

Understanding the transformation toward omnichannel logistics in grocery retail: a dynamic capabilities perspective

OC logistics in
grocery retail

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Abstract

Purpose – Omnichannel (OC) logistics is undergoing a significant transformation in grocery retail. To shed light on this important but underresearched phenomenon, this study aims to investigate how grocery retailers transform and why some are more successful in transforming OC logistics.

Design/methodology/approach – Applying dynamic capabilities as a theoretical lens, a multiple case study was conducted with three grocery retailers at different stages of their transformation.

Findings – Six microfoundations of dynamic capabilities were identified as critical for enabling OC transformation. The study highlights important differences in dynamic capabilities, which can be attributed to investment decision-making, governance and creating co-specialization. Finally, the authors propose seven propositions for contextualization of dynamic capabilities for OC transformation in grocery retail.

Originality/value – This study is original by contextualizing microfoundations in grocery OC retailing. The study contributes to theory and practice by showing the value of dynamic capabilities, stressing the important interrelation among a retailer's governance structure, leadership and capability to make investment decisions, increase logistics coordination and co-specialize.

Keywords OC, Grocery retail, Logistics network, OFC, Automation, Dynamic capabilities, Transformation

Paper type Research paper

1. Introduction

The transformation toward OC has accelerated in the grocery sector (Hübner *et al.*, 2019). The seamless customer experience across numerous sales channels and touchpoints has increased the complexity of order fulfillment, and retailers struggle with plunging profit margins (Verhoef *et al.*, 2015). Therefore, many grocery retailers seek new ways to configure their back-end logistics network (Kembro *et al.*, 2018); they invest in new logistics processes and resources, such as warehouses, automation technology and IT (Information technology) systems, and transform their organizations (Wollenburg *et al.*, 2018; Eriksson *et al.*, 2019). This implies that decisions such as what, where and how to configure logistics networks and the various material-handling nodes have increased in strategic importance. Previous research (e.g. Wollenburg *et al.*, 2018; Zhang *et al.*, 2021) has highlighted the OC transformation of the logistics network as fundamental and explored successful practices for grocery retail. However, knowledge is limited on how these retailers actually transform to

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achieve a sustainable competitive advantage. To address this research gap, this study aims to investigate how and why grocery retailers succeed in transforming their OC logistics. Two research questions (RQs) are addressed as follows:

RQ1. How are grocery retailers transforming their OC logistics?

RQ2. Why some are succeeding faster in transforming OC logistics, i.e. which dynamic capabilities have been essential and necessary?

The dynamic capabilities theory is increasingly used as a theoretical lens to understand the ongoing change (e.g. [Martinelli et al., 2018](#); [Haag et al., 2019](#)). The theory focuses on organizations' capabilities to responsively, purposefully and efficiently adapt their current ordinary capabilities (i.e. routine activities, administration and basic governance; [Teece, 2018](#)) to external changes ([Helfat et al., 2007](#)). This theoretical lens, which has been defined as "the firm's ability to integrate, build, and reconfigure (transform) internal and external competencies to address rapidly changing environments" ([Teece et al., 1997](#), p. 516), is thus useful for investigating and understanding the OC transformation in grocery retail characterized by rapid growth, changing customer expectations and new technological development.

2. Conceptual foundation

2.1 *Dynamic capabilities theory*

Dynamic capabilities theory was introduced by [Teece and Pisano \(1994\)](#) to describe and explain firms' abilities to change their ordinary capabilities to better adapt to a dynamic environment. For this purpose, [Teece \(2018\)](#) defines ordinary capabilities as "the routine activities, administration, and basic governance that allow any organization to pursue a given production program, or defined set of activities, more or less efficiently" (p. 40). In other words, a firm has a set of ordinary capabilities that needs to be adapted to the environment, and the ability to make this transformation is referred to as dynamic capabilities.

The three higher-order dynamic capabilities include (1) sensing opportunities and threats, (2) seizing identified opportunities (e.g. committing resources) and (3) managing reconfiguration (transformation) ([Teece, 2007](#)). This paper focuses on seizing and transformation, which, according to [Teece \(2018\)](#), concerns the transformation of existing ordinary capabilities, as well as the investment in new ordinary capabilities. The seizing and transforming capabilities are operationalized into secondary dynamic capabilities, or microfoundations, which provide detailed explanations (e.g. distinct skills, processes, procedures, organizational structures, decision rules and disciplines) of the reconfiguration ([Teece, 2018](#)). Four microfoundations help explain the transformation of existing ordinary capabilities: near decomposability (decentralization vs integration), co-specialization, governance and learning/knowledge management ([Teece, 2007](#)). For investment in new ordinary capabilities, two microfoundations are described: decision-making protocols for investments and building loyalty and commitment ([Teece, 2007](#)). We use this as our conceptual foundation ([Figure 1](#)).

2.2 *Dynamic capabilities and microfoundations used in the logistics context*

While dynamic capabilities theory is used in many research disciplines, its application to the retail context is limited to a few relevant contributions. A few studies (e.g. [Martinelli et al., 2018](#); [Rajaguru and Matanda, 2019](#); [Sandberg and Hultberg, 2021](#)) have focused on the managerial and organizational application of dynamics capabilities in retail. Studied topics include fashion retailers' internationalization ([Frasquet et al., 2018](#)) and logistics service quality from customers' perspective ([Hüseyinoglu et al., 2018](#)). A number of researchers have combined dynamic capabilities with logistics ([Table 1](#)), often suggesting specific supply chain/logistics capabilities. In these studies, the unit of analysis differs (e.g. logistics flexibility, [Sandberg, 2021](#); sustainable supply chain management, [Beske et al., 2014](#) and

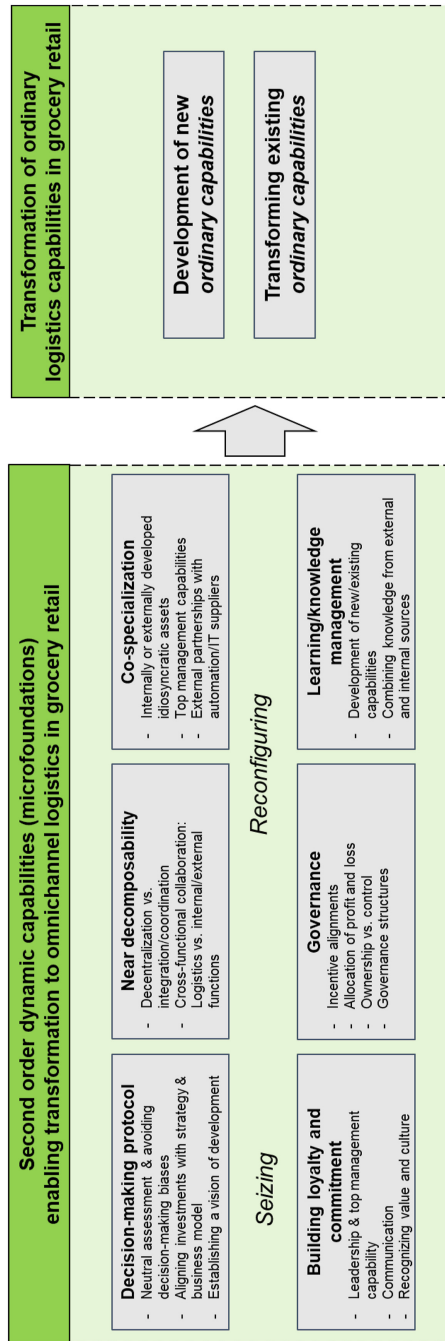


Figure 1.
Conceptual framework

logistics organizational learning, [Esper et al., 2007](#)). Although distinctions between different types and orders of capabilities are lacking, the original microfoundations of [Teece \(2007\)](#) are implicitly represented to varying degrees ([Table 1](#)). While studies have stressed integration, co-specialization and learning together with leadership more generally, limited attention is

Higher-order dynamic capabilities	Second-order capabilities (microfoundations)	Microfoundations found in logistics and SC	References
Seizing opportunities	Selecting investment decision-making protocols Building loyalty and commitment	Leadership capability Managerial knowledge and presence Leadership capability	Haag et al. (2019) Sandberg and Abrahamsson (2011) Haag et al. (2019)
Reconfiguration (align existing capabilities and invest in additional capabilities)	Governance	–	–
	Near decomposability and integration/coordination	Internal coordination and pooling of resources and inventory	Sandberg (2021)
		Integration capability	Gruchmann and Seuring (2018) , Haag et al. (2019)
		Cross-functional teamwork	Sandberg and Abrahamsson (2011)
	Co-specialization	Integrated SC capability	Zhang et al. (2021)
		Partner development	Beske (2012) , Beske et al. (2014) , Gruchmann et al. (2019)
		Supply chain relationships	Sandberg and Abrahamsson (2011)
	Knowledge management	Supplier collaboration	Sandberg (2021)
		Supply chain orientation	Defee and Fugate (2010)
		Networking capability	Mitrega et al. (2012)
		Co-evolving	Defee and Fugate (2010) , Beske (2012) , Beske et al. (2014) , Gruchmann et al. (2019)
		External partnership to access knowledge	Sandberg (2021)
		Logistics learning	Esper et al. (2007) , Sandberg and Abrahamsson (2011) , Gruchmann and Seuring (2018) , Haag et al. (2019)
		Learning orientation	Defee and Fugate (2010)
		Knowledge management	Rebs et al. (2019)
		SC re-conceptualization	Beske (2012) , Beske et al. (2014) , Gruchmann et al. (2019) , Rebs et al. (2019)
		Continuous redesign of logistics systems	Sandberg (2021)

Table 1.
Research combining dynamic capabilities with logistics

paid to governance, building commitment and decision-making processes for investments. Next, we go through each of the microfoundations relevant for transforming existing capabilities and investing in new ordinary capabilities.

The first microfoundation, *selecting decision-making protocols for investments*, emphasizes the ability to commit resources and invest in new ordinary capabilities to complement old capabilities (the output of sensing) (Teece, 2018). This concerns when, what and how much to invest, as well as aligning the investment with an organization's strategy and business model. Investments in new ordinary capabilities related to technology (e.g. automation solutions), new facilities [e.g. online fulfillment centers (OFCs)] and new internal processes seem to be prerequisites for OC grocery retailers to be competitive (Marchet *et al.*, 2018; Eriksson *et al.*, 2019). According to Teece (2007), the decision-making protocol should ensure a neutral assessment of both old and new investments. Investing in new automation systems, for example, implies committing substantial financial resources to a vision of future technology and market position, and predicting the future always means high uncertainty (Teece, 2007).

The second microfoundation, *building loyalty and commitment*, includes demonstrating leadership, communicating and recognizing values and culture (Teece, 2007). Leadership capabilities, such as top management's communication and actions, are critical for creating loyalty and commitment to innovation and efficiency improvements in the logistics network (Teece, 2007; Haag *et al.*, 2019). Management must create an organization where everyone involved in the investment decision feels safe and comfortable being honest and objective. In the end, "some level of managerial consensus will be necessary to allow investment decisions to be made" (Teece, 2007, p. 28).

