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DELIVERY SECTORS POST-COVID-19"

RELATORE:

CH.MO PROF. ALBERTO ALVISI

LAUREANDO/A: SOHEIL MAZIDI

MATRICOLA N. 1225750

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APPENDIX

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Table of Contents

Abstract	6
Introduction	7
Chapter 1 - Overview of the Retail Market	8
1.1 Pre-COVID vs. Post-COVID Retail Landscape	8
1.1.1 Pre-COVID Retail Landscape	8
1.1.2 During and Post-COVID Retail Landscape.....	11
Chapter 2 - The Role of Delivery Companies	22
2.1 From Complementors to Competitors.....	22
2.2 Impact on Consumer Behavior and Retail Strategies.....	23
2.3 Impact of delivery services on the Retailers.....	23
Chapter 3 - Economic Performance of Key Retailers and Delivery Companies After The Covid-19	26
3.1 Delivery Companies	27
3.1.1 Deliveroo.....	27
3.1.2 Delivery Hero	30
3.1.3 Just Eat.....	34
3.2 Retail Companies.....	39
3.2.1 Carrefour	39
3.2.2 Ahold Delhaize	43
3.2.3 Tesco.....	46
3.3 Key insights and trends derived from these reports	49
Chapter 4 - The Future of Retail and Delivery	52
4.1 Delivery Industry.....	52
4.1.1 Future Key Trends and Methods.....	52
4.1.2 Impact of Delivery Sector in Economy.....	55
4.1.3 Delivery Sector Role in Retail Industry.....	56
4.1.4 Delivery Sector and Sustainability	58
4.2 Retail Industry	63
4.2.1 Technological Advancements in Retail.....	63
4.2.2 Evolving Retail Formats	66
4.2.3 Customer-Centricity	69
4.2.4 Sustainability and Social Impact	71

Conclusion	78
References	80
Bibliography	80
Webography	87

List of Figures and Tables

Figure 1: Online retail sales, selected economies, 2018-2020.....	9
Figure 2: E-commerce sales: Top ten countries, 2019	9
Figure 3: Food and Grocery Market Key Performance Indicators	10
Figure 4: EU-5 Retail sales vs previous year, by quarter, %	12
Figure 5: Development of e-commerce shares in total retail sales in selected countries before and after the coronavirus (COVID-19) pandemic as of January 2021	13
Figure 6: Retail E-commerce Sales Worldwide from 2022 to 2028 (in billion U.S. dollars)	13
Figure 7: Food and grocery market KPIs in 2023 (Year over year growth in 2023 vs 2022 and 2019, %)	15
Figure 8: Characteristics of multichannel and omnichannel business.....	18
Figure 9: Some Key Performance Indicators of Deliveroo	28
Figure 10: Key Performance Indicators of Deliveroo for H1-2024.....	29
Figure 11: GMV and Total Segment Revenue growth 2022 vs. 2023	31
Figure 12: Key Performance Indicators of Delivery Hero for H1-2024.....	34
Figure 13: Key Performance Indicators of Just Eat for 2023	35
Figure 14: Key performance Indicators of Just Eat for H1-2024	37
Figure 15: Key Performance Indicators of Carrefour for 2023.....	40
Figure 16: Key Performance Indicators of Ahold Delhaize for 2023	44
Figure 17: Key performance Indicators of Tesco for 2024	48
Figure 18: US Click-and-Collect Sales 2020-2025	68
Figure 19: Carroll’s Pyramid	72
Figure 20: The Triple Bottom Line (TBL).....	73
Figure 21: Circular Economy.....	74
 Table 1: Summary of Different Delivery Methods	 54

Abstract

The retail and delivery sectors have changed because of the COVID-19 outbreak, which affected consumer behavior and business operations. This paper aims to examine the transformations that occurred within these industries during and after the crisis by focusing on the increase in the role of platforms and their interconnection. The crisis acted as a growth accelerator for the uptake of online shopping, while delivery firms contributed by implementing sophisticated logistics systems for the continuity of business operations.

In addition, the study examines the performance of retailers and delivery firms and underlines the importance of flexibility and innovation in order to address challenges such as increasing prices, broken supply chain, and changing customer needs. Industry 4.0 technology advancements and a greater focus on sustainability are expected to shape the future of retail and shipping. In this paper, through outlining these trends and their implications, I am seeking to provide insights on how businesses in these industries can thrive in a post-pandemic era of digitalization and environmentalism.

Introduction

The outbreak of COVID-19 resulted in a shift in the global economy and changed the way that businesses operated, affecting consumer behaviour. Two areas that were affected by this shift were retail and delivery services; both underwent an accelerated shift towards digitalization, with an increase in online shopping due to pandemic restrictions. This shift placed delivery companies at the center of logistics management as retailers and delivery services had to develop new strategies to address new consumer needs and ensure business sustainability during one of the most challenging periods in history.

This paper aims to discuss changes in retail and delivery industries during and after the pandemic by looking at the relationship between technology and consumer behaviour and market dynamics. It examines how retail companies adapted their models to the increase in online sales without compromising on their physical stores. At the same time, delivery firms faced new opportunities and challenges as they moved from being supporters to essential players of commerce. The boundaries that used to separate these industries began to blur as they began to integrate with one another due to the extent of their interconnection during this period.

The discussion also continues with the analysis of the economic results of the major companies and differentiation between the adaptable and innovative victors and the vanquished. Omnichannel retailing, autonomous delivery systems, and other factors that contributed to success during the period of significant change are explored in the paper. In addition, it examines the future of the retail and delivery industries with the help of Industry 4.0 technologies and the growing importance of sustainability as organizations face increasing environmental and societal expectations.

In this paper, the development of both industries pre and post COVID-19 is examined to understand how delivery and retail companies can adapt to the opportunities and challenges of a fast-changing world. The experiences of this time period might be useful in guiding businesses through the future.

Chapter 1 - Overview of the Retail Market

1.1 Pre-COVID vs. Post-COVID Retail Landscape

1.1.1 Pre-COVID Retail Landscape

There is a gradual shift that was being experienced in the retail industry before the COVID-19 pandemic was felt was the growing adoption of e-commerce. However, the shift to the online retailing was not evenly distributed throughout the regions and industries. The physical stores were still predominant especially in the sectors which include groceries and other daily needs while the online retailing segment continued to grow especially in the non-essential product categories for example electronics, apparel and luxury goods.

There were several changes that occurred in the online shopping behavior of consumers in this period. The use of physical stores was still prominent especially in the grocers' sector, and other challenges and consumers' preferences towards the physical inspection of the products constrained the growth of the e-commerce segment. For instance, in the United States, the share of e-commerce in total retail sales increased from 9.9% in 2018 to 11% in 2019. Also, in the United Kingdom, the share of online retail sales in the total retail sales was 15.8% in 2019 (UNCTAD, 2021).

Regional variations in e-commerce adoption impacted the pre-COVID landscape. Driven by tech giants like Alibaba and JD.com, China led the way with a significantly larger share of online retail sales, reaching 20.7% of total retail sales in 2019. On the other hand, other regions like North America and Europe adopted online retail more slowly. However, South Korea became another leader in online retail, with a 20.8% share of online retail sales in 2019 (UNCTAD, 2021).

Figure 1: Online retail sales, selected economies, 2018-2020

Economy	Online retail sales (\$ billions)			Retail sales (\$ billions)			Online share (% of retail sales)		
	2018	2019	2020	2018	2019	2020	2018	2019	2020
Australia	13.5	14.4	22.9	239	229	242	5.6	6.3	9.4
Canada	13.9	16.5	28.1	467	462	452	3.0	3.6	6.2
China	1,060.4	1,233.6	1,414.3	5,755	5,957	5,681	18.4	20.7	24.9
Korea (Rep.)	76.8	84.3	104.4	423	406	403	18.2	20.8	25.9
Singapore	1.6	1.9	3.2	34	32	27	4.7	5.9	11.7
United Kingdom	84.0	89.0	130.6	565	564	560	14.9	15.8	23.3
United States	519.6	598.0	791.7	5,269	5,452	5,638	9.9	11.0	14.0
Economies above	1,770	2,038	2,495	12,752	13,102	13,003	14	16	19

Source: (United Nations Conference on Trade and Development, 2021)

Based on figures from the United Nations Conference on Trade and Development in 2021, E-commerce worldwide, sold (B2B and B2C) in 2019 was estimated at \$26.7 trillion (See figure 2), which is about 30% of the global GDP. Wholesale trade was the leading segment, accounting for 82% of the total through business-to-business (B2B) transactions, while B2C e-commerce sales grew to \$4.9 trillion in 2019, still a relatively small share of the overall retail market (UNCTAD, 2021).

Figure 2: E-commerce sales: Top ten countries, 2019

Rank	Economy	Total e-commerce sales (\$ billions)	Share of total e-commerce sales in GDP (%)	B2B e-commerce sales (\$ billions)	Share of B2B e-commerce sales in total e-commerce (%)	B2C e-commerce sales (\$ billions)
1	United States	9,580	45	8,319	87	1,261
2	Japan	3,416	67	3,238	95	178
3	China	2,604	18	1,065	41	1,539
4	Korea (Rep.)	1,302	79	1,187	91	115
5	United Kingdom	885	31	633	72	251
6	France	785	29	669	85	116
7	Germany	524	14	413	79	111
8	Italy	431	22	396	92	35
9	Australia	347	25	325	94	21
10	Spain	344	25	280	81	64
	10 above	20,218	36	16,526	82	3,691
	World	26,673	30	21,803		4,870

Source: (United Nations Conference on Trade and Development, 2021). (Note: Figures in italics are UNCTAD estimates.)

The grocery retail industry in Western Europe was highly differentiated. Supermarkets and hypermarkets were the most popular retail formats, satisfying consumers' demands for convenient locations with a large assortment of products. As consumers looked for more reasonably priced options at this time, the "Disruption and Uncertainty – The State of Grocery Retail 2021" study reports an increase in discount chains and smaller convenience stores. In 2019, just about 5 percent of food purchases were made online, indicating that online grocery shopping has not yet had a significant influence on the majority of European markets (McKinsey & Company & EuroCommerce, 2021).

Figure 3: Food and Grocery Market Key Performance Indicators

YoY growth 2019 vs 2020, %												
	Germany	United Kingdom	Netherlands	France	Spain	Italy	Portugal	Sweden	Czech Republic	Poland	Russia	Weighted average ¹
Food market—Segment growth												
Foodservice² <i>YoY growth³</i>	-28.5	-47.7	N/A	-30.6	-42.7	-31.2	-36.2	-18.4	-27.1	-14.5	N/A	-34.0
Grocery retail⁴ <i>YoY growth</i>	12.3	13.1	9.6	7.7	13.8	10.0	13.3	15.8	8.4	6.7	4.8	10.4
Modern retail⁵ <i>YoY growth</i>	12.6	13.6	9.5	8.4	13.6	12.9	13.2	15.4	9.9	10.4	8.2	11.5
Other formats⁶ <i>YoY growth</i>	11.2	10.3	10.4	1.4	14.3	0.6	14.1	20.4	4.2	0.4	-0.3	7.2
Modern retail—Growth breakdown												
Revenue⁴ <i>YoY growth</i>	12.6	13.6	9.5	8.4	13.6	12.9	13.4	15.4	10.1	10.5	8.3	11.6
Hypermarket⁷ <i>YoY growth</i>	9.9	4.4	N/A	3.4	7.9	-2.7	N/A ¹⁰	7.6	8.0	-6.7	-5.6	3.3
Supermarket⁸ <i>YoY growth</i>	16.7	9.6	7.0	9.8	13.6	12.2	11.1	12.3	7.8	16.5	-0.4	10.6
Online <i>YoY growth</i>	39.9	66.7	55.9	41.9	63.2	62.4	58.6	101.1	17.7	55.2	50.9	53.9
Discounter⁹ <i>YoY growth</i>	8.9	12.2	6.5	7.5	12.9	19.5	16.1	16.3	13.3	13.6	14.4	11.9

Source: (McKinsey & Company & EuroCommerce, 2021)

Although more and more people have been using e-commerce, the majority of retail sales worldwide were still made in physical stores. Consumers especially in categories like groceries and home goods preferred to visit the physical stores for the touch and feel, the product availability and the chance to meet sales people. This was due to the trust and the familiarity with the physical retail stores as well as the last mile delivery complexities in most areas. In Europe, the hypermarkets and supermarkets played the most important role in the grocery retail trade, and larger stores took

advantage of the scale economies. Hypers have continued to dominate sales areas greater than 2,500 square meters and still captured a considerable share of grocery sales in markets such as France and Germany where traditional retail channels still reign supreme over digital channels. However, the landscape was changing, and some consumers were giving online channels a try as they looked for easier and faster ways to shop (McKinsey & Company & EuroCommerce, 2021). Arguably online grocery services were also regarded with skepticism by the consumers who preferred to touch and feel fresh fruits and vegetables, meat, and dairy products before making the purchase. This tendency to prefer in-store shopping persisted despite the improvement in the availability of click and collect and delivery services which were mainly employed by a portion of urban and tech-savvy consumers.

1.1.2 During and Post-COVID Retail Landscape

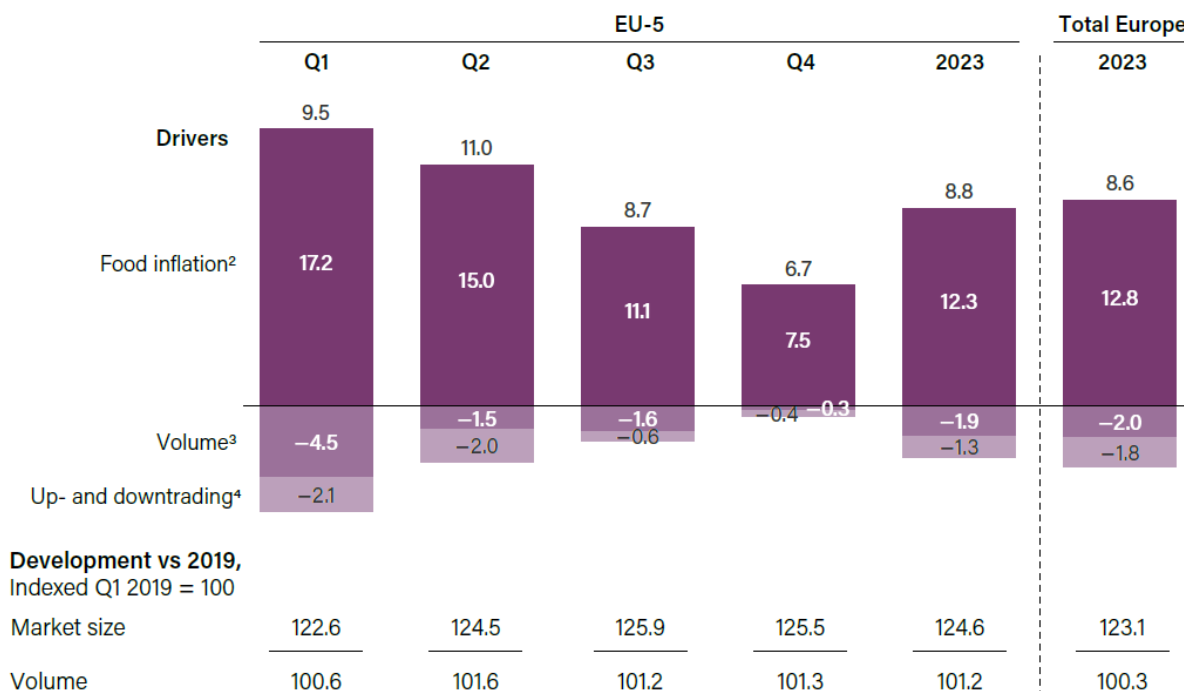
During the pandemic, consumers had to find new ways of shopping thus enhancing online shopping and e-commerce. The physical stores were affected by the lockdowns and social distancing measures which led to a decline in foot traffic.

The retail market has been affected by the COVID-19 pandemic and especially after it, by the inflation which has especially influenced the consumer behavior and retail operations. Dekimpe and van Heerde (2023) in their paper “Retailing in Times of Soaring Inflation” argued that the inflation was fueled by fiscal policies of governments, supply chain disruptions and geopolitical uncertainties including the Russian-Ukrainian war. The combination of these challenges made the global inflation to rise to 9.6% in July 2022, the highest in decades. The challenge that faced the retailers was how to manage the increase in the cost of doing business yet maintain the customers’ loyalty and at the same time, maintain the bottom line. At the same time, consumers were subjected to higher prices for essentials like food and raw materials, which made many of them to reduce their spending by purchasing cheaper brands and limiting themselves to essential purchases only (Dekimpe & van Heerde, 2023).

In the European grocery sector, 2023 was characterized by high inflation, averaging 12.8% for food prices, the highest since World War II, forcing retailers to reassess their strategies (Delberghe et al., 2024). According to McKinsey & Company, “Grocery sales in Europe grew by 8.6 percent in 2023.

This growth was a result of 12.8 percent food price inflation, a downtrading effect of 1.8 percent, and a 2.0 percent volume decline. This implies that grocery sales in real terms (that is, adjusted for inflation) declined again in 2023 and are now 4.5 percent below 2019 levels.” (Delberghe et al., 2024).

