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## Exploring unattended delivery services in e-grocery retail

### A consumer-centric perspective on last-mile logistics

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# Exploring unattended delivery services in e-grocery retail

A consumer-centric perspective on last-mile logistics

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DEPARTMENT OF DESIGN SCIENCES | FACULTY OF ENGINEERING | LUND UNIVERSITY





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A consumer-centric perspective on last-mile logistics

John Olsson



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LICENTIATE THESIS

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*"I don't know where I'm going from here,  
but I promise it won't be boring."*

(David Bowie 1947-2016)



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# Acknowledgments

My research journey began in September 2018. It might not seem like a long time ago, but you will probably agree that the world was different back then. We would all work at the office daily wearing ordinary clothes, most people did not stockpile toilet paper and we had never seen our colleagues' bedrooms in zoom meetings. The coronavirus pandemic has in many ways changed the world as we knew it. As any crisis, this pandemic also offers new opportunities. An example is the unprecedented growth of e-grocery retail, that provides the context for this research.

Along my research journey, I have been fortunate to receive the support of many people who have contributed to my research education and personal development in various ways. I am grateful for this opportunity to acknowledge some of the people who have supported my scholarly and personal growth.

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## Abstract

The retail landscape is transforming at an unprecedented speed and scale, thereby driving an unparalleled growth in last-mile delivery. The already rapidly growing online sales have been further fueled by the coronavirus pandemic. However, the share of online sales varies greatly among different retail sectors. In grocery retail, the share of online sales is still relatively low even though it is the fastest growing e-retail sector. The idiosyncrasies of groceries set high requirements for last-mile delivery. Thus, retailers continuously explore the use of innovative services. Despite the growing interest of scholars in last-mile logistics, little is known about the customer perspective on delivery services. Therefore, the purpose of this research is to contribute to consumer-centric last-mile logistics research.

This research employs a qualitative exploratory approach based on three studies that have been presented in three appended papers. The first study is a systematic review of the literature in last-mile logistics. The systematic review reveals a lack of consumer research in the field. Thus, the subsequent empirical studies explore the consumer perspective on last-mile delivery using a marketing perspective. The second study is a multiple case study on early adopters of unattended grocery delivery services that explores customer expectations of such services. The third study is an interview study that explores the customer experience related to unattended grocery delivery services.

The findings of this licentiate thesis shed light on the consumer perspective in last-mile logistics. The systematic literature review reveals that last-mile logistics research lacks examination from the consumer perspective. The findings of the multiple case study provide a conceptual model of customer expectations of unattended grocery delivery services. The model represents the relationship between forms and determinants of service expectations. The study finds various forms of desired service, expected standard service, and predicted service. Furthermore, the empirical evidence demonstrates that these service expectations are determined by personal needs, technology literacy, and situational factors. The interview study findings offer a conceptual model of the customer experience of unattended grocery delivery services. The model represents the relationship between customer experience elements, customer experience dimensions, and unattended grocery delivery experience. The analysis reveals various elements related to the emotional, cognitive, social, and behavioral experiences of customers.

This research has several implications for theory and practice. Theoretically, this research contributes a cohesive overview of the literature on last-mile logistics. Further, the two empirical studies provide insights into the pre-purchase and post-purchase stages of the customer journey in unattended grocery delivery services. Managers can use the proposed conceptual models to design and improve unattended grocery delivery services.

# List of publications

This licentiate thesis is a compilation of three individual papers. The papers and the author's contributions are presented below. A summary of the results is provided in Section 4, and the full versions of the papers are appended at the end of the thesis.

## **Paper 1**

Olsson, J., Hellström, D., and Pålsson, H. (2019). "Framework of Last Mile Logistics Research: A Systematic Review of the Literature," *Sustainability*, 11, 7131.

The paper is a systematic literature review and includes the framing of the study, and the selection, review, analysis, and synthesis of the existing literature in last-mile logistics research.

As the lead author, John Olsson collected, analyzed, and synthesized the data. Furthermore, he also wrote the majority of the text. Daniel Hellström contributed with guidance on the methodology and provided valuable and insightful support during the analysis and synthesis, and critical and constructive reviews of the text. Henrik Pålsson contributed with guidance on the methodology and reviewed the manuscript critically at several stages of the research process. All authors contributed to the framing of the study. An initial draft of this paper was presented at the 31st NOFOMA conference in Oslo in 2019.

## **Paper 2**

Olsson, J., Osman, M.C., Hellström, D. and Vakulenko, Y. (2021). "Customer expectations of unattended grocery delivery services: mapping forms and determinants," *International Journal of Retail & Distribution Management*, Vol. ahead-of-print, No. ahead-of-print.

The paper is a multiple case study based on data from semi-structured interviews and direct observations.

John Olsson is the lead author and developed the overall research design, contributed significantly to the analysis and synthesis, and wrote the majority of the text. Mary Catherine Osman contributed to the data collection process by setting up the initial case study protocol and conducting semi-structured interviews and observations. She further conducted an initial *a priori* coding based on theory and contributed to formulating the propositions and drafting the conceptual model. Daniel Hellström provided guidance on the research design, gave valuable inputs for the analysis, and critically reviewed the text at all stages during the research process. Yulia Vakulenko contributed to the theoretical framework of the study as well as the implications for theory and practice. She also critically reviewed the manuscript in the final stages of the research process.

### **Paper 3**

Olsson, J. (2021). “Mapping Customer Experience of Unattended Delivery Services in E-Grocery Retail”, published in the proceedings of the 33<sup>rd</sup> NOFOMA conference 2021, Reykjavik, Iceland.

The paper is an initial attempt to empirically identify and describe the customer experience of unattended delivery services in e-grocery retail through an interview study.

John Olsson independently wrote the entire paper from idea to submission. Mary Catherine Osman contributed to the data collection process by conducting semi-structured interviews along with John Olsson. Yulia Vakulenko critically reviewed the manuscript and contributed with constructive comments to improve the research.

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## List of abbreviations

E-Grocery	Electronic grocery retail
FMCG	Fast-moving consumer goods
GHG	Greenhouse gas



# 1. Introduction

This section presents the background, research problem, purpose, research question, research objectives, and research focus. It also provides the reader with suggestions for the order in which this licentiate thesis should be read.

## 1.1. Background

While the retail industry is transitioning toward omnichannel integration, online sales are growing tremendously. The share of e-commerce varies drastically among different retail segments. In Sweden for example, the share of e-commerce in consumer electronics (43 percent) and fashion (30 percent) is relatively high. In other sectors, like grocery retail, the share of e-commerce remains relatively low (4 percent). However, in 2020, grocery was the fastest growing e-commerce sector in Sweden (Postnord 2021a). The transformation of the retail landscape has driven an unparalleled growth in last-mile delivery. The rapidly growing demand for last-mile delivery poses challenges to the last-mile logistics system. This subsection provides an overview of the transformation of the retail landscape that drives the growth in last-mile delivery, and describes associated challenges.

### 1.1.1. Unparalleled growth in last-mile delivery

The retail landscape is transforming at an unprecedented speed and scale, strongly driven by the transition toward omnichannel retail. Digitalization and technological advancements enable retailers to integrate various channels and customer touchpoints seamlessly to optimize customer experience across channels (Verhoef et al. 2015). Currently, retail growth in Sweden mainly stems from the online channel, with sales declining in physical stores, varying greatly among different retail sectors (Svensk handel 2018). In numerous European countries—such as Germany, the United Kingdom, the Netherlands, and Sweden—over 90 percent of the adult population (aged 15–79 years) shopped online in 2020 (Postnord 2021b). The coronavirus pandemic further accelerated this major shift in retailing. For example, in Sweden, the e-retail market grew by 40 percent in 2020 to a market size of 122 billion SEK (Postnord 2021a). Despite the high level of these comparative figures from the early stage of the coronavirus pandemic, e-retail markets continue

to grow. During the second quarter of 2021, e-retail markets grew by 8 percent from the preceding year (Svensk handel 2021).

While the e-commerce penetration rate of groceries remains relatively low, it is one of the fastest growing sectors in e-retail. E-grocery (i.e., online grocery retail) markets have grown considerably in recent years; the coronavirus pandemic has fueled this development, as social distancing measures have spurred consumers to shop for groceries and other essential consumer goods online. In the United States, e-grocery sales grew 54.0% in 2020 to reach \$95.82 billion. In Europe, overall, e-grocery sales grew by 55 percent in 2020 compared to approximately 10 percent in 2019 (McKinsey & Company 2021).

The parcel delivery market is undergoing radical change and faces strong growth. This growth is largely driven by the transformation of the retail landscape and rapidly growing e-retail. Moreover, parcel delivery is in transition to a consumer-driven market, where consumers are increasingly choosing when, where, and how to receive their delivery. In Europe, the parcel market volume grew 73 percent between 2012 and 2019 to reach 12.3 billion parcels in 2019 (Statista 2021a). During the same time period, the parcel market volume in the U.S. grew 58 percent to a volume of 15.9 billion parcels in 2019 (Statista 2021b). In Sweden, the exact growth in parcel market volume is unknown due to a lack of comparable data. However, the available data reveals that 192 million parcels were delivered in 2020 and suggests a growth of at least 15 percent compared to that in the previous year (PTS 2021).

### **1.1.2. Practical challenges of last-mile delivery in e-retail**

Last-mile delivery is a major challenge in e-retail. The term “last mile” stems from the telecommunications industry and describes the problem of connecting individual households and businesses to the main telecommunication network. Since this last mile of the telecommunications network is only used by one household, the cost for its installation and maintenance can only be paid off by one subscriber as opposed to numerous subscribers in the main “trunk” of the network. In logistics and supply chain management, the last-mile problem constitutes the difficulty of transporting freight and people from the last distribution center or hub to their final destination. In the e-commerce context, the term “last-mile delivery” refers to the last stretch of a delivery service from the order penetration point to the recipient’s preferred destination point (Lim et al. 2018).

The growth in last-mile delivery poses multiple challenges to the last-mile ecosystem. The complex intertwinement of these challenges reinforces their speed and magnitude. To understand the challenges of the last-mile logistics system, it is necessary to distinguish between parcel delivery and freight delivery. Parcel delivery refers to smaller deliveries, such as parcels and smaller packages. Freight

transport relates to heavier and bulkier goods, such as furniture and store replenishment. In the following section, the practical challenges of parcel delivery are described.

Because of the complexity of the last-mile logistics system, it is difficult to measure its associated effects and challenges. The nature of e-commerce deliveries leads to a large number of small, heterogeneous shipments in a large number of small vehicles with high time sensitivity (Xing et al. 2011). Consequently, last-mile delivery entails considerable costs, with a few studies estimating that the last-mile accounts for 13–75 percent of total supply chain costs (Gevaers et al. 2009). Another challenge of e-commerce deliveries are externalities such as noise, air pollution, and congestion in urban areas (Deloison et al. 2020). The last mile accounts for approximately 25 percent of greenhouse gas (GHG) emissions from transportation (European Commission 2011). While the last mile in terms of consumer mobility has been a retail challenge even before the e-commerce development, it should be recognized that e-commerce deliveries may not fully eliminate consumer shopping trips (van Loon et al. 2015). The World Economic Forum estimates that e-commerce leads to a 32-percent reduction (in vehicle kilometers) in individual travel, as it leads to a reduction in the number of shopping trips that consumers make (Deloison et al. 2020).

In today's consumer driven markets, last-mile delivery has become a source of market differentiation for e-retailers (Lim et al. 2017). Industry reports suggest that a growing group of consumers desire faster delivery of online orders (e.g., Accenture 2021; McKinsey&Company 2016). However, consumers are willing to collect orders themselves or wait longer for their order to arrive when free delivery and return are offered (Buldeo Rai et al. 2019a). Moreover, reports suggest a mismatch between consumer preferences and delivery options offered by retailers. The largest share of e-commerce orders in Sweden are delivered to pick-up points, which often become a bottleneck in the last-mile logistics system. In particular, during high shopping seasons, such as Christmas or Black Friday, this bottleneck leads to long queues and waiting times. Hence, consumers increasingly prefer home delivery option (both attended and unattended) (PostNord 2020). During the coronavirus pandemic, consumer preferences shifted even more toward unattended home delivery. In December 2020, 52 percent of Swedish online shoppers preferred unattended home delivery (Postnord 2021a).

Particularly in e-grocery retail, last-mile delivery has become a key consumer expectation (Capgemini 2019). The idiosyncrasies of groceries—such as cold chain requirements, food safety, and relatively low item value—place significant constraints on last-mile delivery. Consequently, retailers are constantly searching for new last-mile delivery options to enhance delivery experience and optimize the efficiency of logistics operations. In recent years, e-grocery retailers have expanded their service offerings to include curbside grocery pickup, drive through grocery collection, attended home delivery, and unattended home delivery (Fabric 2020).