The third microfoundation, *governance*, includes, for example, the connection between ownership and control of management. Teece (2007) argues that an organization's ability to reconfigure continuously will deteriorate as the separation between ownership and control increases. Explicit connections between board-level and top management, as well as leadership skills among board members and top managers, are crucial to overcoming these governance issues (Teece, 2007). Furthermore, governance includes incentive alignment, for example, redesigning incentives to ensure that all business units (BUs) are aligned toward the same vision. Research on dynamic capabilities in logistics and supply chains seems to overlook this microfoundation. However, in retail, a more or less complex governance and ownership structure exists, for e.g. franchise or cooperation (Ingene and Pelton, 2020). For OCs, designing an incentive system in organizations with centralized governance structures is relatively easy but more difficult for decentralized structures (e.g. franchise) involving allocation between different entities (Xu and Cao, 2019). In addition, more decentralized governance structures create higher hurdles to achieve centralized online solutions (Wollenburg *et al.*, 2018).

The fourth microfoundation, *near decomposability*, means balancing between decentralization and integration/coordination, for e.g. the tension between having autonomous organizational units making decisions rapidly vs capturing economies of scale and coordination of activities. As OC transformation implies increasingly complex network configurations (Kembro *et al.*, 2018; Hübner *et al.*, 2019), the balancing act between decentralization and integration/coordination gets more important for grocery retailers. Cross-functional integration and coordination are recurring themes in the logistics literature (cf. Norrman and Naslund, 2019) and can be described as continuous routines critical for the ability to reconfigure (Beske, 2012; Sandberg, 2021). Cross-functional integration can entail increased collaboration with top management, integration between different company functions (e.g. logistics and marketing) and collaboration with external actors (Haag *et al.*, 2019; Sandberg and Abrahamsson, 2011).

Fifth, Teece (2007) highlights the microfoundation *co-specialization*, implying that combining assets could enhance their individual value. Co-specialized assets are idiosyncratic and more difficult for competitors to copy. As the asset owner might not understand its value for others, integrated operations and internal coordination are prerequisites to capture co-specialization benefits and achieve strategic advantage (Teece *et al.*, 1997). Also important is the top management's ability to identify co-specialized assets to invest in either through internal development or external partnerships. OC development requires more collaborations across, and beyond, the retailer's logistics organization (cf. Zhang *et al.*, 2021), and in logistics research on dynamic capabilities, partner development and supply chain collaborations as means to develop co-specialized assets are recurring (Defee and Fugate, 2010; Gruchmann *et al.*, 2019).

The last microfoundation, *learning and knowledge management*, facilitates continuous reconfiguration and development of existing and new routines, processes and skills (Defee and Fugate, 2010) and the conversion of "learning outcomes to new logistics management strategies, tactics, and operations in support of further developing other logistics capabilities" (Esper *et al.*, 2007, p. 63). In OC transformation, the old processes and skills of retailers' logistics organizations may be less valuable and lack best practices (Eriksson *et al.*, 2019). Therefore, the company's learning process aims to absorb as much knowledge as possible from external and internal sources (Esper *et al.*, 2007; Sandberg and Abrahamsson, 2011). Thus, combining knowledge from both external and internal actors is a key to unique resources (Eriksson, 2014). From an external perspective, joint learning benefits all involved partners by accessing external resources and new competencies (Beske *et al.*, 2014; Sandberg, 2021).

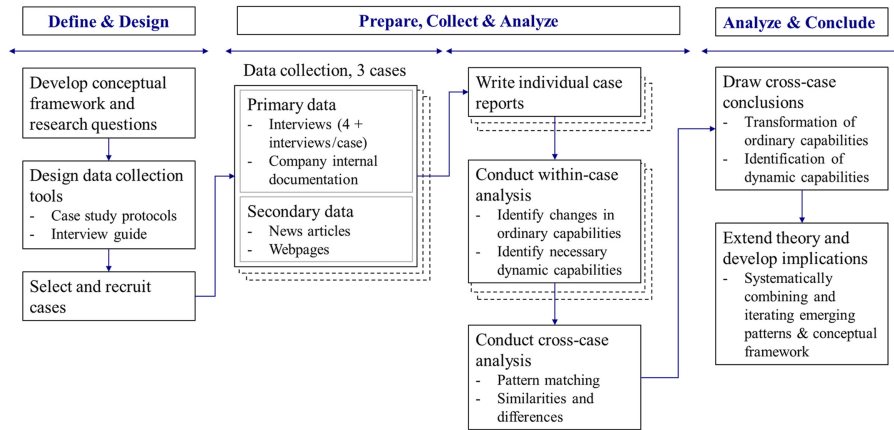
3. Methodology

Phenomenon-driven research has traditionally been dominated by qualitative methods (Schwarz and Stensaker, 2016). We are studying an emerging and contemporary phenomenon in a real-life context, which motivates our multiple case study (Meredith, 1998; Yin, 2014). This theory-elaborating case research (Ketokivi and Choi, 2014) is informed by Yin (2014) (see Figure 2) and aims to contextualize the dynamic capability theoretical lens for OC logistics.

Case selection is vital when using multiple cases (Eisenhardt, 1989; Voss *et al.*, 2002). To represent our unit of analysis, "the ordinary logistics capabilities and dynamic capabilities of a grocery retailer in OC transformation", we searched for appropriate grocery retailers transforming their OC logistics. Our selection of cases and informants aimed to maximize conceptual insights and understanding (Darby *et al.*, 2019), using purposeful sampling to maximize information thickness rather than generalization properties (Flyvbjerg, 2006). Criteria for cases were them (1) *being in a transformation toward OC*, (2) *having both stores and online channels* and (3) *participating and providing the researcher access to the people with relevant knowledge to interview*. Three grocery retailers meeting all criteria were included in the study. They were similar in size (among the leaders in their countries) but represented different ownership and governance structures (Figure 3), geographical coverage, online organizations and different stages in OC development (see Section 4), where OC refers to the ability to provide customers with a seamless experience across numerous sales channels and touchpoints (Verhoef *et al.*, 2015). To guarantee anonymity, they are referred to as Beta, Gamma, and Epsilon, and no specifics regarding the country or market share will be provided.

The case-research approach enabled the triangulation of multiple data sources (Meredith, 1998) and perspectives. Semi-structured interviews (of several representatives from each case representing different functions (Table 2)) gave primary data, capturing all aspects of the

Figure 2.
Research design



Ownership and governance structure	Beta (cooperative, owned by the customers organized in customer associations)				
Business units involved in omnichannel logistics	Central organization (Joint central functions to achieve economies of scale)			Store organization (stores organized per customer associations)	
	Digital business development	Logistics organization		Online Operations	Customer Associations
Main responsibility of each business unit	Digitalization strategy <ul style="list-style-type: none"> - Digitalization process - Coordinating omnichannel development 	Store logistics <ul style="list-style-type: none"> - Replenishments to network of stores - Large volumes managed - < 5 semi-automated DCs - Procuring organization 	Online logistics connected to OFC <ul style="list-style-type: none"> - One OFC - OFC operations - Home delivery - Online logistics development connected to dark store 	Online operations <ul style="list-style-type: none"> - Online platform - Online strategic development - Customer service - Logistics development connected to in-store picking 	Towards customers <ul style="list-style-type: none"> - Owner of customer relationships - Owner of all sales (physical and online) Online logistics connected to stores <ul style="list-style-type: none"> - In-store picking - Home delivery - Click & Collect for all stores.
Ownership and governance structure	Gamma (listed company owning central functions, individually owned stores)				
Business units involved in omnichannel logistics	Central organization (Joint central functions to achieve economies of scale)			Store organization (each store is independent)	
	Digital transformation	Business development	Logistics organization	IT organization	Independent stores
Main responsibility of each business unit	Transformation strategy <ul style="list-style-type: none"> - Responsible for digital strategy and transformation - Coordinating omnichannel development 	Business development strategy <ul style="list-style-type: none"> - Digitalization process and business development 	Store logistics <ul style="list-style-type: none"> - Replenishments to network of stores - Large volumes managed - Automated DCs 	Online logistics connected OFC <ul style="list-style-type: none"> - Two OFCs - OFC operations - Home delivery - Click&Collect - Online logistics development 	Joint IT-structure <ul style="list-style-type: none"> - Online platform - Joint IT-system to support omni development Towards customers <ul style="list-style-type: none"> - Owner of customer relationships - Owner of all sales (physical and online) Online logistics connected to stores: <ul style="list-style-type: none"> - In-store picking - Home delivery - C&C in store
Ownership and governance structure	Epsilon (listed company, largest shareholder has majority, house of brands)				
Business units involved in omnichannel logistics	Central organization (Joint central functions to achieve economies of scale)			Store organization (stores organized per brand)	
	Digital business development	Logistics organization		IT organization	Brand organization
Main responsibility of each business unit	Omnichannel strategy <ul style="list-style-type: none"> - Digitalization process and business development - Coordinating omnichannel development 	Store logistics <ul style="list-style-type: none"> - Replenishments to network of stores - Large volumes managed - > 5 manual DCs 	Online logistics connected OFCs <ul style="list-style-type: none"> - Two OFCs for three brands - OFC operations - Home delivery - Click&Collect - Online logistics development 	Joint IT-structure <ul style="list-style-type: none"> - Online platform - Joint IT-system to support omni development - Joint TMS 	House of brand with three different brands: <ul style="list-style-type: none"> - Three omnichannel strategy towards customers - Owner of customer relationships and physical store sales Online logistics connected to stores: <ul style="list-style-type: none"> - In-store picking - Home delivery - C&C in store

Figure 3.
Presentation of case companies

Table 2.
Overview interviews

Case	Interviewee	Code	Date
Beta	Operations manager – online logistics	Beta_OLog	October 2020
	Head of digital customer experience	Beta_Dig	October 2020
	Head of online operations	Beta_HoO	October 2020
	Director transportation and online production	Beta_ToP	October 2020
Gamma	Strategy and development manager	Gamma_Strat	October 2020
	Chief strategy and digital officer	Gamma_Dig	October 2020
	Project manager, automated OFC	Gamma_PM	November 2020
	Manager – flow optimization, automated OFC	Gamma_OFC	June 2021
Epsilon	Head of logistics, automated OFC	Gamma_Log	July 2021
	Program manager – Omnichannel DC	Epsilon_PM	October 2020
	Head of digital development and E-commerce	Epsilon_Dig	December 2020
	Head of logistics	Epsilon_Log	December 2020
	Site manager – Omnichannel DC	Epsilon_ODC	January 2021

current logistics organization, OC transformation and dynamic capabilities. The interview guide was based on our conceptual foundation and reviewed by three different researchers (available upon request). The interviews started with broad, open-ended questions to ensure open conversation and proceeded with more specific questions while the detailed questions came last (Yin, 2014). The interviews covered both changed ordinary logistics capabilities and enabling dynamic capabilities, asking for reasons for certain decisions and reflections on experiences from transformation. To help informants prepare (Voss *et al.*, 2002), questions were shared before any interview and progressively updated.