Figure 4: EU-5 Retail sales vs previous year, by quarter, %

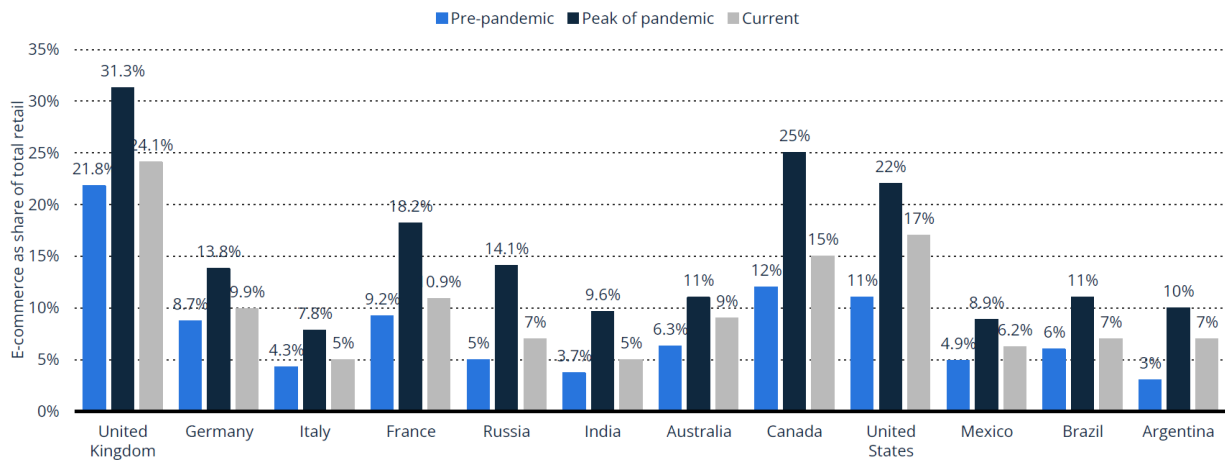


Notes: EU-5 are France, Germany, Italy, Spain, and United Kingdom

Source: (Delberghe et al., 2024)

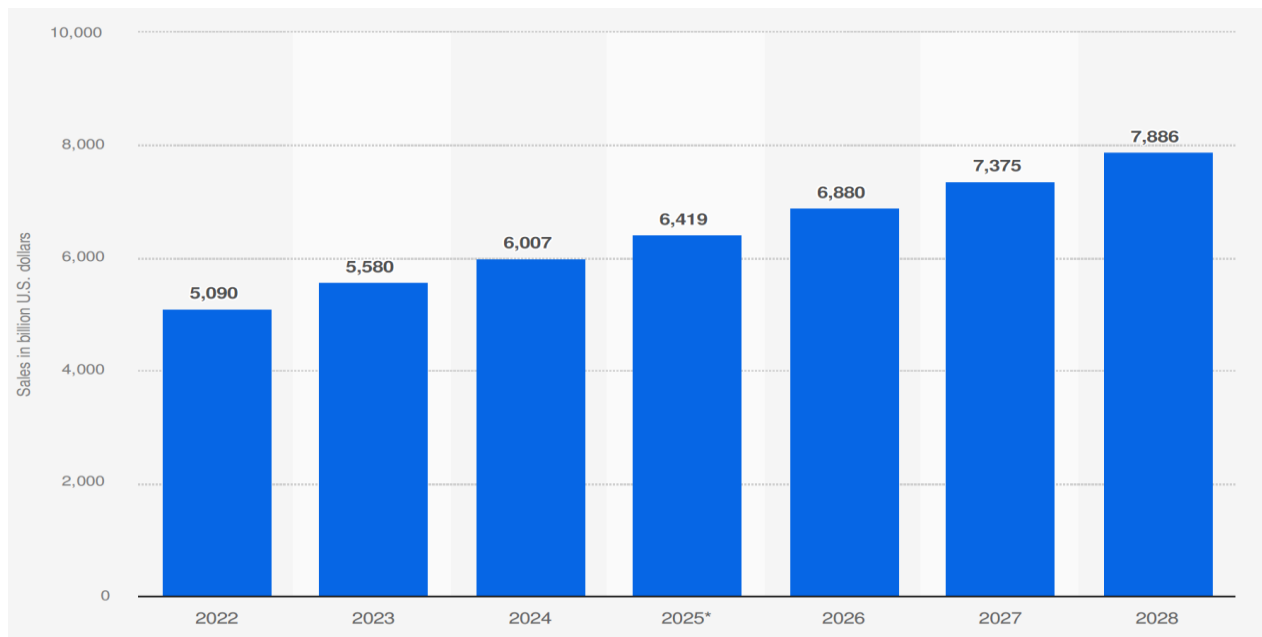
The shift in consumer behavior brought about by inflation also benefited discounters and private labels, which recorded strong growth as consumers looked for cheaper alternatives (Delberghe et al., 2024). The recovery toward the end of 2023 showed early signs of stabilization, with inflation dropping to 3% by the end of that year. Nevertheless, grocery retailers still struggled with rising costs in labor and rent, which continued to put pressure on margins (Delberghe et al., 2024).

Figure 5: Development of e-commerce shares in total retail sales in selected countries before and after the coronavirus (COVID-19) pandemic as of January 2021



Source: (Mastercard Economics Institute, 2021)

Figure 6: Retail E-commerce Sales Worldwide from 2022 to 2028 (in billion U.S. dollars)



Source: (eMarketer, 2025)

Digital channels are supported by physical stores that are converted into experiencing environments. The major merchants have solidified their position in the market, especially those that were early adopters of e-commerce. For example, retailers were able to improve customer experience and integrate digital technology by closing the smaller stores and repurposing some of

them as flag-ship locations. Smaller retailers were also compelled by this environment to adapt by coming up with new ways to compete and collaborate (Fortuna et al., 2021).

Adoption of E-commerce by Retailers

The pandemic has essentially quickened the take up of e-commerce by major food retailers globally. Online grocery shopping was on the rise due to consumers' fear of infection as well as lockdowns and movement restrictions. E-commerce share in total grocery sales stood at 6%, according to the State of Grocery Retail 2024 report from McKinsey & Company. The shift to online shopping was quicker during the pandemic, leading to a significant growth in e-commerce sales in markets including the U.S. and Europe. For example, in the U.S., e-commerce leaped from 9.9% to 14.5% of total retail sales, 2018 to 2020, which shows the rapid growth of the digital retail channels during this time (Sayyida et al., 2021).

From Q1 2020 to Q3 2021, e-commerce sales in the U.S. grew by \$227.82 billion through 'excess' sales—revenue above the expectations of normal growth rates. This surge pushed the share of e-commerce in total retail sales in the U.S. up by 10.61% concluding in a structural change in consumer behavior with online shopping becoming inevitable during lockdowns and other restricted movement periods. The pandemic, in effect, fast forwarded years of digital retail growth into a few short months as businesses raced to meet soaring demand through enhanced digital infrastructure and streamlined delivery options. This rapid evolution of the market has revealed the increasing role of e-commerce as a central player in the retail landscape, transforming from a supporting channel to a dominant one (Tudor, 2022).

Amazon and other big merchants played a significant part in this change. For instance, by utilizing its current infrastructure to provide a large selection of food items and same-day delivery choices, Amazon Fresh also became a well-known grocery delivery business. This quick growth not only matched the increase in grocery shopping done online, but it also established new benchmarks for convenience in the retail sector (Fortuna et al., 2021). Other food retailers followed suit; adopting e-commerce strategies and forming partnership with delivery services to enhance their online presence.

Figure 7: Food and grocery market KPIs in 2023 (Year over year growth in 2023 vs 2022 and 2019, %)

Year-over-year (YoY) growth in 2023 vs 2022 and 2019, %

		Northern and Western Europe						Southern Europe			Central Europe		Weighted average ¹
		Germany	United Kingdom	Netherlands	France	Belgium	Sweden	Spain	Italy	Portugal	Czech Republic	Poland	
Food market—segment growth													
Grocery retail value growth ² percent change	vs 2022	+7.6	+9.2	+7.1	+8.8	+9.0	+5.9	+10.1	+7.8	+8.2	+7.2	+11.7	+8.6
	vs 2019	+23.3	+23.3	+24.9	+18.5	+23.0	+27.1	+21.7	+22.4	+24.2	+23.1	+37.0	+23.1
- Modern grocery retail value growth ³ percent change	vs 2022	+8.6	+8.5	+7.9	+9.6	+8.4	+5.4	+12.1	+8.2	+8.2	+7.0	+13.2	+9.2
	vs 2019	+28.0	+23.6	+25.4	+19.5	+22.0	+29.1	+27.3	+30.8	+25.4	+27.8	+50.8	+26.7
- Other grocery formats value growth ⁴ percent change	vs 2022	+3.5	+12.6	+1.6	+4.2	+11.3	N/A	+3.8	+6.2	+8.2	+7.6	+8.5	+6.2
	vs 2019	+5.1	+21.6	+22.1	+12.8	+26.7	N/A	+5.3	-2.5	+17.6	9.2	+13.1	+11.3
Grocery retail deflated value growth ⁵ percent change	vs 2022	-4.7	-4.8	-4.5	-3.3	-4.4	-6.4	-1.5	-2.3	-2.0	-4.6	-3.9	-3.8
	vs 2019	-8.0	-4.0	-1.0	-4.3	-3.1	-1.9	-6.4	-0.5	-3.1	-11.3	-4.2	-4.5
Foodservice value growth ⁶ percent change	vs 2022	+7.7	+11.3	+13.0	+11.0	+11.0	+7.8	+9.2	+14.6	+14.2	+18.0	+16.4	+11.1
	vs 2019	+8.8	+29.0	+31.0	+29.2	+33.8	+22.8	+5.9	+21.8	+15.9	+30.9	+59.4	+23.8
Modern retail—revenue breakdown													
Total ⁷ percent change	vs 2022	+8.6	+8.5	+7.9	+9.6	+8.4	+5.4	+12.1	+8.2	+8.2	+7.0	+13.2	+9.2
	vs 2019	+28.0	+23.6	+25.4	+19.5	+22.0	+29.1	+27.3	+30.8	+25.4	+27.8	+50.8	+26.7
- Hypermarkets ⁷ percent change	vs 2022	+6.8	+6.6	N/A	+8.8	-2.8	+3.4	+12.3	+5.4	N/A	+4.6	+1.3	+6.8
	vs 2019	+14.0	+4.8	N/A	+12.4	-1.2	+16.4	+23.0	+3.6	N/A	+16.5	+8.6	+11.0
- Supermarkets ⁸ percent change	vs 2022	+6.2	+7.7	+7.9	+8.8	+6.6	+5.5	+11.5	+9.2	+9.5	+5.3	+11.1	+8.2
	vs 2019	+28.9	+14.2	+19.0	+16.9	+16.9	+20.8	+25.2	+30.2	+23.1	+20.9	+33.9	+22.8
- Online ⁹ percent change	vs 2022	+13.5	+2.6	+4.4	+14.9	+3.6	-14.3	+10.1	-10.2	-0.4	+7.2	+23.5	+7.5
	vs 2019	+85.0	+78.4	+116.6	+76.8	+121.5	+70.5	+75.6	+45.7	+14.3	+73.1	+161.6	+83.3
- Discounters ¹⁰ percent change	vs 2022	+10.5	+18.3	+9.9	+9.8	+12.3	+12.8	+14.9	+9.7	+4.7	+10.8	+16.4	+12.4
	vs 2019	+28.2	+58.3	+26.6	+18.5	+24.3	+55.8	+34.1	+50.9	+36.4	+42.3	+69.5	+37.1

Source: (Delberghe et al., 2024)

E-commerce was used for more than just online sales. Retailers began adopting modern technology such as Augmented Reality (AR) and mobile applications to enhance the online buying experience. Some retailers, for example, have used augmented reality to help customers visualize how the products would appear in their homes before purchasing them, while others have created mobile apps to help streamline the shopping process and provide customers with suggestions based on their preferences (Fortuna et al., 2021).

The Rise of Omnichannel Retailing

Omni channel retailing is a significant step forward in the way that retail markets are attempting to meet new consumer demands, but, first, let's look at what omnichannel retailing is.

Omnichannel retailing is the integration of various sales channels to provide the customer with a seamless shopping experience. Traditional strategies employ multichannel retailing, where

channels like online, mobile, and in-store are operated separately. Omnichannel retailing, on the other hand, concentrates on the coordination of these channels to increase customer interaction in all the points of contact. Verhoef et al. (2015) defined omnichannel retailing as “the synergetic management of the numerous available channels and customer touchpoints, in such a way that the customer experience across channels and the performance over channels is optimized.” This ensures the consumer has a consistent shopping experience whether they are buying the product online, through the mobile application or in the physical stores.

Lehrer and Trenz (2022) identify six key characteristics of omnichannel businesses that distinguish them from traditional multichannel strategies. These characteristics focus on integration, seamless operations, and customer-centricity, which create a unified and improved shopping experience for the customers.

Seamless channel transitions are a hallmark of omnichannel businesses and customers have the ability to move between digital and physical channels without a hitch. For instance, a consumer may use a smartphone app to check stock availability, browse products online, and then either finish the purchase in-store or have it delivered to their house. By removing barriers between channels and ensuring convenience, this fluid interaction improves consumer satisfaction and engagement.

Closely related is the need for a **consistent customer experience** across all platforms. Omnichannel firms have an obligation to ensure that their pricing, promotions, availability of products, and customer service practices remain similar regardless of whether a customer uses a certain channel or otherwise. Whether interacting with a physical store, smartphone app, or e-commerce website, customers anticipate the same information and degree of service. This uniformity promotes a seamless buying experience by removing misunderstanding and establishing confidence.

To this level of integration, robust **information systems** that synchronize data across all channels are required. Centralised inventory management, real time stock updates, order tracking and CRM systems are the foundation of omnichannel operations. These systems enable features like product availability check online and holding products for in-store collection or order tracking of delivery. Real time data sharing makes sure that the customers and the employees have accurate and up to date information at every point of contact.

To support this unified approach, **cross-channel management** is a necessity to coordinate all the actions across platforms. Omnichannel organizations align their marketing strategies, sales efforts, and management of resources to work as a cohesive whole, rather than treating their online, in-store, and mobile operations as separate entities. For instance, store staff are trained to help consumers with digital tools, such as placing online orders or handling returns for purchases made through other channels, and promotional campaigns are made to be uniform across all channels.

The success of omnichannel businesses also depends on proper **incentive schemes** that align employee goals with the customer journey. Most traditional businesses compete on the basis of channel sales to reward their team, which creates competition between teams and prevents collaboration. However, omnichannel businesses reward its employees based on how much they help to improve the overall customer experience and encourages them to participate in all cross-channel interactions. For example, if store associates are able to help a customer complete an online order, or solve a delivery problem, they are recognized for their effort in making the customer happy, independent of the channel through which the purchase was made.

Last but not least, **integrated logistics** is essential to omnichannel operations. Companies need to streamline their fulfillment procedures to satisfy customers' growing demands for accuracy, speed, and flexibility. Effective order management is made possible by real-time inventory visibility across all channels, and customers benefit from more convenient delivery alternatives including "click-and-collect," home delivery, and flexible return policies. By ensuring that goods move smoothly through warehouses, retail locations, and delivery networks, integrated logistics lowers expenses and inefficiencies while raising consumer satisfaction.

The holistic nature of omnichannel enterprises is essentially reflected in six key characteristics: seamless cross-channel transitions, consistent customer experiences, information systems, cross-channel management, incentive schemes, and integrated logistics. By emphasizing integration and customer-centricity, omnichannel companies provide a cohesive and customized shopping experience, satisfying the demands of contemporary customers while streamlining their operations to remain competitive in a rapidly changing retail landscape.

Figure 8: Characteristics of multichannel and omnichannel business

	Multichannel Business		Omnichannel Business	
Consumer Viewpoint	▪ No transition between channels	Channel Transitions	▪ Seamless transition between channels within the same transaction	
	▪ Inconsistent customer experience across channels (e.g., in terms of products / services, prices, promotions)	Customer Experience	▪ Consistent customer experience across channels (e.g., in terms of products / services, prices, promotions)	
Firm Viewpoint	▪ Separated IT systems for each channel ▪ Separated databases for customer, pricing and inventory data	Information Systems	▪ Integrated IT systems across channels ▪ Central database for customer, pricing and inventory data	
	▪ Independent, siloed management of channels ▪ No knowledge sharing across channels	Channel Management	▪ Coordinated and integrated management of channels ▪ Knowledge sharing across channels	
	▪ Directed towards channel competition ▪ Channels are optimized separately with each channel pursuing individual goals	Incentive Schemes	▪ Directed towards minimizing channel competition and maximizing channel synergies	
	▪ Fragmented	Logistics	▪ Integrated across channels	
The transition to omnichannel is characterized by technological, organizational, or market changes and will at the same time afford changes to technologies, organizations and markets* 				

*Note that the characteristics multichannel and omnichannel business depicted here describe their ideal archetypes and manifold intermediate configurations are possible (and will occur during a transition process from multichannel to omnichannel).

Source: (Lehrer & Trenz, 2022)

One of the best practices of this approach can be seen in Inditex Group, which owns Zara. Inditex shut down some of the smaller stores and focused on creating flag ship stores that are equipped with the latest digital capabilities. These stores are now function as physical points of sale and fulfillment centers to support the online purchases, so that the customer is able to get the best of both worlds. The flagship Zara store in Beijing is a good example of this integration, which offers a truly integrated shopping experience with in-store technologies combined with the ease of shopping online (Fortuna et al., 2021).

Supply chain integration and flexibility are also key focus of omnichannel strategies. Shoppers are able to buy products online and either collect from a store or have them delivered to their doorstep. This has implied that retailers had to improve their supply chain management in order to guarantee that inventory and order fulfillment are synchronized across all channels (Fortuna et al., 2021).

Omnichannel strategies have made retailers to pay much attention to the customer experiences and business decisions based on data. According to Fortuna et al. (2021) omnichannel retailing enables retailers to collect and analyze consumer data across different platforms and gain a single view of consumers' behavior and tastes. This data helps retailers to know what their customers need or want and, offer suggestions to them, which is vital for retaining loyalty in a market that has so many competitors (Fortuna et al., 2021).

Impact on Consumer Behavior

The COVID-19 pandemic have changed the way of grocery shopping, depending on the need for safety, convenience, and accessibility of goods in the light of the unprecedented challenges. People all over the world changed their behavior, based on the government mandates, supply chain breakages and shifts in individual concerns. In the subsequent paragraphs I will examine the the impact of COVID-19 on consumer behavior through examples from various regions across the world.

Across the European Union, the pandemic accelerated the adoption of mobile commerce, with e-commerce activity increasing by 41%. Interestingly, the traditional sectors of the population, such as the elderly, started to participate in these platforms. For many, this change was not a matter of choice but a necessity, which showed how external crises can change behavioral patterns (Rahmanov et al., 2021).

Online grocery shopping has expanded significantly in Germany during the pandemic. Although this was a step in the right direction, poor infrastructure and consumer preference for in-store shopping were some of the factors that posed a challenge to the long-term adoption of the model. To many people, the feel of the produce and the physical experience of shopping remained crucial (Dannenberg et al., 2020).

The pandemic's effects on consumer behavior differed by demographic and area. Young people, especially millennials, quickly discovered their desire towards digital platforms to explore new ways of shopping. On the other hand, the Baby Boomers' adoption was slow; they were wary of the latest technology and prioritized safety, but they also struggled with the digital interfaces (Eger et al., 2021). The e-grocery geographical expansion in rural areas of Germany revealed differences in digital infrastructure as smaller retailers struggled to reach out to remote customers (Dannenberg et al., 2020).

Elderly shoppers in Sweden showed strength of character by changing their ways of shopping in order to reduce risk. Some of them started to shop during less peak time, extended the time between two purchases and followed strict safety measures like mask and hand sanitization. To many, local stores and outdoor markets became safer options for buying fresh fruits and vegetables and getting a more personal experience. These adjustments enabled the elderly to maintain their autonomy and comply with the public health measures (Hansson et al., 2022).

In Asia, the shopping habits of Chinese consumers also showed significant changes in the initial stages of the pandemic. Supermarkets, which were previously the most common source of groceries, saw a sharp decrease in usage from 54% to 35% among consumers due to overcrowding and infection risks. Similarly, farmers' markets suffered a sharp decline, which may have been due to fears related to the origins of the pandemic from a wet market. On the other hand, online shopping boomed, rising from 11% to 38% of grocery purchases, to become the most preferred channel during the lockdown. Local independent shops also saw a slight increase, showing evidence of customer retention. This shift can be attributed to the pandemic as a catalyst of the digital transformation and shift in the traditional shopping behavior (Li et al., 2020).

In the context of developing countries, Pakistan for example, people started to buy basic goods like rice and flour, reflecting economic priorities and household needs. On the other hand, in the developed markets especially in the United States and China, sanitizers and masks became the major products of panic buying. Government responses also played a role; in India, for example, swift lockdowns and assurances of supply mitigated some of the social media-driven panic buying observed elsewhere (Islam et al., 2021).

Throughout North America, supply chain issues created another level of difficulty for grocery shopping in Canada. About 30% of the food expenditures were shifted from food services to grocery stores which in turn created supply chain issues and shortage of stocks. This pressure made people to diversify their purchasing channels and more people turned to online shopping and smaller, localized stores (Goddard, 2020).

One of the most common and observed consumer behaviors was panic buying during the COVID-19 pandemic, which was motivated by fear, uncertainty and the media coverage of product shortages. Consumers in various countries engaged in stockpiling of items such as canned food, toilet paper, and water in bottles and containers, often exceeding their immediate needs. In Canada, the absence of goods on the shelves brought about another round of panic that set off a vicious cycle of demand that stretched the supply chains and revealed the weaknesses in the inventory management (Hobbs, 2020).

