln (omnichannel retail), som är den dominerande situationen på många marknader idag. Omnikanalshandeln strävar efter att integrera handelskanaler (fysiska och nätbaserade) för att ge en sömlös köppplevelse. Detta har lett till fler interaktioner (t.ex. beröringspunkter) mellan kunder och återförsäljare, där kunderna har förväntningar som är mer sofistikerade än någonsin tidigare. Omnikanalskunder kan köpa en produkt på nätet, men få den levererad till en butik för hämtning. Eller så får de en beställning levererad till sitt hem, men besöker en butik för att returnera oönskade artiklar. Dessa situationer gör att kunderna kommer i direkt kontakt med logistiken, och understryker logistikens ökade vikt inom nät- och omnikanalshandeln.

Logistikens viktiga roll i dagens detaljhandel står i skarp kontrast till dess (ofta) föråldrade beskrivning som en backoffice-verksamhet med fokus på kostnadseffektivitet och förkortade ledtider. Nät- och omnikanalshandeln lyfter fram logistikens relevans och har förflyttat den till framkanten av en återförsäljares tjänsteutbud. För många kunder har en återförsäljares logistik blivit en avgörande faktor när det gäller att söka, köpa och använda varor och tjänster. Denna utveckling visar också att logistikprestationen har blivit allt viktigare för marknadsföringsresultaten. För att övervinna det rådande fokuset på kostnader behövs därför mer kunskap, som bygger på att kundbeteenden införlivas i verksamhetsstyrningsmodeller, för att påpeka logistikens allt större roll inom dagens detaljhandel för återförsäljarna. *Därför är det övergripande syftet med denna avhandling att bidra till en bättre förståelse av logistikens relevans inom nät- och omnikanalshandeln, och dess inverkan på kundernas beteende.*

Detta syfte utforskas i fyra forskningsartiklar som undersöker logistikens relevans ur olika synvinklar. Artikel I är en systematisk litteraturoversikt som syntetiserar empirisk litteratur om logistikens inverkan på kundköps-, återköps- och retur beteende inom nät- och omnikanalshandeln. Artikeln utvärderar det aktuella kunskapsläget och bygger grunden för de tre andra empiriska artiklarna som använder statistiska och ekonometriska metoder. I artikel II analyseras hur lagerhållningen påverkar försäljningen inom näthandeln. Resultaten visar att näthandelsförsäljningen i genomsnitt ökar med 65% för produkter som hålls i återförsäljarens lager. Studien går utöver gängse praxis att förlita sig på tidigare försäljning (eller intäkter) för att avgöra om en artikel ska lagerföras, och visar

också vilken effekt tillgängligheten har på försäljningen och hur den varierar mellan olika produkter. Artikel III undersöker hur en förändring av returpolicy till kostnadsfria returer ökar kundköpen (+9%), men också volymen av varor som returneras till återförsäljaren (+8%). Därför belyser artikeln vikten av återförsäljarens returpolicy för att öka försäljningen och returnerna i nätbutiker, och ger också kunskaper om det ekonomiska värdet av att erbjuda kostnadsfria returer. Slutligen undersöker artikel IV näthandelsreturernas effekt på butiksförsäljningen. Resultat tyder på att återförsäljare drar nytta av en policy som tillåter köp i nätbutiker och returer i fysiska butiker. I genomsnitt spenderar kunder som besöker butiken för att returnera en näthandelsprodukt 40% (€13) mer än det genomsnittliga värdet i varukorgen. Intäktpotentialen beror dock på butikens förmåga att hantera näthandelsreturer, vilket är anledningen till att fokus riktas mot policyns konsekvenser för butikens genomförande.

De teoretiska bidragen till litteraturen är följande. För det första illustrerar avhandlingen logistikens relevans för den moderna detaljhandeln genom att visa hur logistik inte bara påverkar kostnadssidan i ett företag, utan också kundbeteendet, och därmed även efterfrågan. För det andra belyser forskningen den integrerande strategi som återförsäljarna behöver genomföra mellan marknadsförings- och driftsfunktionerna för att kunna driva verksamheten framgångsrikt, eftersom åtgärder som vidtas av en affärsfunktion i allt högre grad påverkar den andra. För det tredje betonar forskningen människans roll inom forskningen om verksamhetsstyrning. Den betonar hur kundbeteendet påverkas av handelns logistik och bidrar därmed till en bättre förståelse för hur människor påverkar faktiska verksamhetsprocesser. Avhandlingen avslutas med en presentation av förvaltningsrelaterade konsekvenser, begränsningar och förslag till framtida forskning.

Nyckelord: handelslogistik, näthandel, omnikanalshandel, kundbeteende, gränssnittet mellan marknadsföring och operations



## Appended Articles

- I. Baldauf, C. (2022). Logistics and Customer Behavior In Online and Omnichannel Retail: A Systematic Review. *Unpublished Manuscript*.
- II. Baldauf, C., Eng-Larsson, F., & Isaksson, O. (2022). Where to Cut the Long Tail? The Value of Carrying Inventory in Online Retail. Forthcoming in *Management Science*.
- III. Patel, P. C., Baldauf, C., Karlsson, S., & Oghazi, P. (2021). The impact of free returns on online purchase behavior: Evidence from an intervention at an online retailer. *Journal of Operations Management*, 67(4):511–555.
- IV. Baldauf, C., DeHoratius, N., Eng-Larsson, F., & Isaksson, O. (2022). Store Performance and the Impact of Online Returns. *Unpublished Manuscript*.



# Contents

<b>1</b>	<b>Introduction</b>	<b>1</b>
1.1	Setting the Scene . . . . .	1
1.2	Problem Formulation . . . . .	2
1.3	Research Purpose, Objectives, and Scope . . . . .	5
1.3.1	Research Objectives . . . . .	5
1.3.2	Research Scope . . . . .	6
1.4	Dissertation Structure . . . . .	7
<b>2</b>	<b>Research Strategy, Quality, and Process</b>	<b>8</b>
2.1	Research Quality . . . . .	9
2.2	Research Process . . . . .	10
<b>3</b>	<b>Article Summaries</b>	<b>11</b>
3.1	Article I . . . . .	11
3.2	Article II . . . . .	12
3.3	Article III . . . . .	13
3.4	Article IV . . . . .	14
3.5	Article Overview . . . . .	15
<b>4</b>	<b>Conclusions</b>	<b>16</b>
4.1	Theoretical Contributions . . . . .	16
4.1.1	Exploring the Relevance of Logistics in Retail . . . . .	16
4.1.2	Highlighting the Integrative Approach Between Marketing and Operations . . . . .	17
4.1.3	Advancing the Role of People in Operations Management . . . . .	18
4.2	Managerial Implications . . . . .	19
4.3	Limitations and Future Research . . . . .	20
	<b>References</b>	<b>22</b>
	<b>Appendix: Articles I-IV</b>	<b>28</b>



# 1 Introduction

## 1.1 Setting the Scene

Talking about retail is like talking about the weather—hardly anyone is a real expert but almost everyone has an opinion on it. Let me introduce this dissertation by taking you back to the time when your grandmother used to give you a few coins to run to the local store to get a candy bar. Or the time when you had to constantly update your browser window to secure a ticket for the only concert being performed by your idol in your region, maybe even your country. What about that last time you opened a package, and had to admit that its contents were purchased more out of temptation than personal need, so you returned the items to a nearby store? The list goes on. Retail, defined as selling goods to the public, has been around for a long time and is here to stay.