## 1.2. Research problem

The logistics and marketing disciplines have diverged from their historically integrated connection, despite social and technological changes, thereby inducing a strong need for more consumer-centric logistics research. In this new business environment, consumer perception, value, and behavior are directly impacted by logistics and supply chain performance. In particular, at the retail echelon, consumers interact directly with the last stage of the supply chain and, in fact, become an integral part of it. Thus, consumer preferences and behavior toward last-mile delivery can form the basis for managing supply chains, both for firms close to the consumer and firms further upstream in the supply chain. Thus, it can be argued that understanding the consumer is increasingly important for all firms in the supply chain to create customer value and customer satisfaction (Esper et al. 2020).

Scholars recognize the necessity for consumer-centric logistics research. Esper et al. (2020) call on scholars to adopt a consumer-centric approach to supply chain management. In this consumer-centric supply chain management, the entire supply chain should focus on customer experience and emphasize the pivotal role of last-mile delivery. Similarly, Hänninen et al. (2021) find that extant literature lacks generalization of the contemporary customer, as customer journeys become more complex. The study proposes that scholars recognize the changing customer characteristics in the 2020s. In addition, Lemon and Verhoef (2016) suggest that customer-based strategy requires an internal firm perspective that places the consumer at the center of decision-making. Shah et al. (2006) outline a path to customer centricity created by an alignment between organizational structures and performance metrics.

Last-mile delivery is the critical link between the upstream supply chain and the consumer. Thus, consumer choices strongly affect GHG emissions and cost of last-mile delivery. Scholarly investigations indicate that GHG emission and cost of last mile delivery depend on numerous factors, such as delivery options, delivery time windows, customer density, mode of transport, failed first-time deliveries, packaging, returns, and buildings (Wygonik and Goodchild 2018; Pålsson et al. 2017; van Loon et al. 2015; Edwards et al. 2010; Boyer et al. 2009). Therefore, consumer insights can provide an important foundation for increasing the efficiency of operations. For example, understanding consumer preferences can provide a basis for consolidation, which can significantly reduce the environmental impact and cost of deliveries (Buldeo Rai et al. 2019a). Thus, previous research implies that consumer behavior in terms of travel mode, choice of delivery option, and basket size strongly affects the environmental impact and the cost of last-mile delivery.

Despite the need for consumer insights in last-mile delivery, scholarly investigations on the matter remain fragmented and rather limited. The available studies explore the role of last-mile delivery in the overall customer experience in retail; these

studies provide evidence that last-mile delivery affects the overall customer e-retail experience (Vakulenko et al. 2019a; Liu et al. 2008; Jiang and Rosenbloom 2005). Moreover, extant studies identify factors such as timeliness, reliability, provision of delivery information, and order tracking as antecedents to customer satisfaction and loyalty in e-retailing (Page-Thomas et al. 2006; Rao et al. 2011; Sharma et al. 1995; Mentzer et al. 1989). However, despite these contributions, it remains unclear how consumers actually perceive last-mile delivery services.

### 1.3. Purpose, research question, and objectives

In recognition of the pivotal role of the consumer in logistics and supply chain management, the purpose of this qualitative research is to contribute to consumer-centric research in last-mile logistics. Driven by social and technological transformation, all firms in the supply chain are required to extend their primary role to interact directly with consumers. Simultaneously, consumers take over parts of the supply chain and co-create value with firms. Thus, consumer insights into last-mile delivery can provide valuable insights for managing relationships and making decisions along the supply chain. To address the lack of consumer-centric research in last-mile delivery, the following single broad research question is proposed:

*How do consumers perceive last-mile delivery services?*

The exploratory nature of this research and the deliberately open research question resulted in a broad scope for this research. This broad scope allowed to address numerous aspects and facets of the consumer perspective on last-mile logistics. The following research objectives were formulated:

1. To consolidate the knowledge in last-mile logistics and provide an integrated view of the literature.
2. To map the forms and determinants of customer expectations of last-mile delivery services.
3. To identify, describe, and analyze the elements and dimensions of customer experience in last-mile delivery.
4. To provide a foundation for more consumer-centric research in last-mile logistics.

### 1.4. Research focus and demarcations

In accordance with the intentionally broad research questions, this research takes off by exploring the current state of last-mile logistics literature. The literature

review focuses on the last mile from a business logistics and management perspective. It should be noted that studies related to telecommunication networks, humanitarian logistics, public transport, and tourism are not covered in this research.

Based on the current state of the literature, the research focus was narrowed down to unattended delivery services. In particular, this research explores the consumer perspective on unattended delivery services in the context of e-grocery retail. Hence, there are certain limitations related to the scope and focus of this research, which are described below.

First, unattended delivery services are conceptualized as a service for the last-mile delivery of groceries. Technological aspects of the service artifact, such as hardware (i.e., the reception box) and software (i.e., the mobile application) are not addressed in this research. The research findings can potentially be used to improve technological aspects of the unattended delivery service for enhanced delivery experience. However, this research does not provide insights into the customer perception of the technological aspects of unattended grocery delivery services.

In terms of consumer-centricity, this research examines two distinct constructs: customer expectations and customer experience of unattended grocery delivery services (see chapter 2.3). Both constructs are important for understanding and managing last-mile delivery services. In this research, these two constructs have not been integrated in terms of the confirmation or disconfirmation of service expectations and perceived performance. This should be done using the expectation confirmation theory, building on the seminal work by Oliver (1980); Oliver (1977).

## 1.5. Reading guidance

This licentiate thesis follows the traditional thesis structure with minor adjustments. The reader is recommended to read the first three chapters in the following order: chapter 1—introduction, chapter 2—theoretical background, and chapter 3—research methodology. Then, it is recommended that the reader go through the appended paper in order. Thereafter, the reader can continue to read the remaining chapters: chapter 4—results and discussion, and chapter 5—conclusions and future research. Despite the summary of key findings in chapter 4, it is necessary to read the appended papers in order to comprehend the answers to the research questions.

## 2. Theoretical background

This chapter provides an overview of concepts and theories relevant to the theoretical formation of this research. A graphical overview is presented to position the research and help the reader understand how the concepts of this research relate to each other.

### 2.1. Positioning the research

While this research stems from the logistics discipline and focuses on last-mile logistics, theories are borrowed from marketing to gain insights into the customer experience of last-mile delivery services. The research is conducted in the context of e-grocery retail. Figure 2.1 provides a highly simplified overview of the intersection of research areas and context of this research.

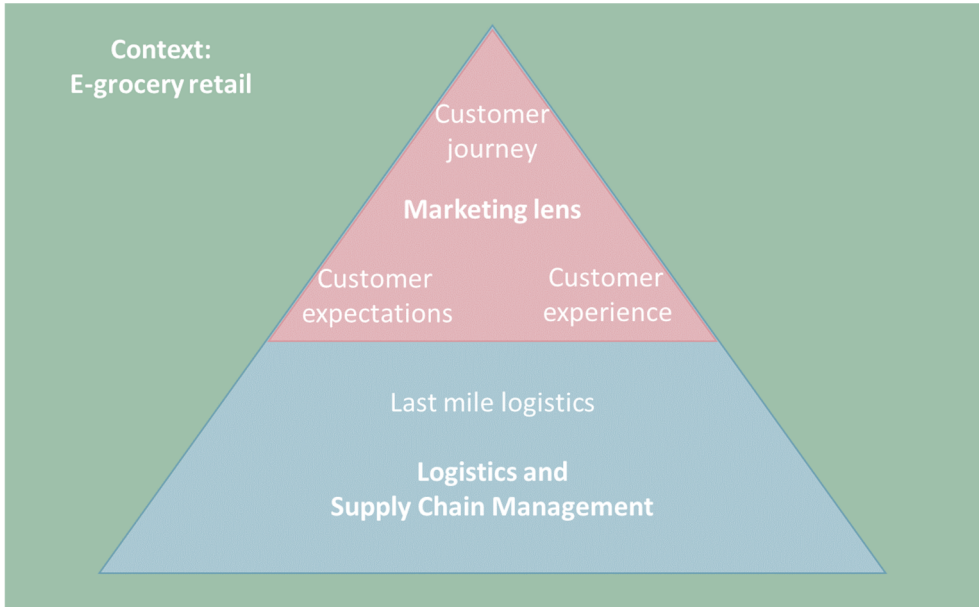
This research has its roots in the field of logistics and supply chain management. Logistics can be described as the science of the efficient flow of materials within and between companies in the supply chain. Inherent to the logistics discipline is the systems view that conceptualizes a logistics system as a network of organizations, people, activities, information, and resources required for the physical flow of goods from supplier to customer (Fahimnia et al. 2011). The logistics system is an open system—that is, it involves an exchange with its surroundings. A logistics system may consist of three main subsystems: the supply system, the production system, and the distribution system; the relationship between these subsystems generates synergy effects (Jonsson 2008). Because last-mile logistics is part of a broader supply network, it can be considered as a distinct subsystem of the logistics system (Lim et al. 2018). Building on Bowersox et al. (2020) view of a supply chain as a series of cycles, the last-mile logistics cycle overlaps with the consumer service cycle as the interface among manufacturers, wholesalers, and retailers with the end consumer. Thus, last-mile logistics is the critical link between the consumer and the upstream supply chain.

Further, theories from the marketing discipline are borrowed to explore the consumer perspective on last-mile delivery services. Despite the divergence of the supply chain management and marketing field in the second half of the last century, marketing theories remain frequently used in supply chain management research

(Defee et al. 2010). Recent consumer-centric developments in retail call on the two disciplines to reconnect (Esper et al. 2020). This research explores the consumer perspective on last-mile delivery services in the context of e-grocery retail. Thus, customer experience is a key concept for this research. Customer experience is a multidimensional construct that is deeply rooted in marketing. The concept involves the customer's cognitive, affective, emotional, social, and physical responses to the firm's service offering during the customer's purchase journey (Verhoef et al. 2009). Hence, the customer journey is another key concept borrowed from the marketing literature. The customer journey is referred to as a series of touchpoints related to the delivery of a service from the consumer perspective (Zomerdijsk and Voss 2010). Conceptually, the customer journey can be described in three general stages: the pre-purchase stage, the purchase stage, and the post-purchase stage. Throughout the customer journey, the customer encounters a series of touchpoints. Further, the literature suggests that customer expectations are an important prerequisite for understanding a customer's response to a firm's service offerings (Oliver 1980).

This research is conducted in the context of e-grocery retail, which constitutes a niche in retail research. E-grocery refers to online commerce of food, drinks, and other fast-moving consumer goods (FMCGs). Grocery retailers are increasingly attempting to gain competitive edge by entering the e-grocery market. In e-grocery retail, last-mile delivery is a major challenge due to product idiosyncrasies that place high demands on material handling in the entire supply chain. Given these challenges, retailers search for new technological solutions for last-mile delivery of e-groceries. Therefore, e-grocery retail provides an interesting context for this research.





**Figure 2.1.** Intersection of research areas and the context of this thesis.

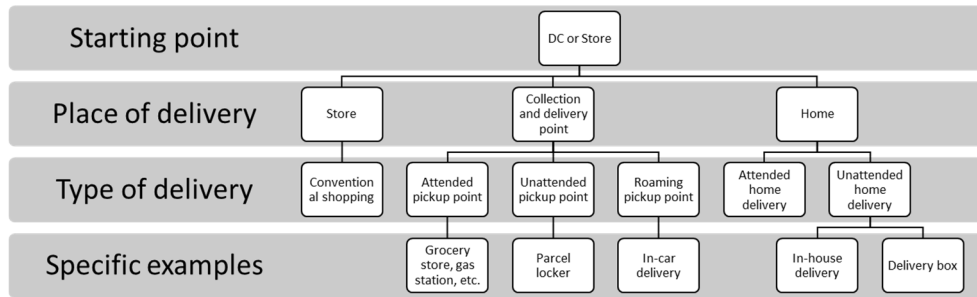
## 2.2. Last mile delivery and e-retail

This subsection introduces the concepts of last-mile delivery and e-retail and discusses the combination of these two concepts as incorporated in the scope of this research.

### 2.2.1. Last mile delivery

Last mile delivery concerns activities conducted for physical delivery to the final destination and is often described as the most expensive, least efficient, and most polluting aspect of the supply chain (Gevaers et al. 2011). Retail transformation, urbanization, and changing consumer behavior are leading to growing parcel volumes, thereby placing tremendous stress on last-mile delivery operations. Innovation and emerging initiatives have reshaped last-mile delivery in an attempt to address the changing market environment. Urban consolidation centers have been investigated as one way of addressing sustainability concerns while simultaneously handling larger volumes of parcels in urban areas (Björklund and Johansson 2018). Another example is crowd logistics, which rely on outsourcing logistics services to an undefined external crowd (Buldeo Rai et al. 2017). Moreover, the use of autonomous drones for last-mile delivery has been investigated in both research and

practice (Aurambout et al. 2019). In combination with trucks, the relatively short operating ranges of drones could be addressed (Boysen et al. 2018).