The same tendencies were observed in the USA where people stocked up on essential goods as a way of coping with the uncertainty. Such actions were motivated by a sense of loss of control, and buying was one of the ways of coping with an extremely unpredictable situation (Chenarides et al.,

2020). Nonetheless, it showed the serious supply chain management weaknesses and highlighted the need for retailers to review their inventory management policies.

The pandemic marked a turning point for online grocery shopping. In the U.S., home delivery and curbside pickup services witnessed tremendous growth, with growth rates of 158% and 255%, respectively. These options were attractive to the consumers who wanted to minimize physical contact with others and still be able to get the essentials that they need. However, the shift was not without its challenges. Small retailers faced a challenge in transforming to the new demand for digital logistics, while large players such as Amazon was also affected by a slowdown due to its distribution centers being overwhelmed (Chenarides et al., 2020).

The reasons for panic buying were not only due to individual factors but also depended on the external factors such as scarcity messages. Research revealed that Limited Quantity Scarcity (LQS), such as announcements about limited supply, and Limited Time Scarcity (LTS), such as reduced store hours, heightened consumer anxiety and created a sense of urgency. These factors were worsened by media coverage and social media platforms that increased perceived arousal and impulsive buying behaviors. For example, Facebook, Twitter, WeChat and other social media sites posted pictures of empty shelves and shortage reports, further fueling panic. This was particularly the case in the United States, China, and Pakistan, although cultural and economic differences determined the kind of goods that people targeted in the different areas (Islam et al., 2021).

Traditional retail methods were reexamined as a result of COVID-19. Consumers' increasing need for variety is demonstrated by the rise of omnichannel shopping models, which include in-store, pick-up, and delivery alternatives. However, because it is impacted by generational, cultural, and infrastructure considerations, the transition to a digital retail environment is still fragmented.

Retailers have learned the lessons of COVID-19: adaptability, resilience, and consumer-centered strategies are critical. Through identifying the requirements of various consumer groups, building digital infrastructure, and enhancing supply chain management, companies can be ready for the future post-pandemic business environment.

Chapter 2 - The Role of Delivery Companies

2.1 From Complementors to Competitors

In the past, delivery services served as supplementary elements in the retail supply chain. They gave traditional retailers the last-mile delivery capabilities and essential logistics they needed to grow their online businesses. Delivery services improved the retailer's value proposition by giving customers a quicker and more convenient experience, and this relationship was reciprocal.

Wynshop and Incisiv (2021) states that 81% of grocery retailers expect these complementors to become their competitors in the future, and 84% agree that the delivery services are capturing customers' attention from the shop owing to a better and more effective customer experience and front-end (Wynshop & Incisiv, 2021). Initially serving as logistic partners for retailers, many of these delivery services have progressively integrated their operations and are currently interacting directly with customers and streamlining their value chain. Because of this, they are able to provide quicker delivery and cheaper prices than the same shops they previously backed.

As customers want more dependable and faster delivery, traditional retailers are changing their tactics to stay competitive. In order to improve customer happiness and reduce delivery times, retailers are also investing more in technology like automated warehouses and micro-fulfillment centers (Mckinsey & Company & EuroCommerce, 2021). Consumer loyalty has also changed due to the move to online shopping, with many customers now prefer delivery platforms to traditional retail outlets.

The dynamics between retailers and delivery companies have gradually shifted. With customer data and logistics networks at their disposal, numerous delivery services have developed into powerful entities in their own right, posing a threat to established retailers.

2.2 Impact on Consumer Behavior and Retail Strategies

The growth of delivery companies has greatly impacted the way of shopping and retail operations of the consumers. These services have been a boon for the consumers as they have gotten used to the convenience and speed that has drastically altered consumer expectations in all aspects of life. Retailers have been forced to adopt omnichannel approaches in order to combine the online and physical channels of the consumer journey. As stated by Fortuna et al. (2021), it is important for retailers to combine the digital and physical channels, as many customers are now expecting product availability in real-time and a seamless transition between different channels (Fortuna et al., 2021).

As last-mile delivery became an important aspect of customer satisfaction, Vakulenko et al. (2019) stress that delivery is now a critical touchpoint in the customer journey, moderating the relationship between the online shopping experience and overall satisfaction. Reliability, tracking capabilities, and flexible time windows are key factors that influence satisfaction with delivery performance and have come to be seen as key drivers of satisfaction, underscoring the importance of logistics in shaping consumer loyalty.

Furthermore, cooperation between retailers and delivery companies has grown more and more important. Both of these entities share the obligation of ensuring customer satisfaction, and a bad delivery experience, even if the logistics provider is responsible for it, hurts the retailer's reputation, claim Vakulenko et al. (2019). In order to give customers a smooth and dependable end-to-end experience, this interdependency has compelled retailers to improve their relationships with delivery services.

2.3 Impact of delivery services on the Retailers

According to Pasirayi et al. (2023) study, "The effect of third-party delivery partnerships on firm value," these kinds of collaborations generally increase a company's worth. However, the retailer's size, market share, and service model all affect how much of a gain there is. One significant conclusion is that shortly after they are announced, these agreements lead to an average increase in

firm value of 0.96% (Pasirayi et al., 2023). This rise demonstrates how confident investors are in delivery platforms' capacity to improve operational effectiveness and market access. The most benefited retailers are smaller ones; delivery partnerships allow them to reach a wider audience outside their physical location. On the other hand, large retailers get diminishing returns because of their strong market position, which limits the incremental value of such partnerships.

The type of service provided also plays an important role. Convenience and self-service retailers gain more value from these partnerships because delivery is easier to match with their business models. However, full-service retailers who rely on in-store customers may not see the same benefits. To these retailers, delivery services are a potential threat to diluting the kind of customer interactions on which they derive their value (Pasirayi et al., 2023).

Fisher et al. (2019) also explain why delivery is a critical strategy in omnichannel retailing. Their study shows that faster delivery increases online sales and has a positive spillover effect on physical stores. Online store sales increased by 1.45% for every business-day reduction in delivery time while offline sales increased by 0.61%. These results highlight the complementary nature of the digital and physical channels and reveal that enhancing the quality of delivery service can improve a brand's equity.

The benefits of fast delivery are particularly visible for online shoppers who infrequently purchase online or in categories with high purchase risk, such as apparel or perishables. This demographic is more responsive to reliable and fast delivery options, increasing their trust and frequency of interaction with the retailer across different channels (Fisher et al., 2019). In addition, the effects of improved delivery time are consistent with the idea that as customers become accustomed to better service quality, they continue to grow over time, and therefore, investment in delivery logistics can lead to increasing returns.

It is noteworthy that the financial impact of these benefits is the same across various sizes of platforms and forms of retailers, including restaurants and non-food products. This shows that third-party platforms are useful in managing last-mile delivery and customer contact. Through the use of these platforms, the retailers do not have to incur high initial costs and can take advantage of the delivery company's infrastructure and knowledge (Pasirayi et al., 2023).

Ultimately, the studies by Pasirayi et al. (2023) and Fisher et al. (2019) establish that delivery partnerships and investments are most advantageous for retailers whose strategies align with the

capabilities of delivery. The immediate benefits are greatest for the small or convenience-based retailers who excel at making transactions easy and straightforward, minimizing the customer contact; however, experience-based retailers who value customer contact and in-store experience, must assess the potential cost of customer disengagement against the potential gain of operational effectiveness. The synergistic impact of the faster delivery on the combined performance of the online and offline channels of omnichannel retailers underscores the need to include the delivery speed and reliability as key elements of their overall strategy.

Chapter 3 - Economic Performance of Key Retailers and Delivery Companies After The Covid-19

The global retail and delivery markets have been affected during the COVID-19 pandemic, as people had to shift their shopping behavior due to restrictions and health risks. This resulted in an increase in demand for retail companies with e-commerce platforms like Carrefour and food delivery companies such as Deliveroo, and Just Eat. Supermarket giants like Coop and Conad also helped in meeting the new needs of the customers during these periods of difficulties. The increase in demand during the pandemic has been a significant growth prospect to these companies; nevertheless, the period immediately after COVID-19 has posed new threats in the form of inflation, supply chain disruptions, and shifting consumer tastes.

After the outbreak, many of the major industry players have had to revise their plans and methods of doing business and operation in the light of the new market trends and regulatory environment. This segment will attempt to evaluate the performance of the top public delivery and retail companies in Europe, based on key metrics such as revenue growth, profitability, gross margin, and operational efficiency. It is possible to get a better picture of how these businesses have fared in the post-pandemic world and what they are doing to secure future growth by looking at companies like Tesco and Deliveroo among others.

Here, we aim to give a picture of the financial status and strategic position of major companies in the global retail and distribution industries with a focus on Europe after the COVID-19 outbreak.

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3.1 Delivery Companies

3.1.1 Deliveroo

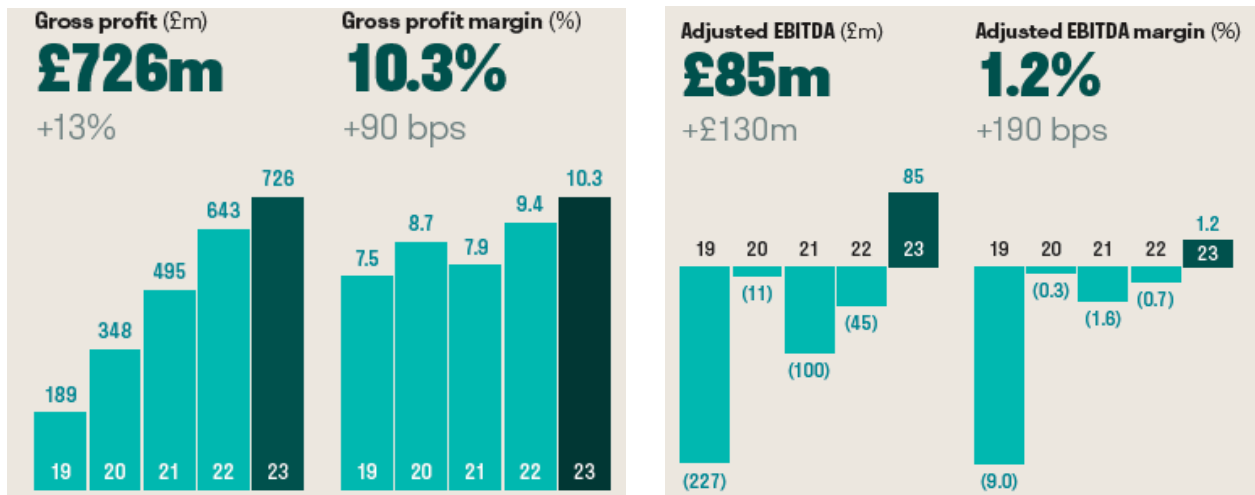
Founded in 2013, the UK-based company Deliveroo has developed into a major online food delivery service that offers customers a wide range of restaurants using advanced supply chain and data management technologies. Its creative business strategy has completely changed how urban dwellers obtain and eat food, and it also helps to alter customer behavior and market dynamics. Deliveroo continues to influence the direction of on-demand delivery services by concentrating on enhancing the delivery process and client relations (Deliveroo plc, n.d.).

2023 Annual Financial Report

Mainly due to the increase in Gross Transaction Value (GTV), Deliveroo's revenue grew by 3% year-over-year, reaching £2,030 million in 2023. Product price inflation and customer fee optimization led to the Gross Transaction Value (GTV) per order to rise by 6% to £24.3 (Deliveroo plc, 2023).

Further, the gross profit was up considerably to £726 million, 13% above 2022 (Deliveroo plc, 2023). In terms of the gross profit margin as a percentage of GTV, it was 10.3%, above the 9.4% of 2022. This achievement is attributable to operational excellence, which entailed the realization of better control of delivery costs and advertising revenue. Deliveroo's adjusted EBITDA also saw a sharp change of direction after reporting a loss of £45 million in 2022, coming in at £85.4 million in 2023. Hence, the adjusted EBITDA margin in 2023 was 1.2% of the GTV due to better gross profit margins and reduced marketing and overheads costs (Deliveroo plc, 2023).

Figure 9: Some Key Performance Indicators of Deliveroo



Source: (Deliveroo plc, 2023)

Significantly improving over -£243 million in 2022, Deliveroo reported a free cash flow of -£38 million. This improvement was mostly attributable to increased profitability and more careful capital expenditure management. Net cash at the end of 2023 was £679 million, down from £1,000 million the previous year, owing mostly to shareholder returns of £309 million over the year (Deliveroo plc, 2023).

The company has also worked on developing operational efficiencies, and along with advertising revenue, making a significant contribution, they succeeded in moderating inflationary pressures and improving their cost structure. Deliveroo also expanded its order stacking capabilities with the launch of multi-pickup stacking and reduced waiting times for riders, further optimizing its delivery operations (Deliveroo plc, 2023).

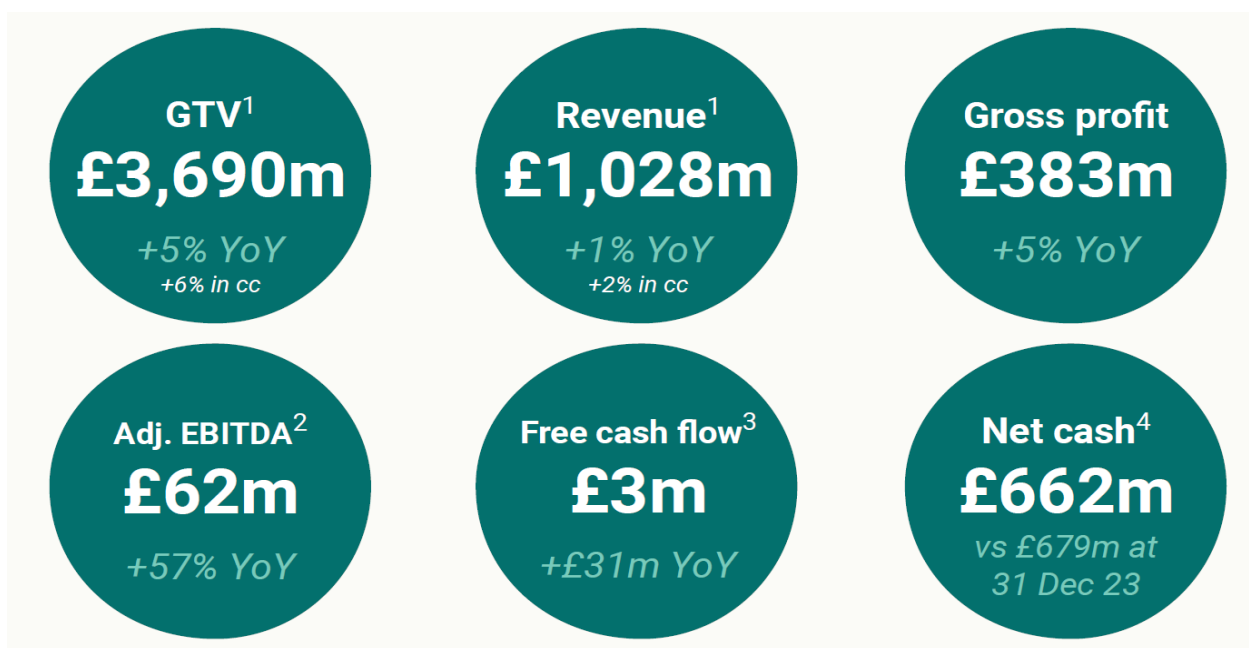
2024 First-Half Financial Report

In the first half of 2024, Deliveroo displayed adaptive behavior and growth, especially in the UK & Ireland (UKI) market and other international markets, including the UAE and France. The company saw Gross Transaction Value (GTV) growth of 5% (6% in constant currency) to £3,690 million, from a 4% growth in GTV per order—due to item level price inflation—and 2% growth in order volume. Deliveroo’s revenue grew by 1% to £1,028 million with a revenue take rate of 27.9%, lower than 2023 due to the rise of low margin grocery orders and promotional activities aimed at keeping consumers and improving value perception (Deliveroo plc, 2024).

Deliveroo's gross profit increased by 5% to £383 million with a stable gross profit margin of 10.4% of GTV despite the pressure of inflation. This stability was mainly attributed to operational efficiencies in the delivery network with reduced rider wait times and the introduction of multi-pickup stacking, which reduced the cost per order. Deliveroo's adjusted EBITDA saw a significant enhancement, increasing by 57% to £62 million with an adjusted EBITDA margin of 1.7% of GTV, as compared to 1.1% in H1 2023, mainly through effective marketing and overhead cost control (Deliveroo plc, 2024).

In cash flow terms, Deliveroo generated positive free cash flow of £3 million compared to the H1 2023 outflow of £27.7 million. This was underpinned by a net cash position of £662 million at the end of H1, which was used to support shareholder returns, including £150 million share buyback to optimize the capital structure (Deliveroo plc, 2024).

Figure 10: Key Performance Indicators of Deliveroo for H1-2024



Note: ¹ "cc" = constant currency growth rate

Source: (Deliveroo plc, 2024)

The UK & Ireland segment of Deliveroo led growth with a 7% increase in GTV to £2,196 million, fuelled by strong demand for the grocery service which now accounts for 14% of GTV. Within this segment, revenue rose 2% to £614 million, driven by the wider grocery product range and effective ad revenue generation. In the meantime, the International segment has grown by 3% in orders and

5% in GTV at constant currency. This was especially visible in France, where consumer confidence is improving and food prices are more stable (Deliveroo plc, 2024).

Deliveroo's ongoing improvements to its Consumer Value Proposition (CVP) were integral to the positive trends in consumer retention and order frequency. Key initiatives included the expansion of the loyalty program, such as launching Plus Diamond, which offers premium benefits like priority delivery and extra credits. These loyalty initiatives are anticipated to further drive consumer engagement and order volume growth. Furthermore, grocery service expansions in the UK and UAE, alongside new market entries in Kuwait and Hong Kong, reflect Deliveroo's focus on broadening its retail offering and enhancing customer selection (Deliveroo plc, 2024).

3.1.2 Delivery Hero

Founded in 2011 and based in Berlin, Delivery Hero is a prominent worldwide player in the online food ordering and delivery industry. With a portfolio of companies like Foodpanda, Talabat, and Yemeksepeti, each of which serves distinct regional characteristics, the company has broadened its market reach. Its focus on creating automated systems and environmentally friendly logistical techniques demonstrates that it is dedicated to increasing productivity while reducing its negative effects on the environment. Delivery Hero has established itself as an influential player in the on-demand delivery market (Delivery Hero SE, n.d.).