The retail industry is an economic heavyweight. For many countries, it is an important contributor to gross domestic product (GDP) and a critical source of employment (OECD, 2020). Several major developments in the latter half of the twentieth century laid the foundation for retail as we know it today. First of all, consolidation led to the first large retail chains and many of the big-box retailers, such as Walmart in the United States, or MediaMarktSaturn in Europe. Second, at around the same time the world became much more globalized. Various trade agreements between markets and countries enabled retailers to operate globally, which resulted in international supply chains and outsourcing of production and services (Bowersox et al., 1992; Fisher and Raman, 2010). However, the principle under which retail operated remained the same. The historical framework for conducting business was based on a simple supplier  $\rightarrow$  manufacturer  $\rightarrow$  distributor/wholesaler system, where products reach the end customer through a network of brick and mortar (B&M) retail stores<sup>1</sup> (Bowersox et al., 1999).

Apart from the increase in consolidation and globalization, a more recent major development is an obvious one: the invention of the internet and the ensuing development of and rise in online retail. Some characteristics of online retail differ fundamentally from conventional B&M retail. For example, retailers are less restricted to doing business with customers who live in close proximity to one of their stores. Instead, when selling on the internet, retailers can reach and cater to a much broader and heterogeneous customer base. Online retailers are also not constrained by the physical limitations of a store (e.g., shelf space), which enables them to offer much larger and more diverse assortments (Brynjolfsson et al., 2003; Rabinovich et al., 2011). Another key difference is that order placement is detached from order fulfillment. While the sale marks the last point of customer contact in B&M retail, it marks the beginning of the fulfillment process in online retail. The final delivery to customers is thus a key service element for online retailers, and a differentiating factor in attracting and retaining customers (Agatz et al., 2008; Caro et al., 2020; Cui et al., 2020; Fernie and Sparks, 2018; Rao et al., 2011).

Although online retail can still be considered a relatively new form of retail, the industry has further developed since the inception of e-commerce in the mid-1990s. In the early days of online retail, there was a clear distinction

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<sup>1</sup>Hereinafter simply referred to as “store/stores.”

between retailers that operated online and their offline counterparts. This distinction started to diminish as online retail began to mature. On the one hand, B&M retailers increasingly sought an online presence once they recognized the potential of selling goods online. On the other hand, many online-first retailers gradually opened physical stores as a way of getting in touch with their customers (see e.g., Bell et al., 2018). The practice of operating several (offline and online) retail channels simultaneously has been termed “multichannel retail” and is characterized by distinct boundaries (e.g., operations) between each channel (Hübner et al., 2015, 2016b). However, the scope of multichannel retail has broadened quickly. The increased engagement of customers required a shift in focus to managing customers across channels and integrating the retail mix<sup>2</sup> (Verhoef et al., 2015). This led to the omnichannel retail context becoming the dominant situation in many markets today (Bijmolt et al., 2021). Omnichannel retail pursues the integration of retail channels to provide a seamless shopping experience where customers can move between channels, use them interchangeably, and expect the same service across them (Brynjolfsson et al., 2013; Hübner et al., 2016b; Verhoef et al., 2015). Modern-day customers often consider it standard practice to visit a store to inspect a product which is then bought online, and in the event that the item does not meet the customer’s needs, it is returned to one of the retailer’s physical locations.

The combination of the rise in consolidation and globalization, the continuous growth in the share of online retail, and retailers’ recent efforts to build omnichannel retail experiences form large parts of the retail industry that exists today. These developments brought advantages for customers and retailers alike (e.g., more choices in where to shop/sell). However, from the retailer’s perspective, these developments often make the simple system of pushing products onto the market through a network of stores obsolete, and much of what is happening in retail today has become more complex (Gallino and Moreno, 2019). Retailers, for example, need to manage larger and more diverse product selections, offer speedy and flexible fulfillment options, or find ways to deal with oftentimes high levels of product returns in online and omnichannel retail.

## 1.2 Problem Formulation

The growth in online retail and the subsequent expansion and overlap of retail channels particularly increase complexity from a logistics point of view (Hübner et al., 2016b). Logistics is defined as the part of supply chain management that plans, implements, and controls the efficient and effective forward and reverse flow and storage of goods, services, and related information, which extends from the point of origin to the point of consumption with the intention of meeting customers’ requirements (CSCMP, 2022). In simple terms, the principal task of logistics is to make products available to customers.<sup>3</sup> As early as the 1950s, it has been acknowledged that logistics can play a prominent role in customer service, although originally mainly in government (e.g., military acquisition) and

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<sup>2</sup>The marketing mix/the 4 Ps of marketing: product, place, price, and promotion.

<sup>3</sup>In the logistics industry, this is often referred to as the “Seven Rs” of logistics—the ability of an organization to deliver the right product, to the right customer, in the right quantity, at the right price, in the right condition, at the right place, and at the right time (Shapiro and Heskett, 1985).

business-to-business (B2B) contexts (Bowersox et al., 1999; Heskett, 1977; Shapiro, 1984; Southern, 2011; Stock, 2002). However, although the major output of logistics activities is customer service, logistics has long been, and often still is very product-focused (Stock, 2002). In conventional B&M retail, this stems from the fact that logistics functions without much public attention. Customers in a free market economy expect retail shelves to be filled. They often take it for granted that a store will carry appropriate products, without thinking too much about how the products got there in the first place (Bowersox et al., 1992; Fernie and Sparks, 2018). Moreover, elements of logistics can be remarkably expensive (e.g., holding inventory) (Fernie and Sparks, 2018; Gustafsson et al., 2006). It is estimated that a typical retailer spends approximately 10-25% of every sales dollar on logistics, which makes logistics a prime area for cost reduction (Bowersox et al., 1999; Waters, 2003). Thus, the main focus of logistics was, and often still is, the provision of products to customers at the lowest possible cost, for instance, through exploiting economies of scale, seeking a cheap labor force, or increasing centralization (Bowersox et al., 1999; Sandberg and Abrahamsson, 2019; Stock, 2002). The initially invisible nature of logistics and its potential for cost savings shaped the prevailing assumption in the retail industry that logistics primarily affects a retailer's cost side of the business, without having a direct impact on customer behavior (e.g., demand) (Abrahamsson and Rehme, 2010; Schramm-Klein and Morschett, 2006).

Nor has the full incorporation of the impact of operational processes (e.g., logistics) on the human factor (e.g., customer behavior) been the main priority of analytical model-based research. This type of research dominated the discipline of operations management (OM) throughout the twentieth century, where scholars worked mainly on idealized problems (e.g., scheduling or routing problems). While a model is always an abstraction of reality, such idealized problems often included simplified assumptions of human behavior, as they were sufficient for the context studied. Examples of such simplifications include the assumption that people are predictable in their behavior or are independent of each other (Boudreau et al., 2003). In addition, factors that could explain or predict the behavior or performance of real-life operational processes might have been omitted to increase the tractability of the model for mathematical analysis (Bertrand and Fransoo, 2002; Terwiesch et al., 2020). Thus, even though scholars were aware of the relevance of the human factor, modeling assumptions had to be made that did not entirely reflect reality but allowed generalization and drawing conclusions (Bendoly et al., 2006). However, simplified assumptions of human behavior can also result in the omission of important features that, for instance, have an adverse impact on decision-making (Bendoly et al., 2006; Boudreau et al., 2003). Since the human factor is a critical component of operational processes (Gino and Pisano, 2008), efforts have been made to revise the role of people in OM research (Roels, 2020; Roels and Staats, 2021; Ta et al., 2015). Two main enablers of these efforts are: the availability of new data sources (e.g., page views or cart abandonment rates), and the development of novel statistical and econometric methods.<sup>4</sup> Both of these factors facilitate more sophisticated modeling of human behavior that can be incorporated to enrich OM models (Fisher et al., 2020; Grewal et al., 2017; Roels and Staats, 2021). This led to a steep increase

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<sup>4</sup>Throughout this dissertation, statistical and econometric methods involve the collection, exploration, and presentation of economic data to uncover underlying patterns and trends that can inform decision-making.

in empirical research in OM over the past twenty years. Empirical research examines relevant phenomena that occur in practice and, potentially coupled with analytical models, aims to improve the understanding of real-life operational processes (Fisher et al., 2020; Flynn et al., 1990; Terwiesch, 2019; Terwiesch et al., 2020). For empirical researchers in retail logistics, this includes an increased interest in understanding how customers are impacted by a retailer’s logistics, but also how the behavior of customers, in turn, informs the design and execution of retail logistics.