At least four informants per case company were interviewed, and each interview lasted 90–120 min (Table 2), with interviews recorded and transcribed. Much effort went into identifying the right roles within the organization to interview. All interviewees received an interview summary that they approved. Also, secondary data (web pages, news articles and annual reports) were used to validate the primary data. This triangulation helps providing the most accurate picture of the events.

Coherent with our research approach, former theory and empirical data were examined simultaneously and in a balanced manner (Ketokivi and Choi, 2014). To elaborate theory, data analysis proceeded through abductive iterations between the framework and the data (Ketokivi and Choi, 2014). Steps included concurrent data reduction, data display, coding and drawing and verification of conclusions (Miles and Huberman, 1994) (first individually and then jointly by the two researchers) (Miles and Huberman, 1994; Voss *et al.*, 2002). The raw data (transcripts) for each case were first coded longitudinally to display phases of the transformation of ordinary logistics capabilities. Through cross-case pattern matching (Eisenhardt, 1989), five areas emerged as most interesting in the transformation of ordinary logistics capabilities. To identify relevant elements of the dynamic capability *reconfiguration*, a within-case analysis was conducted to openly code and understand the key elements of the longitudinal reconfiguration before similarities and differences between the cases were coded, compared and contrasted (Miles and Huberman, 1994). The matched patterns that emerged were systematically compared with the conceptual foundation in a highly iterative process (Eisenhardt, 1989) to build and elaborate theory and draw conclusions.

Generalizing from cases (transferability) is claimed not to be “proof” in a statistical sense; thus, we make analytical generalizations (leveraging literal and theoretical sampling logic) to explain similarities and differences between different cases (Voss *et al.*, 2002; Yin, 2014). To reach trustworthiness, actions of Lincoln and Guba (1986) were followed (see Table 3).

Research quality dimension		OC logistics in grocery retail
Approaches used in this study		
Credibility	All interviewees were given the opportunity to review and approve a summary of their transcribed interviews	1103
Transferability	To be able to transfer results to different contexts, rich description of each case and its contexts are provided in the method chapter (see Figure 2). However, some aspects of the cases and their contexts are not included to allow for anonymity	
Dependability	The method choices and the research design are described in detail in the method chapter (see, e.g. Figure 1)	
	Results are presented continuously at conferences, and input from other researchers validates findings	
Confirmability	In-depth descriptions of cases and details on how the data are collected in the method chapter to assure integrity of results. Interview guide provided upon request	Table 3. Overview of research quality

Table 3.
Overview of research quality

4. Empirical description of the OC transformation of ordinary logistics capabilities

The OC transformation of ordinary logistics capabilities in the three cases is summarized over time in [Figure 4](#). Across these transformations, we inductively identified five themes, which are described below. Detailed coding and corresponding interview quotes are included in [Table A1](#).

4.1 Developing a joint OC strategy across the organization and establishing the role of logistics

The first theme concerns the OC strategy and cross-brand vision, showing differences between the cases. Epsilon’s central strategy, along with a joint vision for all brands and cross-functional BUs, provided a clear role for logistics. This was explicitly defined as key for a successful OC strategy (Epsilon_Dig). Like Epsilon, Gamma developed a joint vision for both stores and central organizations, with logistics taking on a more central role. Gamma’s stores have independent owners, and this previously made it difficult to develop a joint company strategy, which partly slowed down decision-making (Gamma_Dig). By adopting a joint vision and strategy, Gamma was able to overcome challenges connected to ownership structure and decentralized decision-making (Gamma_OFC). Beta still lacks (but works toward) a joint, clear company strategy and vision across channels. This made logistics’ role and responsibility unclear from a strategic perspective (Beta_ToP).

4.2 The strategic focus of online logistics develops similarly for all cases

For all cases, the strategic focus of online logistics started with a phase prioritizing growth and increased market shares over cost. Online logistics’ primary goal was to fulfill customer expectations and requirements, which were managed by allowing fast decision-making through the decentralization of the online organization (Beta_HoO). All cases were then moved into the current phase, with a more established online channel and larger sales volumes. This phase focused on developing online logistics through scaling up: Epsilon focuses on setting the necessary logistics conditions for expansion and growth (Epsilon_Dig) and Gamma_Dig operationalizes logistics, while Beta “rationalize[s] and streamline[s] existing online operations” (Beta_ToP). Capturing economies of scale and coordinating activities are now, to some extent, prioritized over rapid decision-making.

The cases’ online channels are yet to show profit, which is a challenge that permeates the entire industry. Thus, future focus will be on achieving online channel profitability, and thus,

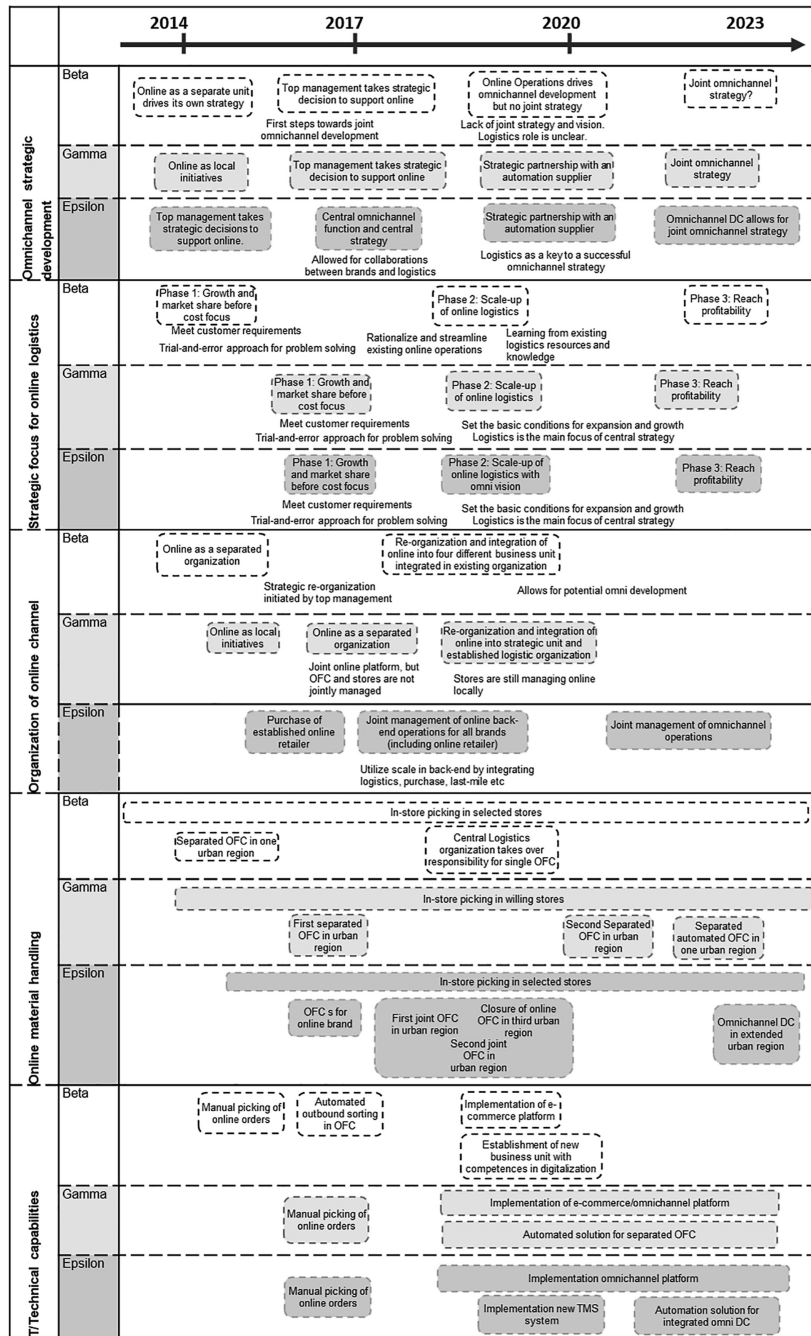


Figure 4.
Within-case
longitudinal analysis of
the cases' transformation of
logistics ordinary capabilities

all cases find the current upscaling of online logistics essential. For example, Gamma currently focuses on making the right logistics investments to ensure that the online channel can be profitable in the future (Gamma_Strat). Similarly, Epsilon's decision to automate its OC distribution center (OCDC) is primarily motivated by a reduced cost ratio for online fulfillment (Epsilon_PM).

4.3 Integration of the online channel with the established organization is a key to enabling OC

All cases' respondents argued that integrating the online channel with the established organization is a key for transformation toward OC. Both Beta and Gamma initially had separate organizations operating their OFCs. In 2019 and 2020, Beta's and Gamma's top management-initiated strategic re-organizations, giving the established logistics organization responsibility for OFCs. The re-organization allowed the central organization to utilize their existing knowledge to improve and streamline OFC operations (Beta_ToP, Beta_OLog and Gamma_Dig).

While cross-channel collaborations between online and established store logistics have increased for Beta, their online BU still controls strategic development. Gamma's all stores are independently owned and operated, while its central organization owns joint functions, such as logistics and purchasing. As a result, Gamma has struggled to balance decentralization and integration. Going forward, Gamma finds it crucial to involve both IT and logistics in the strategic development of an online channel (Gamma_Dig) and therefore has established a cross-functional strategic forum. Furthermore, logistics are represented in the online channel's management team. While the established logistics function has responsibility for online logistics operations, Gamma's chief strategy and digital officer simultaneously has the overall strategic responsibility for the online channel, including logistics. In comparison, although Epsilon entered the online market after Beta and Gamma, Epsilon first created a more integrated organization (Epsilon_Dig). In 2019, Epsilon announced its construction of an automated OCDC combining both stores and online, which required Epsilon to establish a cross-functional OC program with a central OC strategy.

4.4 Current logistics network combines OFCs and in-store picking for online order fulfillment

All cases combined OFCs and in-store picking to fulfill online orders. Beta and Epsilon use selected stores, mostly related to the geographical area and population density, while Gamma lets each independent storeowner to decide. Gamma and Epsilon had two OFCs in two different urban regions, while Beta chose one in the biggest urban region. All OFCs are operated by central logistics but with stores responsible for in-store picking.

All three cases offer home delivery (from OFC or store) and pick-up in-store [click-and-collect (C&C)]. For Epsilon, the established logistics organization is responsible for the last mile, by itself or using outsourced carriers. For Beta and Gamma, the established logistics organization is responsible for the last mile from OFC by outsourcing transportation to carriers, but each store handles its last mile by itself.

4.5 Ordinary logistics capabilities related to IT, technology and automation display several differences

Epsilon is currently building a large, automated OCDC that will serve a large part of its market, cross-channels and cross-brands. Simultaneously, Epsilon closes several DCs (distribution center) serving stores today. Their new OCDC will open in 2023, which is complemented by OFCs and in-store picking in other geographical regions. This new type of OCDC is rare globally, making Epsilon collaborate tightly with its provider. Epsilon also

invested in a new transportation management system (TMS) to support OC development as part of the DC project.