**Figure 2.2.** Classification of last-mile delivery methods adapted from Gevaers et al. (2009)

In today’s consumer-driven markets, it is important for firms to offer last-mile delivery services that meet customer demands. Therefore, retailers and logistics service providers constantly explore novel last-mile delivery options to extend their service offering. The literature offers multiple classifications of last-mile delivery methods. Gevaers et al. (2009) offer a widely accepted classification of last-mile delivery options, delivery location, and type of delivery. Hübner et al. (2016) add delivery time, delivery area, and returns in their classification. More recently, Halldórsson and Wehner (2020) develop a typology of last-mile delivery options according to the energy efficiency of these delivery options. Figure 2.2 synthesizes existing classifications to provide a comprehensive overview of last-mile delivery options.

Last-mile delivery operates within a broader supply network. Lim and Srari (2018) emphasize last-mile delivery as an integral part of a last-mile supply network comprising four configurational constructs: network structure, network flow, relationship governance, and service architecture. Capabilities inherent to last-mile supply networks can positively influence omnichannel performance when adequately utilized. Lim and Srari (2018) use consumer experience as a proxy to measure omnichannel performance, given the central role of the consumer in omnichannel retail. Furthermore, last-mile delivery depends on a number of actors, such as retailers, wholesalers, logistics service providers, and the consumer. Key processes of last-mile delivery—that is, fulfillment, transportation, and delivery—require seamless integration among these actors. Hübner et al. (2016) distinguish backend and frontend logistics in their strategic planning framework for last-mile order fulfillment and delivery. The framework highlights that last-mile delivery should be considered as part of a broader network that interacts with other functions and actors of the supply network. In particular, the interaction between last-mile delivery and backend fulfillment is highlighted. Hence, warehouse operations such as picking and packing can have a significant effect on last-mile delivery.

### **2.2.2. Retail transformation**

The world of retailing is under dramatic transformation from traditional bricks-and-mortar practices to multifaceted omnichannel strategies (Grewal et al. 2021; Verhoef et al. 2015). The manifestation of the online channel has disrupted and permanently reshaped retailing (Rigby 2011). The tremendous growth of the online channel is largely driven by increasing internet penetration, relatively low entry barriers, access to new customer groups, and transaction convenience for consumers (Zentes et al. 2017). Contemporary retailing depends on the extensive use of technology (Pantano and Priporas 2016), thereby enabling retailers to offer a synergetic customer experience across channels (Verhoef et al. 2015). Furthermore, changing consumer behavior further accelerates retail transformation (Wagner et al. 2020). Moreover, omnichannel transformation has far-reaching consequences on marketing and logistics, for example in-store strategies, warehousing, last-mile delivery, and communication strategies (Grewal et al. 2021).

The combination of alternative channels into a single integrated omnichannel strategy enables retailers to exploit the unique benefits of various retail formats and enhance their service offerings. In other words, the service offerings provided by physical stores, traditional catalogs, online channels, mobile channels, and social media are integrated into a single transaction process (Piotrowicz and Cuthbertson 2014). While retailers have used various retail channels in parallel as part of following a multichannel strategy, the novelty of the omnichannel strategy lies in the integration of these channels, which enables consumers to move seamlessly among available retail channels (Verhoef et al. 2015). An example of this integration is showrooming, where consumers use the offline channel to examine a product in a physical store and then go to the online channel to make the purchase (Flavián et al. 2020).

There are numerous reasons for retailers to combine their retail channels. Forrester Research (2015) finds that while 91 percent of retail sales in EU-7 were offline in 2014, 45 percent of offline sales are predicted to be web-influenced by 2020. This implies that consumers look for information online and decide to make the purchase offline. Furthermore, the combination of retail channels enables retailers to expand their market presence into new markets, overcome limitations of existing retail formats, and increase customer satisfaction and loyalty (Zentes et al. 2017). Moreover, cross-channel integration enables retailers to offer diverse touchpoints that customers can use and combine according to their individual needs.

Technological developments pave the way for retailers to offer experiential online shopping and mass customization. Retailers use augmented reality and virtual reality (Bonetti et al. 2018), avatars (Holzwarth et al. 2006), chatbots (Pantano and Pizzi 2020), and other interactive measures to enhance the customer experience in various channels. The incorporation of social aspects into their online shops indicates that retailers are recognizing the growing importance of social

communities. In community-based retailing, product ratings and discussions among community members become central aspects of the retail concept (Shih et al. 2013; Sridhar and Srinivasan 2012). Moreover, retailers increasingly offer individually tailored products or services, also known as mass customization. Typically, customers can combine various product elements, such as shape or color, to create their customized configuration. In turn, mass customization can increase customer satisfaction and enhance brand loyalty (Yoo and Park 2016)

### **2.2.3. Last-mile delivery in e-retail**

The introduction of e-retail has spurred a race in the logistics market for business-to-consumer deliveries (Allen et al. 2018). Last-mile delivery is recognized as a source of market differentiation and competitive advantage, given its importance for e-retail (Lim et al. 2017). In recent years, last-mile delivery has become an integral part of a firm's service offering. Order fulfillment variables—such as on-time delivery (Roy Dholakia and Zhao 2010), total delivery time, and price (Fisher et al. 2019) have been accepted as antecedents of customer satisfaction and loyalty in e-retail. Retail giants like Amazon and Alibaba lead the way in using logistics services to attract new customers and enhance customer loyalty. For example, the Amazon Prime program offers members free two-day shipping and free same-day delivery in certain regions (Amazon 2021). While the Amazon Prime program has recently been complemented with a number of additional services, such as video and music streaming, delivery remains the core of the program.

In recognition of the growing importance of delivery services for competitive advantage, retailers and logistics service providers push for the development and implementation of innovative last-mile delivery methods (Vakulenko et al. 2019b). The growing bargaining power of consumers and the tremendous increase in competition has compelled e-retailers to rethink last-mile delivery. Technology-driven innovation enables e-retailers to gradually complement traditional delivery options with new and emerging delivery services, such as in-car delivery, self-service lockers, autonomous drones, and unattended delivery services to the consumer's home. These emerging services in e-retail provide benefits for all actors involved: consumers gain from the convenience (Tsai and Tiwasing 2021), retailers can expand their market presence (Zentes et al. 2017), and logistics service providers can potentially increase their revenues. The downside is that e-retail and last-mile delivery have significant impacts on the environment (Allen et al. 2018). The environmental impact of last-mile delivery also depends on consumers' choice of delivery method. A review of the environmental impact of e-commerce reveals that in comparison between home delivery and collection from a delivery point, home delivery has higher environmental impacts (Mangiaracina et al. 2015). The main reasons are the high number of failed home deliveries (Buldeo Rai et al. 2019b) and the number of light goods vehicles used for home delivery (Allen et al.

2018). While consumers generally prefer free next-day delivery to an address of their choice, they are prepared to make trade-offs and collect orders themselves or accept longer lead times when free delivery and returns are offered (Buldeo Rai et al. 2019a).

The emergence of e-retail and the integration across channels has a significant effect on retail business models. Business models outline the configuration of interdependent structures, activities, and processes for value creation and competitive advantage (Sorescu et al. 2011). The business model is also part of a holistic framework used to study systemic change in retail (Zott et al. 2011). Davis-Sramek et al. (2020) study the transformation of the retail business model in relation to the omnichannel order fulfillment process. Their study identifies four phases of omnichannel transformation, although not all firms go through all phases. During the first experimental phase, retailers do not significantly change their store fulfillment operations. As volumes grow, retailers transition to dedicated online fulfillment centers. However, maintaining separate inventories for the different channels makes forecasting more difficult. Hence, retailers transition to integrated distribution centers that serve both online and offline channels. With the growing importance of regional distribution networks for responsive last-mile delivery, retailers transitioned to store-integrated fulfillment.

## 2.3. Customer experience and the customer journey

Customer experience is a multidimensional construct that is deeply rooted in marketing. The transformation of the retail landscape has accelerated scholarly interest in customer experience due to the variety of touchpoints through which consumers interact with firms via multiple channels (Grewal and Roggeveen 2020), which results in more complex customer journeys. The concept of customer experience attempts to integrate multiple concepts from the marketing literature at the same time as it seeks to disregard a few archaic longstanding marketing concepts (Lemon and Verhoef 2016). The roots of customer experience can be traced back to the 1960s when initial theories on marketing and consumer behavior emerged. With the evolution of the marketing field, multiple research areas have contributed to the formation of customer experience research.

### 2.3.1. Defining customer experience

Multiple definitions of customer experience exist in the literature, thereby reflecting the complexity of the construct. The common ground among these definitions is the notion of customer experience as a multidimensional construct. Schmitt (1999) identifies five types of experiences: sensory, affective, cognitive, physical, and

social-identity experiences. Similarly, Verhoef et al. (2009) state that customer experience is a holistic construct that involves the customer's cognitive, affective, emotional, social, and physical responses to the retailer. Interactions between the customer and the firm, referred to as touchpoints, are an integral part of the customer experience throughout the customer journey (Stein and Ramaseshan 2016). Lemon and Verhoef (2016: 71) recognize the importance of touchpoints by defining customer experience as a "customer's cognitive, emotional, behavioural, sensorial, and social responses to a firm's offerings during the customer's entire purchase journey."

Customer experience is distinct from other constructs in marketing. Historically, scholarly research has focused on related, more focused constructs. It is helpful to understand how customer experience is related to other customer-focused constructs in marketing. While there are numerous constructs in the marketing literature that have contributed to customer experience research, two important constructs are highlighted here: customer satisfaction and service quality. Customer satisfaction is a well-established construct that has become a standard practice for firms to measure customer reactions to their offerings. Conceptually, customer satisfaction can be described as the resulting disconfirmation from comparing delivered performance with customer expectations (Oliver 1980). Thus, customer satisfaction could be one of the components of customer experience that focuses on the cognitive evaluation of the experience (Lemon and Verhoef 2016). As such, customer satisfaction provides an important building block for the overall understanding and measurement of the customer experience construct. Service quality provides insights into the context in which experiences arise (Parasuraman et al. 1988). Lemon and Verhoef (2016) argue that service quality provides an initial attempt to map the customer journey. Thus, service quality can be considered an antecedent of customer experience (Mittal et al. 1999).

### **2.3.2. The customer journey**

The notion that customer experience is created along a series of touchpoints highlights the importance of the customer journey. The customer journey is defined as a series of touchpoints related to the delivery of a service from the consumer's perspective (Zomerdiijk and Voss, 2010). During the buying process, customers go through several stages, moving from needs recognition to purchase and eventually evaluation of the purchase (Howard and Sheth 1969). In this buying process, behavioral elements such as goals, information processing, involvement, and attitudes play an important role (Puccinelli et al. 2009). Customers encounter a number of touchpoints when buying products, such as advertising, in-store communications, or word-of-mouth (Baxendale et al. 2015; Meyer and Schwager 2007). These buying process models provide a solid theoretical foundation to

support the notion that customer experience is created along a series of touchpoints throughout the customer journey (Puccinelli et al. 2009).

The customer journey can be conceptualized in three overall stages: pre-purchase, purchase, and post-purchase (Shavitt and Barnes, 2020; Lemon and Verhoef, 2016). The pre-purchase stage encompasses the customer experience from need recognition to purchase consideration (Hoyer 1984). The subsequent purchase stage refers to customer interactions with the firm and its environment during the actual purchase. This stage has received significant scholarly attention, particularly in relation to retail atmospherics (e.g., Naylor et al. 2008; Bitner 1990). The post-purchase stage involves customer interactions with the firm and its environment after the actual purchase. This stage can both include purchase behavior, such as product returns (Moore et al. 2020) or repurchase (Patterson and Spreng 1997), as well as nonpurchase behavior, like word of mouth (Trusov et al. 2009; Engel et al. 1969). The various stages of the customer journey are interrelated due to its iterative nature. Therefore, past experiences can influence customers experience at each stage of the customer journey. In this sense, past experiences constitute an antecedent of customer experience (Verhoef et al. 2009).

The customer journey literature suggests that there are different types of customer touchpoints throughout the customer journey. Lemon and Verhoef (2016) identify four types of customer touchpoints: brand-owned, partner-owned, customer-owned, and social/external. Brand-owned touchpoints refer to customer interactions that are managed by the firm and are under its control. Scholarly research has particularly investigated the impact of product and service attributes on customer satisfaction (Berry et al. 2002; Oliver 1993; Bitner 1990). Partner-owned touchpoints refer to interactions that are jointly designed and managed by the firm and its partners. Although the service marketing literature suggests that partner-owned touchpoints have an important role, the experience effects of these touchpoints remain unclear. Customer-owned touchpoints refer to customers actions during the experience that are not under the control of the firm, its partners, or others. These actions are most prevalent in the post-purchase stage where consumption and usage of the product or service are focused upon. Further, consumers can cocreate value independently of firms (Vargo and Lusch 2004). Finally, social/external touchpoints recognize the role of others in the creation of customer experience. In particular, human interactions play a critical role in the retail experience (Srivastava and Kaul 2014); a few examples of this could be the interactions with other customers, peer influence, or reviews from other customers.