The need for increased consideration of the interplay between logistics and customer behavior also has been fueled by recent developments in the retail industry—particularly since the advent of online retail, and the transition toward omnichannel retail. Thus, the prevailing assumption that logistics mostly affect a retailer’s cost side of the business is challenged in several ways. It has been argued, for instance, that the move to online retail with its increased emphasis on order fulfillment has redistributed power from the retailer to the customer (Brynjolfsson and Smith, 2000; Doherty and Ellis-Chadwick, 2010; Fernie and Sparks, 2018). This increased customer power often stems from having more choice in where and how to shop. Since online retailers tend to offer very similar product selections, competition is often fierce, and a retailer’s logistics (e.g., order fulfillment) is an increasingly decisive factor in the customer decision to purchase (Sandberg and Abrahamsson, 2019). In addition, the growth of the service sector in general, and in particular the development of omnichannel retail contexts, made retail more experience-centered (Bell et al., 2020; Roels and Staats, 2021; Yazdanparast et al., 2010). This has brought forward new forms of customer involvement and engagement, and more interactions (e.g., touchpoints) between customers and retailers (Rosengren et al., 2018; Verhoef et al., 2015). Customers bring more sophisticated expectations than ever to these interactions, and much of what constitutes the seamless omnichannel shopping experience puts customers into direct contact with logistics (Gallino and Moreno, 2019; Wollenburg et al., 2018, 2019). Customers can, for example, select one shipping option over another (e.g., home delivery vs. store pick-up), or decide to return an online order, either by sending it back via mail or by visiting a nearby store.

Developments such as these led to logistics being given greater weight in online and omnichannel retail (Bijmolt et al., 2021; Esper and Peinkofer, 2017; Hübner et al., 2016a; Renko and Ficko, 2010). Logistics has been transformed from a retailer’s back-office operation, to a factor that can impact customer behavior with regard to the decisions customers make when searching for, purchasing, and using goods and services. Thus, logistics can play a key role in competitive differentiation and be a source of competitive advantage (i.e., superior business position). This can ultimately contribute to a retailer’s overall profitability and growth (Esper et al., 2007; Sandberg, 2013; Sandberg and Abrahamsson, 2019). Although retailers are aware of the increased relevance of logistics in retail today, many still struggle to overcome the prevailing cost focus to leverage the full potential of logistics. Consequently, more knowledge is needed that is based on the incorporation of customer behavior into OM models to demonstrate to retailers the elevated role of logistics in retail today.



### 1.3 Research Purpose, Objectives, and Scope

The traditional cost focus of logistics is in stark contrast to the elevated role logistics plays in the modern retail industry. *Therefore, the overall purpose of this dissertation is to contribute to a better understanding of the relevance of logistics in online and omnichannel retail, and its impact on customer behavior.* This purpose is broken down into four research objectives (ROs) and guides the appended research articles. The combination of the purpose and the research objectives form the basis for the overarching contributions and implications of the dissertation as outlined in Section 4.

#### 1.3.1 Research Objectives

The first research objective concerns the current state of knowledge on the relevance of logistics and its impact on customer behavior. Research in retail is multidisciplinary (Abdulla et al., 2019; McArthur et al., 2016), and logistics activities involve transportation from the sourcing location to (and from) the final customer (CSCMP, 2022). Therefore, a conceptualization is needed to map the relevant elements of logistics that facilitate fulfillment of the purpose of the dissertation. This leads to the first research objective, which is to:

*(RO1) Assess the current state of the literature on how logistics impacts customer behavior in online and omnichannel retail.*

Having established the current state of the literature, the next step is to explore the relevance of logistics in various contexts for which more knowledge is needed. Logistics has long been characterized as a retailer's back-office operation, which is detached from customers and primarily supports other business functions, such as marketing or sales. Thus, logistics has often been viewed as a cost center, and focused its efforts on cost-effectiveness and lead-time reductions (Abrahamsson and Rehme, 2010; Mentzer et al., 2004; Sandberg and Abrahamsson, 2019). However, the rise of online retail and its emphasis on order fulfillment led to changes in customer behavior that speak to the relevance of logistics (Rao et al., 2011; Sandberg and Abrahamsson, 2019). Furthermore, the development of omnichannel retail contexts has made retail more experience-centered (Bell et al., 2020), which puts customers into direct contact with logistics (Gallino and Moreno, 2019; Wollenburg et al., 2018, 2019). The second research objective reflects the greater weight of logistics in online and omnichannel retail, and intends to:

*(RO2) Explore various retail contexts that accentuate the relevance of logistics in impacting the demand side of a business.*

The preceding research objective implies that logistics performance has become increasingly important for marketing performance (Abrahamsson and Rehme, 2010; Schramm-Klein and Morschett, 2006). Thus, the interdependencies between operations (e.g., logistics) and marketing require consideration. Marketing and operations are both key functional areas that contribute to an organization's success and the creation of customer value (Piercy, 2007; Sawhney and Piper, 2002; Tang, 2010). Both functions affect and depend on each other, as the primary role of

marketing is to generate demand, but it requires operations to deliver goods and services. In turn, operations would not be able to fulfill demand without demand being generated by marketing (Chayet et al., 2004; Ho and Tang, 2004). Consequently, the output of one function is the input of the other (Piercy, 2007). Although retailers know of the importance of managing the marketing-operations interface, coordination and collaboration remain broadly complex (Mollenkopf et al., 2011; Piercy, 2010). This stems from conflict between the two functions due to their divergent responsibilities. Marketing seeks to increase product and service diversity, whereas operations seeks to decrease complexity and costs (Malhotra and Sharma, 2002; Piercy, 2007). Despite their contradictory reward systems, to operate successfully, retailers increasingly need to follow an integrative approach that addresses the interdependencies between marketing and operations (Bijmolt et al., 2021; Rooderkerk and K ok, 2019). For this reason, the third research objective is to:

*(RO3) Highlight the integrative approach that retailers need to adopt between the marketing and operations functions to operate successfully.*

From a more general perspective, this research examines the human factor in OM. Due to the context studied, and for reasons of mathematical tractability, human behavior has often been simplified in the analytical model-based research in OM (Bertrand and Fransoo, 2002; Boudreau et al., 2003). However, new data sources and novel statistical and econometric methods allow for more sophisticated modeling of human behavior. This has led to an increase in empirical research and the growing interest among scholars in studying the relationship between human behavior and OM (Fisher et al., 2020; Roels and Staats, 2021). Research in people-centric operations (PCO), for example, studies how people affect the performance of operational processes (Roels, 2020; Roels and Staats, 2021). Although to date, PCO is still a rather nascent stream of research, the field of behavioral operations management (BOM) has gained traction in recent years. There are currently several definitions of BOM available, all differing in scope. However, in the simplest sense, BOM must contain an element of both operations and behavior (Croson et al., 2013). In the context of the role of logistics in retail today, this refers to a need for a better understanding of how customer behavior is impacted by a retailer’s logistics. The fourth and final research objective is thus to:

*(RO4) Advance the role of people in operations management research by showing that the behavior of customers is impacted by a retailer’s logistics.*

### **1.3.2 Research Scope**

Conceptually, the first research objective differs from the latter three. While the first research objective assesses the current state of the literature, the other three build the basis for the overarching theoretical contributions of the dissertation as presented in Section 4.1. Because of this difference, and to inform the reader about the topics covered in this dissertation, five thematic areas of logistics are introduced below. These five thematic areas of logistics delineate the scope of the dissertation, and are derived from a review of relevant literature on the impact of

logistics on customer behavior (i.e., from *ROI*). Please refer to Article I for an in-depth discussion on the thematic areas of logistics. Additionally, the overview shown in Section 3.5 outlines how the other three appended articles connect to the five thematic areas of logistics, which are:

- *Availability & Assortment.* The thematic area of availability and assortment addresses the importance of making products available to customers when they are looking for them, and the impact of stockouts. Moreover, this thematic area examines customer responses to changes in assortment variety and size.
- *Time & Reliability.* The thematic area of time and reliability concerns the last-mile delivery. It includes how important the final delivery to customers is in terms of customer satisfaction and retention, the effects of processing times for orders and returns, and the impact of logistics disruptions.
- *Information Disclosure.* The thematic area of information disclosure investigates the relevance of sharing logistics-related information with customers, such as inventory levels that communicate the online availability status of a product.
- *Choice Options & Flexibility.* The thematic area of choice options and flexibility covers retailers' efforts in building multi- and omnichannel retail environments, thereby giving customers more choice in where and how to shop (i.e., channel extension and integration). Furthermore, the thematic area includes the amplified importance of flexibility, here in the context of delivery carrier and time slot selection.
- *Retailer Service & Policy.* The thematic area of retailer service and policy bundles aspects of the logistics services that are designed and executed by retailers. These include general service quality features, delivery and return policies specifying the level of cost and hassle to receive and return items, and management of the return flow.

## 1.4 Dissertation Structure

The remainder of the dissertation is structured as follows. Section 2 describes the overall research strategy and also contains brief reflections on the research quality and process. The appended articles are summarized in Section 3, including the methods used and their contributions. In addition, an overview of all four research articles, detailing how they relate to the research objectives and the thematic areas of logistics, can be found at the end of this section. The conclusions in Section 4 reflect on the theoretical contributions, managerial implications, and the limitations of the dissertation, along with suggestions for future research. The appendix contains the four research articles on the relevance of logistics in online and omnichannel retail and its impact on customer behavior.

## 2 Research Strategy, Quality, and Process

To achieve the research purpose stated in Section 1.3, this dissertation takes the form of a compilation thesis comprising an introductory section (Kappa), and four research articles. The introductory section sets the outer boundaries for the dissertation by introducing the research as a whole, and presenting the overall contributions and implications. The four research articles then investigate the topic of the dissertation from various angles, to gain a holistic picture of the relevance of logistics in online and omnichannel retail and its impact on customer behavior. Consequently, the four research articles contribute individually to fulfillment of the purpose of the dissertation. However, a distinction must be made between Article I and Articles II, III, and IV. Article I is a systematic literature review (SLR). As pointed out in the preceding section, the SLR has been carried out to assess the current state of the literature with regard to what is known, and what is not known, about the impact of logistics on customer behavior (Denyer and Tranfield, 2009; Thomé et al., 2016). Furthermore, the SLR (i.e., Article I) builds the foundation for the three other empirical articles, which use statistical and econometric methods. Each of Articles II, III, and IV investigate a *distinct* research problem related to the subject of the dissertation. These distinct research problems connect to one or several of the thematic areas of logistics, as identified in the SLR (see Section 3.5 for more details). Figure 1 depicts the overall research strategy.

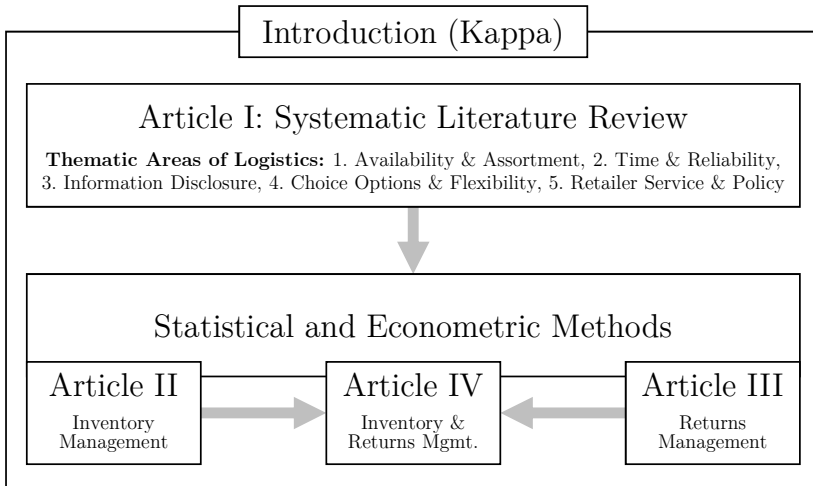


Figure 1: Outline of how the introduction of the dissertation (Kappa), the systematic literature review, and the three articles using statistical and econometric methods comprise the overall research strategy for the dissertation.

In contrast to the SLR, the distinct research problems in Articles II, III, and IV derive from operational issues identified in collaboration with practitioners. Thus, for each of the articles using statistical and econometric methods, secondary data was collected from retailers to analyze the identified problem. The rationale behind using statistical and econometric methods is twofold. First, the increasing amounts of data that retailers have at their dis-

posal allow for better analysis and understanding of the behavior of their customers, which leads to better decisions and hence, better performance (Fisher and Raman, 2018; Grewal et al., 2017). The first objective is thus to provide insight that improves decision-making, based on the analysis of customer-related data. Second, the intention was to examine the causal relationship for each of the distinct research problems that concern the impact of logistics on customer behavior in online and omnichannel retail. That is, statistical and econometric methods are used to build empirical models to test relationships between relevant variables (Sodhi and Tang, 2014). Therefore, the second objective is to facilitate causal inference in real-life settings and quantify the (case-specific) effect sizes (Antonakis et al., 2010; Ho et al., 2017). The quantitative research presented in Articles II, III, and IV thus aims to develop insightful and new empirical relationships derived from a limited set of retailers (Wacker, 1998).

Finally, there is an interconnectedness between the research contexts of the articles using statistical and econometric methods as outlined in Figure 1. Article II has an inventory management angle, and investigates how carrying a stock-keeping unit (SKU) in inventory at the warehouse affects its sales in online retail. Article III concerns returns management, and examines how a change in return policy to free returns impacts customer purchases and returns. Lastly, Article IV analyzes both the inventory and returns management contexts by examining how returns from the online channel affect performance in the retailer's stores. The integrative nature of the four articles combined with the two applied research methods (i.e., SLR and statistical and econometric methods) forms the overall research strategy to address the research objectives and fulfill the purpose of the dissertation.

## 2.1 Research Quality

There are several standards and criteria available for the evaluation of research quality (see e.g., Flynn et al., 1990; Karlsson, 2009; Landry et al., 1983; Meredith, 1998). According to Polit and Beck (2010), the key quality criterion for quantitative research, such as the majority of research presented in this dissertation, is to draw broad inferences from certain observations (i.e., generalization/external validity). Thus, we briefly reflect on the findings of Articles II, III, and IV as the results are case-specific. For considerations regarding reliability and internal and construct validity, reference is made to the appended articles as these criteria are strongly linked to each individual paper.