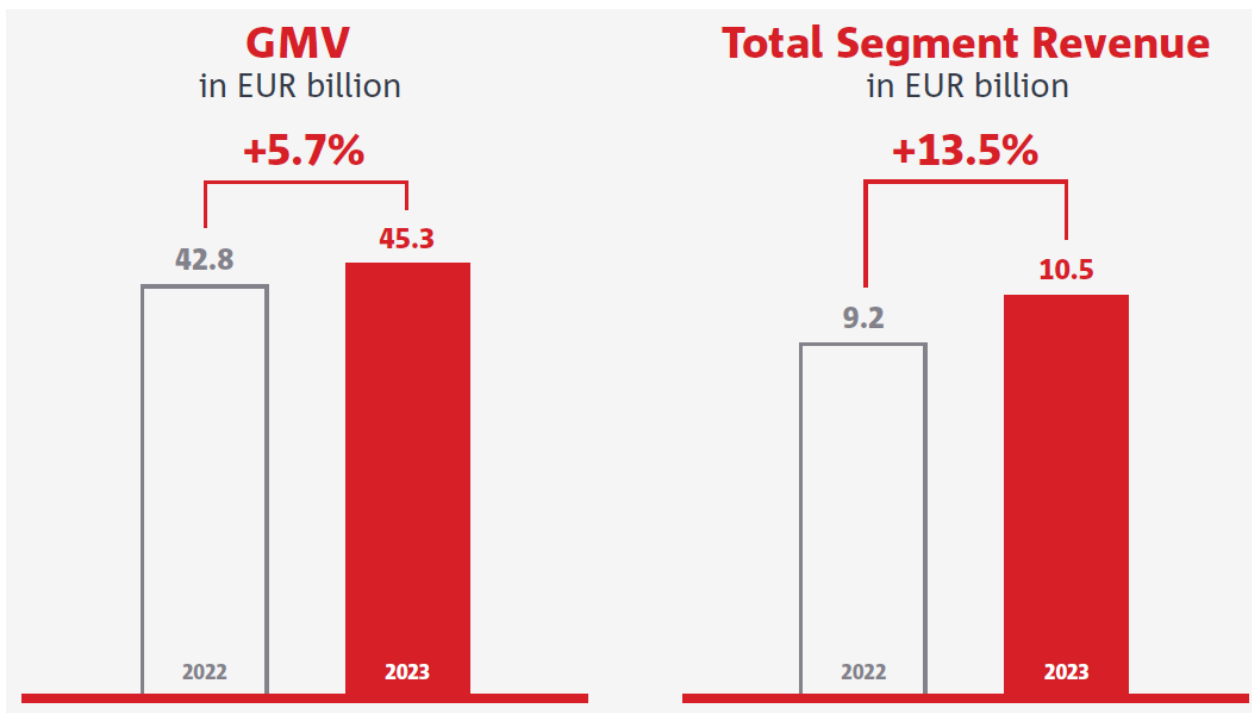
2023 Annual Financial Report

Delivery Hero's total segment revenue increased by 13.5% year-over-year to €10.5 billion in 2023, mainly due to growth in Gross Merchandise Value (GMV). Gross Merchandise Value also grew by 5.7% to €45.3 billion from €42.8 billion in 2022, which indicates the company's growth and sustained demand in key markets (Delivery Hero SE, 2024a).

The most significant achievement was in Adjusted EBITDA, which turned positive for the first time at €253.6 million in 2023, compared to the loss of €467.2 million in 2022. The Adjusted EBITDA margin also improved to 0.6% of the GMV due to better operational

efficiency and cost control. This shift was mainly because of optimized delivery costs, centralized operations in Europe, and the introduction of new revenue channels such as AdTech, which enables real-time ad placements on the platform (Delivery Hero SE, 2024a).

Figure 11: *GMV and Total Segment Revenue growth 2022 vs. 2023*



Source: (Delivery Hero SE, 2024a)

Regional performance highlights Delivery Hero's growth strategy:

- With a 16.6% increase in GMV to €9.96 billion and a significant improvement in adjusted EBITDA margin to 3.1% of GMV, MENA region saw strong expansion (Delivery Hero SE, 2024a).
- Despite adjusted EBITDA remaining slightly negative at -2.2%, Europe's GMV increased by 57%, largely due to the integration of Glovo (Delivery Hero SE, 2024a).
- The GMV in Asia declined by 5.8% due to the general factors that affect the region's demand, including economic pressures and competitive factors. However, it was a strong performance in Adjusted EBITDA, moving from €57 million to €385 million, which indicates strong cost restructuring and efficiency (Delivery Hero SE, 2024a).

- The Americas experienced a 5.4% decrease in GMV, which may relate to currency fluctuations and regional market adjustments. Although the region recovered in Adjusted EBITDA margin going from -5.1% to -2.0%, which shows better cost control in this challenging region (Delivery Hero SE, 2024a).

Delivery Hero reduced expenses in 2023 by centralizing and simplifying the core operations in the company, especially in Europe. This reorganization allowed the company to lower its workforce and improve the effectiveness of its advertising to better align with the core functions of the enterprise. In addition, Delivery Hero made investments in AdTech improvements to establish a new, lucrative advertising revenue stream that allows restaurants and other third parties to place direct advertisements on Delivery Hero's platform. With an advertising revenue target of €2 billion by FY 2024–2025, this campaign is anticipated to be highly profitable (Delivery Hero SE, 2024a).

In terms of cash flow, Delivery Hero achieved free cash flow breakeven in the second half of 2023, which is a critical milestone for financial self-sustainability. Delivery Hero also reported positive gross profit for its Dmarts business (on-demand warehouses) as well. These improvements together with disciplined capital expenditure are indicative of Delivery Hero's progress in the achievement of long term financial targets (Delivery Hero SE, 2024a).

Operational efficiencies and the contribution of advertising revenue have been key in relieving economic pressures and improving cost structures. Delivery Hero also combined functions under the foodora brand in Europe, and has boosted the advertising efficiency and implemented strategic initiatives, like its new AI-powered shopping assistant in the MENA region, talabatAI, to improve customer experience and diversify revenue streams (Delivery Hero SE, 2024a).

2024 First-Half Financial Report

To analyze Delivery Hero's financial performance for H1 2024, the company's report provides information on revenue growth, GMV trends, adjusted EBITDA improvements and cash flow developments. Delivery Hero's Total Segment Revenue grew by 19.1% year-on-year to €6.04 billion. The growth was mainly fueled by an increase in the share of own delivery services, the improvement of Dmart offerings, and increased benefit from AdTech products (Delivery Hero SE, 2024b).

Gross Merchandise Value (GMV) continued to grow by 6.3% to €23.69 billion, maintaining demand across regions, although growth was at a more moderate rate than revenue. The MENA region led the growth in GMV with a 29.4% surge thanks to the growth in customer base and affordability initiatives, while Europe grew 18.2% as the Glovo brand captured category share (Delivery Hero SE, 2024b).

One of the biggest improvements was in Adjusted EBITDA, which rose sharply to €240.5 million in H1 2024 from €9.2 million in H1 2023. The Adjusted EBITDA margin was also up from zero to one percent of GMV, indicating better operational efficiency and cost control. MENA was the most profitable region, delivering a 3.5 percent Adjusted EBITDA margin, and Europe and the Americas both saw a decline in their negative EBITDA margins (Delivery Hero SE, 2024b).

Segment performance also showed different regional trends:

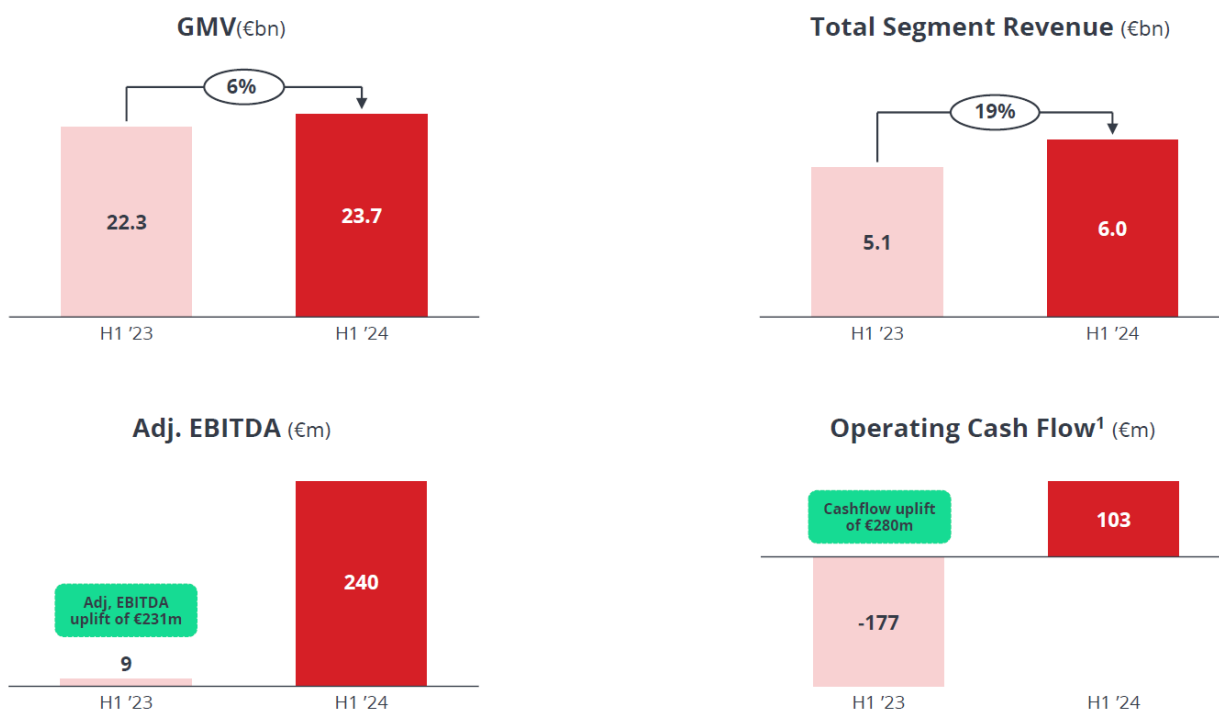
- Asia saw a 6.5% decline in GMV from competitive pressures and adverse currency effects. Adjusted EBITDA in this region dropped by €16.9 million, but this was offset by targeted pricing strategies (Delivery Hero SE, 2024b).
- Customer retention and profitability were further enhanced by affordable subscription options and more efficient delivery, which caused the MENA region to see a strong growth, with GMV up 29.4% and revenue up 32.2% (Delivery Hero SE, 2024b).
- Europe saw a 23.2% growth in revenue with help of Glovo's growing presence, though EBITDA was still slightly negative at -0.9% of GMV (Delivery Hero SE, 2024b).
- America's GMV has grown by 15% through the expansion of quick commerce and cross-selling, and has improved Adjusted EBITDA from -€53.4 million to -€12.9 million, as a result of cost-saving initiatives (Delivery Hero SE, 2024b).

In terms of operating expenses, cost of sales grew by 21.9%, from higher logistics costs and the development of own delivery services, while marketing expenses decreased by 2.6% through optimized spending. The gross profit margin declined only slightly to 28.4% from 29.9%, primarily as a result of logistics and delivery costs (Delivery Hero SE, 2024b).

Cash flow from operating activities improved significantly to €103.2 million, compared to -€177.2 million in H1 2023, reflecting positive cash generation through operational efficiencies. Cash

reserves rose to €1.76 billion, supporting Delivery Hero’s liquidity and growth plans (Delivery Hero SE, 2024b).

Figure 12: Key Performance Indicators of Delivery Hero for H1-2024



Source: (Delivery Hero SE, 2024b)

3.1.3 Just Eat

Just Eat is a well-known online food ordering and delivery service that was founded in Kolding, Denmark, in 2001. It provides a wide variety of cuisines and links customers with a huge network of restaurant partners. Just Eat and Takeaway.com, established in the Netherlands, combined in 2020 to become Just Eat Takeaway.com, which has operations in the UK, Canada, and Australia, among other nations. The Just Eat platform, through its website and mobile app, enables users to easily order and pay for food from local restaurants and groceries (Just Eat Takeaway.com, n.d.).

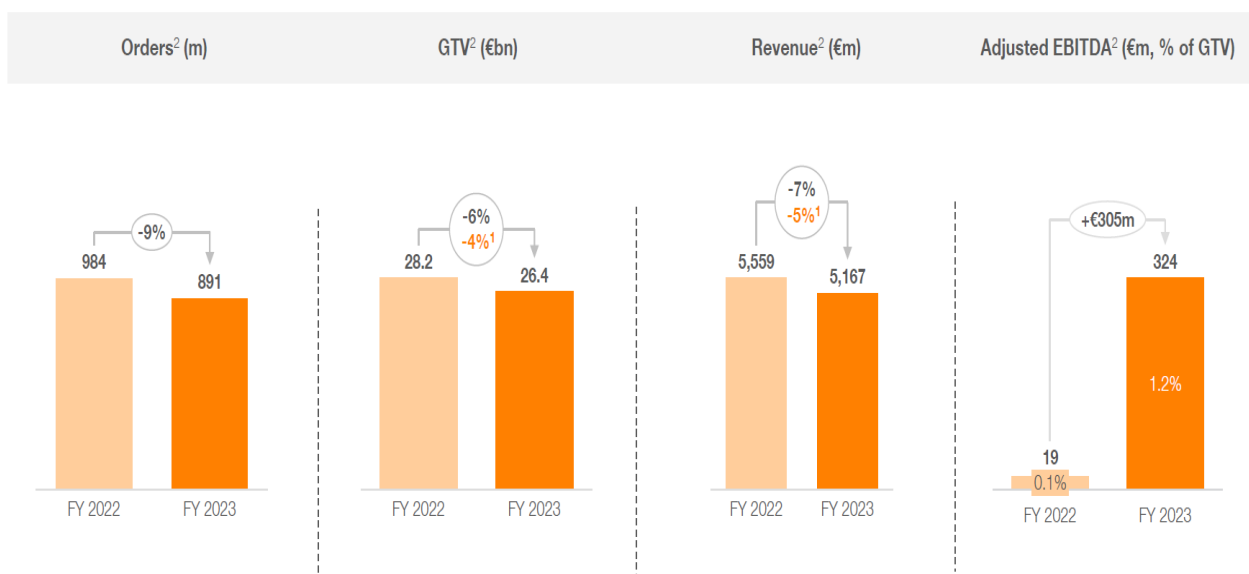
2023 Annual Financial Report

Group Gross Transaction Value (GTV) decreased slightly by 6% year on year to €26.4 billion in 2023, mainly due to lower order volumes in North America and Southern Europe. However, the Northern Europe and UK regions posted positive GTV growth, showing that core markets are resilient (Just Eat Takeaway.com, 2024a).

In 2023, Just Eat Takeaway's revenue was €5.167 billion, down 7% from 2022, which was impacted among other things by a challenging market environment. However, the business experienced an improvement in logistics unit economics and put efficiency measures in place that supported profitability targets and mitigated revenue pressure (Just Eat Takeaway.com, 2024a).

One of the standout financial highlights is the substantial growth in Adjusted EBITDA, which rose to €324 million for FY 2023, well above the previous year. This marks a positive Adjusted EBITDA margin of 1.2% of GTV, up from 0.1% in 2022, demonstrating improved cost control, operational efficiency, and the beneficial impact of AdTech revenue (Just Eat Takeaway.com, 2024a).

Figure 13: Key Performance Indicators of Just Eat for 2023



Note: ¹ Constant Currency Growth

² On a Combined Basis

Source: (Just Eat Takeaway.com, 2024a)

Regional Performance across Just Eat Takeaway's markets showed varied outcomes :

- Northern Europe recorded a double-digit increase in revenue, with Adjusted EBITDA margins nearing 5%, closely aligning with the company's long-term profitability targets.
- UK and Ireland saw a considerable improvement, with a 2.0% Adjusted EBITDA margin, up from 0.4% the prior year, driven by operational efficiencies.
- North America doubled its Adjusted EBITDA margin to 1.3%, indicating progress towards profitability.
- Southern Europe and ANZ experienced a 17% drop in GTV but achieved cost-saving improvements that helped reduce overall losses (Just Eat Takeaway.com, 2024a).

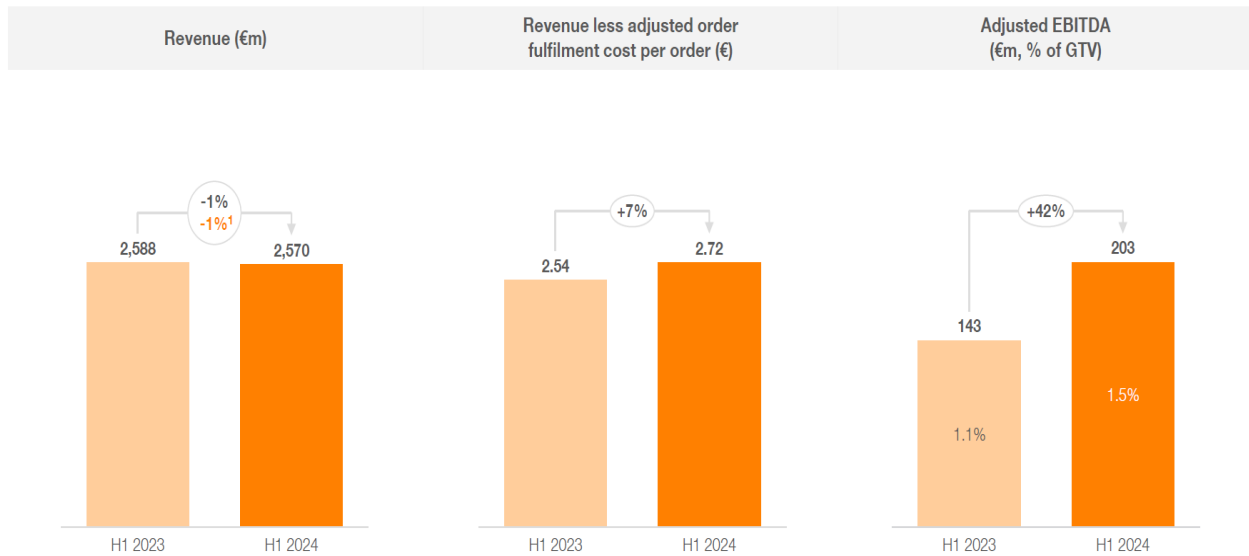
A major turning point in the company's efforts to attain long-term financial stability was reached in H2 2023 when Just Eat Takeaway achieved positive free cash flow. Even with active share repurchases, the company managed to maintain a cash balance of €1.724 billion at year's end thanks to the revenues from the sale of some investments, which also helped to boost free cash flow. As it continues to put liquidity and shareholder returns first, the company has also maintained a conservative approach to capital expenditures and strategic buybacks (Just Eat Takeaway.com, 2024a).

2024 First-Half Financial Report

In H1 2024, Just Eat Takeaway's GTV was €13.2 billion, down 1% from the prior year, as the company concentrated on its core markets and exited unprofitable markets. Demand in Northern Europe and the UK is still high, as evidenced by the 3% GTV growth at constant currency, excluding North America (Just Eat Takeaway.com, 2024b).

Revenue yield has improved, as reflected by the 7% rise in revenue minus fulfillment expenses per order. As a result, the company's Adjusted EBITDA increased significantly to €203 million, or 1.5% GTV margin, from 1.1% in H1 2023. Lower fulfillment costs and central cost savings were the reason for the increase in EBITDA; so, it would seem that the effectiveness of operations has increased (Just Eat Takeaway.com, 2024b).

Figure 14: Key performance Indicators of Just Eat for H1-2024



Note: ¹ Constant Currency Growth

Source: (Just Eat Takeaway.com, 2024b)

Regional Performance Highlights:

- Northern Europe: GTV grew by 6%, reaching €4.0 billion. The adjusted EBITDA for the region was €186 million, a 4.6% EBITDA margin. Investments in logistics and customer loyalty programs, like JET+ in Germany, supported this growth.
- UK and Ireland: GTV increased by 9% to €3.4 billion, with Adjusted EBITDA reaching €92 million and a 2.7% EBITDA margin. This improvement followed the completion of the transition to the company's own delivery platform, lowering delivery costs per order.
- Southern Europe and ANZ: GTV remained unchanged at €1.0 billion. Due to market exits in New Zealand and France, adjusted EBITDA was €49 million, but it was better than last year.
- North America: GTV fell by 9% to €4.8 billion. Nevertheless, Adjusted EBITDA was €80 million, which is a 1.7% margin, and this was achieved with the help of the development of partnerships with major brands and the continuation of the path towards cash flow breakeven (Just Eat Takeaway.com, 2024b).