### **2.3.3. Customer expectations**

Multiple understandings of customer expectations and their role for customer experience can be found in the literature. Parasuraman et al. (1988) highlight that there are different understandings of the construct in both service quality literature

and customer satisfaction literature. In customer satisfaction literature, customer expectations are understood as predictions regarding what is likely to happen during a service encounter. Following this perspective, Oliver (1981: 33) states that “It is generally agreed that expectations are consumer-defined probabilities of the occurrence of positive and negative events if the consumer engages in some behavior.” In contrast, expectations are viewed as consumers’ desires in the service quality literature. Following this view, Parasuraman et al. (1988: 17) define expectations as the “desires or wants of consumers, i.e., what they feel a service provider should offer rather than would offer.”

There is some disagreement on the role of expectations in the evaluation of the service. Robledo (2001) identifies two conflicting paradigms: the disconfirmation paradigm and the perception paradigm. The disconfirmation paradigm holds that customer satisfaction is a result of the comparison of perceived performance with customer expectations (Oliver 1981; Bitner 1990). One of the most influential models of this paradigm is the SERVQUAL model developed by Parasuraman et al. (1985). In contrast, the perception paradigm contends that expectations are not antecedents of service quality and that customer perception is the only measure required. Influential models that build on this paradigm include the evaluated performance (EP) measurement model (Teas 1993) and the SERVPERF model (Cronin and Taylor 1994).

Different types of customer expectations have been described in the literature. In relation to services, there are three well-established types of customer expectations: expected standard, predictive expectations, and desired expectation. Expected standard refers to a plausible level of performance (Miller 1977); predictive expectations describe the anticipated performance level (Swan and Trawick 1980); and desired expectations refer to the performance level that the customer wishes to receive (Swan and Trawick 1980). While the sources of expectations remain largely unexplored, studies indicate that these expectation types can be formed through various means. Examples include comparison of similar products, prior beliefs related to a product or service from advertisements or word of mouth, personal desires for the effect of the product or service on the consumer’s life, and cultural aspects (Assouad and Overby 2016; Nicolae et al. 2013).

In their seminal contribution, Zeithaml et al. (1993) provide a conceptual model of the nature and determinants of service expectations. They identify three levels of customer expectations: desired service, adequate service, and predicted service. The desired and predicted services in this model are in line with the desired and predictive expectations identified by Swan and Trawick (1980). Adequate service describes the service level that customers are “willing to accept” (Zeithaml et al. 1993: 6). Moreover, the model shows that a number of key antecedents affect each expectation level: desired service is affected by personal needs and enduring service intensifiers; adequate service is affected by transitory service intensifiers, perceived service alternatives, self-perceived service role, and situational factors; and, lastly,



predicted service is influenced by explicit service promises, implicit service promises, word of mouth, and past experience (Zeithaml et al. 1993).

### 2.3.4. The expectancy-disconfirmation theory

While several approaches attempt to explain consumer satisfaction, the most widely accepted one is the expectancy-disconfirmation theory (EDT) developed by Oliver (1980). The theory assumes that customer satisfaction is the outcome of a four-step process (Figure 2.3). The process begins with the formation of customer expectations (Oliver 1977), particularly the predictive expectations that refer to the anticipated performance level. Then, the consumer interacts with the service and forms perceptions of its performance. Thereafter, the consumer compares this perceived performance to the initial expectations, which leads to disconfirmation with three possible outcomes: positive disconfirmation (performance exceeds expectations), zero disconfirmation (performance equals expectations), or negative disconfirmation (performance falls short of expectations) (Oliver 1981). The disconfirmation results in customer satisfaction or dissatisfaction with the service. Finally, customer satisfaction determines the consumer's behavioral intention (i.e., anticipation of future behavior toward the service) (Oliver 1980). The direct link between service expectations and satisfaction indicates the assimilation effect on satisfaction, which implies the pervasive nature of expectations throughout the satisfaction process (Oliver 2014).



Figure 2.3. A model of the expectancy-disconfirmation theory adapted from Oliver (2014)

## 2.4. Unattended delivery services

Research on unattended home delivery remains scarce and fragmented. The groundwork for scholarly studies of unattended home delivery was laid with the fundamental contribution by McKinnon and Tallam (2003). Since then, very few studies have explored the phenomenon further and, therefore, research in unattended home delivery remains in its infancy.

### 2.4.1. Defining unattended home delivery

Unattended delivery can be conceptualized as a service that allows delivery of orders without the receiver signing a delivery note to confirm receipt. Multiple unattended delivery practices have evolved in recent decades. McKinnon and Tallam (2003) provide a classification of unattended delivery methods. Two fundamental concepts can be distinguished in this regard: unsecured delivery and secured delivery. Unsecured delivery, also known as “doorstepping,” refers to leaving the consignment in proximity of the recipient’s home—for example, the doorstep or another unsecured location around the property. However, these unsecured setups come with risks, such as theft, denial of receipt, or burglary. In contrast, secured delivery is an attempt to address these risks by securing the reception of goods in different ways. Home access systems provide the delivery company access to the consumer’s home or surrounding facilities such as garage or outhouse. Such home access systems typically use digital door locks and may be complemented with security systems such as cameras and alarm systems. Home reception boxes include designated boxes for deliveries and both individual and communal reception boxes are available. Collection points can also offer unattended delivery, which are another form of communal reception boxes.

Unattended delivery services offer significant benefits for various actors. Currently, an average of 12 percent of attended home deliveries fail because, in more than half of the households, no one is at home during regular workdays to receive deliveries (Fernie and McKinnon 2009). The number of failed deliveries can be significantly reduced using unattended delivery services. Such delivery options can reduce the cost of delivery by up to 60 percent compared to conventional home delivery (Punakivi et al. 2001). The main reason for the increased cost-efficiency of the unattended deliver method is that delivery companies do not have to follow time windows for delivery. The size of the time window is negatively correlated with delivery costs (Boyer et al. 2009). Since time windows can be neglected in unattended delivery, routes can be optimized and the number of vehicles required can be reduced substantially. Moreover, unattended delivery provides benefits for consumers, as they are not required to be at home to receive their delivery. One of the drawbacks of unattended delivery services is the need to invest in reception

facilities; the installation of fixed boxes requires dedicated space for such boxes (Punakivi et al. 2001).

### **2.4.2. Unattended delivery services in e-grocery retail**

E-grocery is one of the fastest growing retail sectors. Although the initial omnichannel transformation of grocery retail has been relatively slow compared to other retail segments, in recent years, e-grocery markets have grown considerably. The coronavirus pandemic has further accelerated this development, as social distancing measures spurred consumers to shop for groceries online. The key challenge in e-grocery retail is the high cost and complexity of online order fulfillment (Aspray et al. 2013). Grocery retailers are continuously expanding their service offering to address these challenges and enhance the last-mile delivery experience. Examples of these novel service offerings include curbside grocery pickup, drive-through grocery collection, attended home delivery, and unattended home delivery (Fabric 2020).

The main concern of unattended home delivery services is to enable safe and secure delivery of online grocery orders regardless of whether or not the recipient is at home (Hübner et al. 2016). The idiosyncrasies of groceries—such as temperature sensitivity, limited shelf life, and relatively low item value—set requirements for the supply chain as a whole as well as for last-mile delivery. Furthermore, unattended grocery delivery services using temperature-controlled reception boxes ensure that the temperature chain is maintained at all times. Further, delivery services need to provide security in order to address external risks such as theft or burglary (McKinnon and Tallam 2003). Unattended delivery services in combination with reception boxes ensure that the delivery reaches only the intended recipient. In addition, unattended delivery services allow delivery with no human contact, which can protect the most vulnerable groups from infectious diseases like COVID-19.

### **2.4.3. Customer experience in unattended delivery**

Despite the rich understanding of customer experience in retail, consumer-centric research in last-mile delivery remains scarce. The notion that customer experience is created along a series of touchpoints highlights the importance of last-mile delivery in the overall retail experience. Last-mile delivery is rooted in the post-purchase stage of the customer journey, but it can also affect the prepurchase and purchase stage of repurchases. Consumers tend to evaluate service encounters holistically without differentiating among individual actors in the service delivery network (Tax et al. 2013). In e-retail, at-checkout satisfaction can vary from after-delivery satisfaction, which indicates that delivery has an impact on overall customer satisfaction (Jiang and Rosenbloom 2005). More recently, Vakulenko et

al. (2019a) provide evidence that last-mile delivery mediates the relationship between online experience and customer satisfaction. Further, last-mile delivery can also affect repurchase intention. Jain et al. (2021) find that customer satisfaction mediates the relationship between electronic logistics service quality and repurchase intention. Numerous studies have identified factors such as timeliness, reliability, provision of delivery information, and order tracking as antecedents of customer satisfaction and customer loyalty in e-retailing (Page-Thomas et al. 2006; Rao et al. 2011; Sharma et al. 1995; Mentzer et al. 1989). Despite these contributions, insights into the consumer perspective on last-mile delivery remain both limited and fragmented.

In particular, consumer research in unattended grocery delivery services remains in its infancy. Two studies have conducted more focused investigations of customer perceptions of unattended delivery services. Xu et al. (2008) surveyed 125 consumers and 15 e-retailers to examine their perception of unattended delivery services. The findings reveal that delivery options offered by retailers were not aligned with consumer preferences. Goethals et al. (2012) conducted a survey of 245 French consumers to investigate their perception of unattended delivery services. The findings reveal that some consumer groups were interested in adopting the service although they were reluctant to pay for the service. Despite these contributions, little is known about customer experience in unattended delivery services.

#### **2.4.4. The unattended delivery system studied in this research**

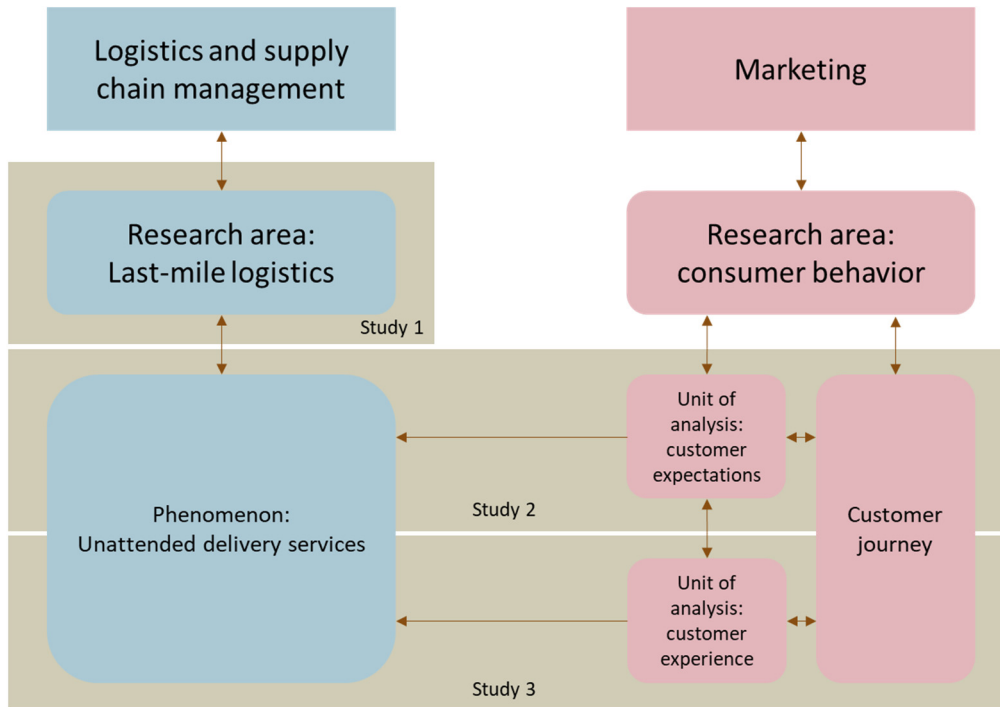
The two empirical studies included in this licentiate thesis explore the consumer's perspective on unattended grocery delivery services, which is exemplified by a specific service for unattended grocery delivery. This specific unattended delivery system uses a reception box with an integrated fridge and freezer, which is one example of a type of reception box that may be used for e-grocery deliveries (Figure 2.4). The reception box is connected to the Internet and controlled through a mobile application to monitor and control the reception box. Further, the reception box is equipped with a digital lock to ensure that deliveries only reach the intended recipient. Consumers orders groceries from an e-retailer of their choice and select delivery to the reception box. Retailers collect the order, either in a dedicated online fulfilment center or in a grocery store, depending on the setting, and pass the order on to a logistics service provider. Upon arrival at the consumer's address, logistics service providers scan the barcode of the order to open the reception box and place the groceries in the desired temperature zone within the fridge. The recipient is notified of their delivery through the mobile application. Finally, the recipient collects the order from the reception box and turns of the cooling system of the fridge if desired. While the reception box is designed for e-grocery deliveries, it can also be used to receive parcels and other smaller deliveries.



**Figure 2.4.** Reception box used in the unattended delivery system studied in this research (Nowaste Logistics AB n.d.)