Gamma partnered with a provider of complete online solutions, including OFC automation and an online platform (going live 2022), with all different parts fully integrated. Gamma believes that investing in a complete solution will make them quickly jump forward, with the automated OFC increasing both picking efficiency and capacity (Gamma_Strat). They target more than double-picking efficiency compared to current manual OFCs. Unlike Epsilon, Gamma chose a separate OFC because of channel optimization. Despite investing in two different automation/warehouse solutions, both Gamma and Epsilon will continue collaborating with their respective providers when the warehouse is in operation. Their providers will be responsible for operating the entire automation system and work closely with site employees.

Beta recently invested in, and implemented, a new online platform to support the OC customer experience, stating this as a first step to ensure online integration with Beta's other systems. Beta is currently investigating future technical options for online order fulfillment but has not yet made decisions. All of Beta's representatives argue that a pre-condition is a joint OC strategy across the organization.

5. Analysis and discussion of dynamic capability enabling transformation of OC logistics

Next, to understand how the three grocery retailers enable their transformation toward OC logistics (Figure 4), we used our conceptual foundation (Figure 1) to analyze the necessary microfoundations (Figure 5). Detailed coding and corresponding interview quotes are included in Table A2, and the following sections present key findings.

5.1 Investment decision-making process and building loyalty and commitment

As the investment decision-making process and building loyalty and commitment are tightly intertwined among our cases, these two microfoundations are presented together. Several significant investments related to OC logistics were identified across the cases, especially in IT/technical capabilities, process development and organizational changes. The retailers' objectives were to create logistics resources that enabled OC. However, we observed critical differences in investment decision processes regarding how they build loyalty and commitment, which can be explained by the retailers' different governance structures.

First, Epsilon and Gamma made significant investments in automation, new facilities and process development. Several aspects were included in the decision-making. As listed companies, Epsilon's and Gamma's boards formally decide these significant investments, implying that top management and the board are well aligned and work toward the same OC vision. Second, significant investment implies the commitment of substantial financial resources to a vision of future technology and market position. Both cases explained that although OC capacity need is a complex question, they had to commit to a scenario and vision of online market growth to start their projects (Epsilon_Lo and Gamma_Dig). Finally, the joint vision and created scenario also helped align different organizational functions, making everyone committed to the investments. Thus, the OC visions and scenarios developed by Epsilon and Gamma, combined with top management abilities, seem to be critical for investment decision-making.

Both Gamma and Epsilon stressed the importance of anchoring investments in the organization and aligning all involved BUs. The decision-making process was crucial for both cases' success. They included key people from all units being impacted by the decision, building loyalty and commitment toward the transformation. In comparison, all of Beta's

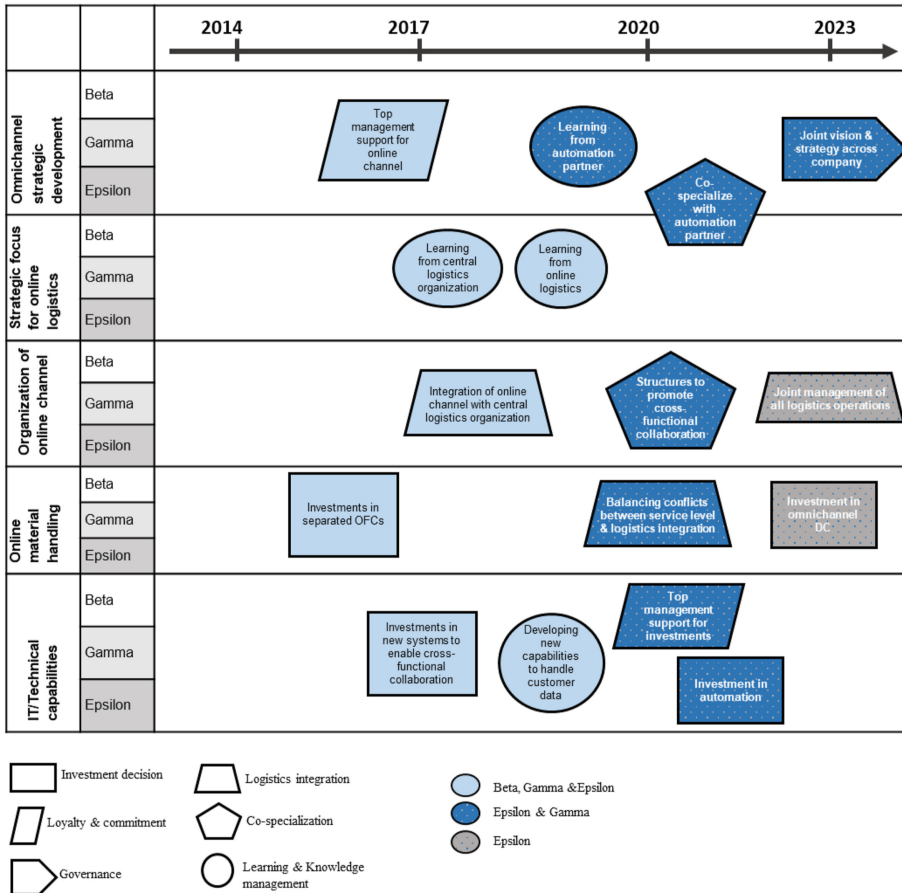


Figure 5. Within-case and cross-case longitudinal analysis of the cases' microfoundations for the transformation dynamic capabilities

respondents stated that an investment in automation for online order fulfillment would be necessary to compete in the OC market. However, aspects such as lack of joint OC strategy and vision, further complicated by the lack of ability to predict the growth rate of online volumes, make it difficult for Beta to commit to a specific solution (Beta_ToP, Beta_OLog and Beta_HoO).

5.2 Governance and ownership

Governance structures, including ownership models (Figure 6), differ between our cases. Epsilon has the most centralized governance and ownership structure, where stores are owned and operated by the company, which seems to simplify investment decisions.

Gamma and Beta have more decentralized and complex governance structures, often recurring in grocery retail. Gamma's stores are individually owned and operated but represented on Gamma's board through membership in the retail store association. Each store purchases joint services (such as store replenishment) from Gamma's central functions and decides the prices against the customer. This governance structure has been a challenge when it comes to driving a centralized online strategy. The store owners are self-employed

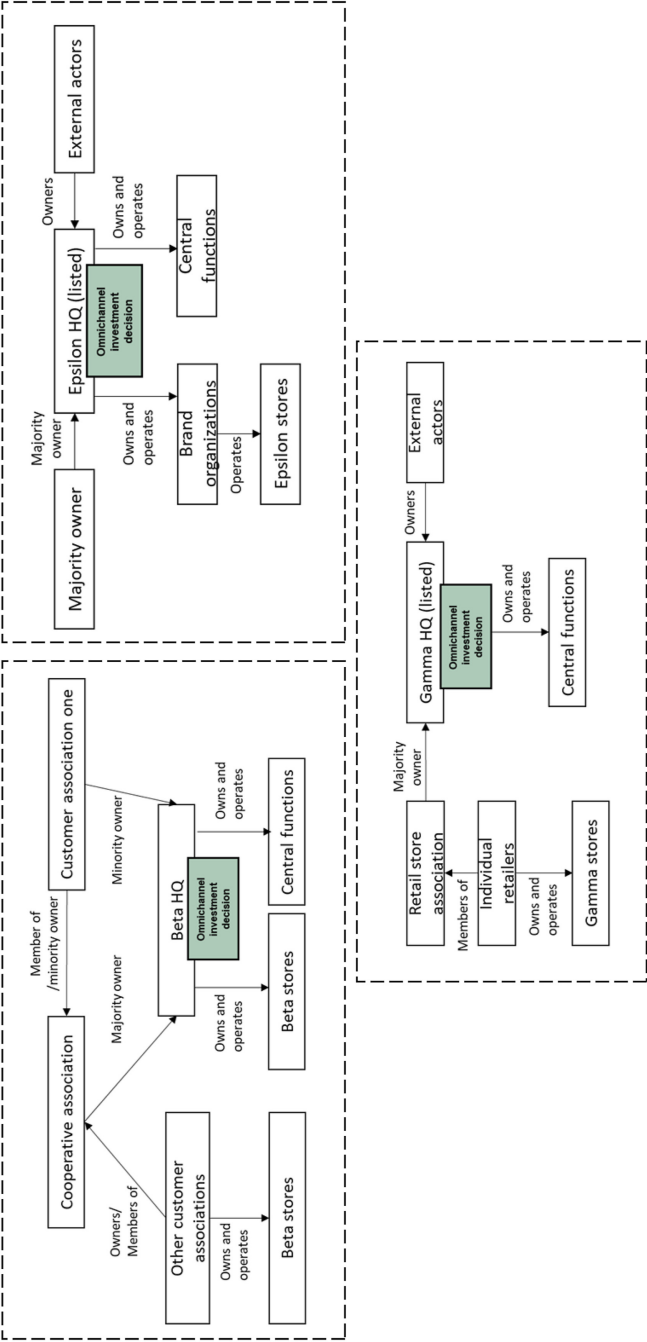


Figure 6.
Ownership model for
each case

and not forced to join the central online channel, which has historically slowed down decision-making. However, since the stores (through the retail store association) and Gamma HQ (headquarters) agreed on a strategy and vision for online, execution has been fast (Gamma_Dig). Gamma's joint strategy created similarities between Gamma and Epsilon; both have a listed headquarters company and now a joint strategy that the long-term majority owner represented in the board drives.

Beta is not a listed company and has a more complex governance structure where stores are owned by either different store associations or the HQ, and all are run by hired store managers. Beta HQ has two different customer associations as owners. Customer associations are responsible for P&L (Profit and Loss) and operations, and each association has its CEO (Chief Executive Officer) who wants to pursue its own agenda (Beta_ToP). This decentralized governance structure creates challenges related to decision-making for online stores. Beta's representatives argue that a joint strategy with clearer incentive structures between online and stores will be required to overcome challenges with a decentralized governance model.

5.3 Near decomposability: integration and coordination in and beyond the logistics organization

An important part of OC development seems to be increased integration and collaboration between the logistics organization and other BUs. All cases have been reorganized to enable cross-functional, cross-channel and cross-brand work connected to OC. Epsilon, Gamma and Beta all argue that BUs (such as IT, logistics, business development and stores) must collaborate more closely to co-specialize and succeed with the OC transformation.

A specific aspect of cross-functional integration observed in our cases was logistics integration. All cases favor the integration of online logistics with the existing logistics organization and describe how this creates economies of scale and more efficiently utilized logistics resources (Epsilon_Log). The insight is that retailers working toward OC should view the logistics network as one unit instead of separate channels to utilize existing systems, resources and processes and build volumes in the online logistics network. Although seeing several benefits from logistics integration for online orders, all cases see potential tensions related to service levels. The considerable investments Gamma and Epsilon made in automated centralized material handling for online orders imply a large shift from their current logistics set-up (Gamma_Strat). The logistics organization may need to drive volumes to the centralized unit to justify the automation investment. In contrast, the marketing organization may want stores to handle more orders to enable shorter and more flexible deliveries. This potential conflict depends on the market development for grocery retail online (Epsilon_Log). Gamma's organizational set-up further contributes to the tension between in-store picking and driving volumes to a centralized unit. Beta has not yet decided its future online automation, but Beta_HoO sees risks with a centralized solution and questions whether the competitors' services will satisfy the customers.

