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Omnichannel Maturity Framework: Italian Retail mapping and cluster analysis

MASTER OF SCIENCE IN
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Abstract

In recent years, the retail world has been profoundly influenced by recent trends, such as a very strong push towards digitalisation and the remarkable spread of online channels, especially since the pandemic. An increasing number of companies have started to implement various strategies integrating both physical and online channels to enrich consumers' omnichannel experience while at the same time exploiting their synergies.

The research work starts with an in-depth analysis of the literature, both scientific and non-scientific, to understand which are the most relevant factors that enable the successful implementation of omnichannel strategies and identify a research gap. The lack of a classification model that can objectively and holistically assess the omnichannel maturity level of retailers was found. For this reason, the Omnichannel Maturity Framework was constructed which, based on 6 macro-dimensions of implementation, allows retailers to independently map their own maturity level, to compare it with the national average or specifically with their sector, and to identify areas for improvement. Finally, through a cluster analysis, the strategies typically most adopted by Italian retailers were identified.

Concerning the methodology used, data to build and apply the model were collected through two questionnaires shared with high-level managers of the main Italian retailers active in both the physical and online channels. While the cluster analysis was carried out by means of hierarchical clustering techniques.

In conclusion, the application of this model allowed a mapping of the current status of omnichannel in the Italian landscape and the identification of the main strategies implemented. In addition, several areas for further research were highlighted, such as the adoption of new variables or an increase in the scope of analysis, going beyond Italy.

Key-words: Omnichannel, Retail, Italian scenario, Classification framework, Cluster

Abstract in italiano

Negli ultimi anni, il mondo del Retail è stato profondamente influenzato dai recenti trend, quali una fortissima spinta verso la digitalizzazione e la notevole diffusione dei canali online, specialmente dopo la pandemia. Un crescente numero di aziende ha iniziato a implementare varie strategie che integrino sia il canale fisico che quello online per arricchire l'esperienza omnicanale dei consumatori e allo stesso tempo sfruttandone le sinergie.

Il lavoro di ricerca comincia con un'analisi approfondita della letteratura, sia scientifica che non, per comprendere quali siano i fattori più rilevanti che abilitino la corretta implementazione delle strategie omnicanale e identificare un gap di ricerca. È stata riscontrata la mancanza di un modello di classificazione che possa valutare oggettivamente e in modo olistico il livello di maturità omnicanale dei retailer. Per questa ragione, è stato costruito l'Omnichannel Maturity Framework che, basandosi su 6 macro-aree di implementazione, consente ai retailer di mappare autonomamente il proprio livello di maturità, di confrontarlo con la media nazionale o specificatamente con il proprio settore di appartenenza, e di identificare aree di miglioramento. Infine, tramite un'analisi di cluster, le strategie tipicamente più adottate dai retailer italiani sono state identificate.

Per quanto riguarda la metodologia utilizzata, i dati per costruire e applicare il modello sono stati raccolti tramite due questionari condivisi con manager di alto livello dei principali retailer italiani attivi sia nel canale fisico che online. Mentre l'analisi di cluster è stata effettuata tramite tecniche di hierarchical clustering.

In conclusione, l'applicazione di tale modello ha consentito una mappatura dello stato corrente dell'omnicanalità nel panorama italiano e l'identificazione delle principali strategie attuate. Inoltre, diverse aree per ulteriore ricerca sono state evidenziate, come l'adozione di nuove variabili oppure un aumento dello spettro di analisi, andando a considerare anche altre realtà al di fuori di quella italiana.

Parole chiave: Omnicanalità, Retail, Panorama italiano, Modello di classificazione, Cluster

Contents

1 Introduction

1.1. Introduction to Retail

Since several years ago, Retail has seen a significant shift. The future of the Retail business is being shaped by the rapid change in consumer buying habits brought about by the rise of eCommerce. This growth is being powered by a wide range of factors, such as the widespread use of smartphones, tablets, and other mobile devices; growing customer trust in online shopping; and increased investments by retailers in their online channels and digital marketing budgets.

Moreover, the rising popularity of eCommerce and the experimentation of innovative communication and shopping methods have forced retailers to reconsider the role of the store and to manage online and offline operations in a more integrated way. The pandemic has increased the urgency of this digital transformation and forced businesses to accelerate the omnichannel integration process. Working on various levels, such as the back-end operations, the interaction with the customer, and the actual store space, is required to integrate online and offline.

According to its definition, retailing is the sale of goods or services by a company to final customers for their own use. In contrast to wholesaling, which involves the buying of items in bulk, Retail transactions typically involve modest amounts of goods. Retailers serve as an intermediary between manufacturers and consumers by operating as companies from whom clients buy goods or services. They often do not produce the goods they offer; instead, they purchase them from a producer or a wholesaler and resell them in small quantities to end customers via a variety of distribution methods.

Usually, the activities included in the Retail market can be divided into three different macro-areas:

- *Grocery goods*, which includes all those activities that distribute goods to consumers for their nourishment;
- *Consumer goods*, which encompasses any businesses that sell consumers items that can be used repeatedly but depreciate quickly (often after three years);
- *Consumer durables*, which includes businesses that provide consumers with goods that can be used frequently over time and that deteriorate more slowly, such as household appliances, furniture or tableware.

Of course, this is not the only distinction that can be made within the industry. Alternatively, further distinctions can be made according to the type of product offered. The main categories are the following:

- Grocery
- Clothing and footwear, including sports equipment/outdoor
- Personal accessories and eyewear
- Beauty and personal care, including consumer healthcare
- Do-it-yourself and home improvement
- Housewares and home furnishings
- Consumer electronics and appliances
- Traditional toys and games
- Publishing
- Pharmaceuticals

Retailers must be categorized correctly in order to conduct a thorough analysis of the Retail industry. They can also be classified according on the distribution channels they choose for their products, each of which has advantages and disadvantages.

More specifically, the segmentation of the various sales channels can be carried out in accordance with two key factors: first, ownership (directly or indirectly managed) and second, physical or virtual presence (offline and online).

Focusing on the final distinction is extremely relevant because it has been driving recent Retail development. As reported by [1], although online retailing still represents only a modest slice of total Retail sales, online retailing drives a large percentage of the total Retail growth due to its much faster growth compared to that of brick-and-mortar Retail. The coronavirus pandemic provided a massive positive shock to online demand, with many Retail stores closures, and stay-at-home orders imposed. The authors investigated what is the relationship between online and offline Retail channels, highlighting how synergies between diverse channels may strongly benefit retailers.

1.1.1. Physical channels

Customers' only point of interaction in the past had been the actual store. With the introduction and quick adoption of eCommerce and the rise of omnichannel formats, the physical store of today is evolving significantly from its original form.

To improve the customer experience, more and more innovative formats and hybrid business models are being used, transforming the physical store into a site where customers may not only pick up their purchases but also interface with them.

As reported by [2], a growing number of shoppers want an omnichannel Retail experience that includes the store as a crucial part of their overall shopping journey. It is necessary for retailers to commit to fully integrate online and offline channels once and for all, and to reset the purpose, function and operating model of the Retail store itself. Moreover, this must be done for each individual shop at a truly local level to align with local customer needs, reduce costs and drive profit.

Having established the significance of the physical store, the next step is to define the different categories. There are various types of Retail shops, and they vary in terms of product availability and price, as well as customer experience, services, and other elements. The major classes are [3]:

- *Specialty store*: it carries a deep assortment of brands, styles, or models within a relatively narrow category, like craft stores, furniture stores, garden centres, sporting goods stores, and bookstores;
- *Department store*: often found in malls, it is a retailer offering a wide range of consumer goods in different areas (or departments) of a store;
- *Supermarket*: it provides a general range of food products, pet food, and basic household products like paper goods and cleaners;
- *Hyper market (or Big Box / Superstore)*: these occupy an enormous amount of physical space and supply a range of goods in multiple product categories, usually products beyond the daily routine;
- *Convenience store*: small in size and offering "quick trip" experiences, they are hallmarked with longer open hours and convenient locations. They typically provide a selection of basic foods and drinks, alcohol, and everyday essentials;
- *Discount store*: known for having lower-than-average prices, a discount store's secrete lies in merchandising. Retailers aim to give the feel of offering all their products for less than the average Retail price;
- *Off-price store*: the off-price model is an offshoot of the discount. Retailers typically highlight the "normal" Retail price alongside their lower price so shoppers can see what kind of deal they're getting. Off-price retailers are independent of manufacturers and buy large volumes of branded goods to sell at a reduced cost;
- *Warehouse store*: managed by food and product retailers that offer large quantities of items at attractive discounts. These stores create a no-frills experience and instead focus on moving products in higher volumes.

The retailers may directly own and control the physical store, or they may manage it indirectly. The potential substitutes for Retail ownership typologies are listed below, along with their benefits and drawbacks [4].

- *Independent retailer (DOS – Directly Owned Stores):* they are privately owned and operated businesses that were created without the aid of a well-known brand. Independent Retail businesses are built from the ground up, meaning that they have full control over operations and procedures. Moreover, independent retailers are capable of adapting to the local environment and modify their product offerings to take into account regional preferences for certain brands or customs.

However, having total control has its drawbacks. Although independence fosters flexibility and creativity, the owner has to take full responsibility of his business and of a hypothetical failure. Additionally, this type of Retail endeavour has a unique brand and struggles to be heard among the sea of Retail giants.

- *Franchise*: it is a type of license that grants a franchisee access to a franchisor's proprietary business knowledge, processes, and trademarks, thus allowing the franchisee to sell a product or service under the franchisor's business name. In exchange for acquiring a franchise, the franchisee usually pays the franchisor an initial start-up fee and annual licensing fees [5].

  Widely recognized benefits include a ready-made business formula to follow. A franchise comes with market-tested products and services, and in many cases established brand recognition. If you're a big company's franchisee, decisions about what products to sell, how to layout your store, or even how to design your employee uniforms have already been made. Some franchisors offer training and financial planning or lists of approved suppliers.

  Disadvantages include heavy start-up costs as well as ongoing royalty costs. By definition, franchises have ongoing fees that must be paid to the franchisor in the form of a percentage of sales or revenue. Finally, franchisees also lack control over territory or creativity with their business.

- *Dealership*: it is a mix of franchise and independent retailer. The licensee has the right to sell goods bearing a certain brand, often exclusively. In contrast to a franchise, the dealer is free to sell a range of brands and pays no fees to the licensor. Dealerships may or may not display the company's trademark or identify themselves as an authorized seller.

- *Corporate chain*: it is a set of various stores that are linked under a single ownership and conform to a set of execution criteria. Unlike franchises that are run by lone owners who have already entered into an agreement with a major corporation, corporate chains are centrally owned. Corporate chains benefit from economies of scale by centralizing common businesses, such as purchasing, advertising, promotion and large-scale operations.