## 2.5. Summary of theoretical framework

In summary, the theoretical framework of this licentiate thesis is rooted in logistics and supply chain management and borrows theories from marketing to answer the research question. More specifically, the research is conducted in the area of last-mile logistics. The studies that constitute this licentiate thesis utilize the theoretical framework in different ways (see Figure 2.5). Study 1 is a broad exploration of last-mile logistics literature in retail. Studies 2 and 3 focus on the phenomenon of unattended delivery services. Furthermore, theories from marketing are borrowed to explore the consumer perception of such services. The unit of analysis in study 2 is customer expectations of unattended delivery services, located in the prepurchase stage of the customer journey. The unit of analysis in study 3 is customer experience of unattended delivery services, which is found in the post-purchase stage of the customer journey.



**Figure 2.5.** Positioning of studies in the theoretical framework

# 3. Research Methodology

This section presents the research methodologies of the three studies included in this licentiate thesis. It begins by presenting the research approach, followed by a presentation of the research process; thereafter, the research design is described. The section concludes with reflections on research quality.

## 3.1. Research approach

Last-mile delivery is an emerging research area that is receiving growing scholarly attention. Research in last-mile delivery is largely driven by omnichannel transformation that is reshaping the retail landscape. Technological development and digitalization enable the emergence of innovative delivery services. The continuously changing industrial and social environment require these emerging services to adjust rapidly to changing market conditions. Multiple disciplines contribute to the growing body of literature in last-mile delivery. However, when this research project was initiated in 2018, the research area of last-mile delivery was relatively incoherent. Therefore, a systematic review of the literature was conducted. The review found that consumer insights in last-mile delivery were scarce and fragmented. Therefore, this research was designed as an exploratory investigation. While previous research in last-mile delivery and existing theories from related disciplines provided important insights, they did not determine the theoretical layout of this research. This research follows a systems approach (Arbnor and Bjerke 1997), which means that last-mile delivery is viewed as a system of components and their interrelationships.

An inductive qualitative approach was adopted in this research. The literature review conducted at the beginning of the licentiate research shows the need for more consumer-centric research in last-mile delivery. Given the exploratory nature of the research question, an inductive approach was adopted to explore the consumer perspective on unattended grocery delivery services. The qualitative research strategy is suitable to explore emerging phenomena in their natural settings (Miles et al. 2018). The strength of this research strategy is its richness and holism that forms the basis for developing propositions. In line with the qualitative research strategy, this research is based on qualitative data, qualitative data analysis methods, and qualitative presentation of the results. Qualitative research is highly contextual.

The researcher can increase the credibility of findings by describing the contextual intersecting relationships between themselves and participants, which is referred to as “reflexivity” (Berger 2015).

It is important to address the basic assumptions regarding the nature of reality and the nature of knowledge in order for the reader to comprehend the methodological choices made in this research. The underlying ontological and epistemological assumptions tend to differ significantly between qualitative and quantitative research, although these differences are not deterministic (Bryman and Bell 2015). Previous research suggests typical pairings between research approach and ontological and epistemological assumptions. The author applies a critical realism approach to research, a specific form of realism-based epistemology, initially discussed by Bhaskar (2010). Critical realism assumes the existence of an objective world that can only be known through research, while assuming that knowledge is a subjective and constantly changing social construction. In this sense, critical realism offers an alternative to the sterile standoff between the positivist and constructivist tradition (Mingers 2015). Bhaskar (2010) distinguishes three domains of reality: the real, the actual, and the empirical. Critical realists assume the existence of generative mechanisms that create certain events. The key task for critical realists is to link these generative mechanisms and the actual event through analysis.

### 3.2. Research process

This research was conducted over the course of three years. The omnichannel transformation described in chapter 2 poses significant challenges to last-mile delivery. Based on these challenges for the retail industry, the research gap and research question were identified and defined. Moreover, given the exploratory purpose of the research, a qualitative inductive approach was followed. Three studies were conducted. First, a systematic review of the literature was conducted to provide a more cohesive overview of the aspects and facets of last-mile logistics research, and to identify relevant research gaps. Second, a multiple case study was conducted to explore customer expectations of unattended delivery services in e-grocery retail. Third, an interview study was conducted to gain in-depth insights into the customer experience of unattended grocery delivery services. Thus, the phenomenon under investigation was analyzed both theoretically and empirically. The research questions were answered gradually, and knowledge was continuously created. As indicated in Figure 3.1, the results of one study built the basis for the next one. The studies have resulted in three papers that are appended to this licentiate thesis.



While the research process presented in this licentiate thesis may appear straightforward, it has been rather circuitous in nature. As typical for research in general, this project took several detours that eventually led to the studies presented in this licentiate thesis. The selected paths are the results of a continuous dialog with other scholars and practitioners as well as external circumstances, like the coronavirus pandemic that has affected this research project—for example, by limiting the possibilities for data collection due to social distancing measures. Thus, the presented research process is simplified and shows the path of knowledge creation in a linear manner.

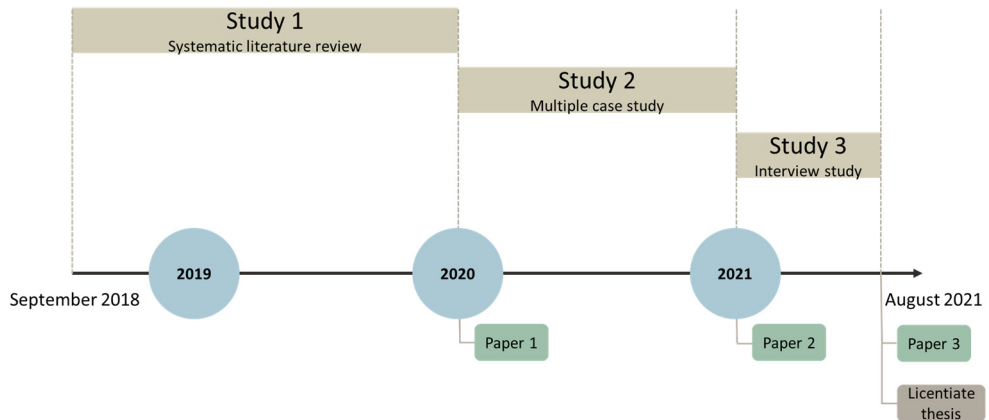


Figure 3.1. Research process

### 3.3. Research design

A multimethod approach was adopted in this research to answer the research questions. The research is built on three methodological pillars: systematic literature review in study 1, a qualitative case study in study 2, and an interview study in study 3. Table 3.1 provides an overview of the appended papers and their characteristics to justify the applied research design. The research design is the result of an iterative process in that the data collection and analysis methods evolved over time. The research began with a systematic review of the literature and continued with two qualitative exploratory studies. This subsection describes the selected methodologies in detail.

**Table 3.1.** Overview of appended papers for justification of the research design.

	<b>Paper 1</b>	<b>Paper 2</b>	<b>Paper 3</b>
Purpose	Consolidate the knowledge in the research area of last-mile logistics to provide an integrated view of the literature published on different aspects and facets of last-mile logistics.	Contribute to the body of knowledge for unattended grocery delivery services by empirically identifying and describing the forms and determinants of customer expectations.	Empirically identify and describe customer experience of unattended delivery services in e-grocery retail and suggest propositions for further research.
Phenomenon	n/a	Unattended delivery services	Unattended delivery services
Context	Business logistics	E-Grocery retail	E-grocery retail
Unit of analysis	Last-mile logistics research	Customer expectations	Customer experience
Research design	Systematic literature review	Multiple case study	Interview study
Data sources	Literature	Semi-structured interviews, direct observations	Semi-structured interviews
Data analysis	Qualitative content analysis	Open coding and axial coding	Open coding and axial coding

### 3.3.1. Multimethod approach

This research employs a multimethod approach to answer the research questions. There are various reasons to employ a multimethod approach to conduct research (McKendrick 1999). Multimethod research tends to generate rich data and provide a broad understanding of the phenomenon under investigation. Further, the combination of multiple qualitative methodologies can reduce bias and, thus, help the research gain confidence from the audience. In line with well-established research processes, this research began with a literature review and continued with an empirical exploration of the identified research gap.

Previous research in logistics and supply chain management relies heavily on single-method quantitative investigations. Golicic and Davis (2012) argue that the dominance of quantitative research undermines the robustness of the research in various ways. For example, research is limited to those questions that can be answered with a limited number of available methods. Further, relying on a limited number of methods can induce “inherent method biases” (Spens and Kovács 2006). Hence, for a long time, scholars have called on more qualitative research in logistics and supply chain management (Näslund 2002). This research contributes to more qualitative investigations in the research field by adopting a qualitative multimethod approach. However, there are also problems involved with multimethod research. On the one hand, it is often assumed that the breadth offered by multimethod research is a benefit. On the other hand, the careful and systematic application of one research method in narrowly focused studies is important for the development of knowledge.

### **3.3.2. Study 1—Systematic literature review**

Conducting a literature review is an important part of any research project. The aim of reviewing the literature is often to map and assess the existing body of literature and to narrow down a specific research question. There is a wide range of different types of literature reviews that can be conducted for different purposes (Snyder 2019). In business and management research, literature reviews are usually narrative. These narrative literature reviews are merely descriptive, subject to researcher bias, and lack critical assessment. In contrast, the systematic literature review that has its origins in medicine provides rigor and transparency. Tranfield et al. (2003) introduced the systematic review methodology to business research, and Durach et al. (2017) subsequently proposed guidelines that are specific to supply chain management research.

Study 1 is a systematic review of the literature in last-mile logistics research. When this research project took off in 2018, the literature in last-mile logistics was relatively incoherent and fragmented. In response, this exploratory study was conducted with the purpose of consolidating the knowledge in the research area and provide an integrated view of the various aspects and facets of last-mile logistics research. The review was conducted in 2019 following the six-step guidelines proposed by Durach et al. (2017). Prior to the systematic literature review a scoping study was conducted to narrow down the research questions, find suitable keywords, and define appropriate inclusion and exclusion criteria. Three databases—namely Scopus, EBSCOhost, and the Web of Science—were searched for and this resulted in a final synthesis sample of 155 scientific journal publications. First, the sample was analyzed in terms of publication trends. Then, qualitative content analysis was conducted to identify themes in the literature. Finally, a framework of last-mile logistics was developed based on the synthesis.

### **3.3.3. Study 2—Multiple case study**

Following the results of the systematic literature review, a multiple case study was conducted to explore customer expectations of unattended delivery services. The systematic literature review revealed a lack of consumer research in last-mile logistics. To address this gap, the purpose of this exploratory study was to identify and describe the forms and determinants of customer expectations in relation to the phenomenon of unattended grocery delivery services. The unit of analysis of this study are customer expectations that are situated in the pre-purchase stage of the customer journey (Lemon and Verhoef 2016). The case study methodology was selected because it is suitable to explore emerging phenomena and practices (Meredith 1998). Case study research enables the gaining of in-depth insights to understand contemporary phenomenon in their real-life context (Yin 2018). Multiple case studies are considered to be more robust than single case studies

(Herriott and Firestone 1983). A purposive sampling strategy was employed to select 10 cases of early adopters based on household characteristics. The data collection was twofold and involved semi-structured interviews and direct observations. Ten semi-structured interviews were conducted with one or two participants per case. In addition, direct observations were made to gain a more holistic understanding of the individual cases and the immediate environment of each household. Case study protocols were used to guide the researchers and a case study database was created, as proposed by (Yin 2018). Two coding strategies were employed: one investigator used *a priori* coding, and another investigator used open coding and axial coding inspired by grounded theory (Corbin and Strauss 2008). The identified themes and codes from both coding strategies were merged and synthesized. Propositions were formulated based on the patterns found during the data analysis.

### **3.3.4. Study 3—Interview study**

This study is a series of nine semi-structured interviews with early adopters of unattended grocery delivery services. The study builds on the initial investigation of customer expectations of such services in study 2 by investigating the post-purchase stage of the customer journey. The unit of analysis is customer experience in relation to the phenomenon of unattended grocery delivery services. The purpose of this exploratory study was to identify and describe the customer experience of unattended delivery services in e-grocery retail. Qualitative interviews are suitable for exploring complex phenomena that may otherwise be inaccessible (Tracy 2013) and are well-established in retail and management research. A purposeful sampling strategy was employed to select early adopters based on socioeconomic characteristics. The selected respondents had used unattended grocery delivery services for at least six months as part of a trial. Data were collected from semi-structured interviews using an interview guide that was developed in iteration between theory and two pilot interviews. The majority of interviews were conducted via video conference due to social distancing measures during the coronavirus pandemic. The collected interview data were analyzed using a two-stage coding procedure (Corbin and Strauss 2008). First, open-coding enabled themes to emerge inductively from the transcripts. Second, these codes were synthesized and categorized into interpretive concepts. The analysis revealed patterns based on the propositions that were formulated.

## 3.4. Research quality

Research quality was considered at all stages of the research process. There are different ways to evaluate research quality. Some scholars argue that qualitative research should be evaluated according to different criteria from those used in quantitative research. For example, Lincoln and Guba (1985) propose the assessment of the trustworthiness of qualitative research based on credibility, transferability, dependability, and confirmability. In contrast, the trustworthiness of this research is assessed using validity and reliability as the trustworthiness criteria. These criteria are well-established for the evaluation of trustworthiness of both qualitative and quantitative research (Yin 2018; Bryman and Bell 2015). Moreover, these criteria are suitable because this research forms the basis for further quantitative investigations to test the propositions proposed in this research. Finally, the aforementioned alternative trustworthiness criteria have parallels with various types of validity and reliability (Bryman and Bell 2015). Table 3.2 presents the research quality criteria and summarizes the multiple tactics used to ensure rigor. As any research, this research has limitations despite the implemented tactics and associated measure to ensure research quality and rigor.