5.4 Co-specialization: between internal BUs and with an external partner

The longitudinal mapping of transformed ordinary capabilities (Figure 4) illustrates that Epsilon and Gamma are ahead of Beta in becoming "true" OC retailers. A critical difference is the management of cross-functional collaborations internally and externally and how they are utilized to co-specialize. Epsilon has created a cross-functional "OC programme" responsible for OC development, where representatives across BUs and the three brand organizations work together. The logistics organization drives the program, but Epsilon finds it crucial to involve all affected actors to create a long-term transformation (Epsilon_PM).

As for now, Gamma's joint assessment finds it best to separate online from regular business due to the online channel's unique requirements. Strategic development is, therefore,

part of Gamma_Dig BU. This assessment is also reflected in Gamma's investment decisions to opt for a separate, highly automatized OFC. However, with a growing online channel and OC maturity, online development and digitalization increasingly affect Gamma's organization. Thus, online business development is no longer a "one team show" but requires a transformation of more BUs and internal coordination. This transformation is driven by business development, but logistics and IT are also becoming more involved early (Gamma_Dig).

Lastly, both Gamma and Epsilon collaborate tightly with their respective automation providers as a way to co-specialize. The long-term partnerships include developing and adjusting the automation solutions to fit with the idiosyncrasies of Gamma's and Epsilon's respective contexts. Gamma and Epsilon have chosen two fundamentally different types of automation solutions. Epsilon's automation provider wants to develop a successful worldwide showcase of a new type of OCDC and has thus been very active in the design phase (Epsilon_PM). Gamma opted for an existing solution. While Gamma and its provider try to adapt to Gamma's contingencies, the provider has already defined many requirements (Gamma_PM).

5.5 Learning and knowledge management

Learning is critical for OC transformation in two primary ways for all cases, while Epsilon and Gamma also learn in a third way. First, to integrate entrepreneurial online logistics with the established logistic organization and support online operations' learning from existing resources, an operationalization of online logistics is currently taking place. Beta is, for example, utilizing its existing knowledge from store replenishment logistics to improve the efficiency and profitability of online logistics (Beta_ToP).

Learning also goes in the opposite direction. All cases' representatives agree that certain OC aspects require new knowledge that the existing logistics organizations currently do not possess, for example, to learn how to respond to new demand patterns and customer requirements. Epsilon will implement new processes and innovative automation types in their OCDC, needing new types of knowledge and competence (Epsilon_Log); hence, Epsilon is currently focused on identifying new processes, evaluating related gaps and identifying learnings needed to close them (Epsilon_ODC). Similarly, Gamma expresses the need to learn and improve how to handle online customers' new expectations (Gamma_PM). Gamma closes this gap by ensuring that the logistics department, responsible for future OFC operations and recruitment, works closely with the ongoing OFC project.

Lastly, Gamma and Epsilon learn from their respective automation providers during the design and implementation phase. Both will continue this when the warehouses are in operation. Epsilon describes this collaboration as dynamic (Epsilon_ODC), where they continuously meet in different teams, revise and exchange experiences and challenge each other. Likewise, Gamma's provider relationship is described as a long-term partnership, with both parties active and involved in implementing the solution and developing new processes. Gamma finds another advantage of collaborating with an established solution provider in its experience with grocery retailers in other geographic markets. This supports Gamma's ambition to collaborate with other international partners and access their competencies and capabilities (Gamma_Dig), for example, exemplified with exchanged experiences and lessons learned during the coronavirus disease 2019 (COVID-19) pandemic.

6. Cross-case discussion of ordinary and dynamic capabilities in OC logistics transformation

The three grocery retail cases show interesting similarities and differences in their transformation of OC logistics. Beta seems less transformational, which is potentially

explained by differences in second-order dynamic capabilities (microfoundations). Two noticeable differences are related to the development of new capabilities by investing in new technical capabilities and how they are reconfiguring their logistics organization by integrating different units (Figure 7).

Developing new ordinary capabilities in a dynamic environment almost always includes investments (Teece, 2018). All cases have made investments (seizing) in manual OFCs and front-end platforms, while Gamma and Epsilon have continued to invest heavily in back-end platforms and automation for online order fulfillment. Although Beta states (sense) that these investments are necessary to become profitable and competitive in a future OC market, Beta lacks the ability to seize identified opportunities (cf. Teece, 2007).

To reap the benefits of their respective new investments, all cases *reconfigured and reorganized existing ordinary logistics capabilities* in several ways. We see a pattern of integrating entrepreneurial online logistics with more established logistics. The established logistics organization has gradually become responsible for OFC operations and logistics development connected to the online channel. For Gamma and Epsilon, continuous integration goes in parallel with increasing investments.

While Figure 8 gives an overview of observed cross-case differences and similarities of microfoundations, we will discuss potential reasons.

Different aspects of the microfoundations of *governance* and *building loyalty and commitment* (leadership) seem to be root causes explaining why Gamma and Epsilon are stronger (relative Beta) in developing new ordinary capabilities by *making investment decisions* for technical capabilities. In our cases, the online channel represents a small share of total sales but drives high investments compared to the traditional store channel. A central part of creating commitment in the cases was including all impacted BUs in the decision-making process. Gamma and Epsilon highlight the importance of anchoring the decision across the organization to create acceptance, loyalty and commitment (cf. Teece, 2007) toward the investment decision. Both Gamma's and Epsilon's boards are well aligned with the strategic directions, while Beta is struggling with aligning all parts of the organization toward the same vision. Strong leadership capabilities among top management, with an explicit connection to board level, thus seem to contribute to stronger dynamic capabilities

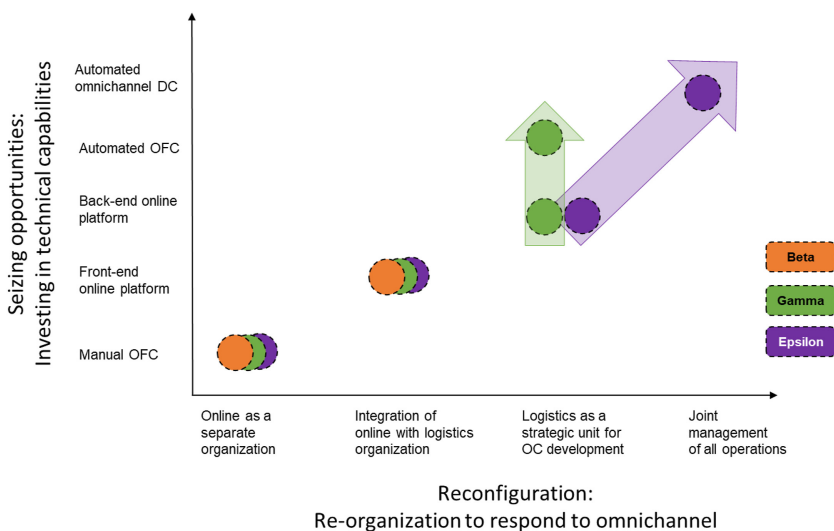
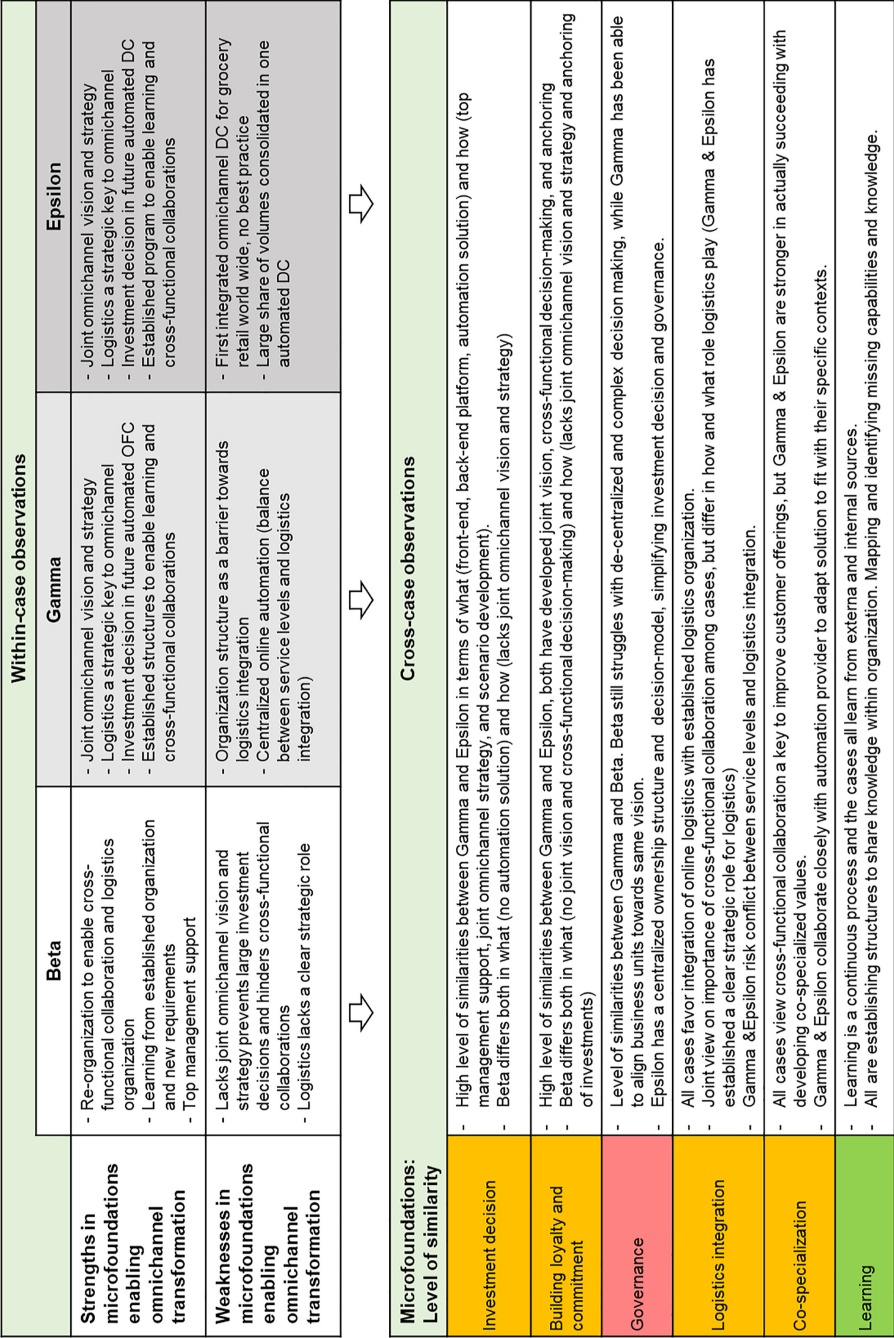


Figure 7.
Transformation of
organization and
technical capabilities

Figure 8.
Cross-case overview of
the cases' microfoundations for
OC logistics transformation
(restructuring)



and the capacity/ability to make more significant investments (cf. [Haag et al., 2019](#); [Teece, 2018](#)). This created a cross-functional understanding and commitment to significant investment in ordinary logistics capabilities and helped align the work across BUs.