In terms of cash flow, Just Eat Takeaway reported free cash flow of €38 million positive before working capital adjustments in H1 2024, an improvement of €116 million from H1 2023. The

company's dedication to financial stability was strengthened by this progress, which was made possible by controlled capital expenditures and lower central costs. The cash balance stayed stable at €1.347 billion in spite of cash losses caused by share buybacks and convertible bond repayments (Just Eat Takeaway.com, 2024b).

3.2 Retail Companies

3.2.1 Carrefour

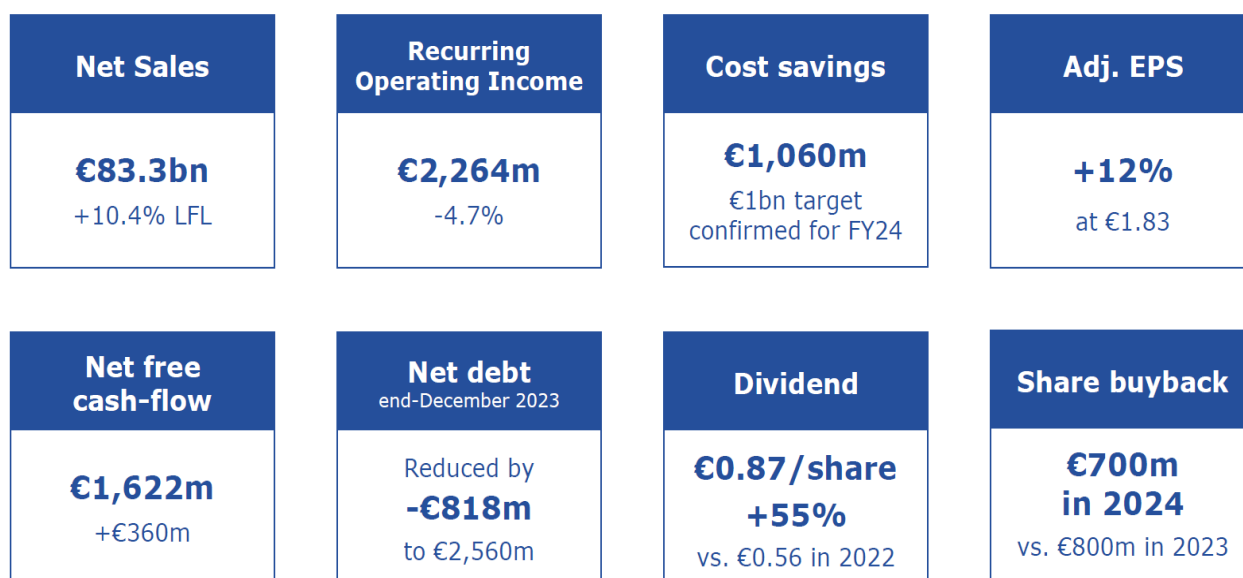
With its headquarters in France, Carrefour is a prominent international retail firm founded in 1959. It offers a variety of supermarkets, convenience stores, and hypermarkets and has more than 14,000 outlets in more than 40 countries. Carrefour's substantial influence in the global retail business is highlighted by its €94.1 billion turnover in 2023 (Carrefour).

2023 Annual Financial Report

The report looks at Carrefour's financial results for FY 2023, focusing on key measures that include revenue growth, recurring operating income (ROI), improvements in cash flow and strategic progress. Net sales were €83.3 billion, up 10.4% in like-for-like (LFL) terms, driven by strong momentum in Latin America and robust food sales in Europe. Carrefour's commitment in online retail and its omnichannel strategy are seen in the robust growth of e-commerce, which saw a 26% increase in GMV (Carrefour, 2024a).

Because of increased energy costs and Grupo BIG's integration expenditures in Brazil, recurring operating income (ROI) was €2,264 million, a 4.7% decrease from the previous year. However, ROI increased by +9.8% at constant exchange rates, demonstrating Carrefour's ability to achieve its objectives in difficult situations (Carrefour, 2024a).

Figure 15: Key Performance Indicators of Carrefour for 2023



Source: Carrefour 2023 Annual Financial Report

Regional Reports:

- France: ROI increased by 18.5%, supported by strong food sales (+6.0% LFL), increased private-label penetration (36% of food sales), and the expansion of e-commerce (+16% GMV). Operational cost reductions and mutualization of support functions contributed to margin improvements.
- Other European Countries: Stable ROI at €604 million, with strong growth in Spain (+14% ROI growth) and Belgium (+7.6% LFL sales growth). Inflationary conditions put strain on Poland's and Romania's profitability.
- Latin America: ROI declined by 24.1% due to negative impact of Grupo BIG integration costs in Brazil. However, the converted Grupo BIG stores were positive, with a +17% LFL growth in Atacadão stores and 5% EBITDA margin in Q4.
- Argentina: In spite of hyperinflationary conditions, Carrefour managed to increase its market share and achieve strong growth in volume. ROI increased by 4.1% (Carrefour, 2024a).

Cash Flow and Debt Management: Carrefour generated net free cash flow of €1,622 million, a €360 million increase compared to 2022. The source of this improvement was good supply chain

management and better year-end events, especially in Argentina. The company also cut its net debt by €818 million, with the help of asset sales and operating cash flow (Carrefour, 2024a).

Strategic Developments:

- Carrefour has completed the integration of Grupo BIG in Brazil, achieving annualized cost synergies of R\$1.6 billion, with a target of R\$2.0 billion by 2025.
- Acquiring Cora and Match in France has strengthened Carrefour's market position, and the combined market share among the top three food retailers increased to 63%.
- Sustainability is an essential part of Carrefour's commitment and has resulted in important improvements, such as a 38% decrease in store greenhouse gas emissions since 2019 and the sales of €514 million in plant-based alternatives, which have exceeded its 2023 targets (Carrefour, 2024a).

2024 First-Half Financial Report

Net sales were €40.6 billion, which is relatively 0.3% below the H1 2023 baseline. Nonetheless, the positive like-for-like (LFL) growth of 12.1% testifies to Carrefour's stability in a challenging economic setting, fueled by growth in Latin America and a strategic focus on France (Carrefour, 2024b).

Recurring Operating Income (ROI) grew by 6.2% to €743 million, driven by cost discipline, operational efficiencies and Carrefour's 2026 initiatives. The ROI margin also expanded by 11 basis points to 1.8%, suggesting that the company is becoming more profitable, despite issues like higher energy costs and a difficult retail environment in Europe (Carrefour, 2024b).

Regional Highlights:

1. France:

- LFL sales declined -2.0%, with hypermarkets performing the weakest at -3.4% LFL, while convenience formats were nearly flat.
- ROI increased by 6.2% to €286 million, driven by cost controls and growth in private-label penetration, which accounted for 37% of food sales (+2 points year-over-year).

- E-commerce GMV grew 30%, reflecting Carrefour's strong focus on omnichannel retail (Carrefour, 2024b).

2. Europe (Excluding France):

- LFL sales declined by -1.5%, attributed to price competitiveness measures, sluggish non-food sales, and integration costs of new acquisitions like Cora stores in Romania.
- ROI dropped sharply by 48% to €84 million, reflecting a challenging market environment in Italy and Poland and unfavorable weather affecting seasonal products (Carrefour, 2024b).

3. Latin America:

- Strong LFL growth of +46.2%, driven by the growth in Brazil (+3.8%) and a great performance in Argentina (+247.1% LFL).
- ROI surged by 37% to €417 million, with Brazil benefiting from improved cost synergies (R\$2.3 billion run-rate achieved by June 2024) and a successful commercial strategy in Atacadão stores (Carrefour, 2024b).

4. Argentina:

- In a hyperinflationary environment, Carrefour has followed a sustainable model expanding its discount formats through Maxi and hypermarkets. The ROI decreased slightly due to IAS 29 effects, but it remained strong in constant currency basis (Carrefour, 2024b).

In H1 2024, Carrefour had good cash flow and debt control even in difficult circumstances. Net free cash flow was -€1.7 billion due to seasonal effects, lower real estate divestments, and the hyperinflation adjustments in Argentina. The company continued its cost control plans, which achieved €580 million in savings and is on the right path to achieving the annual target savings of €1.2 billion. Net debt rose to €5.42 billion as a result of strategic acquisitions and shareholder returns, such as dividends and share buyback (Carrefour, 2024b).

Strategy-wise, Carrefour grew its convenience store footprint by adding 166 franchised stores in France and opening 10 new Atacadão stores in Brazil. E-commerce GMV also grew strongly,

supported by good digital performance in Brazil and the launch of Unlimitail across 13 countries. Sustainability was also high on Carrefour's strategy, which reduced its greenhouse gas emissions by 49% since 2019 and continued its Food Transition Pact, forming new and strengthening existing partnerships and enhanced actions (Carrefour, 2024b).

3.2.2 Ahold Delhaize

Ahold Delhaize is a major Dutch-Belgian multinational retail and wholesale holding company established in 2016 after Ahold and Delhaize Group merged, both of which have their roots in the 1800s. The company has a wide range of local brands, such as Albert Heijn in the Netherlands, Delhaize in Belgium, Food Lion and Stop & Shop in the United States. Operating around 9400 retail stores and e-commerce platforms offering a significant online shopping experience, Ahold Delhaize has a weekly customer base of millions who access not just physical but digital avenues for shopping conveniently (Ahold Delhaize, n.d.).

2023 Annual Financial Report

In 2023, Ahold Delhaize witnessed a 1.9% growth in net sales and ended the year with €88.6 billion. This shows a moderate increase in growth rate with more emphasis on the integration of the omnichannel strategy.

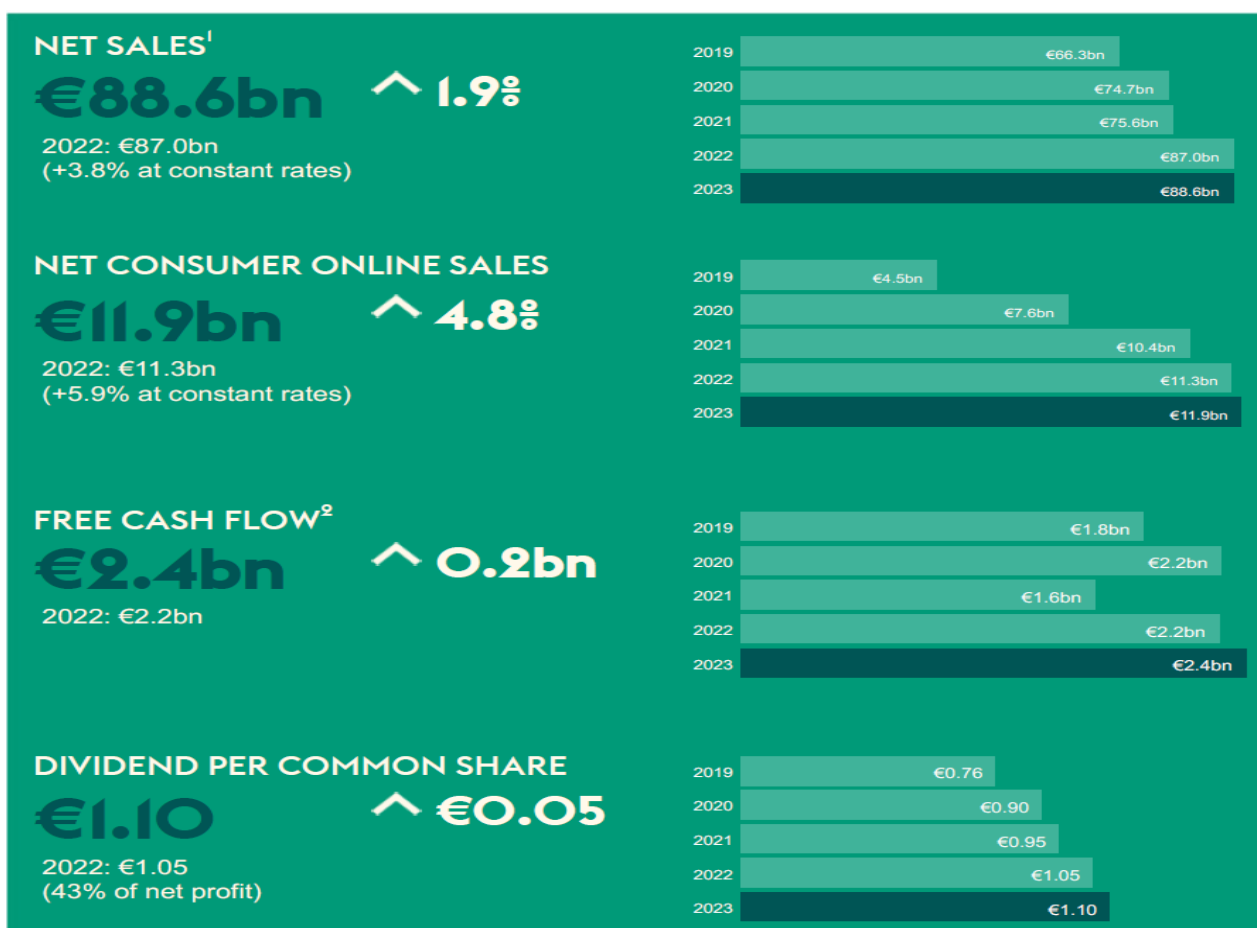
Ahold Delhaize's omnichannel leadership is an essential part of the company's strategy that allows it to seamlessly integrate physical and digital retail by providing a customer-oriented shopping experience. The company reported a year-over-year increase of 4.8% in net consumer online sales to €11.9 billion, as it introduced new additional e-commerce initiatives, including the newest customer trends in 2023. It rose in the online sector by fine-tuning its effectiveness of operations, incorporating the upcoming AI-driven customer tools, strengthening the available loyalty programs, and adopting the Home Shop Centers (HSCs) in Europe, thus retaining its market position in online grocery services. The introduction of click-and-collect and last-mile delivery coupled with speed, product availability, and customer satisfaction is much more accessible by conveying the synergy between physical stores and online platforms. Ahold Delhaize has expanded its logistics network by incorporating third-party companies to guarantee the quality and scalability of its service and, along with the geographical presence in markets such as the U.S. and Northern Europe, which have shown growth potential, assured the customers that the company is dedicated

to its mission of being a leader in e-commerce and omnichannel sectors that are increasingly congested (Ahold Delhaize, 2023).

Profitability Metrics: The company's primary operating income has slightly decreased by 3.3% to €3.6 billion, and the operating income margin has a minor fall to 4.1% from 4.3% in 2022. Despite the inflationary pressures and operating expenses, net income demonstrated a fall of 26.4%, a value of €1.9 billion (Ahold Delhaize, 2023).

Cash Flow and Dividend: Ahold Delhaize displayed strong liquidity after generating a free cash flow of €2.4 billion, slightly more than the €2.2 billion in 2022. The dividend per common share was raised by €0.05 to €1.10, making the payout ratio equal to 43% of the net profit, making it clear how the company invests in its shareholders (Ahold Delhaize, 2023).

Figure 16: Key Performance Indicators of Ahold Delhaize for 2023



Source: Ahold Delhaize 2023 Annual Financial Report

Operational Excellence and Sustainability: Under the Save for Our Customers program, the company has saved up to 1.25 billion euros in costs, exceeding its initial goal by 250 million euros. Ahold Delhaize's sustainability programs, such as a 35% cut in Scope One and Two emissions and ongoing food waste reduction, have placed the company as an industry leader in Environmental, Social, and Governance (ESG), earning the MSCI AAA rating (Ahold Delhaize, 2023).

Strategic Investments and Innovations: Major investments include a €2.5 billion CapEx related to store remodeling, sustainable technologies, and omnichannel capacity expansion. Key initiatives include the rollout of mechanized Home Shop Centers (HSCs) in Europe and advancements on AI-driven platforms for better customer experiences (Ahold Delhaize, 2023).

2024 Second Quarter Financial Report

Ahold Delhaize maintained a stable financial performance in Q2 2024 and demonstrated e-commerce grocery sales growth, operational efficiency and geographical market expansion. The company reported net sales of €22.3 billion, which is up 0.7% at constant exchange rates. This growth was primarily from steady comparable sales in Europe, which was up 2.4%, offsetting a 0.4% decline in the U.S. Online sales grew by 3.4% at constant exchange rates with double digit growth from key brands such as Food Lion and Albert Heijn. However, the online performance was affected by an 8.0 percentage point decline from the divestment of FreshDirect (Ahold Delhaize, 2024).

Profitability metrics were improving; the underlying operating margin was 4.2%, 0.1 percentage point higher year over year. Underlying operating income was €933 million, which is +2.6%, and diluted underlying earnings per share was €0.65, which is +4.5%, highlighting the company's ability to manage costs and enhance operations. The IFRS operating margin was 3.5%, which includes costs associated with the Belgium Future Plan (Ahold Delhaize, 2024).

Regional performance was varied, Europe performed well, while the U.S. struggled. Europe grew comparable sales excluding gas by 2.4%, benefiting from Albert Heijn's 9.3% growth in online sales and Delhaize Belgium's success in converting 108 stores, which was better than anticipated. Loyalty programs and promotional activities on private label products helped in driving regional growth. However, in the U.S., comparable sales decreased by 0.4%, although Food Lion posted its 47th consecutive quarter of comp sales growth. The U.S. region also improved its operational efficiency by doubling the number of online orders through the expansion of its partnership with

DoorDash and stabilized shrink rates through the application of AI-based solutions (Ahold Delhaize, 2024).

Strategically, Ahold Delhaize is continuing to build its Customer Value Proposition (CVP) through initiatives such as the “Compare & Save” campaign, which promotes private label products as a more affordable alternative to national brands. Digital investments, including the launch of a second automated Home Shop Center (HSC) in Zwolle, also enhanced order processing. The company also grew its complementary income streams through innovation in AH Retail Media Services and a new partnership with Placements.io (Ahold Delhaize, 2024).

Cash flow performance was in line with expectations, although free cash flow declined due to the recognition in the prior year of a €377 million tax receivable. Nevertheless, Ahold Delhaize reiterated its full year free cash flow of €2.3 billion. The company declared an interim dividend of €0.50 per share, which remains in line with its commitment to shareholder returns (Ahold Delhaize, 2024).

3.2.3 Tesco

Tesco, founded in 1919 by Jack Cohen, is a leading British multinational retailer headquartered in Welwyn Garden City, England. With the launch of its e-commerce platform, Tesco.com, in 2000, Tesco offers a wide range of products, including groceries, clothing, and financial services. In the fiscal year ending 2023, the company reported revenues of £65.8 billion, maintaining its position as the UK's largest supermarket chain (Tesco PLC, n.d.).

2023 Annual Financial Report

the report emphasizes strong sales growth, operational resilience, and a focus on delivering value to customers during challenging economic conditions. Tesco reported Group sales of £57.7 billion, marking a 5.3% increase at constant exchange rates, driven by solid performances across its retail segments. Statutory revenue reached £65.8 billion, reflecting an overall growth of 7.2%, underscoring the company’s ability to adapt and meet consumer needs (Tesco PLC, 2023).

Profitability and Margins: Tesco's adjusted operating profit stood at £2.63 billion, a 6.9% decline compared to 2022, reflecting continued investments in pricing and support for customers and colleagues. The statutory operating profit declined more significantly by 40.4% to £1.525 billion, largely influenced by inflationary pressures and one-off costs, including those related to the cost-of-living crisis (Tesco PLC, 2023).

Cash Flow and Debt Management: Retail free cash flow reached £2.13 billion, a slight decline from £2.28 billion in 2022, reflecting disciplined cost management and effective capital allocation. The company's net debt remained stable at £10.49 billion, with a slight improvement in leverage ratios due to consistent cash generation (Tesco PLC, 2023).