### 3.4.1. Construct validity

Construct validity, occasionally also referred to as measurement validity, refers to how accurately the study measures the intended construct. While construct validity primarily applies to quantitative research, it can also be used to assess the trustworthiness of qualitative research. Study 1 contributed to an in-depth understanding of the relevant concepts and theories in last-mile logistics research. This study contributes to identifying variables and suitable measurements that could be used in further studies within the scope of this research. In study 2, data were collected from both semi-structured interviews and direct observations to achieve data triangulation. In studies 2 and 3, interview transcripts were further checked against recordings to enhance construct validity and establish a chain of evidence.

Considering the central importance of data triangulation in case study research, the construct validity of study 2 is limited. Despite the two data sources used, additional sources of evidence would have strengthened construct validity of the study findings. Such additional data could have been collected from documentation, archival records, participant observation, or physical artifacts.

### 3.4.2. Internal validity

Internal validity refers to the degree to which the research establishes a trustworthy causal relationship. Study 1 does not attempt to establish cause and effect

relationships. Study 2 implements several well-established measures to increase the internal validity of case study research. The data was analyzed independently by multiple investigators. Patterns were investigated systematically both within and across cases. In addition, a logic model of customer expectations was developed using systemic combining of theory and empirical case data. Propositions were developed and alternative propositions were examined and discussed among investigators. The internal validity of study 3 is somewhat limited. For example, the study relies on interview data and, hence, data triangulation was not possible. Further, since the study was conducted by one investigator alone, investigator triangulation was not possible. However, a few measures were implemented to increase internal validity; for example, rival explanations were actively considered throughout the data analysis (Miles et al. 2018).

### **3.4.3. External validity**

External validity is concerned with the generalizability of findings beyond the specific research context. The three studies that constitute this licentiate thesis have varying levels of external validity. Study 1 shows relatively high external validity, as the systematic literature review synthesizes 155 scientific publications that employ a broad range of methodologies focusing on various aspects and facets of last-mile logistics research. Study 2 implements several measures based on well-established tactics to enhance external validity of case study research. The research design of study 2 is based on literal and theoretical replication. Further, purposive sampling is employed and a clear rationale for the selection of cases was provided. Study 3 implements several measures to enhance external validity that are similar to measures typically used in case study research (Brinkmann and Kvale 2015). For example, purposive sampling was used and a clear motivation for the selected respondents were provided. Further, thick descriptions of research design and findings were included for the readers to assess the appropriateness of findings in their own settings. However, as is characteristic of qualitative research, the research design of the included studies only allows for the analytical generalization of findings.

### **3.4.4. Reliability**

Reliability refers to the consistency and repeatability of the research. Study 1 follows a well-established, systematic methodology that was carefully documented, thereby enabling it to be repeated at any time. Furthermore, intercoder agreement checks were employed to ensure the reliability of the findings. Study 2 maintained detailed case study protocols. The available evidence was systematically organized in a case study database that contained rich descriptions of individual cases, recordings and transcriptions, as well as the coding. Intercoder agreement checks

were made throughout the data analysis process. Study 3 specified analytic constructs to enhance the reliability of the findings. Further, a colleague review was conducted that further enhanced reliability.

**Table 3.2.** Summary of research quality in this research.

<b>Quality criteria</b>	<b>Research design</b>	<b>Data collection</b>	<b>Data analysis</b>
<p><i>Construct validity</i></p> <p>Accuracy with which the study measures the intended constructs</p>		<p>Triangulation of multiple sources of evidence: interviews and observations; interview transcripts were checked against recordings.</p>	<p>Clarification of the data analysis procedure.</p>
<p><i>Internal validity</i></p> <p>Extent to which the study establishes a trustworthy causal relationship</p>			<p>Multiple investigators independently analyzed the data, and patterns were systematically investigated within and across cases (case study); systemic combining of theory and empirical data, carefully developed propositions, and examined alternative propositions.</p>
<p><i>External validity</i></p> <p>Extent to which the study findings can be applied to the populations of interest and a domain can be established in which findings can be analytically generalized.</p>	<p>Research design is based on literal and theoretical replication.</p>	<p>The purposive sampling strategy was used to select respondents based on pre-defined criteria and a rich description of study context.</p>	<p>Cross-case analysis of multiple cases.</p>
<p><i>Reliability</i></p> <p>Consistency and repeatability of study findings.</p>		<p>Clearly defined inclusion- and exclusion criteria to retrieve literature sample; a case study database was created and systematically organized; detailed memos and protocols were maintained.</p>	<p>Intercoder agreement checks.</p>

## 4. Results and discussion

The results of this thesis are presented in three appended papers. First, a synthesis of the empirical papers is presented. Then, the three appended papers are individually summarized. Each paper contributes to the overall purpose of this thesis, which is to contribute to consumer-centric research in last-mile logistics. At the end of this section, the findings are discussed in relation to understanding the customer journey in unattended grocery delivery and customer experience management in unattended grocery delivery.

### 4.1. Synthesis

This subsection synthesizes the consumer perspective of unattended delivery services throughout the customer journey. The synthesis integrates the findings and goes beyond the results presented in the appended papers, which results in the conceptual model presented in Figure 4.1. The results from the appended papers are presented in blue boxes (studies 2 and 3) and concepts that are not included in the appended papers are presented in brown boxes.

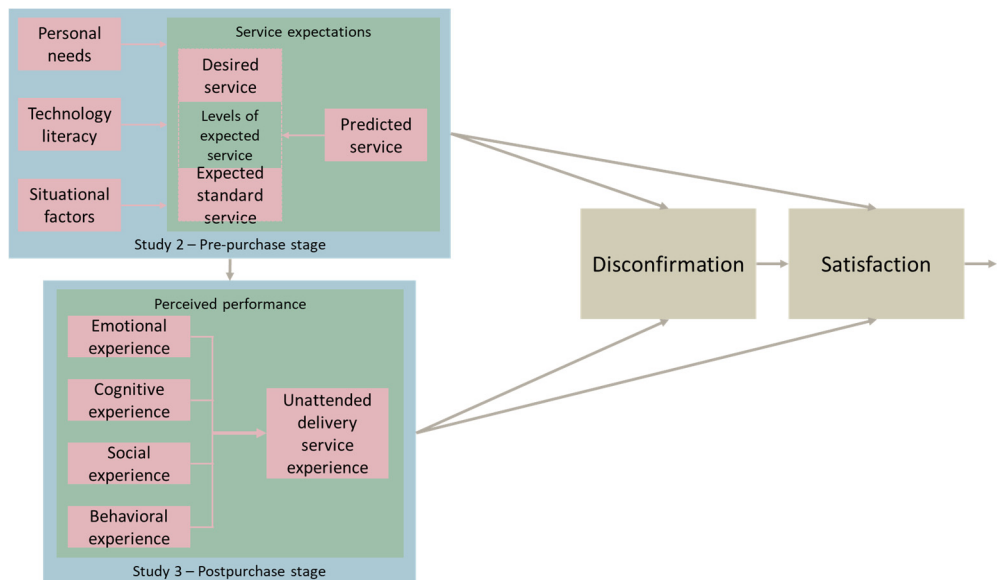
The model conceptualizes the expectancy-disconfirmation process in relation to unattended delivery services. The findings of this research are integrated in the model using the expectancy-disconfirmation theory (Oliver 1980). The model shows that consumers form service expectations prior to using the unattended delivery service. In turn, these service expectations affect the perceived performance of the unattended delivery service. The model suggests that the comparison of service expectations and perceived performance results in a disconfirmation with three possible outcomes: positive disconfirmation, zero disconfirmation, or negative disconfirmation. Disconfirmation is a direct antecedent of customer satisfaction or dissatisfaction. The concepts of disconfirmation and satisfaction are not covered in this research.

The empirical evidence from study 2 shows that consumers form three types of service expectations throughout the prepurchase stage: desired service, expected standard service, and predicted service. The results reveal that consumers desire open access features from retailers and service providers, integrated product returns service, and nondescript hardware designs. Further, the findings reveal that



consumers expect to save time, gain flexibility, and benefit from ease of use of the service. Finally, the study shows that consumers predict a sufficient level of security from unattended delivery services. The study identifies three determinants of service expectations: personal needs, technology literacy, and situation factors.

During the post-purchase stage, consumers evaluate the perceived performance of the unattended delivery service. The analysis of study 3 reveals four dimensions of unattended grocery delivery experience: emotional experience, cognitive experience, social experience, and behavioral experience. The combination of these four customer experience dimensions creates the unattended grocery delivery experience. Each of these four dimensions is affected by several customer experience elements, which are presented in the summary of paper 3.



**Figure 4.1.** Synthesis of unattended grocery delivery experience throughout the customer journey.

## 4.2. Paper I

Academic interest in last-mile logistics has faced a significant increase in recent years. Multiple disciplines contribute to the growing body of literature in last-mile logistics research. Consequently, the research area of last-mile logistics is relatively incoherent. Therefore, the purpose of this study is to consolidate the knowledge in the research area and provide an integrated view of the various aspects and facets of last-mile logistics research. In this paper, a systematic review was conducted to describe the literature landscape and provide a framework of last-mile logistics research.

### 4.2.1. The literature landscape

The systematic review finds that last-mile logistics literature encompasses a wide range of themes, which emphasizes the complexity of the research area. The literature is classified according to the themes addressed in the studies to provide a structured overview of the thematic landscape. The following themes were identified: (1) emerging trends and technologies, (2) operational optimization, (3) supply chain structures, (4) performance measurement, and (5) policy (see Table 4.1). The diversity of themes indicates that last-mile logistics research goes beyond the scope of a single discipline.

The systematic review shows that last-mile logistics literature is both fragmented and diversified. The increase in publications has been almost exponential, with three out of four contributions published within the past five years (i.e., 2015–2019). In total, 84 unique scientific journals have published the selected 155 articles, with none of the journals leading the research area with respect to the number of publications. The review finds a diversity of methodological approaches in last-mile logistics research. While this methodological diversity indicates a broad examination of the research area, the imbalance between methodologies suggests a limited perspective on the phenomenon under investigation. In line with the general lack of theory in logistics and supply chain management research, this review finds that the majority of publications in last-mile logistics lack a theoretical lens. However, a diversity of employed theories was found among theoretical articles.

**Table 4.1.** Themes addressed in last-mile logistics research.

Themes	Count
<b>Emerging trends and technologies</b>	<b>51</b>
Goods reception solutions	22
Innovative vehicle solutions	15
Emerging business models	7
New perspectives on collaboration	7
<b>Operational optimization</b>	<b>45</b>
Routing	23
Transport planning	12
Scheduling	6
Facility location	4
<b>Supply chain structures</b>	<b>35</b>
Logistics and supply chain design	15
Urban freight terminals	9
Urban planning	5
Urban freight structures	3
Networks design	3
<b>Performance measurement</b>	<b>22</b>
Environmental performance	9
Customer focused performance	9
Economic performance	4
<b>Policy</b>	<b>2</b>
	2
<b>Total</b>	<b>155</b>

### 4.2.2. Framework of last-mile logistics research

The study proposes a framework to address the various aspects and facets of last-mile logistics identified in the literature. A systems approach was used to develop the framework, which enabled the capturing of the diversity and complexity of the literature. The core of the framework comprises three sequenced components: last-mile fulfillment, last-mile transport, and last-mile delivery. These three central components are operational within a short-term planning horizon. The three components coalesce under last-mile distribution, which is tactical with a mid-term planning horizon. Finally, last-mile logistics is strategic in character with a long-term planning horizon. The proposed framework consists of a back-end and a front-end system. The back-end of the framework faces the sender, while the front-end faces the receiver. The framework is presented in Figure 4.2.