A complicating factor for investments, common in retail, is different ownership and governance structures (e.g. franchise, cooperative or independent store owners). Epsilon's centralized structure, with a strong majority owner, seems to facilitate significant investments in new ordinary capabilities. Gamma and Beta have both decentralized governance structures with a division between central functions and stores, which seems to act as a barrier toward central investments in online ordinary capabilities. For Gamma, the stores (through the retail store association) and Gamma HQ agreed on a joint strategy and vision for online. The joint strategy created a governance structure for Gamma's central organization like Epsilon. Gamma now has centralized OC decision-making and a strong majority owner driving a long-term joint strategy. In comparison, Beta's governance structure, with a number of different CEOs driving their own agendas and a lack of joint strategy, can potentially explain the weakness in seizing.

For grocery retail OC logistics, we propose the contextualizations as follows ([Figure 9](#)):

With more decentralized ownership and governance structure of retail stores . . .

P1: . . . the more important for leadership to develop loyalty and commit resources for joint OC logistics investments.

P2: . . . the more important to develop aligned incentives (governance mechanisms) and joint vision to be able to get resource commitment to joint OC logistics investments.

Furthermore, in the decision-making process, Gamma and Epsilon built on the joint vision and established a detailed scenario for how online sales volumes and demands would develop. This scenario was a fundamental condition for the ability to commit to a specific solution. Conversely, representatives from Beta argued that their lack of joint OC vision was one main barrier to making the automation investment decision. In line with [Teece \(2007\)](#), our study thus confirms that establishing a joint vision is important; but for logisticians, creating a detailed scenario of how the organization expects the market and technology to develop is crucial for the ability to make OC investments.

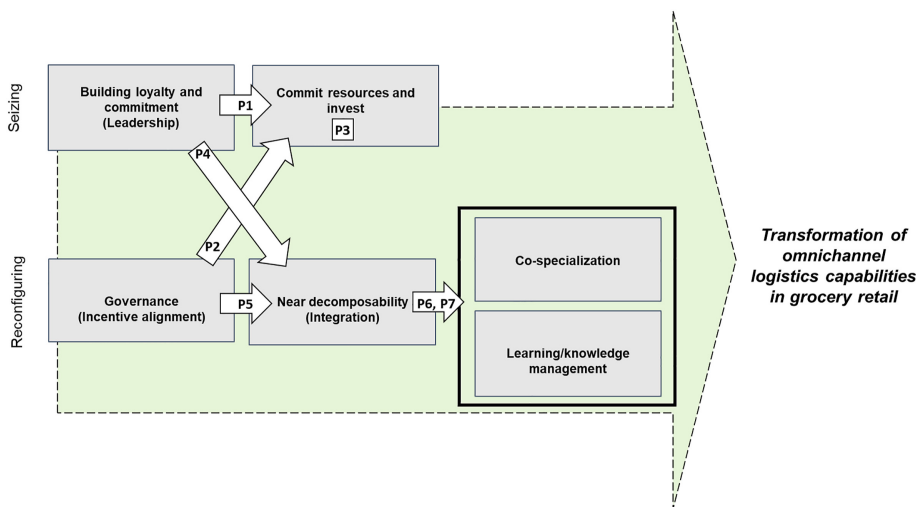


Figure 9.
Microfoundations
enabling the dynamic
capabilities to
transform OC logistics

P3: For investments in ordinary OC logistics capabilities, detailed scenarios of market and technology development are required for investment decision making.

Gamma's and Epsilon's top management leadership has established a joint vision and strategy for the whole organization, including establishing logistics as a strategic unit for OC development. The logistics integration of the online and the established logistic organization improves internal coordination, economies of scale, pooling of resources (Sandberg, 2021) and logistics learning from both directions (e.g. Esper *et al.*, 2007; Haag *et al.*, 2019). Establishing joint visions and structures for cross-functional integration is crucial for their development (something Beta lacks). Several microfoundations enable this.

For all cases, the re-organization aims to promote cross-functional integration between stores and online within the logistics organization. This has forced both store and online logistics to improve their understanding of each other's objectives. While Gamma and Epsilon initially reconfigured their organizational set-up similarly, they now deviate in terms of automation solutions and their corresponding organization. Each path is, however, well connected to their respective strategic vision of OC development. By establishing logistics as a strategic unit for OC development and aligning organizational structures, Gamma and Epsilon improved cross-functional integration between BUs (especially marketing, business development, IT and logistics) and strengthened their ability to co-specialize. Thus, the top management-initiated re-organization strengthens the microfoundations near decomposability (integration/coordination), which seems to be a foundation for both co-specialization and learning. Conversely, for Beta, the logistics' role and responsibility are strategically unclear, making it more difficult for logistics to add value (i.e. improving co-specialization).

To reconfigure existing ordinary capabilities in the transformation of OC logistics in grocery retail ...

P4: ... leadership capabilities to develop cross-functional loyalty and understanding for logistics strategic role in OC will increase near decomposability through integration (cross-functional, cross-brands, cross-channels).

P5: ... well-designed governance mechanisms will increase near decomposability through integration (cross-functional, cross-brands, cross-channels), especially for retailers characterized by decentralized ownership.

P6: ... close decomposability through integration (cross-functional, cross-brands, cross-channels) is supporting both (a) co-specialization and (b) learning needed.

An important aspect of dynamic capabilities is integrating and reconfiguring external ordinary logistics capabilities (Beske, 2012; Sandberg, 2021). External partnerships allow Gamma and Epsilon to access knowledge and resources they do not have internally (learning). Gamma and Epsilon have established long-term partnerships with their respective automation providers with whom they exchange experience and adapt the automation solution to the retailer's specific contingencies.

P7: External integration, e.g. long-term partnership with technical capability suppliers, allows the grocery retailer to (a) co-specialize by adapting technical capabilities to their specific contingencies and to (b) improve learning by accessing knowledge and resources they lack internally.

The contextualization of the dynamic capabilities for the OC transformation of grocery retail (implied by the propositions) stresses a few characteristics as follows:

- (1) The importance of balancing a decentralized ownership and governance structure with a joint vision and strategy;

- (2) The strength of microfoundations for seizing, e.g. leadership (building loyalty and commitment) and investment decision, creates a foundation for reconfiguring (transformation);
- (3) There seems to be a sequential/casual relationship between a dynamic capability's microfoundations, meaning they are not independent and
- (4) There are also cross-capability relationships between microfoundations [e.g. governance (transformation) influences investment decisions (sense)].

7. Contributions, limitations and future research

This study contributes to OC knowledge in several ways. First, the longitudinal mapping and categorization of how grocery retailers transform their ordinary logistics capabilities (RQ1) makes an empirical contribution to current research on OC logistics in grocery retail (e.g. Marchet *et al.*, 2018; Wollenburg *et al.*, 2018; Galipoglu *et al.*, 2018). Second, while previous research focused on what OC transformation might change for grocery retailers' logistics, we elaborate on why certain grocery retailers seem to transform OC logistics faster than others (RQ2). We base our analysis on six second-order dynamic capabilities (microfoundations) presented by Teece (2007, 2018) and contribute theoretically by seven propositions. Specifically, we identify and develop the importance of governance issues related to decentralized ownership structures, as well as leadership building cross-functional loyalty and commitment understanding logistics' strategic role, for the capabilities to make investment decisions, develop near decomposability (integration) and co-specialization. Our study thereby extends the current dynamic capabilities research (cf. Teece, 2007; Beske *et al.*, 2014), especially in the retail and logistics domains.

By using second-order dynamic capabilities (microfoundations) to explain the transformation of ordinary capabilities, we extend how dynamic capability is used in logistics research. We focus on OC logistics and thus complement previous studies on dynamic capabilities in, for example, logistics flexibility (Sandberg, 2021), retail internationalization (e.g. Haag *et al.*, 2019) and sustainable supply chains (e.g. Beske *et al.*, 2014). Our study confirms the importance of, for example, increased integration and cross-functional collaborations (e.g. Zhang *et al.*, 2021), partner development (e.g. Sandberg, 2021) and logistics learning (e.g. Esper *et al.*, 2007). Also, the findings highlight the importance of strengthening microfoundation governance, which is an aspect often lacking in previous research but that seems important in the (decentralized) retail context.

Lastly, as dynamic capabilities are quite a novel concept in OC grocery retail, our study elaborates the theoretical concept in this specific context. Our results confirm the applicability of dynamic capabilities as a theoretical lens to understand the transformation toward OC in grocery retail and point at specific issues, such as the balancing governance act between decentralized store ownership and investments for centralized logistics cross-functional integration and co-specialization. We also point to interrelations between different microfoundations.

The summary of crucial ordinary and dynamic capabilities could help practitioners to increase competitiveness in OC grocery retail. The longitudinal map of how ordinary logistics capabilities transform, including enabling elements of dynamic capabilities, allows practitioners to benchmark. In particular, a joint commitment to a shared OC vision seems essential.

Despite presenting second-order dynamic capabilities critical to transforming OC logistics in grocery retail, we did not differentiate their importance. Future research could compare their relative influence and study if some dynamic capability elements for transformation are

more important and why and if their relevance differs for certain types of markets and retail sectors. Another limitation is the use of three cases from the same country. By analyzing additional cases from other markets, potentially different far in the OC transformation, the study's transferability/external validity could be improved, for example, whether retailers in different geographical markets or retail sectors transform ordinary logistics capabilities similarly. Finally, by studying retailers' transformation longitudinally, interesting aspects can be explored, such as what ordinary capabilities contribute to successful OC and why.

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Category	Definition	Code	Example
Omnichannel strategic development	This category describes the strategic development on an organization-wide level	Development of omnichannel strategy <i>The cases differ when it comes to how far they have come with omnichannel strategy work</i>	"It (the investment) has forced the lines to get information and make decisions for how Epsilon should work in the future" (Epsilon_PM) Gamma "[...] may not necessarily have been faster in decision-making but faster in terms of execution" (Gamma_Dig) "From the perspective of Beta logistics, I see a need to really address the omnichannel offer from a strategic perspective" (Beta_ToP) "We have a good board as well, which gives us room to venture new opportunities. At Epsilon, we have a majority owner, which decides most at the board. Then, you can get this continuity and maybe dare to make more bold decisions because the owner is a little more long-term" (Epsilon_PM)
		Top management involvement <i>For all cases, top management support for online channel was crucial for the strategic work</i>	"I believe that we are the grocery retailer that has the most left right now (in the omnichannel transformation). It's not because we were a slow starter; we started early, we had the leader Jersey. We gave away the leader Jersey for many years, and then, based on strategic decisions, we have now gained new momentum. The reason for losing the leader Jersey had to do with the board's focus and management in previous years. There has been a lot to prioritize at Beta, to act on and invest in, which may have meant that online has been left behind for many years. But once the strategic decision was made, then it took off" (Beta_HoO) "Logistics is somewhere both the big enabler and, right now at Gamma, the big challenge. The logistics perspective is therefore taken into account a lot already in the strategy development" (Gamma_Strat) "Online has gone from being an incubator to becoming a sub-business, to now becoming something that must be integrated into basically everything that Gamma does" (Gamma_Dig) "We can hardly take a step without logistics, that I can say. We get nowhere without them, with the phase we are in of growth and upscaling [...] so I would say that they are almost always with us" (Epsilon_Dig)
		The role of logistics <i>The cases differ in the strategic role logistics play for omnichannel development</i>	

(continued)

Table A1.
OC transformation of
logistics operational
capabilities

Table A1.