Tesco continued to demonstrate strategic and operational strength across key areas in FY 2023, maintaining its position as the UK's leading full-line grocer with a 27.3% market share. Initiatives such as Aldi Price Match and Clubcard Prices bolstered its competitive edge, providing value to customers during a period of rising inflation. Clubcard penetration reached an impressive 79%, highlighting the success of its loyalty programs in driving customer engagement and retention (Tesco PLC, 2023).

In Central Europe, Tesco delivered growth in both sales and profitability by leveraging operational efficiencies and expanding its convenience store formats. The region's performance underscored the effectiveness of Tesco's focus on tailored, local strategies to meet evolving customer demands.

Digital and e-commerce operations played a pivotal role in Tesco's success, with online grocery sales acting as a key growth driver. Tesco has emphasized the integration of its physical and digital services to provide a seamless shopping experience. The company operates the UK's largest online grocery service, supported by significant investments in logistics and delivery networks. Online grocery sales were bolstered by the rollout of Whoosh, Tesco's rapid delivery service, now available in over 1,000 stores, enabling customers to receive deliveries within an hour. Additionally, Tesco has expanded its Click & Collect network, ensuring that more than 70% of UK households are within 25 minutes of a site (Tesco PLC, 2023).

The company has also introduced GetGo frictionless stores, where customers can shop and pay without using a traditional checkout process. Two new urban fulfillment centers were launched to enhance the efficiency of online grocery order processing. Tesco's commitment to digital growth is

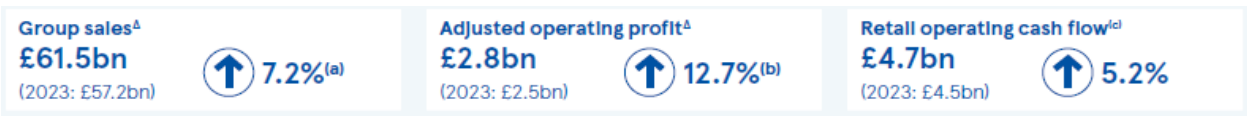
evident in its focus on enhancing convenience and scaling e-commerce infrastructure to cater to rising consumer demand (Tesco PLC, 2023).

Tesco also made considerable advancements in sustainability, achieving a 55% reduction in Scope 1 and 2 emissions compared to its 2015/16 baseline. Key initiatives included transitioning to renewable electricity and piloting low-carbon farming solutions, reinforcing Tesco’s commitment to environmental responsibility and its goal of achieving net-zero emissions by 2035. This cohesive approach to strategy, operations, and sustainability positions Tesco for continued growth and leadership in the retail sector (Tesco PLC, 2023).

2024 Annual Financial Report

Tesco’s FY 2024 performance highlights steady growth in sales, operational efficiencies, and a strong focus on customer satisfaction. The company reported Group sales of £61.5 billion, an increase of 7.2% at constant exchange rates, driven by both retail and digital operations. Tesco’s statutory revenue, which includes VAT and fuel, rose to £68.2 billion, reflecting a 4.4% year-over-year increase. This growth was supported by price-competitive initiatives such as Aldi Price Match and Clubcard Prices, which bolstered Tesco’s position as the UK's leading full-line grocer for 16 consecutive months (Tesco PLC, 2024).

Figure 17: Key performance Indicators of Tesco for 2024



Source: Tesco 2024 Annual Financial Report

Profitability Metrics: Adjusted operating profit grew by 12.8% to £2.83 billion, reflecting strong trading performance and effective cost-saving measures. The statutory operating profit increased significantly to £2.82 billion, a 100.1% year-over-year jump, demonstrating Tesco’s ability to manage costs and maintain profitability in a challenging macroeconomic environment (Tesco PLC, 2024).

Digital and E-Commerce: Tesco's online market share remained robust at approximately 34%, supported by investments in digital services such as the rapid delivery service Whoosh, now available in over 1,424 stores and serving 66% of the UK. The company also strengthened online

availability, achieving 98.1%, with a 20-percentage-point improvement in perfect order rates. Personalisation efforts were enhanced through Clubcard, with 16.3 million app users and 289 million personalised coupons issued, reinforcing customer loyalty and increasing digital engagement (Tesco PLC, 2024).

Regional and Strategic Performance: Tesco continued to lead in the UK with a 27.6% market share, while Central Europe recorded positive growth driven by expanded convenience formats and efficiency improvements. Globally, Tesco focused on its "Save to Invest" program, achieving cumulative savings of £1.2 billion since 2022, helping to offset inflationary pressures and reinvest in strategic priorities (Tesco PLC, 2024).

Sustainability Initiatives: Tesco made significant progress in sustainability, achieving a 61% reduction in Scope 1 and 2 emissions versus its 2015 baseline. The company expanded its low-carbon initiatives, such as introducing 571 electric home delivery vans and installing solar panels on 100 large stores, moving closer to its goal of carbon-neutral operations by 2035 (Tesco PLC, 2024).

3.3 Key insights and trends derived from these reports

1. Growth in Digital and E-Commerce Operations:

- All companies have significantly invested in e-commerce and digital platforms due to the shift in consumer behavior after the post pandemic world.
- Tesco leads with its Whoosh rapid delivery service available in 1,424 locations, and a 34% online grocery market share, focusing on convenience and speed. Similarly, Carrefour reported a 30% GMV growth in e-commerce in France, and Ahold Delhaize achieved €11.9 billion in online sales in 2023 with the help of Home Shop Centers (HSCs) and advanced logistics.
- Delivery companies like Deliveroo and Just Eat have also expanded their grocery services, by using their platforms to diversify the products offered, from restaurant deliveries.

2. Cost Optimization and Profitability Improvements:

- Across the board, companies focused on operational efficiency and cost management to steer through inflation and supply chain disruptions.
- Tesco has made £1.2 billion of savings since 2022 through its 'Save to Invest' program. Delivery Hero centralized its operations to improve cost efficiency and enhanced its Adjusted EBITDA margin to 1.0% of GMV. Just Eat reported positive free cash flow of €38 million in H1 2024, which indicates improvement in financial stability.

3. Sustainability Initiatives:

- Environmental stewardship remains important, and there are significant improvements in cutting carbon footprints.
- Carrefour reduced its greenhouse gas emissions by 49% since 2019 while Ahold Delhaize cut Scope 1 and 2 emissions by 35%. Tesco has brought in 571 electric delivery vans, as well as solar panels on 100 stores, demonstrating industry-wide commitment to greener operations.

4. Resilience in Core Markets:

- Under global economic pressures, all companies demonstrated stability in key markets:
 - Tesco's UK market share rose to 27.6%, maintaining leadership.
 - Carrefour, in Latin America, had outstanding performance, with a +46.2% LFL sales growth.
 - Delivery Hero's MENA region was the main driver of GMV growth by +29.4% in H1 2024, demonstrating regional strengths.

5. Strategic Focus on Consumer Value:

- Initiatives such as Tesco's Clubcard Prices, Carrefour's private-label expansion, and Just Eat's loyalty programs like JET+ reflect a shared strategy of enhancing customer value and retention amid competitive pressures.

The post-pandemic world has made retailers and delivery firms change their strategies to meet the new consumer needs, digital transformation, cost management, and environmental sustainability. While traditional retailers such as Tesco, Carrefour and Ahold Delhaize exploit their omni-channel

strategy to enhance their market share, food delivery platforms like Deliveroo and Just Eat aim to expand the range of products and services and enhance their profitability.

Individually, the companies show strength and flexibility, with a clear strategy of integrating technology, operational efficiency, and sustainable practices to achieve long-term growth and competitive advantage. These shared priorities highlight the further convergence of retail and delivery ecosystems as a response to the changing market dynamics.

Chapter 4 - The Future of Retail and Delivery

4.1 Delivery Industry

Due to the increasing rise of online shopping, technological advancements, and changing client needs, the delivery sector is undergoing a transformation. These developments suggest a transformation of how products are moved around with an emphasis on quick delivery, environmental friendliness, and effectiveness.

4.1.1 Future Key Trends and Methods

The growth of e-commerce is a central driver of innovation in the delivery sector. As consumers increasingly shop online, delivery volumes have surged, particularly in urban areas. Reports indicate that urbanization, coupled with a projected 70% urban population by 2050, will create significant logistical challenges, such as traffic congestion, limited delivery windows, and rising consumer expectations (Boysen et al., 2020). This growth has spurred a demand for last-mile delivery solutions that can handle increasing parcel volumes efficiently while minimizing environmental and infrastructure strain.

Last-Mile Delivery Innovations:

- **Drone Delivery:** Drones are a revolutionary technology for the last mile in logistics especially in congested urban areas and remote areas. Their ability to bypass traditional traffic networks and deliver goods quickly has started a discussion as a potential solution. For instance, hybrid drone-truck systems combine the speed of drones with the capacity of trucks, thus improving the delivery time and reducing the number of vehicles used in the urban areas (Perera et al., 2020).

- **Autonomous Vehicles:** Autonomous delivery vehicles are appearing as scalable solutions for urban and suburban areas also. These vehicles use AI and advanced sensors to navigate complex traffic environments, offering a cost-efficient and sustainable alternative to traditional vans. However, high initial investments and regulatory challenges remain barriers to widespread adoption (Yoo & Chankov, 2018).
- **Parcel Lockers:** These enable customers to collect their packages at their own time, thus minimizing on failed deliveries and operational costs. However, this effectiveness is dependent on the accessibility and closeness to the customers.
- **Delivery Robots:** Autonomous, small delivery robots are currently being tested in urban environments to transport small parcels. These robots are quite environmentally friendly, and they are well suited for short-distance deliveries, but their application is restricted by the existing infrastructure and people's acceptance (Boysen et al., 2020).
- **Cargo Bikes:** Applied in areas with high population density, cargo bikes are environment-friendly and avoid traffic jams. The only major constraint is the size of the vehicle, which is convenient for small or light-weight parcels.

Integration of Technology and Data Analytics:

Logistics providers are leveraging big data and AI to enhance decision-making across the supply chain. Important applications include:

- Predictive analytics for demand forecasting, enabling better resource allocation during peak seasons.
- Real-time tracking of packages to improve transparency and customer satisfaction.
- Optimized route planning to reduce delivery times and fuel consumption (Boysen et al., 2020).

Micro-Hubs and Urban Warehousing:

- Companies are increasingly investing in micro-hubs and urban warehouses to position goods closer to consumers. This allows for faster delivery, especially for same-day or next-day orders. Urban warehouses are complemented by localized delivery networks that minimize transit times and emissions.

Sharing Economy in Logistics:

- For last-mile deliveries, crowdsourced delivery platforms such as DoorDash or Uber Eats use independent contractors. This approach raises problems regarding labor rights and service consistency, but it also lowers costs and increases flexibility during peak demand (Perera et al., 2020).

The following table summarizes the various delivery methods discussed in the aforementioned sources, highlighting their respective advantages and disadvantages.

Table 1: Summary of Different Delivery Methods

Delivery method	Pros	Cons
Drone Delivery	- Fast delivery, especially in urban areas. - Bypasses traditional traffic networks. - Low operational costs.	- Limited payload capacity. - Weather-dependent. - Regulatory hurdles and public acceptance.
Autonomous Vehicles	- Cost-efficient with reduced labor dependency. - Scalable for urban and suburban deliveries. - Eco-friendly options like EVs.	- High initial investment. - Limited operational capability in complex urban environments. - Safety and regulatory concerns.
Parcel Lockers	- Reduces failed deliveries. - Convenient for customers with 24/7 access. - Lowers last-mile operational costs.	- Requires proximity to consumers. - Limited to parcels that fit locker sizes. - Expensive to deploy at scale.
Traditional Vans	- Reliable and familiar delivery method. - Suitable for high-capacity deliveries. - Flexible for diverse routes.	- High emissions and fuel costs. - Traffic congestion impacts efficiency. - Delivery delays due to parking challenges.
Cargo Bikes	- Environmentally friendly and reduces urban congestion. - Cost-effective for small parcels in dense areas.	- Limited payload capacity. - Not suitable for long distances. - Weather-dependent.

	- Easy navigation in crowded cities.	
Delivery Robots	- Energy-efficient for short distances. - Low operational costs after deployment. - Fully autonomous, reducing labor needs.	- Limited delivery range and speed. - Infrastructure and public safety concerns. - Cannot handle large or heavy parcels.
Truck-Drone Hybrids	- Combines capacity of trucks with speed of drones. - Optimizes delivery efficiency in urban and suburban settings.	- Complex coordination required. - Regulatory challenges for drone operations. - High initial costs.
Crowdsourced Delivery	- Flexible and scalable during peak demand. - Lower operational costs. - Uses existing labor pools.	- Inconsistent service quality. - Potential labor exploitation concerns. - High reliance on third-party contractors.
Urban Warehousing	- Enables faster delivery by positioning goods closer to consumers. - Reduces transit times and emissions.	- High real estate costs in urban areas. - Requires significant investment in infrastructure and logistics.

4.1.2 Impact of Delivery Sector in Economy

The use of technology in the delivery industry is truly transforming our modern economy, changing everything from how much things cost to how and where we work, and regional market dynamics. One major way it's making a difference is by cutting costs. Thanks to cutting-edge technology—think self-driving vehicles, drones, and route optimization algorithms—companies can save on labor and operational expenses. For example, self-driving delivery vehicles can run non-stop,

which helps lower long-term costs and scale up operations, while innovations like parcel lockers and micro-hubs make the last-mile delivery much more efficient (Boysen et al., 2020).

On the other side, sustainability initiatives are influencing economic decision-making in the industry. Electric vehicles (EVs), alternative fuels, and AI-based route planning that we adopt also reduce carbon footprints and, in turn, fuel costs. These environmentally friendly practices are in sync with global policies that encourage green logistics and provide long-term cost benefits to companies (Frias et al., 2023).

The job market is also changing because of these changes. The growing reliance on AI and automation has created more job opportunities for tech-savvy professionals in logistics and engineering. On the other hand, the growth of crowdsourced delivery apps like Uber Eats and DoorDash has created new opportunities for gig economy workers. But, these models also present issues with job security, wages, and worker benefits, which presents new challenges for policymakers and companies.

Regional variations reveal the unequal integration of delivery innovations. Urban areas, which are characterized by higher population density and improved infrastructure, are already implementing the advanced technologies. Rural areas, however, have limited connectivity and higher costs per delivery, which slow down innovation and make it more costly in these areas (Skender et al., 2016).

Lastly, the necessity for efficiency in the delivery sector has only been emphasized by economic issues like inflation and growing fuel prices. Businesses are increasingly trying to streamline their delivery systems and supply chains in order to maintain consumer affordability while safeguarding their bottom line. A key component of contemporary economic systems is the delivery industry's careful balancing act between cost containment and value delivery.

4.1.3 Delivery Sector Role in Retail Industry

The delivery business has greatly impacted the retail sector by changing the way that companies can interact with their customers and provide value. Perhaps the most significant change has been in consumer expectations, where same-day and next-day delivery has become the norm, which forces retailers to integrate rapid logistics into their core operations. Those who cannot fulfill these

new standards will be competing for customers with more flexible companies (de Araújo et al., 2020).

Today, many retailers consider delivery a part of the shopping process rather than an additional service. Companies such as Tesco have also been able to integrate their Whoosh rapid delivery service into their ecosystem and enhance customer loyalty and shopping experience. Similar to this, partnerships with third-party platforms like Deliveroo and Just Eat help small retailers to expand their market without having to put a lot of effort into developing their own logistics infrastructure.

The growth of the delivery industry has also fast tracked the adoption of omnichannel retailing, where consumers are able to transition between shopping online and in stores easily. Urban micro-hubs and localised fulfilment centres enable faster deliveries; click and collect services and home delivery become crucial parts of the contemporary retail model (Frias et al., 2023).

Moreover, the integration of AI and data analytics has enabled retailers to personalize the delivery experience. Tesco's Clubcard app, for example, not only tracks purchasing behavior but also provides tailored delivery promotions and incentives, enhancing customer engagement and satisfaction.

Sustainability pressures have also revolutionized the relationship between retailers and delivery companies. As more consumers become environmentally conscious, retailers are aligning themselves with logistics partners who share their concern for the environment. Measures include the use of electric delivery fleets, investment in wind and solar powered warehouses, and encouragement of environmentally friendly last mile solutions. These efforts are attractive to the present customer while also addressing the wider environmental responsibilities (McKinsey & Company, 2020).

Overall, advancements in the delivery industry have woven delivery into the core of retail strategies, allowing businesses to meet evolving consumer demands while also prioritizing innovation and sustainability. As delivery solutions grow more personalized and sustainable, they will increasingly shape retail practices, transforming how businesses engage with customers and deliver value.

4.1.4 Delivery Sector and Sustainability

Environmental Challenges in Delivery

Urban freight transport and last-mile delivery are major contributors to environmental challenges in cities. The rapid growth of e-commerce has increased the volume of urban deliveries, which in turn has led to more delivery vehicles on city streets, often traveling partially loaded and making frequent stops (Velazquez Martinez et al., 2024). These trends exacerbate greenhouse gas (GHG) emissions, air pollution, noise, and traffic congestion in urban areas (Casas & Naudé, 2024). Studies show that while freight vehicles may comprise a small fraction of urban traffic (e.g. ~10%), they can generate over 40% of local traffic-related pollution and noise (Shin, 2018). This disproportionate impact is due to factors such as diesel engines, stop-and-go driving in congested conditions, and idling during loading/unloading. In dense city centers, double-parked delivery trucks not only impede traffic flow but also add to emissions; for example, an analysis in New York City found that a single double-parked delivery truck can delay dozens of other vehicles and add measurable particulate pollution, contributing to an estimated \$243 million in yearly costs from lost time and environmental damage (Meyer, 2024).

Another challenge is the carbon footprint of last-mile delivery. While home delivery can sometimes reduce individual shopping trips, the net effect often leans negative without interventions (Hopkins & McCarthy, 2016). Delivery vans typically emit significant CO₂; one study estimated ~21.7 kg CO₂ for an average 80 km delivery route by van (Hopkins & McCarthy, 2016). The rise in on-demand delivery and fast shipping expectations (same-day or next-day service) further strains sustainability, as it prevents delivery consolidation and leads to more vehicles dispatched with partial loads (Velazquez Martinez et al., 2024). Air quality is a related concern: freight trucks and vans (many running on diesel) are major sources of urban NO_x and particulate matter, linked to respiratory issues. In the U.S., trucking produces about 23% of transportation GHG emissions and a significant share of local pollutants. The external costs of urban freight (emissions, noise, road wear, accidents) are thus substantial, underlining the need for greener logistics solutions.

Technological Innovations for Sustainable Delivery

To address these environmental issues, the delivery industry is adopting a range of technological and operational innovations aimed at reducing emissions and improving efficiency. A prominent strategy is the transition to electric vehicles (EVs) for last-mile delivery. Replacing diesel delivery vans with electric vans or e-cargo bikes can eliminate tailpipe emissions in cities. Recent literature highlights electric vehicles as one of the most promising solutions for short-range urban freight (Frias et al., 2023). In practice, delivery companies have begun piloting electric vans, trucks, and bicycles in city centers. For example, courier drivers in a qualitative study viewed hybrid and electric vans positively, noting lower fuel costs, although they expressed concerns about range limitations. (In fact, some participants conflated hybrid and full-electric capabilities, revealing a need for better education on EV technology). Despite the “range anxiety” barrier, ongoing advancements in battery technology and declining costs are making urban EV fleets more feasible. Research suggests that matching vehicle type to delivery needs (e.g. using smaller electric vans or two-wheeled electric cargo bikes for dense urban deliveries) can overcome many limitations and significantly cut emissions. Indeed, logistics analyses emphasize that a mix of vehicle types, from cargo bikes to electric vans, will be necessary for a systemic low-carbon transition in last-mile logistics (Hopkins & McCarthy, 2016).