- *Co-op*: it is an association of different independent retailers. They combine their resources and use their bargaining power to negotiate better prices with suppliers and split costs for infrastructure or marketing.

1.1.2. Online channels

The next section shifts its attention to online channels to continue the research of the Retail industry. As stated before, Retail has adapted to the internet's rising popularity and quick development in order to take advantage of the tremendous potential that the online world and digital innovation have to offer.

There are many examples of retailers who have expanded their online capabilities in recent years, particularly in light of the pandemic, by offering their products through websites to complement the physical store with an eCommerce option; at the same time, some online retailers, as previously mentioned, are realizing the value of providing customers with a physical experience and are deciding to expand their brands by opening brick-and-mortar locations.

As reported by [6], the SARS-CoV-2 virus pandemics halted the world economy and forced its complete reorganization. This situation caused a shock, which will have long-lasting effects on both the micro and macro scales. Creative industries are struggling to maintain the scale of production, employment, and financial liquidity, preserve intellectual property rights, and adapt to the eCommerce world. In the situation of an uncertain future, businesses are faced with new challenges, but also opportunities.

As shown in Figure 1.1, the online channel is expanding considerably more quickly than the online channel and will continue to gain popularity over time. According to Statista's study [7], this growth is not expected to slow down any time soon, and in fact, it has accelerated due to the epidemic.

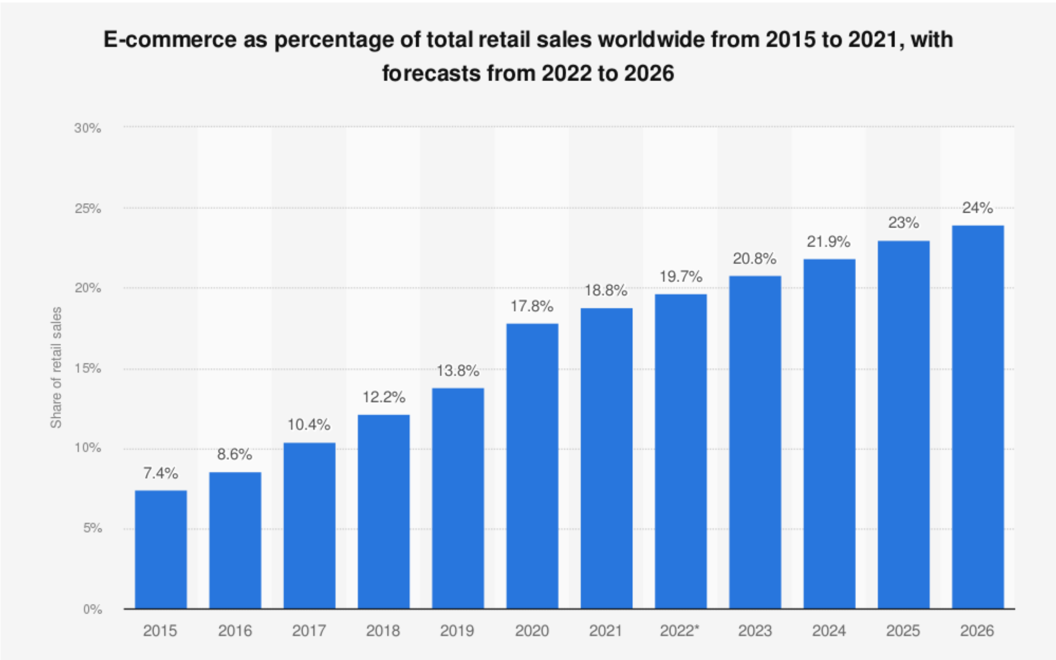


Figure 1.1: E-commerce as percentage of total Retail sales worldwide 2015-2026 (Statista)

As with physical stores, online channels may be run by the retailer directly or they may be independent websites and platforms that the company uses to sell its goods. The following list includes the various online sales channels [8], [9].

- *Own website*: It is a fully owned online store, where the retailer handles both management and transactions. The direct touch with clients is without a doubt the greatest benefit of having this type of website. Since there are no intermediaries in the contact with them, the website that users interact with is set up to best reflect the brand's attributes. Additionally, this increases consumer loyalty to the retailer.

  A valuable aspect of having an eCommerce website is gathering information about current and potential clients. In the majority of circumstances, customers need an account on the website to finish their transaction. Age, gender, email address, and location information gathered during the registration and purchase phases may be entered into the proper databases, aggregated, and used by the business. For instance, having access to a customer's email address enables more official and direct communication with them, as well as the opportunity to provide individualized discounts and recommendations.

  Another benefit is the larger degree of strategic decision-making autonomy and profit margin that may be realized compared to other online channels. In contrast to the others, this kind of channel enables a quick sales operation that avoids using a middleman without paying any additional commission.

  Despite the many benefits, one disadvantage is the complexity that businesses must handle when building an internal website. This complexity starts with the expenditures in a service provider to set up the platform and ends with the requirement to hire new specialized people for the management.

- *Marketplace*: Retailers can rely on this website as a middleman to sell their products. A marketplace's primary purpose is to gather goods from various sellers on the same platform. In particular, the ownership of the goods is what sets a marketplace apart from an online retailer; in the former, the shop sells its goods to a third-party vendor but retains no further control of them.

  It is less expensive to enter a marketplace than to build a custom eCommerce website. The platform offers several advantages, including a guarantee for its high visibility and reputation.

  The establishment of long-term relationships with clients is challenged by the fact that customization options are severely limited, there are many sellers offering comparable products, which increases rivalry, and it is challenging to establish a strong brand from start on a marketplace.

- *Flash sales* [10]: are online stores that provide goods at a discount for a brief period of time, often 24 to 48 hours. Customers are encouraged to buy right away and make so-called impulse purchases because of the time constraint and the limited supply of the goods.

Flash sales are a powerful tool for selling out-of-season or excess merchandise rapidly. They also offer a fantastic chance to expand brand recognition and draw in new customer profiles.

- *E-tailer*: Similar to marketplaces, e-tailers are middleman websites that combine the goods from many retailers on a single platform. In this case, the goods are still the property of the sellers and these websites do not become owners of the goods they offer.
- *Social commerce*: It combines social networking and online shopping. Direct product purchases can be made by users on the social networking platform, which offers an easy and straightforward purchasing experience. Social media marketing is become more and more lucrative because of the huge audience that companies can reach.

  Given the benefits, social commerce goes beyond simply pushing the purchase of a good or service, like an eCommerce platform, by including the customer in all phases leading up to and beyond the transaction, drawing people in and developing a relationship with them that is engaging.

Examining mobile applications and online purchasing is vital after thoroughly discussing the various online channels. According to [11], with the internet's quick development, mobile commerce becomes extremely flexible in terms of time, place, and channels. Mobile devices' ultra-portability, location sensitivity, untetheredness, and personal nature enable users to utilize them for a variety of shopping-related tasks, including creating shopping lists, searching for products, comparing them, purchase and post-purchase activities.

Customers use their mobile devices for a wide range of pre-purchase activities, including locating stores, checking opening hours, comparing prices, finding deals, locating retailers of specific products, browsing for product details and reviews, checking product availability in-store, and making purchases. Mobile shopping gives customers access to product details and merchant offers from virtually anywhere at any time, making shopping incredibly flexible in both time and place. Even in a competitor Retail location, customers can access a retailer's website on a mobile device and even make a purchase without ever leaving the physical store.

[11] further investigated drivers beyond the use of mobile application. As described in Figure 1.2, the author found that: the use of a mobile device in shopping improves shopping productivity dimensions (time/effort savings, money savings, right purchase, and emotional benefits from shopping); improved shopping productivity leads to higher shopping value; shopping with a smartphone for a particular purchase depends on product category; the relation between shopping productivity and

shopping value is moderated by product category (commodity goods, shopping goods, and specialty goods); shopping with a smartphone for a particular purchase depends on the tendency to maximize; and finally the relation between customer shopping productivity and shopping value is moderated by the tendency to maximize: for given levels of consumer shopping productivity dimensions, satisficers tend to report higher shopping values than maximisers.

Mobile Devices Usage Conceptual Model

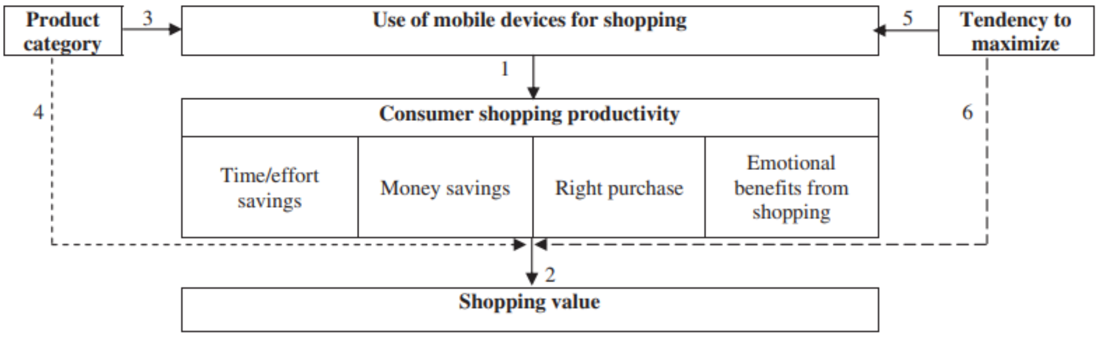


Figure 1.2: Conceptual model relating to the use of mobile devices for shopping, consumer shopping productivity and value Voropanova (2015)

In conclusion, retailers must constantly expand their presence in alternative channels and distinguish their points of contact with customers due to the development of new technologies that give customers a variety of ways to communicate, the complexity of the information and services that must be provided, and the heterogeneity of the public that companies must engage with.

1.1.3. Channels evolution

Shopping and buying have become more convenient and enjoyable for consumers as a result of the expansion in the variety of channel formats and the shift from single, to multi-, to cross-, and to omni-channel (Figure 1.3), but this has also made selling more challenging for both upstream suppliers and downstream retailers [12].