Category	Definition	Code	Example
Strategic focus for online logistics	This category focuses on strategic focus of online logistics and how it has developed	Phase 1: Growth and market share before cost focus	"There has also been a shift where the online organization has gone from being able to do almost anything without affecting the bottom line for all of Gamma, but now that the share of online increases, it is no longer so" (Gamma_Strat)
		<i>All cases describe this first phase, meeting customer requirements above for example costs. The cases described the previous online strategy as more entrepreneurial</i>	"A person with an idea could go down to the warehouse and say to three people 'can you fix this?'" (Beta_ToP)
		Phase 2: Scale-up <i>In this phase, all cases work with operationalization of online logistics and setting the logistics conditions for future expansion and potential profit</i>	"Epsilon focuses on setting the necessary logistics conditions for expansion and growth" (Epsilon_Dig) "Due to the rapid volume growth, a real operationalization of online logistics is now taking place" (Gamma_Dig) "Gamma must now balance efficient logistics with ensuring solutions adapted to a wide range of different customer needs (Gamma_Strat) "If you want to take responsibility for a business and run efficient processes and if you are going to industrialize something and start creating a stable foundation, then you want to go through a few different process steps, and these do not currently really exist" (Beta_ToP) Beta_ToP's task is to "rationalize and streamline existing online operations" "If we are to make money from it, we must at some point rationalize and streamline our processes" (Beta_ToP) "There is a big difference between shopping in a store and online. In the store, store personnel packs up products, and then the consumer himself comes and picks, packs and drives the order home. In online, Epsilon takes over some of that work and must find a way to be able to charge for the service in a reasonable way" (Epsilon_Log)
		Phase 3: Reach profitability <i>In the future, the cases argue that the main strategic focus will be on reaching profitability and there logistics will play a key role</i>	(continued)

Category	Definition	Code	Example
Organization of online logistics	This category presents how the different cases organizes their respective online channel in relations to the existing organization	Integrated or separated <i>The cases have moved from having online as a separate unit to more and more integrate it in the established organization</i>	“When new customer offerings or new concepts are developed, logistics has historically been involved too little and arrives too late to be able to add value. Logistics gets a concept and makes it happen. But this is getting better, and right now, Beta is on a journey to handle these questions differently” (Beta_ToP) “Online was not previously integrated into established logistics but was allowed to do its own thing on the side. There has to some extent, been a mindset in online that ‘you know nothing about this’ even though you are part of the same organization” (Epsilon_ODC) “I never think about logistics details, but I think about things that affect logistics. I definitely think about our position in the last mile, but I do not think about what type of truck we should have or if such aspects are affected” (Gamma_Dig) “After the reorganization, online logistics belongs to the established logistics organization. Online logistics works closely with established logistics for incoming deliveries. Online logistics is highly involved in how dark store is supplied from the internal network’s main terminals. Online logistics has a basic set for deliveries to the dark store. Online logistics follows established processes when they need more and/or earlier deliveries etc. in the same way as store logistics” (Beta_OLog) “[...] to balance between utilizing the scale and the efficiency with having a central online channel, but at the same time be able to use the strength of the local retailers” (Gamma_Strat) “Online is still new, and today there are different views on whether/how to run online from a store perspective or a central perspective. We have to go back and think about how the organization as a whole wants to operate online” (Beta_OLog)
		Re-organization <i>The re-organization of integrating with established logistics is viewed as important step by the cases</i>	
		Local or central <i>Beta and Gamma highlighted the struggle of balancing a central online channel with the strength of local stores</i>	

(continued)

Table A1.

Table A1.

Category	Definition	Code	Example
Online material handling	In this category it is described how the three cases manage online order fulfillment	<p>In-store picking</p> <p><i>In-store picking has been and still is an important function for online material handling. The cases highlighted the risk of relying too much on this when volumes are growing</i></p>	<p>"Today, no click-and-collect is picked in the dark stores, but these orders are picked in a store as we have that the marginal cost of picking in a store is lower than picking at another location and then driving to the store. The stores already do many processes; there are already incoming flows, infrastructures, staff who work with goods receipt, etc. in the stores. In the long run, it is not sustainable to work like this; if the volume grows, a store cannot continue to pick all orders. It has to stop somewhere because otherwise, consumers will not go into the store anymore because it will just go around people with carts in the stores all day. So if volumes increase, which they have done by now, you will notice that the stores have a capacity cap to handle it all" (Epsilon_Log)</p> <p>"Suppose you talk from a slightly longer perspective. In that case, there is no capacity in Beta's physical stores to act in that way (picking online orders) based on the expectations on future online volumes" (Beta_HoO)</p> <p>"If you think about the difference between today versus in the future, the majority of our online orders are currently picked in-store, and that is definitely not how it will look like 2025. It is a pretty big shift" (Gamma_Strat)</p> <p>The picking process should "[...] be optimized as a conveyor belt instead of traditional customer pick route because that will improve efficiency" (Gamma_Dig)</p> <p>"How it will be in the future, I think the front-end offer will determine a lot. And the volumes, because if they do not grow, it is probably smart to try to use the ODC as much as possible. If the ODC instead reaches its capacity limit early on, then maybe it is good to facilitate shorter lead times by using the stores and pick orders with a little longer lead time in the DC. We can control that. The advantage of how we have built it, and it has nothing to do with the ODC, but with the online platform, is that we can do both and that we can quickly change. It's nice to have basically" (Epsilon_Log)</p>
		<p>Setting up alternative MH-nodes</p> <p><i>All cases has set up at least one manual OFC serving urban regions</i></p> <p><i>Improving efficiency and service levels</i></p>	

(continued)

Category	Definition	Code	Example
IT/technical capabilities	This category presents the different IT/technical capabilities that the cases have developed in relations to online logistics	Manual vs automated <i>The cases highlight how building capabilities connected to automation will be crucial for the transformation</i>	“We wanted an automation that would help us to be more efficient, it was about quality, and that there should be a trust in that this will work. The robustness of the system and the fact that it was proven to work were also important. Because you can imagine in a situation like this that you might want to be extremely at the forefront, that is, get something that almost does not exist yet, but that may be good. But that is not really what we were looking for, we want to create a platform where we become much more qualitative and efficient than we are today by operating warehouses manually” (Epsilon_Log)
		IT-platform <i>All cases have invested in new IT-capabilities to support the transformation</i>	“Early on, it was most profitable to pick in a store. At a given time, an OFC was required to increase the ability to deliver. Then at a later time, automation comes in and creates a superior efficiency in picking” (Gamma_Dig)
		Separated vs integrated logistics platforms <i>Gamma and Epsilon have chosen to invest in two different types of platforms and discusses pros and cons</i>	“From a system perspective, Beta has worked in silos for so many years that it requires quite large investments to be able to use collected data cross-functionally” (Beta_HoO) “Epsilon has organization, system support, and a platform with stores and can therefore quite quickly switch between picking in the dark store and picking in the store, and in that way also meet the consumer based on requirements and needs” (Epsilon_Log) “Store and online are so different, so by separating them you can optimize based on their specific requirements, the advantage is that you can optimize both logistics networks. Gamma’s assessment is also that it is more profitable from a holistic perspective” (Gamma_Dig) “We believe that since we are building an omnichannelDC, where we will have all the goods in one place, we will be able to get higher delivery quality, a higher level of freshness and reduce lead times” (Epsilon_PM)

Table A1.

Table A2.
Microfoundations
enabling the dynamic
capability to transform
OC operational
logistics

Category	Definition	Code	Example
Investment decision-making	This category connects to the microfoundation decision-making protocols for investments (Tece, 2007) and investigates how and why the three different cases take investment decision	Investment process <i>The investment process of large omnichannel logistics investments includes a lot of work evaluating and anchoring the decision</i>	"To create a decision basis, a steering group was set up. There you have representatives from the different brands, logistics, IT and business development. IT is important to include because everything you have to do has some form of IT component or IT development" (Epsilon_PM) "The investment decision itself then went up to Epsilon's board because it was such a big investment. Since it will be such a big transformation that will affect the whole of Epsilon, we have tried and succeeded well in getting stakeholders from the entire organization into the steering group" (Epsilon_PM) "Logistics does not make any decisions on its own when it comes to strategic investments. We can pursue an issue and investigate conditions and requirements. The decisions themselves, or the decision process, will occur in the various management groups that want to do this based on how they see the market and the growth" (Beta_OLog) "If (the automation investment decision) was a very broad decision, broad and difficult. Part of the anchoring of this decision within the organization was the decision-making work itself that led to it; many key people had been involved in this work" (Gamma_Dig) "[...] with the growth Epsilon had calculated for, online would have quite high growth, and now it has also turned out that it had even higher growth. So we saw that it would be difficult to manage it in future dark stores, but above all, since we had all these online picks in-store, Epsilon saw that we would hit the cap quite quickly in the stores" (Epsilon_PM) "In the end, you have to decide and agree that this is the capacity we are building for. And then we are not just talking capacity in the form of annual volume or daily volume, but we are actually talking down to the hourly level. This is the capacity we can achieve. And how we have come up with this is that we have taken the daily situation at some point and looked at: what does it look like now, what do we think about growth, not just volume, but what do we think about growth in the form of assortment and customer orders. You have to create a common view of what you think about the transformation and agree on certain issues, such as will customer orders look the same in 5 years as they do now or will they be larger or smaller" (Epsilon_Log) "For the really big investments, if you think e.g. automated picking, you have to agree on the common goal picture before you invest the money required" (Beta_Top) "We basically outlined the curves for online growth and we then had a hypothesis of how big this would be in the future. With that scenario of future needs, we understood that we needed a fundamental transformation of our capabilities, both IT to customer, IT in fulfilment and the logistics connected to it" (Gamma_Dig) "It is very much about organizational structure and organizational culture. It takes hard work to get everyone on the same train at a stage like this when Beta has a digitalization that needs to take place. Furthermore, it is important to have very strong leadership with a clear picture of coordination, and that always has the right perspective. That's where you get the culture" (Beta_HoO) "We have had a good board as well, which gives us room to venture new opportunities. At Epsilon, we have a majority owner, which decides most at the board. Then you can get this continuity and maybe dare to make more bold decisions because the owner is a little more long term" (Epsilon_PM) "They (the omnichannel program) have really tried to create a community in the program; that the brands have been involved from the beginning, that there is transparency and trust, and it is clear whose responsibilities it is. This can be a bit challenging for new things like this so it has been very important" (Epsilon_PM)
		Scenario development <i>All logistics representatives highlighted the importance of establishing a joint scenario of online growth as a condition for investment decision</i>	
Loyalty and commitment	This category connects to the microfoundation building loyalty and commitment (Tece, 2007) and analyzes how the cases work with this. Online represent small share of total share of total sales but drives high investment costs, which makes the task more challenging	Top management support and leadership capabilities <i>A recurring theme in literature and highlighted as crucial among our cases</i>	