Although the research presented in this dissertation is based primarily on secondary data collected from specific retailers, the studies provide inferences that can be generalized and transferred to other (retail) settings. For example, the effect size of having an SKU in stock on its online sales in Article II is estimated at 65%. While this effect size will certainly differ in other settings, it is of considerable size. Thus, it is reasonable to assume that the effect of availability on sales is likely to hold in a variety of retail settings such as selling gardening tools or jewelry. Reasons that can explain this are customer sensitivity to stockouts and delivery lead times, and customer desire for convenience and instant gratification (see e.g., Jing and Lewis 2011; Marino et al. 2018). In contrast to Article II, which studies an interior design and furniture retailer, Articles III and IV study fashion retail settings, both with a focus on product returns. Although buying clothes online comes with a higher likelihood of returns as customers

cannot touch and feel the products, the same applies to assessing how comfortable a certain sofa is, or how well a new set of golf clubs is finished (Ofek et al., 2011). With regard to Article III, which studies the introduction of free returns, it can thus be expected that free returns will also increase sales and returns at other fashion retailers, or for non-fashion items. Depending on the retailer and product, the effect sizes corresponding to increases of approximately 8-10% for the outcome variables we studied, will of course differ again from case to case. Since many relevant attributes of customer purchase decisions are non-digital (e.g., quality) and hard to communicate online, it can also be assumed that returning online orders to stores will increase both store sales and unwanted inventory beyond the retailer and fashion context of Article IV. One explanation for this is that customers generally like the convenience of cross-channel returns. In addition, what might matter more than the type of items that a retailer sells and at what price point, is the accessibility of its stores (Nageswaran et al., 2020). Because we study a retailer that has a large number of physical stores that customers can visit, we anticipate comparable results for other retailers with a similar offline/online structure. Overall, the knowledge contributed by this research thus enables inferences beyond the (case-specific) contexts that we have studied.

## 2.2 Research Process

The research strategy shown in Figure 1 suggests that the SLR was carried out first, followed by the three articles using statistical and econometric methods. In practice, the research shown in this dissertation started with the project that is now reported in Article II. The problem that the retailer experienced is also one experienced by many other retailers. Due to large online assortments but limited warehouse space, there is a need to decide which items from the product selection to carry in inventory. In addition to this forward-oriented research context (i.e., which products to stock so they can be shipped to customers quickly), I developed an interest in integrating reverse logistics into my research. The collaboration and project reported in Article III progressed as a result of this interest in returns management. The focal retailer has recently launched a free returns policy, and we were interested in understanding whether such a policy creates economic value. To put the two ongoing projects into perspective and better understand my field of research, I undertook a systematic review of related literature. With a better understanding of similar subject areas and research methods came a better synthesizing of this information in a literature review that later developed into Article I. Since Article II and III have an online retail context, but the literature review (i.e., Article I) includes studies from online *and* omnichannel retail, I was eager to launch another project examining the omnichannel retail context. This was made possible through the focal retailer in Article IV, which allows its customers to return online orders to its stores. The intention with this paper is to show how online returns impact store performance. Overall, this briefly explains why the chronological order of the four research articles is II - III - I - IV, and not the same as the sequence presented when introducing the dissertation (i.e., articles I - II - III - IV). However, due to the divergent methods used (SLR vs. statistical and econometric methods), and the research contexts of the articles, they are presented in non-chronological order.

## 3 Article Summaries

### 3.1 Article I

#### Logistics and Customer Behavior in Online and Omnichannel Retail: A Systematic Review

(Single-authored – Unpublished Manuscript)

Presented at:

*31st European Conference on Operational Research, 11–14 July 2021, Athens, Greece*

*7th Nordic Retail and Wholesale Conference, 9–11 November 2021, Umeå, Sweden*

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*Summary.* The rise of online and omnichannel retail has fundamentally changed how customers search for and buy products. Increasingly, a product is bought not solely for its features but also for how, and how fast, the item is delivered and/or returned. This implies that logistics can impact customer behavior, which gives logistics greater weight in online and omnichannel retail. In this paper, 40 peer-reviewed academic journals are reviewed across five thematic areas of logistics and three customer behaviors (i.e., purchase, repurchase, and return behavior). The review renders outdated the assumption that logistics primarily impacts the cost side of a business, and shows how a better understanding of the impact of logistics on customer behavior can improve retail operations. The article closes with a discussion of additional insights and an integrative framework, which summarizes the main findings and outlines the responsibilities of marketing and operations across the five thematic areas of logistics.

*Method.* As the article title and summary suggest, this article is a literature review that uses the systematic literature review (SLR) research method. The SLR method is characterized by its rigorous approach in locating, selecting, and evaluating relevant studies and their contributions compared to other types of literature review methods (see e.g., Grant and Booth, 2009). Moreover, the SLR method analyzes, synthesizes, and reports evidence in such a way that it allows for reasonable inference about what is known and what is not known in a specific field (Denyer and Tranfield, 2009; Thomé et al., 2016).

*Contributions.* The review establishes the current state of knowledge on the impact of logistics on customer behavior in online and omnichannel retail. In doing so, it stresses the increasingly important interplay between the marketing and operations functions, and highlights a number of interesting avenues for future research. The article also contributes a framework for retailers to identify the responsibilities of marketing and operations across the five thematic areas of logistics.

*Authorship contribution statement.* Single-authored article.

## 3.2 Article II

### Where to Cut the Long Tail? The Value of Carrying Inventory in Online Retail

(Co-authored with Fredrik Eng-Larsson and Olov Isaksson – Forthcoming in *Management Science*)

Presented at:

*3rd EURO Working Group Meeting on Retail Operations, 23–25 May 2018, Eindhoven, the Netherlands*

*25th International EurOMA Conference, 24–26 June 2018, Budapest, Hungary*

*POMS 30th Annual Conference, 2–6 May 2019, Washington D.C., United States of America*

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*Summary.* Online retail has the advantage of unlimited (virtual) shelf space to present products to customers. However, financial and spatial constraints often make it unfeasible to stock all presented products. Retailers thus need to decide which items to stock at the warehouse, and which items to back-order from suppliers following a customer order. To estimate the economic value of this decision, we partner with a European interior design and furniture retailer to exploit random transitions in and out of inventory at the retailer’s warehouse. We find that on average, a product sells 65% more if it is available at the warehouse. Interestingly, the product price moderates this effect. The higher the price, the less it appears to matter whether the product is in stock. Our results highlight the demand effects of stocking the right products, and assist retailers in deciding which items to carry in inventory.

*Method.* To estimate the causal effect of carrying inventory on sales, we use a fixed effects Poisson model with product-level cluster robust standard errors as our main specification to account for the panel data structure and over-dispersion in our dependent variable. The paper also applies a matching approach that calculates the Mahalanobis distance between products and Lasso regressions to explore second-order effects in customer behavior when products are not available at the warehouse. In the robustness analysis section, we implement a two-stage control function approach to control for potential endogeneity between price and availability, and create a new sample using a standard stratified sampling approach to correct for sample selection, among other things.

*Contributions.* The paper highlights how carrying a product in inventory impacts its sales in online retail. We go beyond the common practice of relying on past sales (or revenues) when deciding whether to carry an item in stock or not, and show how the effect of availability on sales differs among products. We also demonstrate how our research can inform retail managers about where to cut the long tail. In particular, we show how the information regarding the heterogeneity in customer willingness to wait for different SKUs can be incorporated into the decision about whether to carry an SKU in inventory or not.

*Authorship contribution statement.* Actively involved in: literature review, data collection, data preparation, data analysis, writing original draft, writing review and revision.



### 3.3 Article III

#### The Impact of Free Returns on Online Purchase Behavior: Evidence From an Intervention at an Online Retailer

(Co-authored with Stefan Karlsson, Pejvak Oghazi, and Pankaj Patel – Published in *Journal of Operations Management*)

Presented at:

*4th EURO Working Group Meeting on Retail Operations, 9–11 April 2019, Colonia de Sant Jordi, Spain*

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*Summary.* Although free returns are still the industry standard for many online retailers, the question of whether a free returns policy creates economic value has been neglected. This paper examines an online retailer that decided to offer free returns to customers in one of the markets in which it operates (Denmark). We find that offering free returns has several positive effects on customer behavior as the order amount, product variety per order, and gross margin all increase following the intervention. However, the number of products returned also increases by approximately 0.2 items per order (i.e., every fifth order will contain an additional return). Using simple back-of-the-envelope calculations, we show that the order-level gains from free returns can hardly compensate for the additional costs of waiving return shipping fees and handling higher return volumes.