Retail Channel Transition

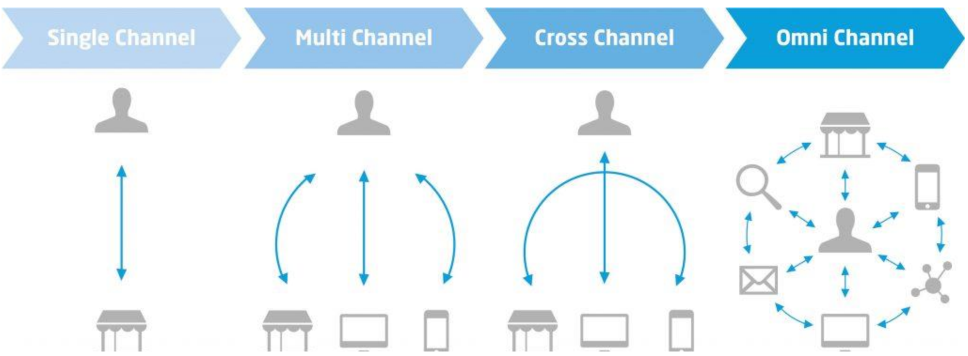


Figure 1.3: Retail transition from single channel to omnichannel

As shown, online retailing radically altered all Retail systems. New fulfilment methods must be developed given the increasing significance of online sales. It is vital to understand how retailers have developed over the past few years by examining each step taken to achieve omnichannel commerce, which has an integrated perspective and seamless interactions between online and bricks-and-mortar channels [13]. The whole transition will be investigated in detail in the following paragraphs.

Single channel

First, single channel retailers are those who use just one physical or virtual distribution channel to reach their customers. This tactic allows for a strong, clear, and direct interaction with the final consumer while minimizing costs and organizational complexity. The primary risk, on the other hand, is not being able to communicate with segments that have distinct buying habits and use different channels and touchpoints. This strategy has particular risks given how modern customers are connected and empowered. Therefore, running a single retail or online business means having fewer clients interact with the brand. From a financial standpoint, this drastically lowers brand recognition and inhibits sales growth.

In conclusion, the single-channel strategy is unable to satisfy the demands of customers who expect to be able to make purchases whenever, wherever, and on any device. In order to respond to client demands, businesses started to adopt a multichannel approach.

Multi-channel

Second, multi-channel retailing is a set of actions taken to offer goods or services over many channels or across all popular channels without the involvement of the customer or the retailer's control over channel integration [14].

In contrast to the previous category, supplying products through many channels could boost the company's visibility and draw in new prospective clients who can select various purchasing modalities in accordance with their own convenience and preferences. A diverse consumer base from which collect data and analytics is a further significant benefit for businesses. As a result, businesses can utilize this information to analyse product performance across complimentary channels, as well as compare those of other channels to determine which is preferred by customers.

By definition, multi-channel retailing is the strategy with the least level of retailer and consumer control over channel integration and interaction. The introduction of new channels resulted in their execution as distinct entities with independent administration and channel-specific goals. These changes led to unclear pricing practices, promotions, and brand building across channels, which ultimately produced poor customer experiences. In the worst-case scenarios, a retailer's two channels might even compete directly with each other.

Companies have shifted to a more integrated strategy, namely cross-channel Retail, in order to mitigate risks brought on by the absence of connectivity across various channels and keep the benefits of multichannel strategy.

Cross-channel

Considering that the retailer is active across multiple channels, cross-channel Retail is comparable to the multichannel strategy. However, there is one difference between the two approaches: in the multichannel scenario, a customer can only use one channel to buy the product, whereas in the cross-channel approach, the client can utilize many channels at once to place an order. To be more precise, he can start by gathering product information through an online touchpoint, such a smartphone app, and finish the transaction in a physical point of sale, or vice versa.

To have a more complete definition, [14] defined cross-channel retailing from either the standpoint of the customer or the retailer. From the perspective of the client, cross-channel retailing enables the customer to initiate either complete channel engagement through more than one channel but not all widely used channels or partial channel interaction through all widely used channels. From the perspective of the retailer, it involves having control over either complete channel integration through a select few channels or partial channel integration across all widely used channels. This comprises the exchange of goods, cash, and information across channels. Therefore, partial channel interaction and/or partial channel integration are characteristics of cross-channel retailing. The possibility of creating channel synergies and consequently raising repurchase intentions drives retailers to pursue a cross-channel strategy.

Moreover, [15] further investigated Retail strategies identifying a deeper distinction for cross-channel models. The author investigated various omnichannel strategies, based on customer journey (search to purchase to aftersales) and channel choice (online vs. offline), as shown in Figure 1.4.

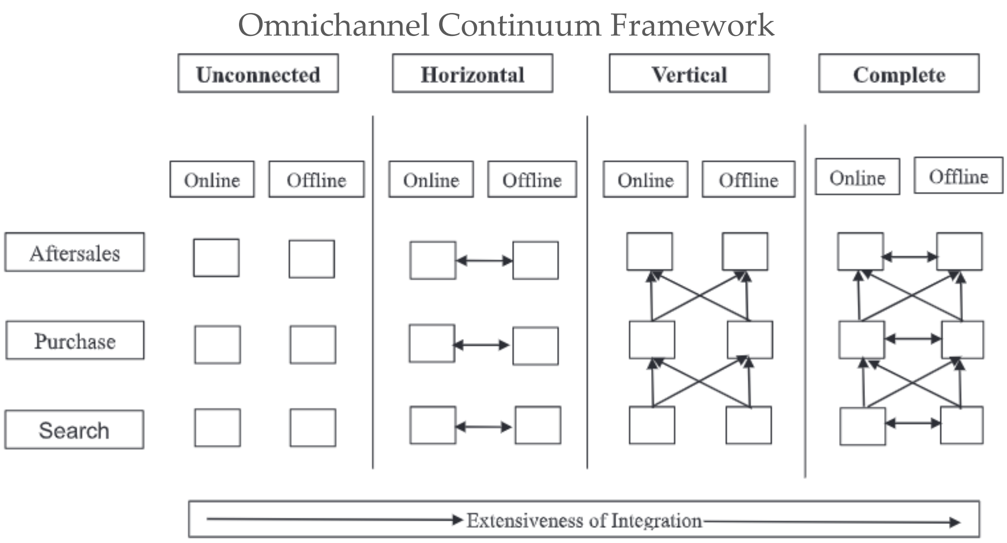


Figure 1.4: Omnichannel continuum framework (Neslin, 2022)

With regard to the extreme models, Unconnected and Complete strategies, these can be compared to multi-channel and omnichannel (addressed in the next paragraph) respectively. More interesting are the intermediate models as two different stages of cross-channel strategies.

Concerning the Horizontal strategy, the firm strongly integrates online and offline channels at each stage of the consumer decision process. It can make it easy for the customer to search online or offline by including computer terminals in-store. It can let customers pay for the product online but pick it up in-store. Its website can offer guidance regarding simple customers' questions but route them to an agent for more complicated ones. Under the Horizontal strategy, channels are highly coordinated within decision stage, but the firm does not try to influence for example which channel the in-store (offline) searcher subsequently uses to make the purchase. The company saves money this way. It does not have to provide incentives or invest in technology to encourage customers to use particular channels as they progress from one stage of their decision process to the next.

On the other hand, in the Vertical strategy the retailer makes it easy for consumers to continue on the same channel or switch channels as they progress through the decision process. The firm might design the website to encourage customers to search, purchase, and get post-purchase support all online. The website might remember customers' credit card and shipping address to encourage online searchers to complete the purchase online and provide them with an order number they can use to access aftersales help offline. An offline fully Vertical strategy would leverage sales reps to "nurse" the customer through information gathering, purchase, and aftersales support. One advantage of the Vertical strategy is it can satisfy the needs of "offline" and "online" segments. The disadvantage is it can frustrate customers if they find channels are not integrated horizontally. For example, the online buyer may first look for aftersales support online, but not finding it, contact the store. However, website and store are not horizontally integrated, therefore, the store agent has no idea where the customer is coming from.

Omnichannel

Last but not least, as reported by [14], omnichannel retailing is defined as the set of activities used to offer goods or services via all widely used channels, where the client can initiate complete channel engagement and/or the retailer can manage full channel integration.

This strategy relies on adopting a holistic approach to all channels. From the perspective of the customers, they are capable of switching seamlessly from one channel to another, including widespread channels like a manufacturer's website, store app, and a pick-up location. This strategy includes conventional mass marketing channels as well, necessitating synergistic management. Additionally, several channels interact with each other and are frequently used concurrently to create the consumer experience.

Customers thus have extra advantages over the other options, such as information visibility, cost savings, or convenience. Additionally, rather than the contact between the customer and a specific channel, the emphasis is on the interaction between the customer and the retailer's brand.

Finally, [15] defined omnichannel strategy through the definition of Complete strategy, described as the combination of Vertical and Horizontal strategies. The benefit is a fully satisfying shopping experience for the customer, where all channels are highly coordinated over all stages of the customer journey.

1.2. Retail scenario

As shown, during the past few decades, Retail has experienced significant transformation. The proliferation of eCommerce, new services, in-store innovations, and new consumer behaviours have completely altered the way traditional Retail is perceived. In this regard, the Covid-19 pandemic put pressure on the industry, resulting in a decline in overall sales due to unpredictability and closures. While physical retailers were suffering greatly, eCommerce has grown to be more significant and essential.

Modern technological advancements significantly influence consumers' shopping habits. Customers can now access a limitless amount of information about companies and products, as well as reviews and price comparison tools, thanks to the widespread use of smartphones, which enables them to make more informed and logical purchases. Additionally, as the internet continues to grow, consumers are becoming more and more demanding. They want to be able to purchase their products whenever they want, using any device that is accessible, without having to physically go to the point of sale. As a result, customers no longer view Retail as a collection of purchase transactions; instead, they seek out immersive and distinctive experiences that will increase their level of involvement with shops.

Instead of continuing with the more theoretical approach from the previous section, a more thorough investigation of the current status of Retail will be provided in this one. After a detailed analysis of the worldwide scenario, attention will turn to the Italian context. Finally, the pandemic's effects and potential future trends will be discussed.

1.2.1. Global scenario

The Retail industry is expanding and increasingly competitive on a global scale. Statista estimates that global Retail sales will reach $27.34 trillion in 2022 as opposed to the $26.03 trillion they reached in 2021 and the $23.74 trillion in 2020. Retail continues to grow in popularity despite the pandemic's impact on sales; by 2023, it is anticipated that global Retail sales would be around $28.64 trillion [16].

In addition, the global Retail sales growth from 2021 to 2024 is going to be stable and will be around +5%. Regarding the previous years, in 2020 sales dropped of -2.9% due to the pandemic and in 2021 there was an incredible market recovery with a growth of +9.7% [17].

As already shown, eCommerce sales represent 19.7% of total sales in 2022 and by 2026 this percentage will increase to 24% of total sales (Figure 1.1). In addition, Asia-Pacific is by far the region with the highest eCommerce share of Retail with 51% in 2020 and 61% expected in 2025. On the other hand, Middle East & Africa is the region with the lowest share (7% in 2020) but with the highest expected percentage growth (10% in 2025) [18].