(continued)

Category	Definition	Code	Example
Governance and ownership		Anchoring decisions in organization <i>All cases emphasize the importance of anchoring the investment decisions in the organization by including all affected units</i>	<p>"Especially since Epsilon's structure is that we are a house of brands and that this (omnichannel) will affect how each brand works. There will be new processes, and you need to train each unit, it's not just within the logistics organization. So it is important to explain why we do this, that it is not only that we will be more efficient, but that we also have to do it based on lack of capacity and competitiveness" (Epsilon_PM)</p> <p>"When you make an investment decision, such as investing in a new online platform, you start from the overall decision of where the company is going. These initiatives are then created based on decision material from the various business areas concerned and go up to the board for final decision. The board has representation from the associations, which means that you then have that anchoring through the board" (Beta_HoO)</p> <p>"The reference groups are also important for disseminating information about the project in the organization. The members from the brands pass on information from various steering group meetings to their organizations" (Epsilon_PM)</p> <p>"We are definitely not far apart, it's just that you have to say it together, you have to build a joint base to be able to make decisions. Then, once the decisions are made, you have to start speaking the same language and so on" (Beta_Top)</p> <p>"Once you have set the strategy, building a production that supports it will not be as complex. If you have a strategy 'this is where we are going' and clarity, then the road there will be less complicated" (Beta_OLog)</p> <p>"The digital customer meeting is one of Epsilon's strategically most important areas, and there is a joint strategy, which makes all units work toward the same goal" (Epsilon_Dig)</p> <p>"The customer associations are the ones that actually have the P&L responsibility and are responsible for the operations. Online can therefore not, on its own initiative, more than perhaps based on a strategy, pursue these issues (online development) without agreement from the associations. The associations have input from the local activities, and then online can start the development" (Beta_HoO)</p> <p>"This also requires a clear strategy for the entire organization. It also requires a clear goal picture of what you want with the journey (year by year), clear incentives and a joint structural follow-up linked to goals and incentives. The entire organization (associations and centrally) must plan and run online together. Basically, there are many joint points where the different associations agree, but online is new and there are today different views on whether/how to run online from a store perspective or from a central perspective. You have to go back and think about how the organization as a whole wants to operate online" (Beta_OLog)</p> <p>"When the automated OFC will be implemented and up and running, deliveries will go both to the store and home, depending on what the customer wants. The stores simply buy this service from the OFC and decide prices against the customer. This is in line with how our governance model works" (Gamma_Dig)</p> <p>"We have a solution that can work. And of course, it is not optimal for the central warehouse, it is not something they want to do, but it is an example that we must jointly try to solve something. It should be good for everyone somewhere. We all belong to the same wallet" (Gamma_OFC)</p>
		Joint vision and strategy across company <i>The joint vision and strategy for omnichannel across company are identified as keys to successful transformation. Gamma and Epsilon are stronger than Beta</i>	
	Governance, incentives and ownership are part of the microfoundation governance (2007), often underrepresented in research on dynamic capabilities in logistics	Incentive alignment and P&L responsibility <i>This code analyzes how the cases share costs and profit across store and online</i>	

(continued)

Table A2.

Category	Definition	Code	Example
Integration	This category corresponds to near decomposability and integration/coordination (Teece, 2007), often recurring in previous research on dynamic capabilities in logistics	Ownership structure <i>All cases represent different ownership structures, which creates different challenges and advantages</i>	"Our ownership structure means that we are run by the customer associations. This means that we may have slightly different challenges compared to some competitors. Beta is owned by the cooperative association and has a number of different associations with different CEOs around the country, who all want to make their mark on their business. [...] They talk to their members, it is the members who own the customer association and that association then owns part of Beta. There are pros and cons to that" (Beta_ToP)
		Integration between logistics and other business functions <i>The first code identified refers to the internal integration and coordination between logistics and other business functions (marketing, business development, etc.) as a part of omnichannel development. Gamma and Epsilon are stronger here</i>	"I think our model helps Gamma to work with the right things. There are a lot of stores that work with online, and they challenge Gamma centrally in various decisions. The decisions may require a little more discussion, but there will also be a little better decisions; the dynamics of the model sharpen all parties more. Gamma must always bring the stores with them and since the stores have a different type of competence and a different understanding of the business, they can challenge the decisions" (Gamma_Dig)
			"I feel that there is consensus within Gamma about what role online should play and where you want to go with online. Then it is extremely complex with our store structure, the individual store owners, and what they want. They are self-employed and make their own decisions, and they do not need to join Gamma's central online channel. But I think there is a joint view of where we want to take this; we want to drive volume and take market shares, that's what it's about. Once you have decided to go with the large investment in the automation solution, you have also made a decision about which path to choose" (Gamma_OFc)
			"In traditional retail flows to the store, we have had a very clear role; we take care of the back-end, we do not meet the end-customer. Logistics' role has been very supportive. Now, we are more a part of the customer meeting, which makes it quite important how we act all the way out in delivering the goods. So it will be much more involvement between the brands and the logistics organization" (Epsilon_Log)
			"The silo idea that we previously had regarding the sales channels, which they had been quite far apart, did not have coordination and did not have a set strategy from the customer perspective, it is the same between the different business areas. So we are not where we would like to be when it comes to the end-to-end process between purchasing and the category organization, the marketing organization, the sales organization, digital, online, etc. and that it is a huge challenge" (Beta_HoO)
			"It is extremely important to work closely together and to create an understanding of the various processes that need to take place. Marketing cannot reflect something that logistics cannot deliver and they need to understand logistics operations. In the same way, logistics must understand what needs to be built up to be able to deliver omni" (Beta_OLog)
			"This (ODO) is a large logistics center, we perform all types of tasks to supply our customers, regardless of whether it is a store or a consumer on the online side. If you have previously worked with supply to stores, you must now also understand online and think that it is the complete logistics solution that applies now. The logistics organization must think holistically here. Otherwise, we will not get the economies of scale and the effects of this investment" (Epsilon_OIDC)
			"This type of collaboration (between store and online logistics) has become easier now that you belong to the same organization. I do not think there is any resistance in helping each other. I think more, in the past, that it was about understanding – that store logistics did not really understand online" (Gamma_OFc)

(continued)

Table A2.

Category	Definition	Code	Example
Co-specialization	Co-specialization (Teece, 2007) among our cases builds on the increased integration and cross-functional collaborations	Creating value based on increased integration between business units <i>First, our cases create co-specialized value by increasingly collaborate across business unit often toward customer. Gamma and Epsilon are stronger</i>	<p>"That those who work in logistics can see beyond efficiency, and that those who drive business development can understand the complexity their work creates. Business development and logistics must work together to make the service being good enough for the customer but at the same time efficient enough for Gamma to not disrupt the calculation" (Gamma_Dig)</p> <p>"It is crucial to include IT and logistics already in the development phase. Gamma has therefore established structures to promote cross-functional collaboration with, e.g. regular meetings and a "sponsor forum" where the chief strategy and digital officer, head of logistics and head of IT meet regularly" (Gamma_Dig)</p> <p>"It can be a battle internally sometimes, with different driving forces from both logistics and marketing. Based on given capacity and behavior, logistics can sometimes say that: "Now we are making larger windows for this to be efficient and cost-driven at all." The logistics and the brand concerned then sit down and agree on which way forward to choose. It's not always just one big cloud of demands that comes our way, it's actually a collaboration to find the right way forward" (Epsilon_Log)</p> <p>"The (omnichannel) program has lots of different reference groups where we capture the different parts. There, the logistics organization can present how they design the ODC, get input if something new has happened and what the various representatives see going forward. The logistics organization can then take these important inputs back to the drawing board to see how they can be managed in the solution" (Epsilon_ODC)</p> <p>"We have had much help from having an expert to brainstorm ideas with. The provider comes up with proposals that we review to see if we understand how it could work in reality. We have an interactive process that works well, and together, we then come up with a solution that on the drawing board will work" (Epsilon_PM)</p> <p>"It has been an integrated process, but the automation solution is still fundamentally based on provider's solution; it has been the footprint for everything" (Gamma_PM)</p> <p>"Gamma will gain major economies of scale as our automation partner will operate around ten such facilities in the near future. Gamma will therefore have lots of synergies. Our partner will be able to have a completely different type of monitoring of the systems than what we could manage to have on our own" (Gamma_Dig)</p> <p>"We work with daily management, information and improvement meetings where employees are involved and can influence decisions. When there are changes, you involve those who are affected and discuss: how can this be done in the best way in our production, how do they want to do it and what support will be needed to succeed" (Beta_OLog)</p> <p>"We have gaps in both behavior and competence that we need to close. The best we can do is train our existing staff because then we can bring a lot of what we are good at today with us to the new structure" (Epsilon_Log)</p> <p>"In the project, we work a lot with "train the trainer." it is about identifying key people early on who receive training and who become ambassadors in their organizations. These people will work in different parts (of the ODC) and will then have been involved for a long time and tested the solution, regardless of whether it is automation or our transport solution" (Epsilon_PM)</p>
Learning and knowledge management	The category, learning and knowledge management (Teece, 2007) is well established in logistics research	<p>With automation partner <i>Gamma and Epsilon also co-specialize with their automation partner by designing and adapting a solution to their specific idiosyncrasies</i></p> <p>Continuously learning <i>A theme highlighted by previous research that all our cases work with as part of the transformation</i></p>	

(continued)

Table A2.

Category	Definition	Code	Example
		From automation partner <i>For Gamma and Epsilon, we identified learning from automation partner as an important aspect</i> Learning between online and established logistics <i>A type of learning important for the omnichannel transformation that we identified among all our cases was the mutual learning between online and established logistics</i>	<p>"We have felt somewhere that we need to connect with the best in the world on this in order to access their knowledge" (Gamma_Dig)</p> <p>"It is okay to discuss things and both are open to asking for help. Both parties can say 'we cannot do this, but we will solve it if we help each other we will solve it'" (Epsilon_PM)</p> <p>"A large part (of OFC improvement work) has been a transfer of responsibility to clarify leadership. The goal of the relocation and reorganization is to give those who, for example, work in the OFC more responsibility for the processes and efficiency work. Logistics has built more of a warehouse structure in the organization and distributed responsibilities further down to drive employeeship, responsibility and quality. With that kind of responsibility also comes efficiency improvements" (Beta_ToP)</p> <p>"Logistics skills were in demand when we took over the OFC and I feel that we have really contributed positively with the experiences that logistics brought with us. Online and OFC have been something of a start-up for Beta, but it's not that, it's logistics – take an order, pick it up and deliver it in a rational way" (Beta_ToP)</p> <p>"There is a very big difference working with online logistics in the new OFC versus how Gamma works in the established DCs that deliver to stores" (Gamma_PM)</p> <p>"We have weekly meetings so that the logistics department (responsible for the future OFC operations and recruitment) understands what they need to recruit, what the profiles are and when and how we involve new employees in the project and educate them" (Gamma_PM)</p>