Another emerging innovation is the use of autonomous vehicles and delivery robots. Automation can range from self-driving trucks for long hauls to small autonomous delivery robots or drones for last-mile drop-offs. These technologies are still developing, but they hold potential to optimize delivery routes and reduce idle time. Researchers identify autonomy as a transformative trend in logistics, envisioning, for instance, small self-driving delivery robots and drones handling local deliveries, which could bring flexibility and reduce van traffic in cities (Frias et al., 2023).

Pilot projects have already tested drone deliveries and sidewalk robots in controlled environments, demonstrating faster drop-offs with zero tailpipe emissions. However, widespread adoption will depend on regulatory frameworks and proving safety and reliability at scale (Hopkins & McCarthy, 2016).

Beyond vehicles, digital technology and data-driven optimization are crucial for sustainable logistics. Sophisticated route optimization algorithms, real-time traffic data, and demand forecasting can substantially improve efficiency – cutting unnecessary mileage and avoiding congestion. IT solutions and smart routing systems are frequently cited as enablers of greener last-mile operations (Kiba-Janiak et al., 2021). For instance, advanced telematics and routing software

allow carriers to consolidate orders and minimize empty miles, directly reducing fuel consumption and emissions. The rise of the Internet of Things (IoT) also supports efficiency: sensors can monitor vehicle performance (preventing fuel-wasting issues) and track shipments to enable dynamic rerouting or consolidation on the fly. In addition, parcel lockers and pickup point networks are a notable innovation. By delivering multiple parcels to a single locker location, carriers can reduce the number of individual home stops and enable recipients to collect packages at their convenience. Studies find that alternative delivery methods like lockers, pickup points, and crowdshipping (engaging local citizens to deliver packages on routes they already travel) can lower the environmental footprint of e-commerce deliveries (Kiba-Janiak et al., 2021). For example, a trial in Rome combining crowdshipping with parcel lockers showed promising reductions in delivery distance and emissions per package (Kiba-Janiak et al., 2021).

Overall, technology trends – from electrification and automation to digital optimization tools – are converging to make urban deliveries cleaner and more efficient.

Case Studies and Examples of Sustainable Delivery Practices

Real-world implementations of sustainable delivery practices illustrate both the potential benefits and the collaborative effort required to achieve them. A few noteworthy examples include:

- **Cargo Bikes in New York City:** In dense urban areas, replacing trucks with electric cargo bicycles can dramatically reduce emissions and congestion. New York City piloted a commercial cargo-bike program starting in 2019, authorizing major carriers to use e-assist cargo bikes for last-mile deliveries. By 2022, participants like UPS, DHL, and Amazon had made over 130,000 cargo-bike trips, delivering more than 5 million packages. This shift is estimated to have eliminated a substantial number of truck trips and their associated emissions; city officials reported an annual reduction of roughly 650,000 kg of CO₂ from the pilot (Rose V, 2024). Beyond cutting emissions, the cargo bikes, which occupy far less road space than trucks, help ease traffic flow and virtually eliminate the double-parking issue on narrow streets. The NYC program's success has led to new regulations formally legalizing larger cargo bikes and dedicating curbside loading zones for them, paving the way for broader adoption (Rose V, 2024).
- **Urban Micro-Hubs and Consolidation Centers:** Logistics companies in Europe and North America are experimenting with micro-distribution hubs at the city neighborhood

level. These micro-hubs serve as transfer points where large shipments are broken down and final deliveries are completed with low-emission vehicles (such as electric vans or bikes). DHL, for example, has established micro-hub operations in several cities. In one case study from Miami, DHL reported that using a centrally located micro-hub and a fleet of electric cargo bikes for last-mile drop-offs is expected to reduce CO₂ emissions by about 101,000 kg per year (roughly a 100-ton reduction) compared to conventional van deliveries (Katsela et al., 2022). Similar trials in European cities (e.g. in the Netherlands and Germany) have shown that consolidation centers coupled with e-bike deliveries can significantly cut the number of trips entering downtown areas, leading to less congestion and improved air quality (Shin, 2018). These initiatives demonstrate the importance of logistics network redesign – by rethinking the staging of goods and using cleaner vehicles for the final leg, companies can maintain delivery performance while slashing emissions.

- **Low-Emission Delivery Zones and Green City Logistics:** Several city governments, often in partnership with industry, have created dedicated low-emission zones or green logistics schemes. For instance, London and Paris have implemented policies restricting or charging polluting freight vehicles in city centers, which has incentivized companies to switch to electric vans and to optimize load consolidation. In Paris, a notable project is the Chapelle International logistics hub, a multi-story urban distribution center that uses rail and electric vehicles to bring goods into the city and then dispatches them by electric vans, cargo bikes, or even electric-assisted trolleys for final delivery. Early results from such city logistics hubs indicate reductions in diesel truck-kilometers and measurable improvements in urban air quality alongside noise reduction (Shin, 2018). Likewise, some cities have piloted using existing public transport infrastructure for freight – for example, logistics trams in Amsterdam and boats on urban canals – to move goods with minimal road traffic impact (Kiba-Janiak et al., 2021).
- **Crowdshipping and Alternative Models:** Innovative delivery models are also being tested to improve sustainability. Crowdshipping platforms (leveraging everyday travelers or commuters to deliver packages) have been studied as a way to utilize existing passenger trips for freight purposes. One experiment in Rome combined crowd couriers with automated parcel locker pickup, finding economic and environmental benefits by reducing dedicated delivery trips (Kiba-Janiak et al., 2021). Another example is the use of ride-

sharing services for parcel delivery during their off-peak hours, effectively increasing vehicle utilization. While these models face challenges (coordination, reliability, insurance), they highlight creative approaches to cut redundant journeys. Similarly, many e-retailers now offer “green delivery” options at checkout (such as slower shipping or consolidated delivery days) to encourage consumers to choose more sustainable fulfillment, an approach supported by evidence that a significant segment of customers will accept slightly longer wait times for environmental reasons

These anecdotal evidences underscore that sustainable delivery solutions often require a blend of new technology, operational changes, and policy support. They also illustrate the importance of measuring outcomes: cities and companies are beginning to track metrics like CO₂ saved, vehicle miles reduced, and delivery efficiency gains to build the business case for scaling these practices.

4.2 Retail Industry

The retail industry is at a transformative stage, due to technological advancements, changing retail formats, the shift back to customer-centric models, and the critical need for sustainability. In the digital age, consumers' shopping behaviors are being changed by digitization, and retailers are using new technologies like artificial intelligence (AI), the internet of things (IoT), and predictive analytics to improve business operations and offer personalized experiences (Adulyasak et al., 2024). These advancements are not only changing the conventional retail formats but also giving birth to new formats like micro-fulfillment centers and hybrid retail models that seek to combine the best of the online and offline shopping experiences (Felipe Caro et al., 2020).

As consumers demand smooth, customized, and convenient shopping experiences, customer-centric methods are progressively becoming essential. In order to satisfy consumers and foster loyalty, retailers use data to understand their requirements and desires (Gauri et al., 2021). To achieve a balance between profitability and environmental stewardship, companies are being forced by the growing sustainability agenda to adopt green practices and conform with the circular economy's principles (Desai et al., n.d.).

In order to thrive in a global market that is becoming more competitive and interconnected by the day, retailers must innovate, adjust to shifting consumer needs, and implement sustainable practices.

4.2.1 Technological Advancements in Retail

Substantial technological developments in new technologies such as blockchain, augmented reality (AR), robotics, artificial intelligence (AI), machine learning (ML), and the Internet of Things (IoT) are transforming the retail industry. By streamlining operations, improving customer experiences, and addressing industry issues, these innovative technologies are revolutionizing how shops operate and engage with their clientele.

Internet of Things (IoT): Transforming Smart Retail

Internet of things has revolutionized the retail industry by enabling real-time connections between consumers, devices, and inventory. RFID (Radio Frequency Identification) and sensor networks, which provide precise real-time product monitoring and insightful data on consumer behavior, are important IoT applications in retail. Retailers can reduce the number of out-of-stock items by automating restocking procedures with the help of these solutions. improving efficiency in the end (Yrjölä et al., 2024).

For example, sensors on intelligent shelves alert employees to inventory levels and help customers quickly locate items. However, there are difficulties with IoT integration, particularly with regard to security and data privacy. Protecting the vast amounts of consumer data generated by IoT systems from threats is still a major concern.

Artificial Intelligence and Machine Learning

AI and ML are central to the modernization of retail. These technologies enable retailers to forecast demand, tailor marketing strategies, and optimize inventory management. For instance, AI-driven recommendation engines analyze customer purchase history and suggest products, enhancing the shopping experience. ML algorithms are also used in dynamic pricing, which is the process of identifying and implementing price change strategies based on market demand and competitor information (Yrjölä et al., 2024).

The role of AI is not limited to the retail operations as it is used in the store operations as well, where the automated customer service systems help the shoppers and answer their queries. The retailers are also implementing predictive analytics to forecast the trends and customize their products and services to enhance customer satisfaction and retention (Grewal et al., 2018).

Robotics in Warehousing and Store Operations

Robots are becoming more and more important in retail, especially in logistics and store management. Robotics systems are utilized in warehouses for automated picking and packaging, which lowers labor costs and increases accuracy. Robots on the retail floor carry out tasks including scanning shelves, monitoring inventory levels, and even directing clients to certain items. In

addition to increasing productivity, these applications free up human workers to concentrate on more difficult tasks (McKinsey & Company, 2020).

Analytics for Decision-Making

Analytics of data is a key strategy in the modern retail management and affects the pricing, inventory control and fulfillment processes. Using big data analytics, retailers can reason about customer preferences, the right amount of stock, and the reduction of waste. For example, purchase pattern recognizing systems powered by AI can identify which products people would want to buy more, informing the need for restocking of inventory. Furthermore, the analytics tools help in making right decisions about the fulfillment so that the delivery of goods is efficient and on time (McKinsey & Company, 2020).

Blockchain and Data Transparency

Through the use of Blockchain technology, transparency and trust in retail supply chains are being improved. Every transaction and movements of goods are recorded in the blockchain, fraud is prevented, and the customers are confident that the product they bought is authentic. Besides that, retailers are also using blockchain to streamline payments and contracts, which reduces transaction costs and delays (Roe et al., 2022).

Virtual and Augmented Reality (VR and AR)

Through AR and VR, customer engagement in retail is being revolutionized. Some of the AR applications include virtual try-on of clothes, virtual furniture placement, which helps customers to see how the product would appear, before they buy it. This technology fills the gap between the online and offline shopping and is always a bonus to the whole process. Meanwhile, the VR provides the shoppers with a way of moving around the virtual stores from the comfort of their homes (Grewal et al., 2018).

4.2.2 Evolving Retail Formats

From Retail 1.0 to Retail 4.0

Beginning with Retail 1.0, which started with the opening of the first self-service grocery shop, Piggly Wiggly, in 1916, the history of retailing has demonstrated a series of modifications in the practice over time. Customers could now serve themselves thanks to this invention, which introduced to the market, the ideas of open shelving and standardized layouts. Following this period, Retail 2.0 emerged, marked by hypermarkets such as Carrefour in 1963 that offered "everything under one roof" and prioritized time and money (Desai et al., n.d.).

The process of Retail 3.0 started with the advent of e-commerce in the late 1990s and Amazon led the way by removing the geographical barriers and redefining convenience and assortment. Finally, Retail 4.0 has emerged as the age of the omnichannel retailing, which means the combination of the physical stores, e-commerce, and digital tools. Some of the terms like “dark stores” and hybrid models distinguish between the conventional and digital retail settings and show the growing role of technology in retail (Desai et al., n.d.).

The Evolving Role of Physical Stores

The traditional role of the physical stores has changed significantly in response to digital innovation and changing consumer behavior. Brick-and-mortar locations are still important for the sensory experience, but many retailers are trying to refashion their formats to meet the needs of the digital shoppers. Some of these adjustments include implementing technologies such as smart shelves and click and collect. These adjustments are in response to the risk of decreasing in-store foot traffic, which was worsened by the COVID-19 pandemic (Gauri et al., 2021).

The Rise of E-Commerce and Omnichannel Integration

E-commerce has continued to be the main driver of retail trade because of the convenience it offers. However, physical stores are not disappearing but changing their functions to also fit in with the online channels. Omnichannel strategies are the integration of digital and physical platforms to enable retailers to reach the consumers, and provide a seamless experience. Successful retailers

have embraced the instant delivery of e-commerce and the creative and engaging experience of in-store shopping to create a good balance of the two (Felipe Caro et al., 2020).

As retailers adapt to the digital age, hybrid models like Buy Online, Pick Up In-Store (BOPIS) exemplify the seamless integration of e-commerce and physical stores.

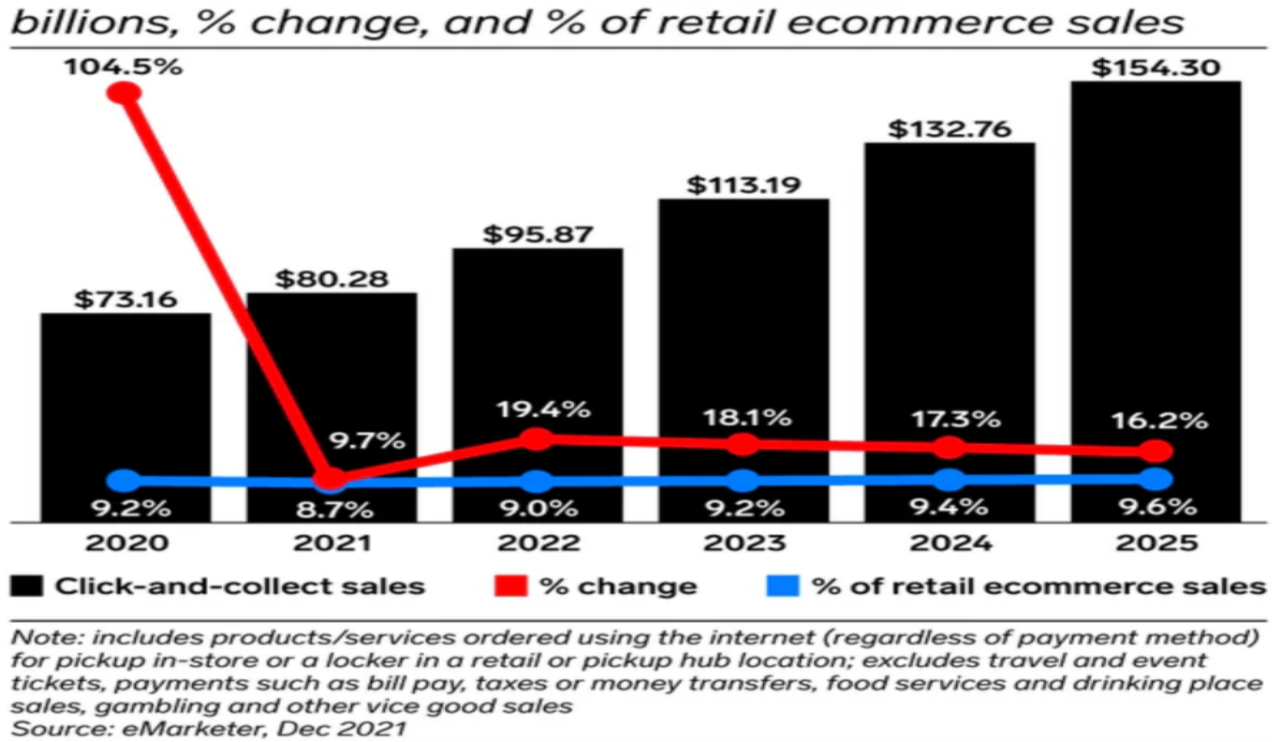
Buy Online, Pick Up In-Store (BOPIS) was a retail strategy that combines the two, online shopping and in-store pickup, in a way that is seamless, and improves the customer experience. This way, customers can browse and purchase products online via a retailer's website or mobile app, and the retailer receives the order and confirms the product availability at the pickup location pointed out by the customer. After the order is prepared, the customer would receive a notification and pick up the purchase from a specific in-store or curbside pickup spot (Paulson, 2024).

The benefits of BOPIS are substantial. It increases the foot traffic to physical stores, which is often accompanied by more in-store purchases, thus increasing the overall sales. Furthermore, it eliminates the need for home delivery, decreasing the shipping expenses for both the retailer and the customer. In addition, retailers can better manage their stock by integrating their online and in-store inventory systems, providing real-time updates and a smoother order fulfillment process. Customers also appreciate the flexibility and cost savings that come with BOPIS, since it helps them avoid shipping fees and potential delivery delays (Paulson, 2024).

However, the use of BOPIS is not without some challenges. This is because it needs a good integration between the online channels and the physical stores, which can be rather complicated and costly. It is therefore important to have real-time inventory information because consumers are likely to be dissatisfied if what they order is not available for pickup. Additionally, store employees need to be trained on how to manage BOPIS orders to ensure that the customer is satisfied (Paulson, 2024).

The growing popularity of BOPIS is reflected in consumer interest and industry projections. eMarketer has predicted that US click-and-collect retail sales will reach \$154.3 billion by 2025. This stat show the strategy as a key part of omnichannel retailing, which is crucial to meet consumer needs and enhance operational efficiency.

Figure 18: US Click-and-Collect Sales 2020-2025



Source: (Cramer-Flood E, 2022)

In conclusion, BOPIS is a valuable retail innovation that combines the advantages of physical stores and e-commerce. Retailers can optimize the advantages of this approach by addressing operational challenges and guaranteeing accurate inventory management, improving both consumer satisfaction and business performance.

Customer Enhanced Experience

Modern retailing emphasizes reducing customer friction and enhancing the shopping experience. This involves leveraging technologies like virtual fitting rooms and AI-driven personalization to streamline the customer journey. For example, retailers invest in AR to allow customers to visualize products in their homes before purchasing, bridging the gap between online and physical shopping. These innovations cater to a more demanding consumer base, making customer-centricity a cornerstone of modern retail strategies (Gauri et al., 2021).

Social and Live Commerce

Thanks to platforms like Instagram and TikTok, social commerce is becoming a significant retail channel. Live commerce, in which brands or influencers present products to online audiences in

real time, is becoming more popular due to its ability to interact with customers directly. This strategy appeals to younger demographics and creates a sense of immediacy and exclusivity by fusing the entertainment of social media with the functionality of e-commerce (Desai et al., n.d.).

4.2.3 Customer-Centricity

Understanding Customer Needs and Reducing Friction

The importance of understanding customer needs, preferences, and demand tendencies is a basis of modern retail strategies. It is necessary for retailers to assess consumer expectations that are influenced by technological changes and social environment. Improving the customer journey and removing frictions in the shopping process are crucial for success. For example, omnichannel retailing such as integrating online and offline retailing simplifies the customer journey and enhances loyalty (Gauri et al., 2021). In order to achieve this, retailers need to use feedback and data to predict customers' needs and make the shopping process as simple and efficient as possible.

The Role of AI in Creating Customer Value Propositions (CVPs)

In retail, artificial intelligence (AI) has become an effective instrument that makes it possible to develop sophisticated customer value propositions (CVPs). AI assists retailers in supplying customized products to their clients by facilitating accurate demand forecasting, personalized marketing, and dynamic pricing strategies. By making relevant product recommendations based on past behavior, AI-powered recommendation systems improve the purchasing experience (Yrjölä et al., 2024).