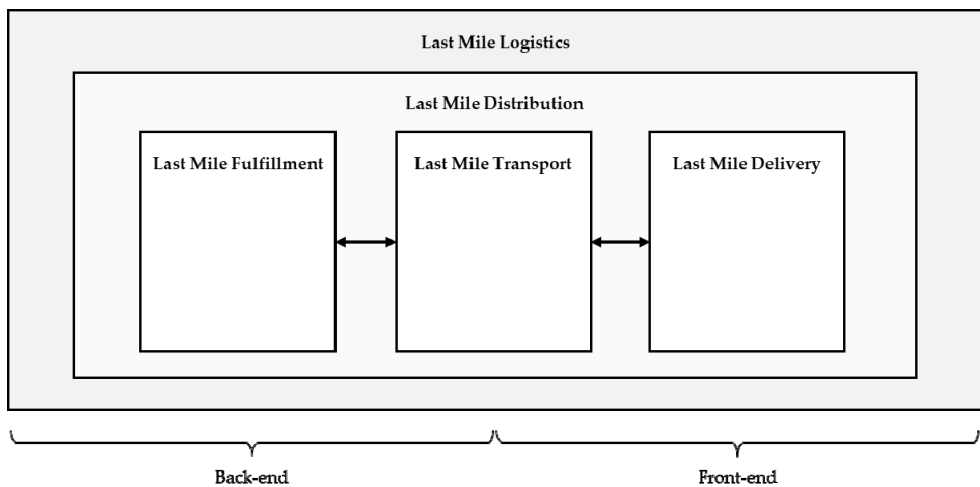


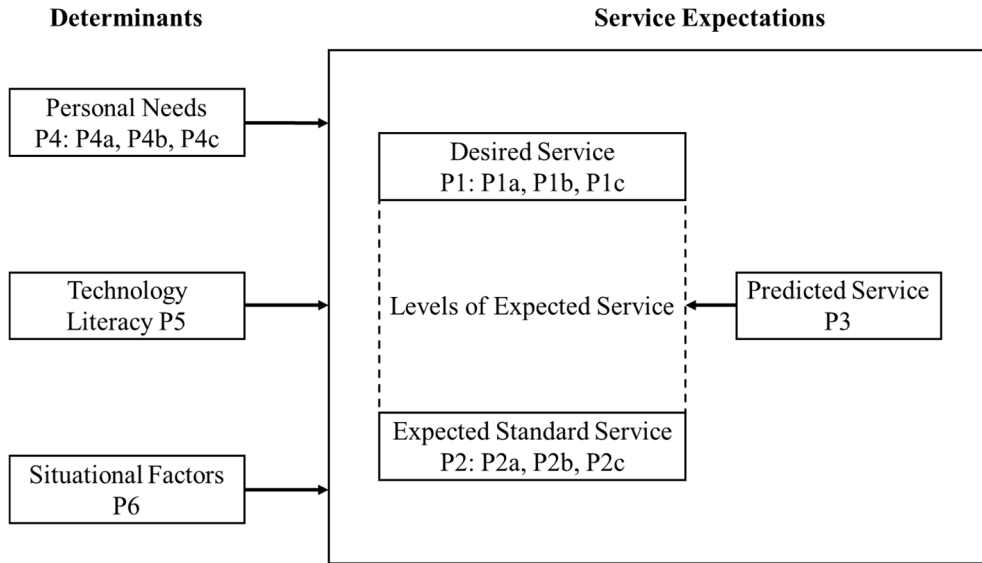
Figure 4.2. Overall framework of last-mile logistics research.

## 4.3. Paper II

The purpose of this paper is to map the forms and determinants of customer expectations of unattended grocery delivery services. The systematic literature review (paper 1) highlights the lack of consumer insights into last-mile logistics research. To address this gap, a multiple case study of early adopters was conducted to explore their expectations of unattended grocery delivery services. The study provides a conceptual model (Figure 4.3) that contributes to understanding what consumers expect from unattended grocery delivery services and how they form these service expectations. Three types of services expectations were identified: desired service, expected standard service, and predicted service. The case study

evidence suggests that these service expectations are formed by three determinants: personal needs, technology literacy, and situational factors. Based on the empirical evidence, a set of propositions was formulated (the underlying reasoning and detailed argumentation are included in the appended paper):

- P1. Consumers expect a combination of forms in their desired service for unattended grocery delivery services.
  - P1a. Consumers desire integrated returns in unattended grocery delivery services.
  - P1b. Consumers desire an open system for unattended grocery delivery services.
  - P1c. Consumers desire nondescript designs for the hardware used in unattended grocery delivery services.
- P2. Consumers expect a combination of forms of expected standard service in unattended grocery delivery services.
  - P2a. Consumers expect to save time by using unattended grocery delivery services.
  - P2b. Consumers expect to gain flexibility by using unattended grocery delivery services.
  - P2c. Consumers expect ease of use in unattended grocery delivery services.
- P3. Consumers predict a sufficient level of security for unattended delivery services.
- P4. Consumers' personal needs elevate their expectations of unattended grocery delivery services.
  - P4a. Consumers have a personal need for stress reduction in grocery shopping.
  - P4b. Consumers have a personal need to limit social interaction in grocery shopping.
  - P4c. Consumers have a personal need to increase spare time and decrease time spent grocery shopping.
- P5. Consumers' technology literacy raises their expectations of unattended grocery delivery services.
- P6. Consumers' expectations of unattended grocery delivery services are elevated by situational factors.



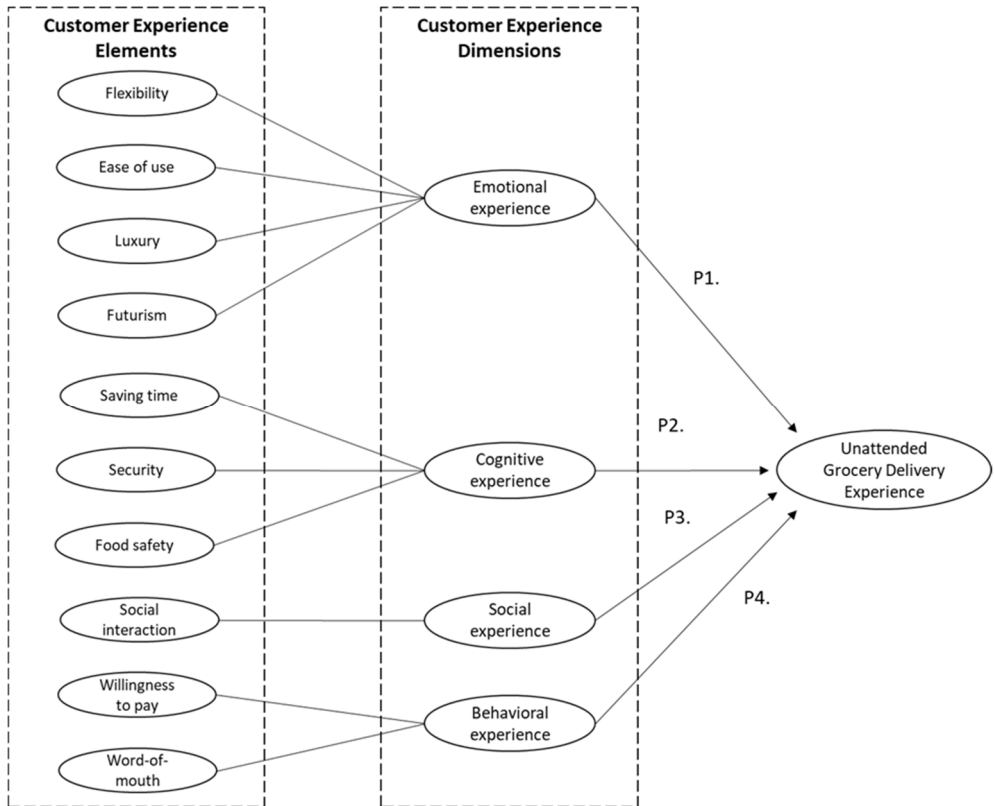
**Figure 4.3.** Conceptual model of the forms and determinants of unattended grocery delivery services.

## 4.4. Paper III

The purpose of this paper is to map customer experience of unattended delivery services in e-grocery retail. While paper 2 provides insights into customer expectations of unattended grocery delivery services, customer experience of such services has not been studied as a distinct construct. The findings offer a conceptual model (Figure 4.4) that represents customer experience elements and customer experience dimensions that together create the unattended grocery delivery experience. The emotional dimension includes the customer experience elements flexibility, ease of use, luxury, and futurism. The cognitive experience dimension includes saving time, security, and food safety. The social dimension incorporates interactions with the social environment, such as family, friends and colleagues. The behavioral dimension includes willingness to pay and word of mouth. Based on the empirical evidence, the following four propositions were put forward (underlying reasoning and detailed argumentation are found in the appended paper):

- P1. The use of unattended delivery services creates an emotional customer experience.
- P2. The use of unattended delivery services creates a cognitive customer experience.

- P3. The use of unattended delivery services creates a social customer experience.
- P4. The use of unattended delivery services creates a behavioral customer experience.



**Figure 4.4.** Conceptual model of dimensions and elements of unattended grocery delivery experience

## 4.5. Understanding the customer journey in unattended grocery delivery services

The three papers described above present the knowledge that was developed continuously to answer the research question that guides this licentiate thesis:

*How do consumers perceive last-mile delivery services?*

Paper 1 provides a broad examination of last-mile logistics literature, which provides a basis for the more focused studies on unattended grocery delivery services in papers 2 and 3. In contrast to previous literature reviews that have investigated more focused aspects of last-mile logistics research (Lim et al. 2018; Melacini et al. 2018; Ranieri et al. 2018; de Oliveira et al. 2017), this paper offers the first broad and comprehensive review that provides an integrated view of last-mile logistics research. Moreover, the systematic review of the literature reveals that last-mile logistics research has mainly focused on emerging trends and technologies as well as operational optimization. However, the review finds that consumer insights in last-mile logistics are scarce. Considering the central role of consumers for last-mile delivery and e-retail, it is important to understand consumers' response to service offerings in last-mile delivery (Lim and Srari 2018). The literature review shows that last-mile logistics research has investigated emerging solutions for goods reception. An emerging goods reception solution is unattended home delivery. The review finds that scholarly investigations of the consumer perception of these novel services are scarce. Considering the rapid growth of e-grocery retail, unattended grocery delivery is an interesting and relevant service to investigate.

Paper 2 addresses the gap of consumer insights into unattended grocery delivery by exploring customer expectations of such services. Customer expectations can affect the choice and experience of unattended delivery services and are, therefore, an important phenomenon to investigate (Oliver 1980; Bitner 1990). Through a multiple case study on early adopters, the study maps the various forms and determinants of customer expectations of unattended grocery delivery services. In line with previous research, the study hypothesizes that there are three forms of customer expectations in unattended grocery delivery: desired service, expected standard service, and predicted service (Zeithaml et al. 1993; Swan and Trawick 1980; Miller 1977). Based on the case study evidence, it is further hypothesized that these service expectations are formed by three determinants: personal needs, technology literacy, and situational factors. While these insights into customer expectations of unattended grocery delivery services contribute to the understanding of the pre-purchase stage of the customer journey, the findings also contribute to understanding the subsequent purchase and post-purchase stages due to the nature of the customer journey (Lemon and Verhoef 2016).

Paper 3 goes beyond customer expectations by exploring the experience of unattended delivery services in the post-purchase stage. In-depth interviews with early adopters were conducted to gain insights into their experience of unattended delivery services. The study identifies 10 customer experience elements. In line with previous research, these customer experience elements are synthesized into four customer experience dimensions: emotional experience, cognitive experience, social experience, and behavioral experience (Verhoef et al. 2009). The identification of these customer experience dimensions and their constituting customer experience elements contributes to a more holistic understanding of the customer journey in relation to unattended grocery delivery services. This study is the first to investigate customer experience as a distinct construct in last-mile delivery. While the findings provide insights into the post-purchase stage, they can have a significant effect on the pre-purchase and purchase stages of subsequent repurchases due to the iterative nature of the customer journey.

The literature suggests that customer expectations and customer experience are interrelated (Oliver 1980). While papers 2 and 3 do not investigate the disconfirmation between the two concepts, the findings indicate a few parallels. For example, early adopters both expected and experienced flexibility, ease of use, and saving time. The findings of the three studies that constitute this licentiate thesis offer some insights and perspective on the customer's journey in unattended grocery delivery. However, these studies contribute with an initial exploration and can, in no way offer a complete picture. In contrast, in line with previous research, the studies re-emphasize the complexity of the customer journey in unattended grocery delivery (Lemon and Verhoef 2016).

## 4.6. Customer experience management in unattended grocery delivery services

Although customer experience management is a promising marketing approach in consumer industries, the literature on this emerging marketing approach remains rather scarce and practitioners have taken the lead. Homburg et al. (2017: 384) define customer experience management as “the cultural mindsets toward [customer experiences], strategic directions for designing [customer experiences], and firm capabilities for continually renewing [customer experiences], with the goals of achieving and sustaining long-term customer loyalty.” The management of the customer experience requires firms to design the customer journey and its touchpoints, manage partner networks, and facilitate a customer-centric focus within the firm.

Thus far, scholarly research has not investigated customer experience management of unattended grocery delivery services. Management of the customer experience in



unattended grocery delivery requires insights into customer experience and its constituting elements across the customer journey. The empirical investigations that lead to papers 2 and 3 make a modest yet important contribution toward customer experience management of unattended delivery services. Paper 2 maps the forms and determinants of customer experience in unattended grocery delivery services, which provides insights into the prepurchase stage of the customer journey. Paper 3 maps the elements and dimensions of customer experience in unattended grocery delivery, which provides insights into the post-purchase stage of the customer journey. These findings can be used for designing the customer journey and its touchpoints and may contribute to an understanding of customer loyalty. However, these contributions toward customer experience management remain rather limited and further research is required to develop a holistic framework of customer experience management in unattended grocery delivery.

## 5. Key findings and implications, limitations, and future research

This section outlines the key findings, theoretical and managerial implications of this research, limitations, as well as suggestions for further research and potential research direction for studies beyond the scope of the research question.