The 250 largest retailers in the world (those having annual sales of at least $4 billion) are examined in Deloitte's Global Power of Retailing 2022 report [19]. The findings of this research show that the Retail industry is highly concentrated; in fact, the top 10 retailers account for 34.6% of the market. As can be seen in Figure 1.5, the majority of them are established in the US, and what's more intriguing is that a Chinese company, JD.com, has just entered the ranking for the first time. In particular, online retailer JD.com, which is the main competitor of Alibaba, achieved year-over-year a Retail sales growth of 27.6% in 2020, the second highest among the Top 10 companies, and the highest five-year compound annual growth rate (CAGR) in 2015-2020, 31.2%.

Moreover, Deloitte analysed Retail performance of the Top 250 by primary Retail product sector. Four product sectors are used for analysis: apparel and accessories; fast-moving consumer goods (FMCG); hardlines and leisure goods; and diversified. A company is assigned to one of the three specific product sectors if at least half of its Retail revenue is derived from that broadly defined product category. If each of these product sectors accounts for less than half of a company’s Retail revenue, it is categorized as diversified.

As shown in Figure 1.6, The hardlines and leisure sector was the best-performing sector in 2020 on all metrics. Retail revenue growth more than doubled, from 6.5% in 2019, to 14.5% in 2020. Nearly 80% of the 57 retailers in the sector reported growth, with 35% achieving double digit growth in Retail revenue.

Concerning apparel and accessories, retailers saw Retail revenues fall by 14% in 2020, a decline of 18.6 percentage points from 2019. Fashion specialty and department stores were the sector worst-affected by the Covid-19 pandemic, with enforced store closures and reduced consumer demand for workplace and occasion apparel and accessories.

Top 10 retailers, FY2020

Top 250 rank	Change in rank	Name of company	Country of origin	FY2020 retail revenue (US$M)	FY2020 retail revenue growth	FY2020 net profit margin[1]	FY2020 return on assets	FY2015-2020 retail revenue CAGR[2]	# countries of operation	% retail revenue from foreign operations
1	0	Walmart Inc	United States	559,151	6.7%	2.5%	5.4%	3.0%	26	21.9%
2	0	Amazon.com, Inc.	United States	213,573	34.8%	5.5%	6.6%	21.9%	21	31.7%
3	0	Costco Wholesale Corporation	United States	166,761	9.2%	2.4%	7.3%	7.5%	12	26.8%
4	0	Schwarz Group	Germany	144,254	10.0%	n/a	n/a	7.8%	33	72.0%
5	2	The Home Depot, Inc.	United States	132,110	19.9%	9.7%	18.2%	8.3%	3	7.5%
6	-1	The Kroger Co.	United States	131,620	8.3%	2.0%	5.3%	3.7%	1	0.0%
7	-1	Walgreens Boots Alliance, Inc.	United States	117,705	1.5%	0.3%	0.5%	5.6%	9	8.5%
8	0	Aldi Einkauf GmbH & Co. oHG and Aldi International Services GmbH & Co. oHG	Germany	117,047 e	8.1%	n/a	n/a	5.8%	19	73.3%
9	4	JD.com, Inc	China	94,423	27.6%	6.6%	11.7%	31.2%	1	0.0%
10	1	Target Corporation	United States	92,400	19.8%	4.7%	8.5%	4.6%	1	0.0%

[1] Net profit margin based on total consolidated revenue and net income. May include results from non-retail operations if these are <50% of group revenue.
[2] Compound annual growth rate

e = estimate
n/a = not available

Figure 1.5: Top 10 retailers, Global power of Retailing 2022, Deloitte

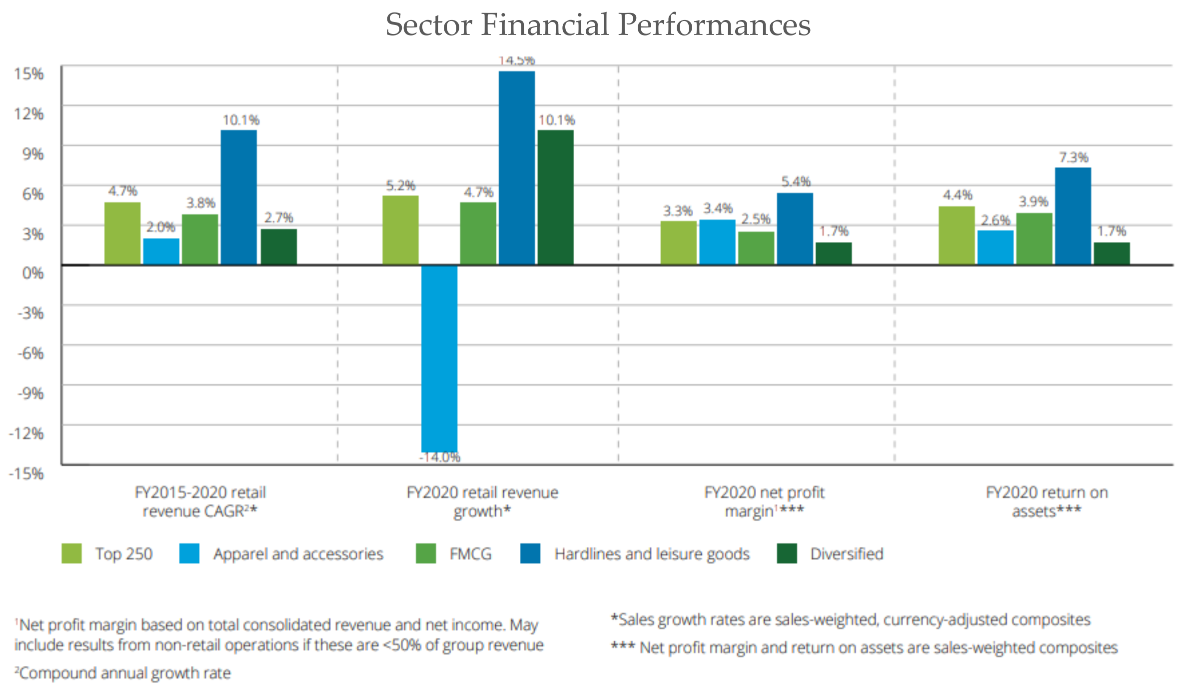


Figure 1.6: Sector financial performances, Global power of Retailing 2022, Deloitte

Retail revenue in the FMCG sector year-over-year growth was 4.7%, 1.1 percentage points higher than in 2019 and just lower than for the Top 250 as a whole. In terms of profitability, it ranked third, with a 2020 composite net profit margin of 2.5% (an increase of 0.5 percentage points from 2019).

Regarding the diversified sector, retailers achieved a strong performance in 2020, with Retail revenue growth of 10.1%, 3.3 percentage points higher than the previous year. Among the four product sectors, diversified retailers reported the lowest 2020 composite net profit margin (1.7%) and return on assets (also 1.7%). Net profit margin was down 0.9 percentage points from 2019.

Then, the state of omnichannel execution worldwide was investigated by [20], which analysed and compared 28 countries and nine Retail categories. Firstly, English-speaking countries showed the highest maturity levels. The top three countries were the U.S., the U.K., and Australia, respectively, with Canada in fifth place (Figure 1.7). These countries have a higher percentage of online to offline sales, and they have a high level of consumer demand for omnichannel Retail, along with healthy and sustainable growth rates and strong digital infrastructure. This is because they were among the first countries to embrace omnichannel strategies, and they built the right infrastructure early on. This has given them a sustained head start.

Among Retail categories, media products sector was the most mature in this analysis, reflecting broader changes in the way people consume newspapers, magazines, movies, and music. Consumer electronics and appliances and traditional toys and games finished second and third, respectively (Figure 1.8). Both are categories in which products are standardized and features are well-documented, making it easy for consumers to compare prices across retailers and purchase the lowest-cost option online. The least mature category was grocery, primarily because the products are perishable and have a high cost-to serve, due to logistics issues.

Finally, as reported by [21], the Covid-19 pandemic continues to create significant challenges for a variety of business sectors. In such scenario, changes in how people

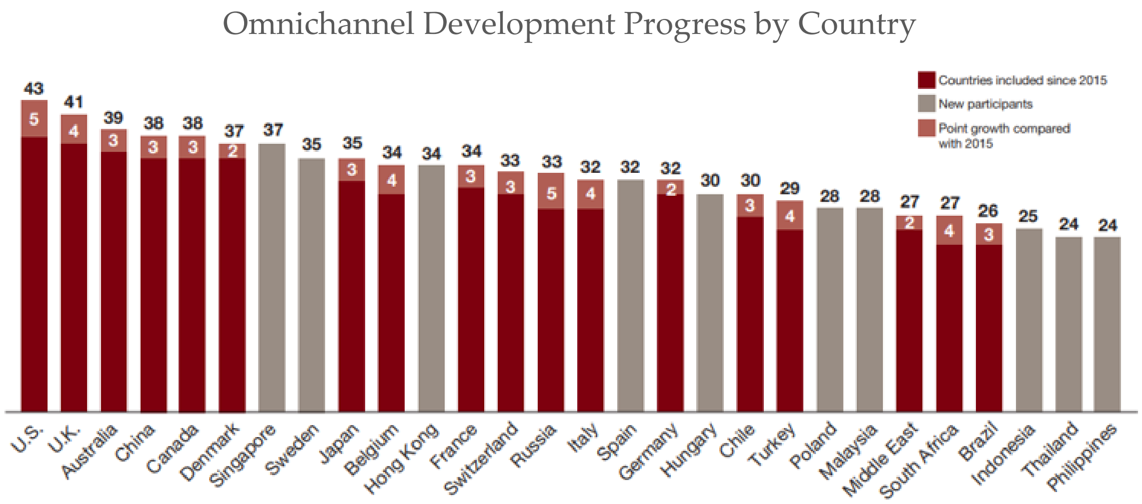


Figure 1.7: Omnichannel development progress by country (scale: 1–100) (PricewaterhouseCoopers, 2017)