*Method.* To estimate the economic impact of the introduction of free returns, we use a difference-in-differences (DiD) design, in which we compare customers in Denmark (treatment group) with all other customers in the data (control group). The DiD design is a quasi-experimental research method to study causal relationships, which allows measurement of the before-and-after changes in our outcome variables for the treatment and control groups (Fisher et al., 2020). In addition, we test several mechanisms to validate the causal evidence we obtained from our DiD estimation. The robustness section thus includes analyses of parallel trends, placebo effects, event study methods, and alternative specifications, among other things.

*Contributions.* The article emphasizes the trade-offs associated with a free returns policy in online retail. Although we show that free returns have several desirable effects on customer behavior (e.g., larger and more diverse orders), simple back-of-the-envelope calculations demonstrate the limited economic value of deploying a free returns policy. The results thus also contribute insight into the growing interest amongst the public (and thus amongst retailers) in mitigating the environmental consequences stemming from product returns.

*Authorship contribution statement.* Actively involved in: conceptualization, literature review, methodology, data preparation, descriptive analysis, writing original draft, writing review and revision.

### 3.4 Article IV

#### Store Performance and the Impact of Online Returns

(Co-authored with Nicole DeHoratius, Fredrik Eng-Larsson, and Olov Isaksson – Unpublished Manuscript)

Presented at:

*5th EURO Working Group Meeting on Retail Operations, 12–13 October 2022, Istanbul, Turkey*

*8th Nordic Retail and Wholesale Conference, 8–10 November 2022, Tampere, Finland*

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*Summary.* Omnichannel customers value the option of being able to return online orders to B&M stores. This type of buy-online-return-to-store (BORS) policy has obvious advantages for retailers, such as increased store traffic and cross-selling opportunities. Nevertheless, BORS might also harm profit and increase complexity, due to (too) many returned items in the store. In this study, we partner with a global fashion retailer to investigate the impact of online returns on store performance. We focus on all stores in a mid-sized European country and find that online returns are associated with higher sales. However, we also find that online returns can lead to “stray inventory”—items that are returned from the online channel to stores that do not carry the items. We investigate the effects of stray inventory and show that labor moderates the impact of online returns on sales. Our analysis provides insight into the implications of BORS, and highlights the importance of store execution in managing online returns.

*Method.* To estimate the impact of online returns on store sales, a fixed effects panel regression model with robust standard errors clustered at the store level is used. In addition, a matching approach calculating the Mahalanobis distance between store-category pairs is applied to investigate the markdown implications of BORS. The robustness section corrects for potential endogeneity (reverse causality) between sales and labor. The section also includes the results with sets of additional control variables, and examines alternative specifications with regard to our main dependent variable, among other things.

*Contributions.* The research adds to the limited empirical evidence of the positive traffic and cross-selling effect of BORS. Our analysis finds that online returns are associated with higher sales, but also that the revenue potential of the policy depends on stores’ ability to manage online returns. In particular, we focus on the effects of stray inventory and the role of labor in moderating the impact of online returns. Analytical research examining BORS is complemented with our findings that we discuss in relation to the literature, and for retail managers seeking to improve their omnichannel operations.

*Authorship contribution statement.* Actively involved in: conceptualization, literature review, methodology, data preparation, data analysis, writing original draft.

### 3.5 Article Overview

Table 1: Overview of how the articles connect to the thematic areas, address the research objectives, and provide avenues for future research.

Article	Thematic Area of Logistics	Research Objective (RO)	Future Research
<b>I.</b> Logistics and Customer Behavior in Online and Omnichannel Retail: A Systematic Review	Systematic review of the literature in the sub-themes: <b>AA:</b> (1) product availability and (2) assortment variety and size. <b>TR:</b> (1) satisfaction and retention, (2) processing speed, and (3) logistics disruptions. <b>ID:</b> (1) inventory availability information. <b>COF:</b> (1) channel extension, (2) channel integration, and (3) delivery carrier and time slot selection. <b>RSP:</b> (1) service quality, (2) delivery policy, and (3) return policy and management.	<b>RO1:</b> Assesses the current state of the literature. <b>RO2:</b> Explores the relevance of logistics through a review of relevant empirical research. <b>RO3:</b> Synthesizes research from marketing and operations to stress their interdependence. <b>RO4:</b> Shows how logistics impacts customer purchase, repurchase, and return behavior.	<ul style="list-style-type: none"> <li>✧ Confirm the studies relying on stated behavior with studies investigating real behavior.</li> <li>✧ Address aspects of logistics that are not covered in depth by the review (e.g., order tracking, time slots).</li> <li>✧ Focus on how behavior serves as an input, rather than a consequence of logistics.</li> </ul>
<b>II.</b> Where to Cut the Long Tail? The Value of Carrying Inventory in Online Retail ( <i>Investigation of a retailer that needs to decide which SKUs from the full product range to carry in inventory</i> )	<b>AA:</b> We show how the decision to carry an item in inventory affects the online sales of that SKU. <b>TR:</b> Since products carried in inventory can be sent to customers shortly after purchase, this indirectly results in a decision about which SKUs to offer with a faster delivery lead time. <b>ID:</b> Since product availability is shown to customers on the website, consideration is given to the effect of disclosing inventory availability online.	<b>RO2:</b> Puts a price tag on the decision to carry an SKU in inventory and provides indirect inference regarding how customers value fast deliveries. <b>RO3:</b> Shows that although it is expensive to carry items in inventory, stocking the right products has a considerable marketing effect on customer purchases. <b>RO4:</b> Uncovers customer sensitivity to product availability and delivery lead times. Explores several second-order effects in customer behavior when an SKU is not available.	<ul style="list-style-type: none"> <li>✧ Show the impact of operations decisions on demand in other inventory-related settings where demand is normally considered exogenous.</li> <li>✧ Investigate factors other than price that could moderate customer heterogeneity in the optimal designation of which items to carry in inventory.</li> </ul>
<b>III.</b> The Impact of Free Returns on Online Purchase Behavior: Evidence From an Online Retailer ( <i>Investigation of a retailer that starts to offer free returns</i> )	<b>RSP:</b> We show that although lenient return policies come with several desirable effects on the demand side, retailers also need to consider the drawbacks of free returns.	<b>RO2:</b> Examines how retailer return policy design impacts sales and returns from customers. <b>RO3:</b> Demonstrates the implications of a marketing initiative in the context of free returns. <b>RO4:</b> Investigates several behavioral reactions from customers when they can return for free.	<ul style="list-style-type: none"> <li>✧ Focus on the cost-side implications of free returns as an extension to the effects on the revenue-side.</li> <li>✧ Examine customer characteristics such as age, gender, or location that potentially impact customer behavior in the context of free returns.</li> </ul>
<b>IV.</b> Store Performance and the Impact of Online Returns ( <i>Investigation of a retailer that has a BORS policy in place</i> )	<b>AA:</b> We examine how BORS as a cross-channel return policy impacts the items available at the store. <b>COF:</b> We show the implications of this channel integration initiative on store performance. <b>RSP:</b> We investigate the effects of such a cross-channel return policy on store performance.	<b>RO2:</b> Analyzes the implications of online returns on store performance. <b>RO3:</b> Shows that BORS is an important part of the omnichannel experience, and the effect of the policy on store performance. <b>RO4:</b> Provides evidence that customers value BORS, but also that the policy leads to more unwanted items in the store.	<ul style="list-style-type: none"> <li>✧ Consider the impact of online returns on non-stray inventory.</li> <li>✧ Contrast reselling online returns at the store with central collection and management.</li> <li>✧ Analyze the customer behavior underlying the impact of BORS in more detail.</li> </ul>

Note: AA=Availability & Assortment; TR=Time & Reliability; ID=Information Disclosure; COF=Choice Options & Flexibility; RSP=Retailer Service & Policy

## 4 Conclusions

The concluding section starts with a presentation of the theoretical contributions of the dissertation. Alongside the theoretical contributions to the literature, the section presents the managerial implications of the research, focusing on how retail managers can elevate the role of logistics within their organization. Overall, the four research articles and the overarching contributions and implications facilitate fulfillment of the purpose of contributing to a better understanding of the relevance of logistics in online and omnichannel retail, and its impact on customer behavior. The section closes with the limitations of the dissertation, and both narrow and broad suggestions for future research.