### 5.1. Key findings

This research sheds light on the consumer perspective in last-mile logistics. While the systematic review of the literature shows tremendous growth in academic publications in recent years, it also finds that consumer research in last-mile logistics is scarce. Further, the review reveals a diverse range of theories in the research area, although most publications do not employ an explicit theoretical lens. The two empirical studies included in this licentiate thesis focus on the phenomenon of unattended delivery services in the context of e-grocery retail. The multiple case study sheds light on customer expectations of unattended delivery services. Moreover, the findings offer a conceptual model of the relationship between the forms and determinants of customer expectations. The case study finds various forms of desired service, expected standard service, and predicted service. The empirical evidence demonstrates that these service expectations are determined by personal needs, technology literacy, and situational factors. The interview study illuminates the customer experience of unattended delivery services. The study offers a conceptual model representing the relationship among customer experience elements, customer experience dimensions, and unattended grocery delivery experience. Furthermore, the empirical evidence also reveals various customer experience elements of emotional, cognitive, social, and behavioral experience.

### 5.2. Theoretical implications

This thesis contributes to consumer-centric research in last-mile logistics. Consumer-centric last-mile logistics research is important because consumer

behavior can form the basis for the configuration of last-mile logistics networks (Lim and Srari 2018), and for managing relationships in the supply chain (Esper et al. 2020). Understanding consumer preferences in last-mile delivery can contribute to enhanced consolidation, thereby reducing the cost and environmental impact of last-mile delivery (Buldeo Rai et al. 2019a). The empirical investigation focuses on the emerging phenomenon of unattended delivery services in e-grocery retail. Building on the seminal contribution by McKinnon and Tallam (2003), this research provides an initial exploration of the consumer perspective on unattended grocery delivery services. Furthermore, the exploration of consumer preferences contributes to understanding the feasibility of unattended home delivery services (Punakivi et al. 2001). Study 2 explores the pre-purchase stage of the customer journey by mapping customer expectations of unattended grocery delivery services. However, in contrast to the early work by McKinnon and Tallam (2003), this study finds that the respondents predict a sufficient level of security in relation to unattended grocery deliveries. Study 3 explores the post-purchase stage of the customer journey by identifying and describing customer experience of unattended grocery delivery services. The study highlights the important role of last-mile delivery for customer satisfaction in e-retail.

Individually, the three studies included in this licentiate thesis contribute to consumer-centric last-mile logistics research in various ways. The systematic literature review presented in paper 1 provides a cohesive overview of the research area. The review provides insights into the various aspects and facets of last-mile logistics research. Further, the paper proposes a framework of last-mile logistics research that comprises five interrelated components. This contribution is important because it helps researchers in positioning their work in the research area. Finally, the study provides avenues for future research.

The multiple case study presented in paper 2 contributes with an initial investigation of customer expectations of unattended grocery delivery services. The study uses theory from the marketing discipline to explore the forms and determinants of customer expectations. In line with previous research, the study re-verifies the nature and determinants of customer expectations (Zeithaml et al. 1993). The results add to consumer-centric logistics research by identifying customer needs and forms of service expectations in the specific context of unattended grocery delivery services. Thus, this study provides novel consumer insights in the niche intersection between last-mile delivery and e-grocery retail. In line with previous research, this study re-emphasizes the importance of last-mile delivery for e-grocery retail (Singh 2019; Wilson-Jeanselme and Reynolds 2006).

The interview study presented in paper 3 contributes with an initial investigation of customer experience in unattended grocery delivery services. In line with previous research, this study re-verifies the emotional, cognitive, social, and behavioral nature of customer experience (Lemon and Verhoef 2016). The study extends previous research by exploring customer experience in the specific context of

unattended delivery services. The identification of word-of-mouth and willingness to pay as customer experience elements of the behavioral customer experience dimension re-emphasizes the role of last-mile delivery for overall satisfaction in e-retail (Jain et al. 2021; Vakulenko et al. 2019a).

### 5.3. Managerial implications

This research has several managerial implications. First, the proposed conceptual models can be used by managers to design and improve unattended grocery delivery services. Paper 2 proposes a conceptual model of customer expectations of unattended grocery delivery services, and paper 3 proposes a conceptual model of customer experience of such services. Managers can use the conceptual models and findings from these two empirical papers to ensure a better fit between the firm's service offering and customer expectations. Second, the findings of this research imply that managers need to broaden their view of unattended delivery services beyond operational aspects to include customer expectations and customer experience. Furthermore, the findings of this research highlight the importance of customer expectations and customer experience throughout the customer journey. Given that delivery experience can affect customer satisfaction in e-grocery retail, managers should consider customer expectations and customer experience of unattended grocery delivery to enhance such services. Third, this research provides a basis for measuring customer expectations and customer experience of unattended grocery delivery services. The proposed conceptual models and the propositions provide a basis for operationalizing and measuring customer expectations and customer experience. However, further operationalization is required for developing a measurement scale of customer expectations and customer experience of unattended grocery delivery services. Measuring what customers expect and how they experience unattended delivery services provides an important foundation for managerial decision-making.

### 5.4. Limitations

As any research, the studies included in this licentiate thesis have limitations despite the various measures implemented to enhance research quality and rigor (see Chapter 3.4—Research quality). First, despite the rigorous methodology, the systematic literature review conducted in study 1 might have missed potentially relevant publications due to the search criteria employed, such as search string, language, and publication type. Further, the classification of the literature has its limitations, although intercoder agreement checks were used to enhance the

reliability of findings. Second, study 2 is a multiple case study of early adopters of unattended grocery delivery services in Sweden, limited by the contextuality of case study research. Hence, some findings may be specific only to the Swedish context. For example, the need to limit social interactions in grocery shopping (proposition 4b) could be context-specific. Moreover, the research has investigated the customer expectations of early adopters. Due to the study design, it is not possible to infer service expectations of other consumer groups. The biggest weakness of study 2 is the limited sources of evidence. Case study research typically relies on multiple sources of evidence for data triangulation. However, study 2 mainly relies on semi-structured interviews and direct observations. Additional data would have strengthened the findings of the case study. Finally, study 3 is an interview study of early adopters of unattended grocery delivery services in Sweden. The findings are limited by the contextuality of qualitative research in general. The Swedish context and the choice of early adopters pose limitations to the research findings. Further, the study fails to incorporate customer expectations as an antecedent to customer experience. Instead, the study investigates the customer experience of unattended grocery delivery services as a distinct construct.

## 5.5. Suggestions for future research

This subsection presents directions for future research on unattended grocery delivery services within and beyond the scope of the research question.

### 5.5.1. Extending the theoretical scope

The theoretical scope of the studies that constitute this licentiate thesis poses multiple limitations to this research. Some limitations of the theoretical scope were accepted to investigate the phenomenon of unattended grocery delivery services with limited complexity. In turn, other theoretical frames were put aside. In the following, a brief overview of theories relevant to this research is presented.

This research is the first to investigate customer experience as a distinct construct. Previous research has investigated more focused constructs of customer experience, such as customer satisfaction and service quality (Lemon and Verhoef 2016). Study 3 was deliberately designed to conduct a broad examination of customer experience. This has provided in-depth insights into the customer experience elements and customer experience dimensions that constitute unattended grocery delivery experience. However, future studies could investigate the antecedents and consequences of customer satisfaction as well as service quality. Extending the research on customer satisfaction and service quality to the context of unattended

grocery delivery services could provide additional in-depth insights into the customer journey of such services.

This research investigates customer expectations and customer experience of unattended grocery delivery services to gain insights into the customer journey of such services. This consumer-centric research assumes that the consumer is a key actor. Therefore, conscious choices were made in this research to disregard other aspects of this innovative service. For example, this research does not explore technological aspects of the service although unattended grocery delivery is a technology-enabled service. Therefore, the technology acceptance model (TAM) could provide further insights into the customer journey of such services (Davis et al. 1989). Future investigations could obtain additional insights by extending the theoretical scope to include technology acceptance.

Finally, this research chose to investigate customer expectations and customer experience independently. This approach enabled in-depth investigations of the respective construct with limited complexity. However, the literature suggests that the two constructs are interrelated. Currently, the effect of customer expectations on customer experience remains unclear. Therefore, future research should integrate the two concepts in the context of unattended grocery delivery services. The expectation disconfirmation theory is one of the most widely accepted theories in relation to the customer satisfaction process (Oliver 1980; Oliver 1977). Applying expectation disconfirmation theory could provide a better understanding of how consumers evaluate unattended delivery services.

### **5.5.2. Extending consumer groups beyond early adopters**

This research focuses on early adopters of unattended grocery delivery services. Early adopters were selected because they are an interesting group to investigate in relation to emerging technology-enabled services. However, as discussed in section 5.3, the focus on early adopters also poses certain limitations to the research findings. Therefore, future research should investigate other consumer groups to gain additional insights and a more holistic understanding of the customer journey of other consumer groups. Different consumer groups have different socio-economic characteristics, such as the number of people living in the same household, children living in the same household, spending on groceries, income, and lifestyle (e.g., special diet, sports). Consequently, different consumer groups may have different needs in relation to e-grocery delivery. These personal needs may, in turn, affect customer expectations, customer experience, and eventually customer satisfaction.

Elderly people are a particularly interesting consumer group to investigate. Some elderly are not able to perform grocery shopping by themselves due to physical impairment and reduced mobility, while others may want to avoid crowded places

to reduce infection risks in relation to the coronavirus pandemic. Currently, home care personnel performs grocery shopping for such elderly groups that cannot or do not want to do this by themselves. The implementation of unattended grocery delivery services for this consumer group could improve the use of resources in elderly care; this would significantly enhance the quality of life for this consumer group.

Young professionals are another consumer group that is highly relevant to investigate. This group typically lives in single households, has an above-average income, no children, and is highly familiar with online shopping. Due to the familiarity with online shopping, it would likely be natural for this consumer group to shop for groceries online. In contrast to early adopters, this group might be more interested in shared solutions for unattended grocery delivery services apart from private lockers that are installed permanently in front of the house.

### **5.5.3. Hypothesis testing**

The purpose of this qualitative research was to build theory by gaining in-depth insights into the customer journey of unattended delivery services in e-grocery retail. The selected research design is suitable for exploratory research on emerging phenomena, as previously described in chapter 3.1. This research design limits the external validity of findings and allows only for analytical generalization. Further, based on the selected research design, it is not possible to infer how strongly the various determinants affect the level of customer expectations. As is indicative of qualitative research, papers 2 and 3 provide conceptual models and propositions for further research. Future research should empirically test these hypotheses to validate the findings of the studies included in this licentiate thesis. Quantitative research is suitable for testing the hypotheses provided by this research. This can be done through a survey of e-grocery customers who have used unattended delivery services to receive their orders. The findings of this research provide a conceptual foundation for further quantitative investigations and hypothesis testing.

### **5.5.4. Broadening the conceptual scope**

This research revolves around the customer journey in unattended grocery delivery services. The study is supported by multiple disciplines and its findings contribute to the domains of logistics, marketing, and retail research. However, future studies should broaden the conceptual scope to investigate other relevant concepts in relation to unattended grocery delivery services.

First, while this research has investigated customer expectations and customer experience of unattended grocery delivery services, it remains unclear how the unattended delivery experience affects the overall e-grocery retail experience. The

literature suggests that last-mile delivery has an effect on overall retail experience (Jain et al. 2021; Vakulenko et al. 2019a). However, in the specific context of e-grocery retail, the role of last-mile delivery remains unexplored. In particular, the effect of unattended grocery delivery services on customer satisfaction and loyalty in e-grocery retail needs to be explored further.

Second, considering the growth of the sharing economy and circular economy models, product returns will likely increase dramatically and play a key role in enabling these business models. Therefore, future research should explore how unattended delivery services could be integrated with returns in line with the findings of this research. An unattended system that integrates delivery and returns could become a catalyst for circular business models and a sharing economy.

Third, the sustainability effects of unattended delivery services remain largely unexplored. Unattended delivery services enable logistics service providers to optimize routes, as they do not have to follow any specific time windows. Previous research indicates that eliminating time windows can significantly reduce miles per customer and increase stops per delivery route (Boyer et al. 2009). Thus, scholarly research should investigate the environmental benefits of unattended delivery services. This could contribute to reduced environmental impacts of e-retail.

Finally, the findings of this research show that early adopters desire to use unattended delivery services for items other than groceries, such as books or clothes. Thus, future research should investigate unattended delivery services in a broader context that is not limited to grocery deliveries. Potential product categories depend on the consumer group using the delivery services. For example, elderly citizens may want to receive medical products using unattended delivery services.



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## About the author

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John Olsson has his roots in Germany and Sweden. After graduating in Business Engineering (BSc) from Technische Hochschule Mittelhessen (University of Applied Sciences) in Germany, he moved to Sweden to study Supply Chain Management (MSc) at Linnaeus university. Now he is doctoral student at Lund university in the division of Packaging Logistics. His research coalesces under the umbrella of consumer-centric last mile logistics.



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