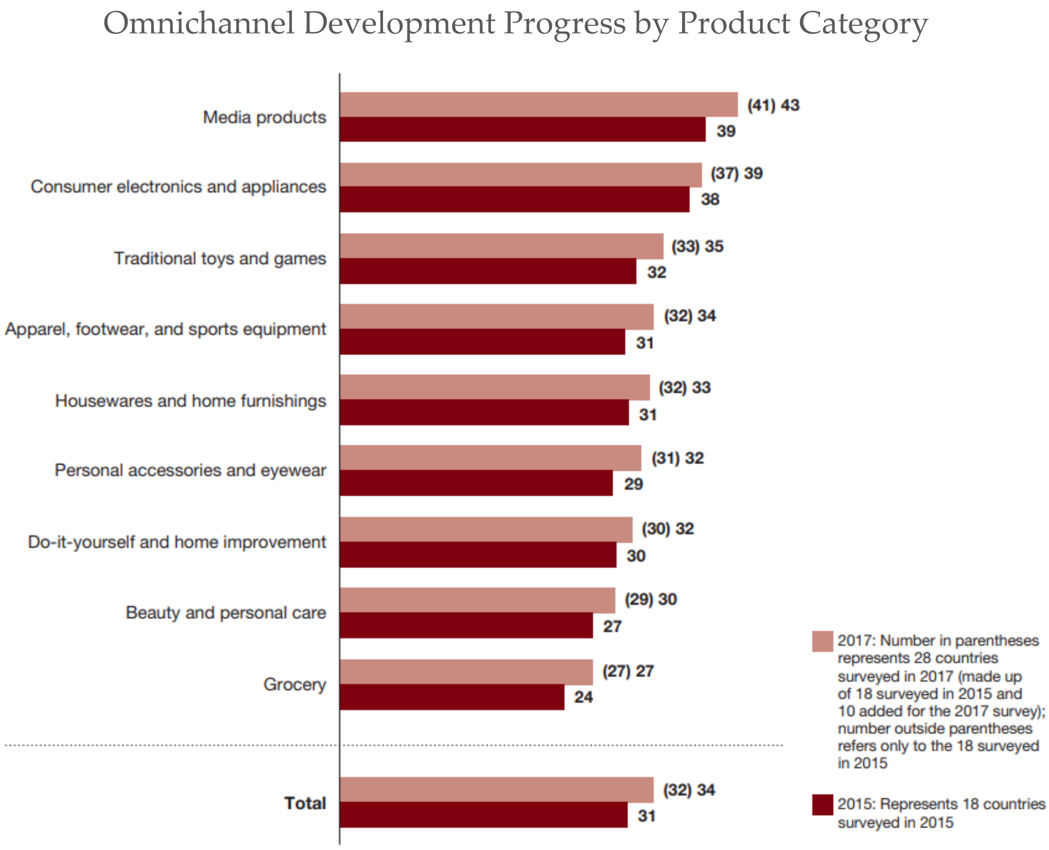


Figure 1.8: Omnichannel development progress by product category (scale: 1–100) (PricewaterhouseCoopers, 2017)

work, live, and shop have been embedded. Retailers may have long-term repercussions that are particularly significant and long-lasting since they are dealing with the disruption on the front lines.

At the beginning of the crisis, many industry trends accelerated as people rapidly adapted their behaviours to meet health and safety requirements. Consumers, many of whom had already embraced e-commerce, jumped onto the internet in even greater numbers, buying more groceries and other goods online and selecting from an array of outside-the-store fulfilment options, such as Curbside pick-up and home delivery. In the first six months of the Covid-19 crisis, it was also clear that a pre-pandemic movement towards more socially and environmentally conscious buying quickly gained steam, as many people increasingly considered not just their own health and wellbeing but that of society and the world at large.

Now, many months after consumers have settled into these and other behaviours, the future of consumer markets can be seen more clearly. In its paper, [21] outlined five main trends that are already shaping tomorrow:

- *The store of the future*: the store will be omnichannel and experience-rich and will fuse the physical and digital worlds;

- *Brand relevance*: socially conscious consumerism will continue to grow as people seek brands that they trust and that align with their values;
- *The digital supply chain*: the supply chain of the future will operate with near autonomy, making 'smart' decisions to self-regulate;
- *The future of food*: consumer demand for healthier products, along with expectations for greater transparency and sustainability in the food value chain, will increase;
- *ESG ascendance*: pressure from regulators and boardrooms to focus on ESG will continue to intensify.

1.2.2. Italian scenario

The analysis then turns to the state of Italian Retail. Data gathered by the Politecnico di Milano's Osservatori Digital Innovation, specifically Osservatorio Innovazione Digitale nel Retail and Osservatorio eCommerce B2c, will be used to support this section [22]–[24].

Small businesses dominate the fragmented Italian Retail landscape. Commercial activities have been significantly impacted by the health emergency that broke out at the start of 2020 and the government's implementation of stringent measures to minimize contagions. Retailers actually underwent a brief reorganization, and during lockdowns, the capillarity of stores significantly decreased. However, while demand in the offline component was largely consistent, the Retail infrastructure had already been shrinking for years. In contrast to the downward trend in 2020, the value of total product Retail sales (the sum of online and offline sales) in 2021 indicates a recovery: +7.8% compared to 2020.

On the other hand, the trend in the number of Retail point of sales follows the one of the previous years: by the end of 2020, Italy had 965,576 store outlets, a decline of -0.5% from 2019. There are differing dynamics across the various types of businesses: there are 585,090 physical product shops (9,051 fewer than in 2019), while there are 380,486 restaurants (3,753 more). Geographically, there are also substantial differences: the Retail environment in Northern Italy is more comparable to the European, with few but large shops, whilst in Central and Southern Italy, there are much more shops but smaller. Within products, there are differences between the individual product sectors: in the last year, the reduction in the number of shops was -3.2% in Publishing, -2.3% in Clothing, -1.8% in Furnishing and -0.9% in Computers and Electronics. Food (+0.6%) was the only industry to report an increase in sales outlets.

B2c product eCommerce has already been experiencing significant growth for years. The disease outbreak has increased the importance of the internet even more. Italy saw a growth of +18% in the value of online purchases in 2021, with the product component alone totalling EUR 30.5 billion. Different trends in the various product sectors have contributed to this increase. Following Food (+38%) in terms of growth are Clothing and Accessories (+23%), Perfumes and Cosmetics (+19%), and Food (+38%). Additionally performing well were Furniture (+18%), Computers and Electronics (+10%), and Publishing (+9%). In terms of absolute growth, three industries dominate online sales: food, clothing, and IT and electronics. Of the €4.6 billion rise in total, €1.1 billion was realized by the food industry, €1 billion by the clothing industry, and €0.7 billion by IT and electronics. The slight upturn in consumption on traditional channels and the (far greater) growth in online purchases generate a positive impact on the B2c eCommerce share of the Retail total (an index of the sector's maturity), which rises to 10% in 2021 (1 percentage point higher than in 2020). Although online is still a secondary channel, it is responsible for 20 per cent of the total increase in consumption.

Retailers are investing more in developing and/or expanding eCommerce projects to meet the growing online demand. More than 85% of the top 300 Italian retailers by turnover will have an online and mobile presence by 2021. The adoption of eCommerce sites varies by industry: Publishing, IT and consumer electronics, and clothing were the industries with the highest percentage of online commerce initiatives activated even before Covid-19. Food and furniture initiatives have increased by 15 percentage points and 5 percentage points, respectively, over pre-Covid levels as a result of the emergency. Additionally, Italian retailers are rapidly embracing relational activities (through social networks, instant messaging platforms, mobile applications, etc.) to guide and support customers during the pre- and post-purchase stages.

The pandemic has driven a change in the perception of consumers (more digital education, reduced barriers to online shopping, ...) and retailers (new balance between online and offline, awareness of the centrality of digital, ...) towards digital.

Retail is at a turning point: eCommerce is no longer the finish line, but the starting and essential point for enabling an omnichannel shopping experience. Online-offline integration must be based on the complementarity of channels and the ability to exploit and combine the peculiarities of eCommerce (convenience of service, speed, ...) with those of the physical experience (the relational aspect, product testing, ...).

This is confirmed by the investment in complementary channels by retailers and merchants. On the one hand, retailers, even the traditionally more reluctant ones, are developing eCommerce initiatives (Coin in Italy; Poundland in the UK) or downsizing their physical network to free up resources to devote to the omnichannel approach (Disney, Douglas have closed part of their stores worldwide to boost eCommerce and online-offline integration). On the other hand, many Dot Coms are investing in the physical channel to consolidate their relationship with consumers (Amazon has announced the opening of two department stores in the US; Net-a-Porter is opening a pop-up store in the UK with advisory services).

2 The scientific literature review

A systematic literature review was the first step to address the topic of omnichannel, analysing in detail the current state and impacts of the Retail landscape. In this phase, it was crucial to have a wide overview on all the main omnichannel determinants and characteristics from an academic point of view. The growing importance of the customer experience and brand relationship, the role and usage of new innovative digital technologies, the new role of physical stores, the impact of Covid-19, the skills of the sales force and the strategic approach retailers are pursuing in this new context are just a few examples of the numerous topics that needed to be covered.

The main objective of this analysis was to understand how the academic research is addressing each of the topics involved in the omnichannel retailing and to find a gap in the literature. Using this method of analysis, it was possible to gain insight into which aspects are the most important and pertinent, as well as how they are managed and, as a result, which strategies are currently used, and which will become a standard in the future.

A Microsoft Excel database was used to compile all the data pertaining to each publication in order to conduct the analysis in a clear and organized manner. In addition, a framework for analysis was created to keep track of all the results. Given the abundance of articles available online, this was unquestionably essential. It also served as a helpful starting point for the non-scientific literature review that will follow.

Moreover, several workshops and events hosted by Politecnico di Milano's Osservatorio Innovazione Digitale nel Retail and eCommerce B2c consolidated theoretical knowledge and findings. Top managers from Italian Retail enterprises and service providers could be engaged closely at these events. In such circumstances, it was possible to learn from their experiences and viewpoints by reviewing specific case studies and taking part in various group sessions. This facilitated a greater comprehension of the actual omnichannel dynamics and criticalities influencing the modern world.

Finally, the fundamental processes for gathering the theoretical data on this vast and constantly evolving subject must be established.

2.1. Methodology

It was crucial to follow an organized procedure while gathering, choosing, and analysing the papers for the literature analysis. This section provides a detailed explanation of the procedure and illustrates the layout of the Excel database used to classify all the articles.

2.1.1. Scientific literature procedure

The main goal was to gather a sufficient number of scientific publications that could be used to frame the current state and potential future development of omnichannel models in the Retail industry. Here, the Excel database's input data were provided in four main steps (Figure 2.1).