### 4.1 Theoretical Contributions

The theoretical contributions of the dissertation are structured in accordance with the latter three research objectives,<sup>5</sup> and are to explore the relevance of logistics in retail (*RO2*), highlight the integrative approach between marketing and operations (*RO3*), and advance the role of people in operations management (*RO4*).

#### 4.1.1 Exploring the Relevance of Logistics in Retail

This dissertation highlights the relevance of logistics in online and omnichannel retail in a variety of ways. The SLR (i.e., Article I) hereby serves as an overarching paper that consolidates empirical research done in the field, and focuses on customer purchase, repurchase, and return behavior. Insight from the article shows that logistics impacts purchases from customers in many different contexts. Examples include how customers react to increases (decreases) in assortment size, or logistics-related information that is presented to them. The SLR also highlights logistics elements that are relevant to increasing customer patronage (i.e., repurchase behavior). In particular, the successful execution of the last-mile delivery and returns process distinguish themselves as important determinants of whether customers will buy again. Lastly, product returns have become an increasing issue in recent years. The SLR reveals the factors that can lead to more (fewer) returns, and thus what retailers can do to better manage costly returns from customers. The remaining three articles each pronounce the relevance of logistics in particular contexts. Article II finds that on average, online sales increase by 65% for products that are stored in the retailer's warehouse. Since assortments tend to be much larger in online retail, the article consequently puts a price tag on the decision regarding which SKUs to carry in inventory. Moreover, items that are in stock at the retailer's warehouse can be shipped directly and reach the customer within 2-3 business days. Therefore, the article also presents the indirect inference that customers value fast delivery. Article III shows how the design of retailer return policy in the context of free returns increases purchases from customers, but also the volume of items returned to the retailer. A retailer's return policy is thus an important tool for leveraging sales and returns in online retail.

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<sup>5</sup>Note that (*ROI*)—to assess the current state of the literature—was obtained through Article I (i.e., the SLR), and the identification of the five thematic areas of logistics.

While free returns appear to be an important factor for customers when purchasing items online, such a lenient return policy can be very costly. Retailers can therefore use and apply these insights to their own businesses when balancing the demand effects of free returns, and the higher processing and markdown costs associated with more returned items. Finally, Article IV investigates how returns from the online channel impact store performance. The main takeaway is that retailers benefit from allowing customers to return online orders in the offline channel, as such returns are associated with higher B&M sales. Nevertheless, retailers also need to be aware of the drawbacks of cross-channel returns. Our study focuses on items being returned to stores for which the store did not plan (i.e., stray inventory). Retailers hence need to understand and act accordingly to the pros and cons of developing a seamless omnichannel shopping experience. In summary, the papers presented in this dissertation highlight different angles on the increased relevance of logistics, and add to the notion of logistics being given greater weight in online and omnichannel retail.

#### **4.1.2 Highlighting the Integrative Approach Between Marketing and Operations**

The research presented in this dissertation demonstrates the importance of logistics to marketing performance in a number of aspects. Article I (i.e., the SLR) synthesizes research on the impact of logistics on customer behavior across both marketing and operations fields to highlight how closely the functions are linked in online and omnichannel retail. The SLR reveals that it is often challenging to make a clear distinction between what constitutes research from the marketing field and what constitutes research from the operations field, as both disciplines are increasingly tackling similar problems and using identical methods (e.g., matching approaches). The findings show that several elements of logistics, such as high product availability or fast delivery, attract customers and lead to more sales. In addition, we reviewed research on delivery and return policies, which have become an important marketing tool in online and omnichannel retail. Much of what is stated in such policies is facilitated through operations. This includes, for example, same or next-day shipping promises or lenient return time windows, such as 90 days of hassle-free returns. Overall, the SLR shows that logistics elements become increasingly important in retailer marketing strategies and indicates how retailers can utilize operations for marketing purposes. Article II measures the effect of product availability, and thus also indirectly the effect of delivery speed, on sales in online retail. We show that although it is expensive to store items in the warehouse, having the right products in stock has a considerable marketing effect on customer purchases. Therefore, retailers require an understanding of the factors in their operations that are of relevance to their customers, and what moderates them. One factor that mattered in our case is product price, as customers seem to be more willing to wait for more expensive items. At the core of Article III is a marketing initiative involving an aspect of logistics in the form of offering free returns. The paper demonstrates that offering free returns to customers increases sales, which operations ultimately has to fulfill. However, we also show that free returns increase the overall level of returns, which operations has to manage. Therefore, the article highlights that marketing and operations are interdependent, and illustrates how action taken

by one business function will impact the other. Lastly, Article IV has both a marketing and operations focus. Here, the focus is on studying how returns from the online channel impact store performance. Although it appears to be beneficial to allow customers to return items across channels, there is also a downside to this in terms of more, and often unwanted, items in the store. Altogether, the four research papers demonstrate how marketing and operations are interconnected, and that it is worthwhile for retailers to invest in further integration of the two functions.

#### **4.1.3 Advancing the Role of People in Operations Management**

This research studies the role of people in operations management by examining customer behavior in response to retail logistics. The SLR (i.e., Article I) synthesizes empirical research done in the field, and assesses how retail logistics impacts customer purchase, repurchase, and return behavior. This is shown across five thematic areas of logistics that emphasize the impact logistics can have on customers in online and omnichannel retail. In addition, the SLR encompasses research examining how customer behavioral responses impact operational processes. Examples include how reductions in delivery times lead to higher order volumes, or how disruptions in the final delivery can cause more returns. The other three articles provide more nuanced insight, and their behavioral context might not be immediately apparent. Article II investigates the effect of product availability on sales in online retail. We find that on average, sales increase by 65% when an SKU is in stock, which demonstrates customer sensitivity to product availability and the respective delivery lead time implications. Furthermore, the article explores several second-order effects in customer behavior when an SKU is not available. We show that customers seem to neither wait for items to come back into stock, nor do they substitute to another item online, or in the B&M channel. Customer behavior thus appears to be strongly impacted by product availability, and if customers can no longer get what they want, they decide not to buy or look elsewhere. In Article III, we examine several customer behavioral reactions when a retailer starts offering free returns. We show that such a change in return policy leads to customers buying from a more diverse set of categories since they know that they can return for free. However, the decision to implement free returns also has a direct impact on the retailer's operational processes. On the one hand, the retailer sells more items so it needs to ensure it has the capacity to process increased order volumes. On the other hand, free returns lead to more items being returned. This requires the retailer to have the capability to manage the increase in returns that follow from the changes in customer behavior triggered by the change in return policy. The focus of Article IV is on how online returns impact store performance. Although we do not examine the introduction of BORS itself, we find that such a policy can result in many items being returned from the online channel to stores that do not carry the items (i.e., stray inventory). Moreover, we find that stray inventory is resold at a considerably lower price, so retailers need to be aware of the consequences of BORS for inventory and pricing in the offline channel. Additionally, the paper shows that labor can moderate the impact of online returns on store sales. On the whole, all four articles show that people (e.g., customers) play an important role as their behavior can be impacted by operations such as retail logistics.

## 4.2 Managerial Implications

The research in this dissertation leads to several managerial implications that can assist retail practitioners in the pursuit of organizational goals. We present these according to the three levels of strategy in an organization (i.e., corporate-level strategy, business-level strategy, and functional-level strategy). At the corporate level, the findings suggest that retail managers need to reconsider the role of logistics if they have exclusively focused on reducing costs. In today's retail industry, logistics plays a much more important role—it has moved from a back-office operation to the forefront of retailers' service offerings. This transition has to be acknowledged by the the highest level of the organization to fully leverage the strategic role of logistics. Thus, logistics needs to be considered in the retailer strategy formulation process, and logistics managers at the operational level need to participate in this process. While this might not be a worthwhile consideration for every retail business at this point (e.g., one that competes solely on price), corporate-level managers need to be aware that online and omnichannel retail will continue to grow, and so will the usage and integration of technology that facilitates this growth. Both of these factors will lead to a further increase in the relevance of logistics, and this dissertation presents a starting point for (corporate-level) management to comprehend the potential of logistics to add to firm performance.