Misguided AI initiatives, however, have the potential to alienate customers, especially if these AI initiatives are viewed as obtrusive or not in line with the customer's needs. Examples include excessively aggressive or irrelevant advertisements based on incorrect algorithms, which can undermine satisfaction and trust (Adulyasak et al., 2024). Retailers must carefully balance automation with consideration for consumer impressions to ensure that the solutions actually improve rather than detract from the shopping experience.

Ethical Considerations: Data Privacy and Customer Trust

In the digital retail landscape, legal issues pertaining to data privacy and trust are paramount. Customers value transparency regarding the collection, usage, and protection of their data more and more. In addition to putting consumer relationships at danger, mishandling sensitive information might have legal ramifications (Grewal et al., 2018).

Retailers are urged to put strong data security measures in place and let their clients know about them. Building trust requires not only adhering to privacy regulations but also exhibiting a dedication to moral behavior, such as offering clear consent options and utilizing data solely for purposes that have been agreed upon.

Leveraging Data Analytics for Personalization

The data analysis is a key process in developing the personalization of the customer experience and targeted promotions. From the purchasing patterns and customer feedback analysis, the retailers can recognize the trends and what can be expected from the customers in the future. This ability enables tailored marketing strategies and inventory management to be directed at certain consumer groups (Adulyasak et al., 2024).

For instance, some retailers apply analytics for changing the product mix according to the regional preferences or seasonal patterns. Such strategies not only improve customer satisfaction but also decrease inventory turnover time and waste.

Engaging Customers Through Digital Channels

Digital channels, including social media, have revolutionized customer engagement. Social media platforms allow retailers to interact with their audience in real time, gathering insights and fostering brand loyalty. The rise of social commerce—where purchases are made directly through platforms like Instagram and TikTok—illustrates the growing influence of these channels on consumer behavior (Ivanova, 2020).

4.2.4 Sustainability and Social Impact

Because of growing environmental concerns, regulatory challenges, and consumer demand for ethical corporate practices, sustainability has recently become a critical focus in the retail industry. Sustainability is an approach that entails the integration of economic, social, and environmental obligations into every facet of organizational operations to prevent negative effects while actively promoting social and environmental values. For retailers, this means addressing climate change and resource depletion by sustainable supply chain management, waste reduction, and ethical sourcing.

Background

Sustainability as a formal concept can be linked back to the Brundtland Report of 1987 by the United Nations World Commission on Environment and Development. The report provided the most common definition of sustainability as “meeting the needs of the present without compromising the ability of future generations to meet their own needs”. This definition also revealed the importance of seeking a balanced approach that would embrace environmental protection, social well-being, and economic development.

By the 1990s, sustainability moved beyond theoretical discussions and into corporate strategy and governance. Businesses started to incorporate Corporate Social Responsibility (CSR) measures, thinking that sustainability should be incorporated into their operations. Companies were facing increasing customer and shareholder interest in social reporting, ethical sourcing, and environmental performance, which led to the development of sustainability reporting standards (Thomas et al., 2022).

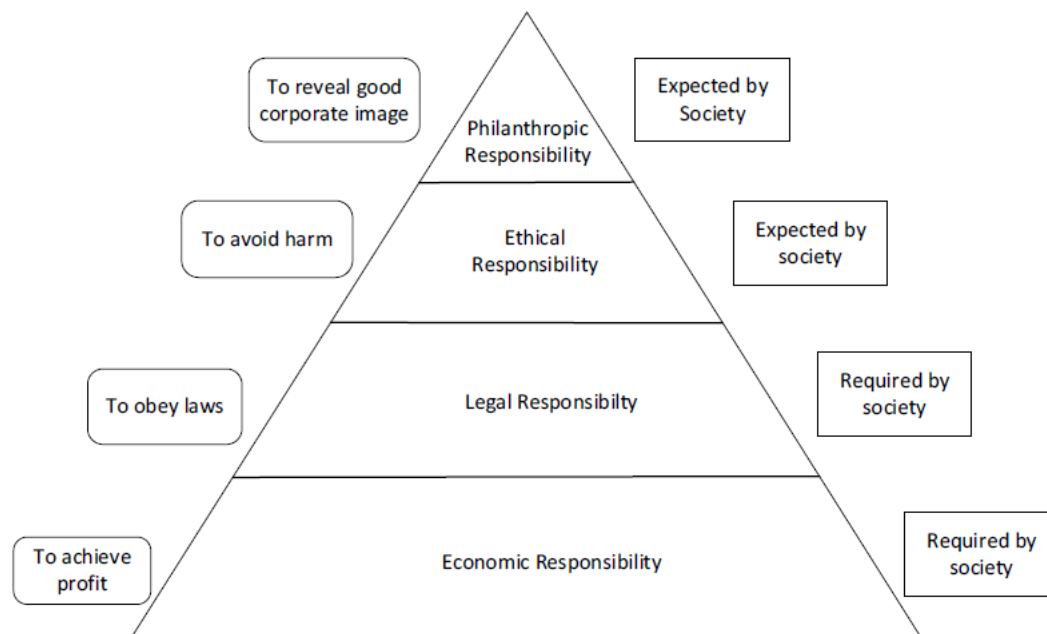
Corporate Social Responsibility (CSR)

Corporate Social Responsibility (CSR) has become a strategic approach that organizations incorporate into their business plans to link profitability with social and environmental accountability. CSR is defined in various ways as different authors have written about it at different times. For instance, according to Brin and Nehme (2019), one of these definitions offered by Reza Safar zad is the concept of CSR, which encompasses a company’s obligation to maximize

shareholders' value while, at the same time, incorporating ethical and environmental concerns into the economic processes. Another view by Dal Mas et al. (2022) argued that CSR in retail should not be seen as stand-alone business initiatives but as a supply chain approach for sustainability. Consumer pressure for ethical business practices combined with regulatory frameworks has made CSR a critical element of corporate governance. Three primary frameworks support CSR theory are: Carroll's Pyramid of CSR, the Triple Bottom Line (TBL), and Stakeholder Theory.

Carroll's Pyramid, introduced by Archie Carroll, organizes CSR into four hierarchical responsibilities: economic (profitability), legal (compliance), ethical (fair business practices), and philanthropic (voluntary contributions to society).

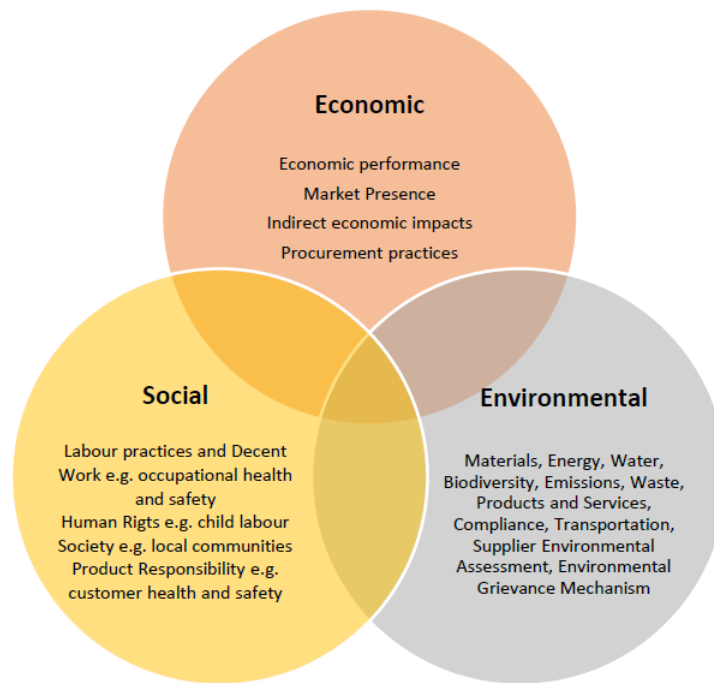
Figure 19: Carroll's Pyramid



Source: Brin and Nehme (2019)

The Triple Bottom Line (TBL), which was first proposed by John Elkington in 1994, on the other hand, measures success in three ways: profit (economic gains), planet (environmental effect), and people (social impact). This approach moves business attention away from just financial achievement. For retail organizations, which are crucial in striking a balance between cost competitiveness and sustainable supply chain management, this paradigm has become especially pertinent.

Figure 20: The Triple Bottom Line (TBL)



Source: (Thomas et al., 2022)

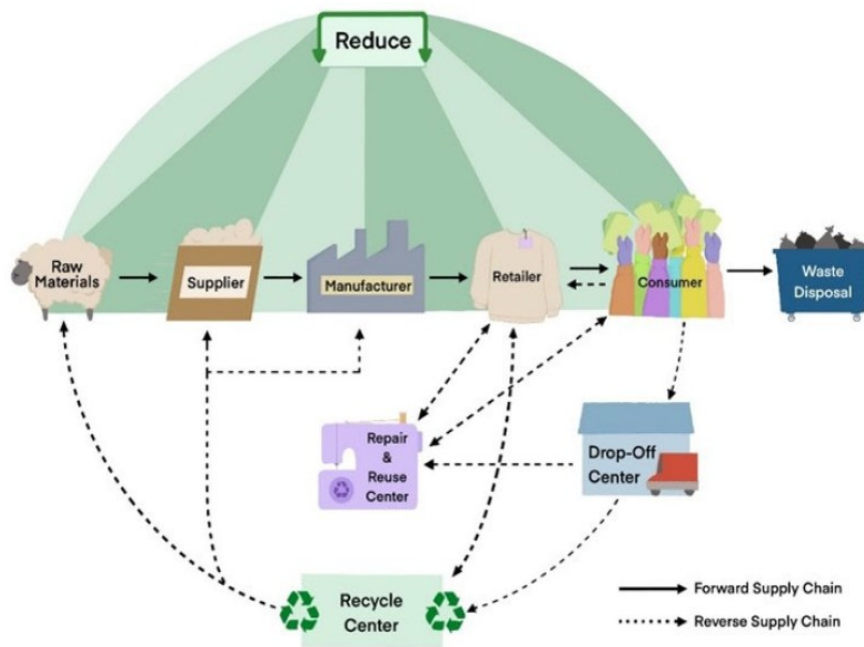
R. Edward Freeman's Stakeholder Theory expands the scope of corporate social responsibility (CSR) by highlighting the need for businesses to take into account the interests of not just shareholders but all stakeholders, including communities, suppliers, employees, and customers.

As they have direct contact with the consumer and the supplier, retail businesses are in a unique position to implement CSR strategies. Dal Mas et al. (2022) describe the challenges for retail businesses to achieve all of these goals simultaneously, especially in global supply chains where cost pressures are often accompanied by exploitative labour practices and environmental degradation. Vadakkepatt et al. (2021) found that CSR is crucial in brand differentiation, improving customer loyalty, and minimizing regulatory risks. Those companies that have incorporated CSR into their operational frameworks – Patagonia's ethical sourcing and IKEA's focus on circular supply chains are examples – show that sustainability can be a competitive advantage instead of just a regulatory obligation.

Circular Economy (CE)

Intimately related to CSR is the idea of the circular economy (CE), which is based on the idea of moving away from the classic ‘take-make-dispose’ model, and moving towards reducing, reusing, and recycling resources. The circular economy is a sustainable business model that is in harmony with CSR objectives since it aims at minimizing waste, maximizing the use of resources and extending the product’s life. According to Hong et al. (2023), companies who implement eco-design (ECO) and reverse logistics (RL) practices report improvements in their corporate social responsibility (CSR) performance, particularly in terms of cost effectiveness and environmental sustainability. These ideas are already being applied in sectors like electronics and clothing, where businesses like H&M and Apple have created recycling and take-back programs to cut waste and guarantee sustainable sourcing.

Figure 21: *Circular Economy*



Source: (Vadakkepatt et al., 2021)

The circular economy and CSR are also connected via supply chain sustainability according to Thomas et al. (2022). Many companies are still failing to effectively implement sustainable supply chains, and are guilty of ‘greenwashing’, that is marketing themselves as environmentally friendly

with little substance behind it. This has been addressed by frameworks such as the Global Reporting Initiative (GRI) and the United Nations Global Compact (UNGC) that have provided guidelines through which organizations should report on their sustainability and ethical business practices. Supply chain transparency does not only enhance corporate accountability but also builds consumer confidence since consumers are now more concerned with ethical issues when making purchasing decisions.

Enhancing CSR and circular economy initiatives has also been made possible by the development of digital technologies and data analytics. In order to track carbon footprints, monitor labor conditions, and improve logistics to minimize waste, retailers are utilizing blockchain, IoT, and AI. One example of how large-scale retailers might leverage technology to achieve sustainable business transformation is Walmart's Project Gigaton, which aims to save one billion metric tons of greenhouse gas emissions from its supply chain by 2030, which has already achieved this goal by 2023. (Vadakkepatt et al., 2021)

However, there are still some issues to be discussed. Perhaps the most significant hurdle between the adoption of CSR and the circular economy is the conflict between sustainability and cost. Many consumers state that they prefer sustainable products but at the same time, they are frugal, which makes it difficult for businesses to transition fully without affecting profitability. In addition, Dal Mas et al. (2022) point out that CSR activities in retailing are not well communicated to the public and thus they are not very effective. This issue can be solved by the companies' transparent marketing and consumer education to create awareness of the benefits of sustainable consumption.

Driving Sustainability Through Consumer Engagement

Retailers can influence consumer behaviour towards sustainability through the use of marketing and advertisement, education, and social media, thereby, retailers can encourage sustainable consumption behaviours (White et al., 2019). Research shows that consumers tend to engage in sustainable actions if sustainability is made easily accessible as part of the shopping process. For instance, real-time information on the environmental impact of a product can be provided by smart labels in physical stores, thus encouraging consumers to make environmentally friendly decisions (Bäckström et al., 2024). Digital platforms and e-commerce channels can also be used to display

sustainable product recommendations, eco-friendly packaging options, and information on ethical sourcing.

In addition, the application of behavioral science techniques including sustainable purchase based loyalty rewards, carbon footprint calculators, and transparent sustainability scores can transform consumer behavior (White et al., 2019). Retailers can also collaborate with influencers and sustainability activists to create social media campaigns for encouraging people to reduce their environmental footprint through conscious consumption.

Industry 4.0 and Its Role in Sustainability

Enabling technologies of Industry 4.0 such as artificial intelligence (AI), Blockchain and Internet of Things (IoT) are changing the sustainability in retail in a revolutionary way. These technologies provide real time data collection and analysis to enable retailers to manage their closed loop supply chain (CLSC) for better sustainability performance (Riccardo Aldrighetti et al., 2023). The CLSCs, which are more about reuse, remanufacture, and recycling, are greatly enhanced by AI demand forecasting, blockchain-enabled traceability, and automation in sorting and processing of returned goods.

AI powered predictive analytics can minimize waste by precisely forecasting demand, and preventing overproduction (Vhatkar et al., 2024). Likewise, blockchain technology provides transparency by tracing a product from its source, from raw materials to the post-consumer recycling. This level of traceability reinforces sustainability claims and has the potential to help companies avoid greenwashing, which is becoming an increasingly important issue in the retail sector.

Furthermore, robotics and automation in warehouses and the last mile delivery are environmentally friendly due to the optimization of energy use and reduction of dependence on labor. Some examples include autonomous electric delivery vehicles and drones which have been identified as potential game changers in sustainable logistics and reduce carbon emissions from transportation (David et al., 2024).

Balancing Sustainability with Cost and Operational Challenges

The advantages of sustainability are evident, but implementing these practices as a retailer is not without its challenges, in order not to jeopardize profitability. The main issue is that sustainable products and operations are viewed as more costly. However, research indicates that operational efficiency gains from Industry 4.0 can recoup these costs in the long run (Ivanova, 2020). For example, adopting circular economy models where the material is used over and over again significantly cuts the cost of the raw material.

Another challenge is to make sure that sustainability initiatives are aligned with consumer expectations. While many consumers are concerned about environmental issues, their purchasing decisions are often based on price and convenience. Therefore, retailers have to make sustainability an effortless choice, by integrating it into the shopping journey without adding friction (Sarkar, 2023).

The Future of Sustainable Retail and Future Research

According to the research done by Thomas et al. (2022) the future of sustainable retail will likely feature increased standardization of sustainability KPIs so that retailers can easily measure and convey their improvements. Future research should also aim at establishing industry-specific benchmarks for carbon footprint, circular economy performance, and supply chain sustainability (Thomas et al., 2022). Additionally, collaborations across industries will be vital in advancing sustainability as companies collaborate to establish shared logistics networks and sustainable sourcing agreements.

Retailers also have to consider the regulatory frameworks like carbon tax and extended producer responsibility laws that may induce more environmentally friendly actions while punishing the reckless behaviors (Aldrighetti et al., 2023). Sustainability is increasingly a non-negotiable aspect of business continuity, and companies that fail to adapt are likely to face reputational and financial risks.

Conclusion

In conclusion, the COVID-19 pandemic not only disrupted traditional market operations but also served as a powerful catalyst for innovation and transformation in the retail and delivery sectors. The extensive shift toward digitalization has redefined the boundaries between online and offline commerce, urging traditional retailers to rapidly adapt to an omnichannel approach. This integration of digital channels has not only enhanced the overall consumer experience by providing seamless interactions across multiple platforms but also enabled companies to streamline operations and improve supply chain efficiency.

Throughout this study, we have observed that the retail industry experienced a profound change in consumer behavior. Lockdowns and public health concerns accelerated the adoption of e-commerce, leading to a significant increase in online sales. Retailers who were quick to invest in digital infrastructure and advanced data analytics managed to mitigate some of the adverse impacts of the pandemic by meeting the emerging demand for convenience and safety. Moreover, the evolution of consumer expectations has prompted even long-established physical stores to reimagine their roles, transitioning from solely transactional environments to experiential hubs that also support digital sales channels.

Similarly, the delivery sector has undergone a substantial transformation. Initially regarded as mere complementors to traditional retail operations, delivery services have increasingly evolved into standalone competitive entities. Their investments in technology—ranging from data analytics and artificial intelligence to streamlined last-mile logistics—have enabled them to offer faster, more reliable services. This progression has not only intensified competition within the market but has also forced retailers to reexamine their partnerships and strategic alliances. The emergence of innovative business models, such as dark stores and micro-fulfillment centers, highlights the sector's ongoing evolution and its potential to disrupt conventional retail paradigms.

Economic performance metrics further underscore the transformative impact of the pandemic. Both retail and delivery companies have demonstrated that agility, strategic reorientation, and technological investment are critical for navigating unprecedented disruptions. Enhanced

operational efficiencies, improvements in gross margins, and the ability to manage rising costs have all contributed to stronger financial performance. The convergence of digital innovation and traditional retail practices has created new opportunities for revenue growth and market expansion, offering valuable lessons for future crisis management and long-term competitiveness.

As this paper has detailed, the interplay between retail and delivery has led to a convergence of services that blurs the once-clear lines separating physical and digital commerce. The increased focus on consumer-centric strategies—driven by both technological advancements and the urgent need to adapt to shifting market dynamics—has established a new blueprint for success in a post-pandemic world. Companies that continue to innovate and align their operations with emerging trends, such as sustainability and Industry 4.0, are likely to emerge as leaders in the evolving global marketplace.

Ultimately, the lessons learned during this transformative period emphasize that the capacity for rapid adaptation and strategic integration of digital solutions is essential. As businesses move forward, the convergence of retail and delivery will continue to shape the future landscape, offering a promising pathway to sustainable growth and enhanced customer satisfaction in an increasingly digital economy.

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