1. Article search

The initial stage was to sift through the enormous variety of articles that were online and identify the best ones that would allow a thorough review of the subject. Two

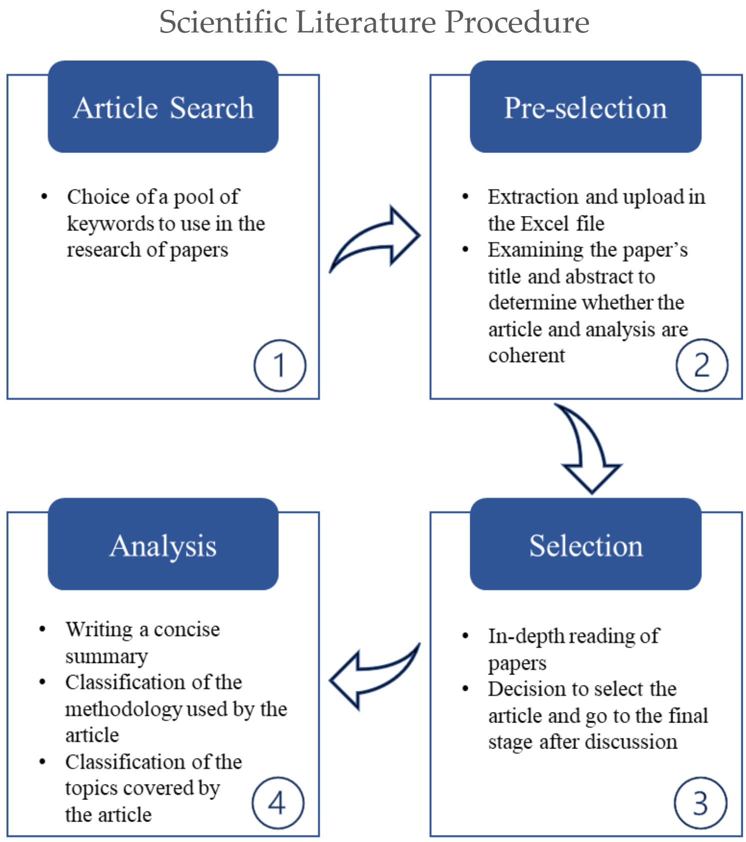


Figure 2.1: Scientific literature procedure

main sources were chosen for this purpose: Politecnico di Milano's online library and Scopus. Only peer-reviewed articles were taken into consideration in order to ensure that the study was as thorough as feasible. It was important to pay attention to using the suitable search input for each topic because the research required information from a variety of fields, making the usage of the appropriate keywords an important factor to take into account. Additionally, papers are published all around the world, and various writers frequently refers to the same concepts using different words, which complicated the process. To solve this problem, several versions of the same word or expression were taken into account in the queries so that relevant articles were not lost. As an example, in all articles, the expressions *omnichannel*, *omni-channel* and *omni channel* were inserted together in the queries by using the "or" operator.

To properly cover all the different topics, several queries were written, and the most used keywords are displayed in Table 2.1.

Table 2.1: Main keywords used for article search

Keyword			
Omnichannel	Retail	Customer	eCommerce
Digital	Innovation	Store	Experience
Design	Covid-19	Framework	Distribution

Then several combinations of the ones mentioned above were made to provide a wide range of outcomes. Following the same procedure on each online repository (such as Scopus), the available articles resulted in a staggering number of findings.

The year of publication was the second driver to be taken into account in order to overcome the high volume of publications found utilising the aforementioned keywords. Analysing recent articles was crucial because the world is changing more quickly than ever, and the Retail industry is being dramatically altered by recent trends. Consequently, only papers published within the previous ten years were taken into consideration.

2. Pre-selection

Moving to the second phase, the identified papers were extracted and uploaded to the Excel database. Subsequently, the title and the abstract of the articles were read and discussed. Only the most promising papers could move on to the effective analysis after this stage. Each abstract that was considered for inclusion in the collection was carefully examined to avoid going off topic. The research in this step was only focused on the contents addressed, rather than a particular Retail industry (e.g., grocery, fashion) or market (e.g., Italy, UK). This made it feasible to obtain a wide and complete analysis that examined all the relevant topics and provided various degrees of detail for the diverse markets and industries.

3. Selection

In this phase, the papers considered eligible to be analysed were entirely read. In particular, the core part, the conclusions and related insights were discussed in order to decide whether to include each paper and to proceed with the final analysis.

4. Analysis

The final step for each chosen article involved writing a concise summary that highlighted the most significant points and conclusions, filling out the Excel framework, and creating a general view of the whole analysis. The framework was created using a hierarchical structure, which is covered in the following chapter. Furthermore, the model frequently needed to be updated and improved iteratively at this stage in order to be as accurate as possible once each article had been classified.

2.2. Literature analysis

51 papers were acquired as a result of the procedure just outlined through the study on the online libraries of Politecnico di Milano and Scopus (see Bibliography for the entire list).

Firstly, it is possible to analyse the time distribution of the articles under consideration by looking at the publication dates. In Chart 2.1 it is displayed the papers' temporal density and a larger concentration can be seen in more recent years.

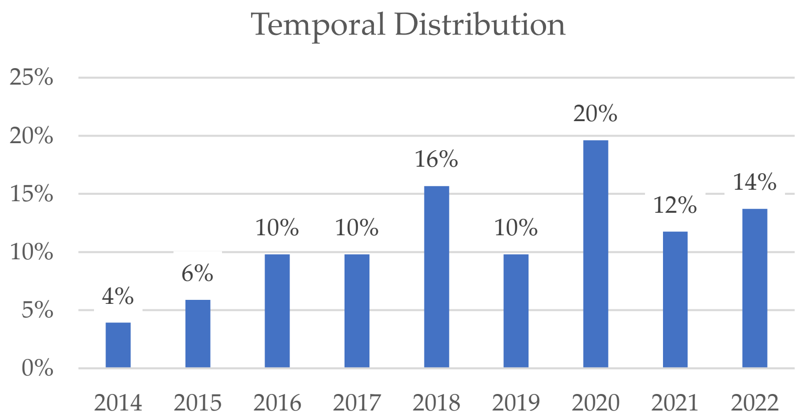


Chart 2.1: Temporal distribution of scientific papers (base: 51 papers)

Finally, through a co-citation and text-mining software, it was possible to find the most selected keywords, which the authors have specified for each publication, among all the articles (

Table 2.2), selected with a minimum occurrence of 3. Moreover, it was possible to detect the most used terms in the titles and abstracts (Table 2.3), measured with a minimum occurrence of 10.

Concerning the first analysis, the most frequently used keywords were “omnichannel” and “retailing” for obvious reasons. It is really intriguing that "multichannel" came in third. Among the publications examined, some authors discussed the transition from multi- to omni-channel and furthermore others overused the phrase without realizing the subtle distinction. This distinction is discussed in great detail in the introduction chapter and the literature [13], where in addition those models are compared to cross-channel models [14]. Moreover, the emphasis on the supply chain and its management as well as the current trend of showroom formats may be noted.

Table 2.2: Recurring keywords in the selected articles

Keyword	Occurrences
Omnichannel	20
Omnichannel Retailing	12
Multichannel	8
e-commerce	4
Logistics	3
Channel integration	3
Order fulfilment	3
Supply chain	3
Supply chain management	3
showrooming	3

In the second analysis, the terms returned demonstrated how these are linked with the keywords used for query development in addition to the conventional terms of a research paper (such as “article” and “research”). It is noticeable that the word "challenge" was frequently used. This is unquestionably a result of the multiple

Table 2.3: Recurring terms in titles and abstracts

Term	Occurrences
Retailer	35
Channel	35
Study	34
Paper	32
Research	25
Design methodology approach	19
Originality value	19
Customer	19
Framework	19
Literature	17
Store	16
Challenge	15
Consumer	15
Practical implication	12

channels integration, which increases competition removing barriers between industries that previously didn't interface e.g., eCommerce versus brick-and-mortar companies. In addition, recent trends like Covid-19, digital innovations, and the increasingly challenging expectations of customers in terms of experience and service are profoundly revolutionizing this industry and forcing companies to update and adapt their business models. These subjects are well covered in the literature. For instance, the current trends, implications and challenges of information systems (IS) related to omni-channel logistics [25] and challenges at the marketing–operations interface in omnichannel Retail environments [26].

Moving to the Excel database, a detailed discussion of the analytical framework, that was constructed and filled with information obtained from the articles, is necessary since it was a crucial tool for identifying gaps in the literature.

The framework is composed by eight main areas (Table 2.4, Table 2.5). The first four sections are more general and aim to give a broad overview of the topics covered. The first one address the *methodology* employed by the researchers, highlighting the use of *qualitative* and *quantitative* techniques. Then, the reference *market* refers to general information and it is split into *sector*, *nationality* and *size* of the retailer discussed. Subsequently, there is a general overview on *omnichannel*, by identifying *models* and *sales channels* implemented. The next section addresses which stages of the customer *purchasing process* are discussed. Finally, the last four sections get much more into details regarding the main business topics and are specifically: *logistics and operations*, *data strategy and digital innovations*, *store*, and *marketing*. In the next paragraphs each section will be explained in detail and results will be discussed.

Table 2.4: Excel literature framework (1)

OMNICHANNEL		CUSTOMER PURCHASING STAGE	METHODOLOGY		MARKET
MODEL	SALES CHANNEL		QUANTITATIVE	QUALITATIVE	NATIONALITY
Home Delivery Click &Collect Reserve & Collect Ship-from-Store Curbside Pick-up Online purchase in-store Cross-channel Return Inventory Availability Check Webrooming Showrooming	Mobile App Social Media eTailer Marketplace Live stream shopping platform Videocall	Problem recognition Information search Alternatives evaluation Purchase Delivery Post-purchase evaluation Return Other after sale services	Mathematical/Statistical Model Secondary Data Survey/Questionnaire	Secondary Data Interviews Focus Group Framework Case Study Literature Analysis	Generic Specific **INDUSTRY** Generic Specific **RETAILER SIZE** Small Large

Table 2.5: Excel literature framework (2)

LOGISTICS & OPERATIONS

DELIVERY SERVICE		
Delivery Mode	Velocity	Time Slot
Attended HD Unattended HD In-store C&C Attached C&C Solitary C&C	Same day Next day Two or more days	Specific with price differentiation Specific with no price differentiation Undefined

DISTRIBUTION SETTING		
Online Picking Location	Online Delivery Area	Transport Service
Central WHS Separate fulfillment center In-store	Local Regional National International	Milk run LTL - express courier LTL - courier FTL - local distribution

OPERATIONS MANAGEMENT		
Stock mgmt	Order preparation mgmt	
Stock Integration	Online Picking Automation	Picking integration
Separated Integrated Capacity-optimised and integrated	Manual Semi-automated Fully-automated	Separated Integrated Capacity-optimised and integrated
Order mgmt		
Order Integration	Order Allocation	Order Priority
Separated Integrated	Static Dynamic	No priority Online Offline
Fulfillment Structures mgmt	Return mgmt	
Separated Integrated	CEP returns from home CEP returns from other sources In-store returns	Separated Integrated