The managerial implications for business-level strategy focus on designing logistics services that retailers want to offer in order to compete in their industry. What this research reveals is that different elements of logistics can have a diverse impact on customer behavior. Middle management needs to address specific questions such as: How can we decrease our inventory costs without hurting sales? What are the implications of raising our delivery fees? Is it sensible to anticipate that we can liquidate online returns in our stores? It is thus critical to evaluate a retailer's available resources, decide where to invest, and contemplate how various logistics elements can affect each other (e.g., if a retailer offers free returns, does it have the warehouse capacity to handle an increased return flow?). In particular, the SLR provides a comprehensive overview of the thematic areas of logistics that impact customer behavior in online and omnichannel retail. It simultaneously synthesizes empirical research done in the field over a timeline of twenty years. This provides business-level managers with an extensive toolbox of diverse real-life problems that they can exploit in order to transfer relevant insights and findings to their operations.

On a functional level, the managerial implications of this research relate to the day-to-day operations and short-term goals of retailers. One of the main insights here is that the marketing and operations functions are more interdependent than some retailers might be aware of. Although acknowledging the interconnectedness of marketing and operations might be up to a higher strategy level, it is on the functional level where marketing and operations have to collaborate. In contrast to the perception of marketing creating demand and operations fulfilling it, we increasingly move toward a notion in which marketing and operations create and fulfill customer demand *together*. However, it is not only important to rethink internal structures, but also to foster relations with external organizations, such as third-party logistics providers responsible for the final delivery to the customer. Furthermore, the research presented in this dissertation shows how analyzing customer-related data can help improve a retailer's

logistics. In the long term, increased collection and exploitation of such data can support retailers in tailoring their offerings according to customer preferences. This can help account for and manage customer heterogeneity (e.g., offer free express delivery to highly loyal customers with a low return record). Practitioners at the functional level thus need to ensure that they understand customer needs on a day-to-day basis, with the ultimate aim of bringing back the high level of customer intimacy once was observed with specialty and Mom-and-Pop stores.

### 4.3 Limitations and Future Research

While each of the four research articles has its individual limitations, the dissertation has several overall limitations that present fruitful avenues for future research. First, the dissertation highlights the relevance of logistics from various angles showing how logistics can impact customer behavior in online and omnichannel retail. However, although it comprises an SLR and several distinct research problems on the topic, there are many other elements of logistics that are relevant in today's retail industry. Future research should thus focus on the elements of logistics that have not been expanded by this dissertation. The last-mile delivery, for instance, presents a perennial issue for future related works. Examples include how different delivery options (e.g., home delivery, store pick-up) or new forms of delivery, such as subscription-based or time-based deliveries, are perceived by customers. Another topic of emerging importance is the role of physical stores in the retail environments of both today and tomorrow (see e.g., Hübner et al., 2022). Although this dissertation touches on the store as a hub for online returns, there are many additional tasks that are being increasingly performed by stores. Examples include the store as fulfillment center for online orders (i.e., buy-online-pick-up-in-store), or as a warehouse from which items are shipped to customers or other stores (i.e., ship-from-store-to-store). Since retailers are still in the process of implementing such offerings, it is often not yet well understood how customers respond to the range of new roles that stores fulfill today. This research focuses mainly on the customer-facing effects of logistics. Hence, it would also be interesting to investigate whether logistics activities further upstream in the supply chain, such as order picking or warehousing, can have a direct impact on customer behavior, and the implications for retail logistics. A final point relating to this limitation is that the secondary data presented and analyzed in this research stems from Swedish retailers. Although the majority of our partner companies operate internationally, the results presented are nevertheless location-bound to some extent, and could differ across continents and cultures. Therefore, future research should attempt to replicate this, or similar research, to see whether the findings hold beyond the cases studied here.

Second, Section 1.2 states that there has been increased interest among empirical researchers in better understanding how logistics impacts customer behavior, *and* how customer behavior can in turn, inform the design and execution of retail logistics. In this research, the focus is mainly on the impact of logistics on customer behavior, and secondarily on how customer behavior can inform the design and execution of retail logistics. The principal reason for this is that secondary data was collected from retailers from which we have drawn inferences (e.g., how



customers react to free returns in online retail).<sup>6</sup> Future research should therefore focus on the interplay between customer behavior and retail logistics, and show how behavioral insight can serve as a key strategic input to the design and execution of retail logistics. For example, this could be done by surveying customers about their delivery preferences, validating the results in a field experiment, and then designing and implementing the preferred delivery options for all of a retailer's customers. This generally points toward the topic of customer co-creation, however, not only for the development of new products, but also for a retailer's logistics (see e.g., Yazdanparast et al., 2010). Retailers need to respond to the different requests from customers in online and omnichannel retail, and ensure that they have the necessary means through which to adapt operations according to customer requirements. This certainly presents an interesting path for future research, as more output is needed that reflects how behavioral insight is incorporated into the design and execution of retail logistics.

Finally, a pressing topic that affects retailers but is not expanded in this dissertation is sustainability. The main reason sustainability is important when examining the impact of logistics on customer behavior, is because retail logistics joins together two main contributors to carbon emissions: transportation and packaging. Globalization has led to international supply chains in which products frequently are shipped around the entire globe before they reach the final customer. Additionally, high levels of product returns in online and omnichannel retail result in products being sent back and forth several times before reaching their end destination. Bulk shipments from the country of origin, and last-mile deliveries often require excessive amounts of packaging. Since packaging material accounts for almost half of all plastic waste, it is unsurprising that the retail industry is responsible for a hefty share of that waste (see e.g., Howland et al., 2019; Vembar, 2019). Scholars thus need to focus on how retail logistics, especially in the context of transportation and packaging, can become more sustainable. This requires a shift in research in retail operations, where empirical research often focuses on increasing sales, and analytical models often focus on either minimizing cost or maximizing profit. Future research should therefore draw attention to outcome variables that benefit society at large. This includes, but is not limited to, the aforementioned reductions in distances traveled (i.e., transportation) and waste (e.g., packaging materials). Such a focus also reflects retailers' interest as they increasingly have to absorb the impacts of climate change, like extreme weather events, that lead to supply chain disruptions or customers not being able to visit the store. A last call for future research is therefore to address the implications of how a changing climate impacts retail logistics, and how this impact can be mitigated.

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<sup>6</sup>It is also possible that the implications of our research are not directly visible, but still impact the design and execution of retail logistics beyond our research. In Article III, for example, we caution against the deployment of a free returns policy in online retail. This is in line with return policies becoming more restrictive again in recent years.

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## Appendix: Articles I-IV

- I. Baldauf, C. (2022). Logistics and Customer Behavior In Online and Omnichannel Retail: A Systematic Review. *Unpublished Manuscript*.
- II. Baldauf, C., Eng-Larsson, F., & Isaksson, O. (2022). Where to Cut the Long Tail? The Value of Carrying Inventory in Online Retail. Forthcoming in *Management Science*.
- III. Patel, P. C., Baldauf, C., Karlsson, S., & Oghazi, P. (2021). The impact of free returns on online purchase behavior: Evidence from an intervention at an online retailer. *Journal of Operations Management*, 67(4):511–555.
- IV. Baldauf, C., DeHoratius, N., Eng-Larsson, F., & Isaksson, O. (2022). Store Performance and the Impact of Online Returns. *Unpublished Manuscript*.