DATA STRATEGY AND DIGITAL INNOVATIONS

TYPE OF DATA COLLECTED	BACK-END DIGITAL INNOVATIONS	FRONT-END DIGITAL INNOVATIONS
Contact information Personal Information Purchase history Data related to advertising campaign on traditional and online media Generated by one-to-one contact Satisfaction Analytics data on proprietary channels Data related to the use of loyalty card Data on flows and routings in store	Business intelligence systems CRM WMS RFId Integrated information management In-store customer monitoring Demand, inventory, distribution planning	Sales force automation solutions Kiosks/totems/ touchpoints to gather information in-store Scan&Go systems Mobile POS Self-check-out system Solutions to expand the assortment of stores Beacon/indoor positioning Solutions to collect visitor information Solutions for virtual queue management Visit reservation from remote systems Interactive showcases and digital signage Virtual fitting room & virtual mirror Smart labels / smart shelves Self scanning and smart carts AR/VR devices Innovative payments webchat and chatbot

CUSTOMER-VISIBLE DATA	
Product	Shipment Tracking
Standard info Video 3D model	Absent Partial Real-time
Stock Availability	Environmental Impact Visibility
Absent Partial Total	Absent Present

STORE

SPACES	EMPLOYEES
eCommerce order preparation areas Pick-up and return point in-store Curbside pick-up areas Parcel locker Showroom	Relationship activities with remote customers eCommerce and cross-channel ordering support activities Use of in-store technological solutions to support omnichannel

MARKETING

Product assortment	Prices
Not differentiated Differentiated	Not differentiated Differentiated

Advertising	Promotions	Loyalty programs
Independent Integrated	Independent Integrated	Independent Integrated

2.2.1. Methodology

The first part of the framework refers to the methodology used in the papers. This dimension is divided in two areas of analysis: *Quantitative* and *Qualitative*.

As it can be seen from Chart 2.2, most of the papers, precisely 73%, addressed the analysis in both qualitative and quantitative approaches, trying to obtain a more complete and detailed point of view of the topic. Instead, the remaining 27% of the papers focused only on a qualitative methodology, since this is an innovative topic, some papers tried to explain specific theme or issue before going more into detail by using, for example, mathematical or statistical models.

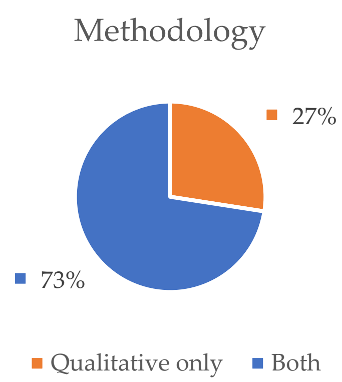


Chart 2.2: Methodologies adopted by scientific papers (base: 51 papers)

Starting with the quantitative methodologies, these are composed by articles whose analysis may be based on mathematical/statistical model, secondary data or survey/questionnaire. Typically, this approach uses measurements to gather numerical data, which is then statistically analysed and processed to test hypotheses, in order to explain a certain phenomenon, customer behaviour or to evaluate the economic viability or profitability of specific implementations. In Chart 2.3, it is summarised the distribution of papers using this method, showing a predominance of mathematical/statistical model (76%) and survey/questionnaire (65%). Indeed, these typologies are the most widely and commonly used to visualise data and get useful insights based on large samples, representative of the population.

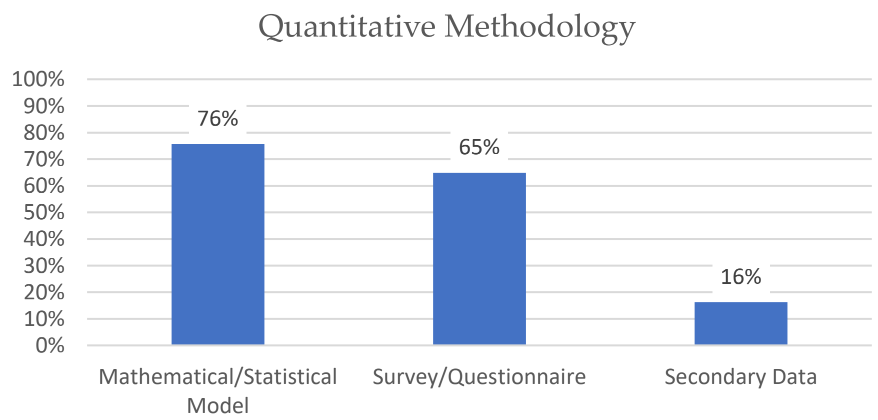


Chart 2.3: Quantitative methodologies adopted (base: 37 papers)

The second alternative is the qualitative analysis, which is leveraged on secondary data, interviews, focus group, framework, case study and literature analysis. This methodology, on the contrary of the first one, explains specific themes without measuring it, relying on non-numerical data obtained through scientific methods of observation. Usually, the findings obtained with this approach set up the baseline for further investigation through quantitative analysis. As it can be seen from Chart 2.4, most of the paper analysed adopted a literature analysis (96%), meaning that authors' starting point was, almost always, the analysis of academic source or papers to further investigate specific themes and to gain relevant information.

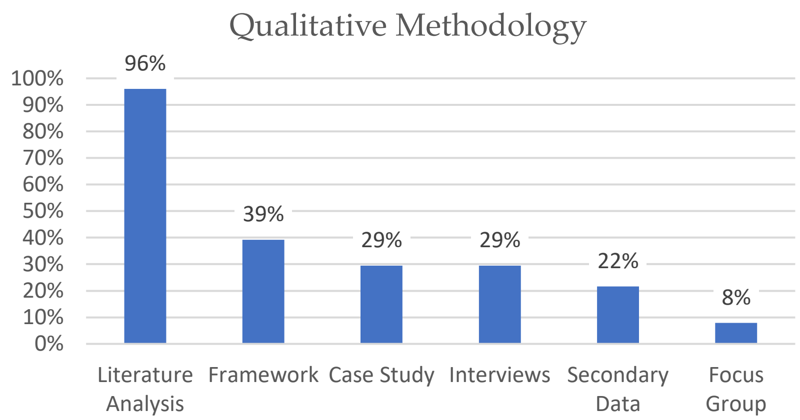


Chart 2.4: Qualitative methodologies adopted (base: 51 papers)

2.2.2. Market dimensions: nationality, industry, retailer size

The next section refers to the market dimension, which is divided in three macro areas: *nationality*, *industry* and *retailer size*. These categories are associated with the environment of the research carried on in the different papers.

Nationality is a crucial factor to take into account in this study because it can determine whether the paper's analysis and findings can be applied globally or they are more country-specific. In Chart 2.5 are shown the distribution of countries in the analysed articles. The majority of them (62%) were not country-specific and attempted to develop general knowledge for businesses worldwide, while the remaining papers focused on specific countries, such as the USA (6%), Germany (4%), or UK (4%). The latter often offered insight about the background context, such as behavioural or cultural aspects, which could influence customers' decision-making processes or businesses' strategic decisions.

For instance, the study at Southwestern University in Texas by [27], which used a web-based survey to collect information on Millennial customers' online buying habits, could serve as an example of a country-specific analysis. In this article, perceptions of risk and showrooming behaviour were measured specifically regarding united states participants.

The second component is the industry; as with the first, the study conducted in the different papers may be more broad-based, relevant to any sector, or concentrated on certain business disciplines. The findings in Chart 2.6 demonstrate again that the majority of respondents concentrated on general difficulties and challenges rather than

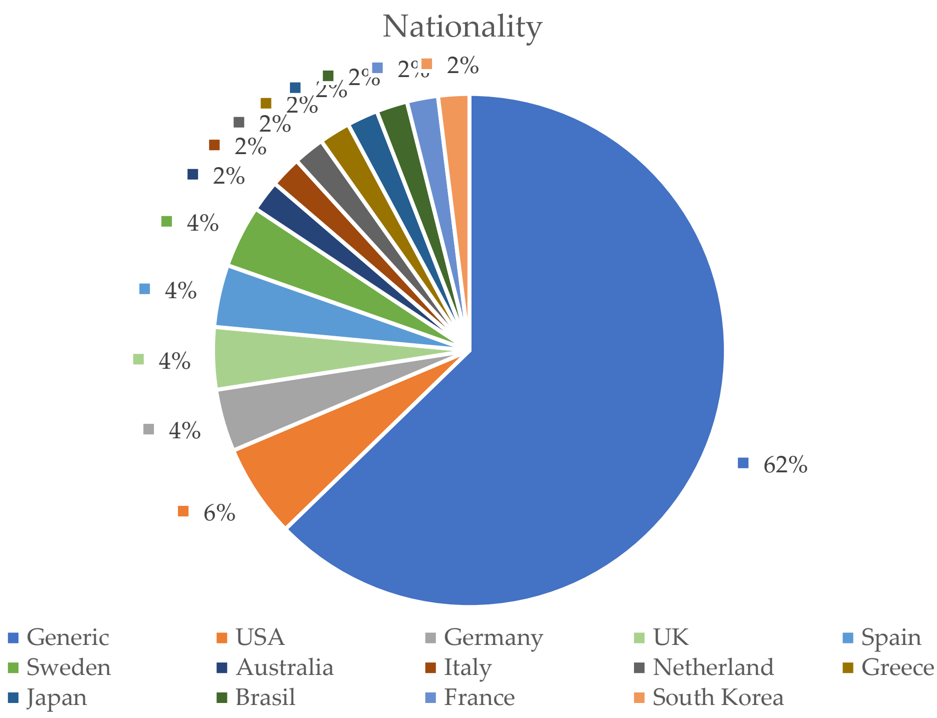


Chart 2.5: Nationality distribution of scientific papers (base: 51 papers)

getting into specifics of particular Retail industries. For instance, this can be seen in the article "*Omnichannel retailing and post-pandemic recovery: building a research agenda*" [28], which study aimed to propose a comprehensive overview of the Omnichannel phenomenon by identifying its theoretical foundations as well as future research directions without focusing in any specific sector.

However, there were several specialized industries represented in the papers, with the fashion and beauty sector accounting for the most (8%). For instance the article

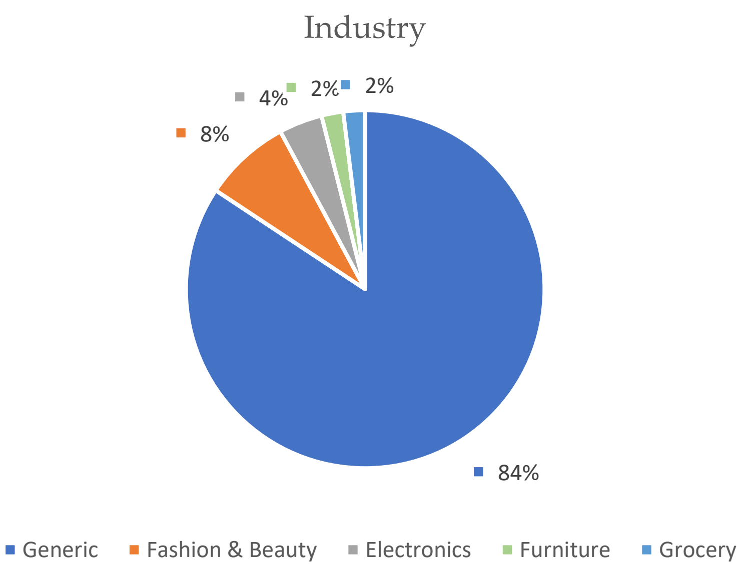


Chart 2.6: Industry distribution of scientific papers (base:51 papers)

"Webrooming or showrooming, that is the question: explaining omnichannel behavioural intention through the technology acceptance model and exploratory behaviour" [29] showed how in the fashion context a customer's behavioural intention in purchasing is influenced by two main factors: individual's willingness to adopt new technology (perceived usefulness and perceived ease of use) and the different forms of information processing (exploratory information seeking and exploratory acquisition).

Lastly, the final dimension to consider is the size of the retailers analysed. This is an important aspect to consider as there are many fundamental differences between small and big retailers. The former usually have limited investment capabilities while the latter have more resources to pursue digital projects such as the implementation of ERP or CRM software. Additionally, big players typically have an advantage when it comes to negotiating with suppliers, customers, and partners, and they can generally take advantage of economies of scale. Another aspect is related to data analytics, big players are advantaged by having the possibility of gather big data on a much larger scale than smaller ones.

As it can be seen from Chart 2.7, the subjects of the papers found were either generic, without being specific of the retailer size, or only big companies. No papers entirely focused on small firms were found and it could be assumed that this outcome was related to the previously listed factors. As reported, it is challenging for small businesses to adopt an omnichannel strategy and this could explain why there is no paper specifically addressing this topic.

[30] developed a framework built on three factors—a seamless customer experience, integrated data analytics, and a successful supply chain and logistics system—that guides companies to switch to omni-channel retailing. The authors found that the modernization of all processes (operational, data structure, digital technologies, etc.) toward an omnichannel structure necessitates large investments that are not always viable for all businesses.

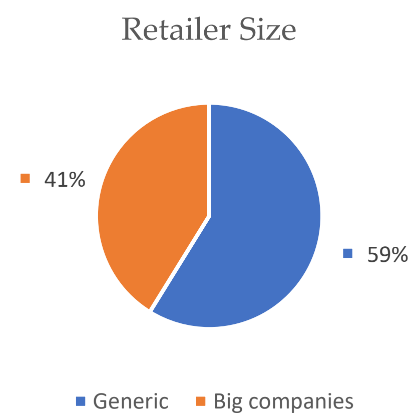


Chart 2.7: Retailer size distribution of scientific papers (base: 51 papers)

2.2.3. Omnichannel: models and sales channels

The next area of the framework is related to the omnichannel strategy which could be adopted by the retailers. More precisely, this section is divided in two sub-areas: the first one regards the *omnichannel models* which could be adopted in order to provide a seamless experience to the customers, by integrating the different available channels; the second instead, concerns the *sales channels* that could be used by the retailers in addition to the physical store and the online website.

To create value in omni-channel commerce, it is important to think about the consumer experience in terms that go beyond a single transaction or purchasing process. To facilitate full customer connection with the retailer, channel borders are erased, putting more emphasis on coordinating meaningful customer-brand interactions. The customisation of the purchasing experience is a crucial component of such a strategy [14]. For this reason, it is crucial to look at the models and channels that a retailer might use to provide a seamless customer experience.

2.2.3.1. Omnichannel models

The models chosen for the analysis can be separated into four sub-groups:

- *Click & Collect, Reserve & Collect and Curbside Pick-up*
- *Showrooming and Webrooming*
- *Ship-from-Store and Cross-channel Return*
- *Inventory Availability Check, Online buy in-store, and Home Delivery.*

The first one is composed by Click & Collect, Reserve & Collect and Curbside Pick-up (also known as Click & Drive). These typologies all follow the same pattern: the customer places his order online and then comes to the store to pick it up in person.

The primary distinction is that in the second typology, Reserve & Collect, both the collection of the order and the payment are handled in-person at the store, whereas in the other two typologies, only the collecting of the order is performed physically. Another distinctive feature is the mode of collection; with Curbside pick-up, consumers drive to their neighbourhood shop and pick up their orders straight from their vehicles by driving through a designated area close to the entrance of the store, where a staff member will deliver them. Instead, the other two models rely on a designated area in the store where consumers can pick up their goods.

As explained by [31], Click & Collect attracts customer demand through a double effect. The first one is an informative one, as products that are available for store pick up must be in stock, customers are more willing to visit the store. The second is related to a convenience aspect, by helping customers pick out items and move them to checkout counters, this model reduces the hassle of shopping. For what concerns the retailers instead, the article highlights a trade-off: on the one hand, there is a decrease in online shipping costs because last-mile delivery is now the responsibility of the customer; on the other hand, there are new fulfilment responsibilities, such as new training for their workforce or the need to hire additional staff to handle the increase in demand.

Moreover, [32] addressed in detail what are the key factors explaining the long-term value creation for each Click & Collect system depending on consumers' profiles, finding that customers' benefits vary regarding the kind of Click & Collect model and the age of customers.

[33] examined the effects of the Ship-to-Store service, a variation on the normal Click & Collect. The difference is that the item requires to be delivered because it isn't already in stock, discovering that the distribution of demand across online and offline channels is significantly impacted by this type of model.

The following group includes the formats of Showrooming and Webrooming, which are diametrically opposed to one another. Both takes into account the consumers' purchasing phases since they are related to the channels through which customers get information and make purchases. The first typology describes the practice of looking and feeling products in a typical brick-and-mortar store before purchasing them online, generally at a lower price, whereas the second, on the other hand, describes the practice of doing online research before making an in-store purchase.

According to [29], webroomers arrive to physical stores having a strong concept of what they want to buy and are often already hunting for a certain product, and they regard the features directly related to the product to be crucial decision-making criteria. In the opposite way showrooming customers' shopping journeys is less planned than those of webroomers, since these customers end the purchase online as they look for a lower price for the product, their behaviours result to be less impulsive.

Additionally, it was shown that customers frequently rely on these two behaviours when they want to purchase a high-risk item, such as clothing or gadgets, because doing so allows them to obtain more information and reduce their uncertainty before the purchase [34].

Lastly, [35] examined the effect of Showrooming retailing (indicated as test-in-store-and-buy-online Retail) on supply chains profit and individual decision-making under different bundling strategies.

Next category discusses about the ability of the retailer to integrate the logistical and operational activities across the cannels, which is made up of Ship-from-Store and Cross-channel Return. The Ship-from-Store fulfilment technique lowers lead times and transportation costs by filling orders directly from the store rather than a warehouse, while the Cross-channel returns allow customers to exchange goods in the channel that is most convenient for them, rather than being compelled to return to the original sales channel.

As shown in the report *"An examination of the effects of omni-channel service offerings on retailer performance"* by [36], since store inventory is an additional resource to be used when filling client orders, ship-from-store may result in higher in-stock rates than merely depending on distribution centre fulfilment. Another advantage is the chance to use unsold store inventory, which lowers the necessity for markdowns and increases gross profits. Moreover, regarding Cross-channel Return, the author pointed out that customers who return items in-store may choose to exchange them rather than return them or choose an alternative product (or purchase additional items while processing the return), potentially leading to higher customer satisfaction and net sales.

The final models take into account the following services that a retailer could adopt to improve the client experience during the various stages of their purchasing: Inventory Availability Check, Online buy in-store, and Home Delivery.

The first one involves real-time access to inventory information for products across channels, which discourages customers from visiting the store when an item is out of stock; the second gives customers the option to use in-store digital tools or the assistance of staff to acquire things that are unavailable in-store online; the last one, the Home Delivery, evaluates quick and adaptable delivery options, such as same-day or next-day delivery.

Analysing the results emerged from the analysis of the literature, as it is shown in Chart 2.8, most of the papers covered the topics of Home Delivery, Click & Collect and Inventory Availability Check, as nowadays these models have become a common requirement for retailers to improve the customer experience. In addition, it emerged the importance of integrating the operations activities among the different channels (Cross-channel Return and Ship-from-store) and the use of the store as a strategic asset for the customer purchasing stages (showrooming and Online purchase-in-store).

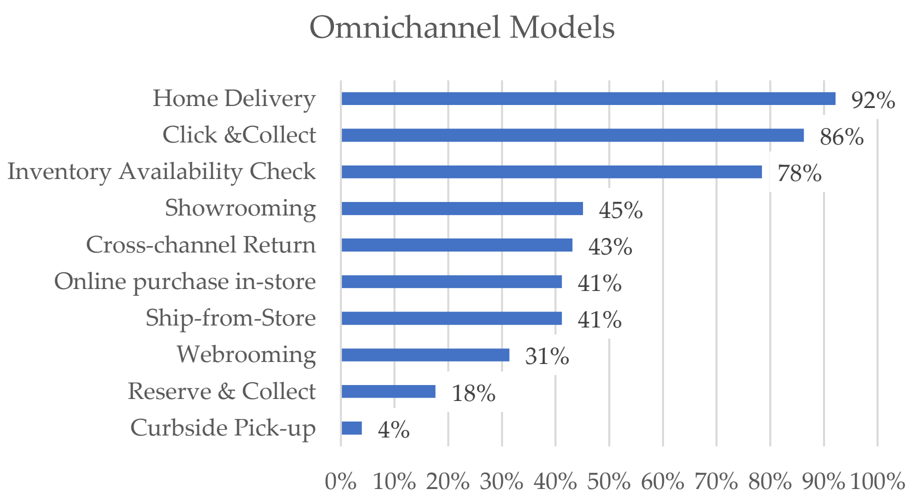


Chart 2.8: Distribution of scientific papers addressing omnichannel models' topic (base: 51 papers)

2.2.3.2. Sales channels

This section analyses the different possibilities of the retailers to sell their products or services to the customers. This variable, which is made up of *mobile*, *social media*, *marketplaces*, *e-tailers*, *live stream shopping platforms*, and *videocalls*, takes into account only alternative sales channels and not the traditional ones, such as the physical store or the digital website, since it was assumed that their relevance had already been proven.

As it can be noted from Chart 2.9, the adoption of the mobile as a sale channel resulted to be extremely common, followed by social media and marketplace with a smaller frequency.

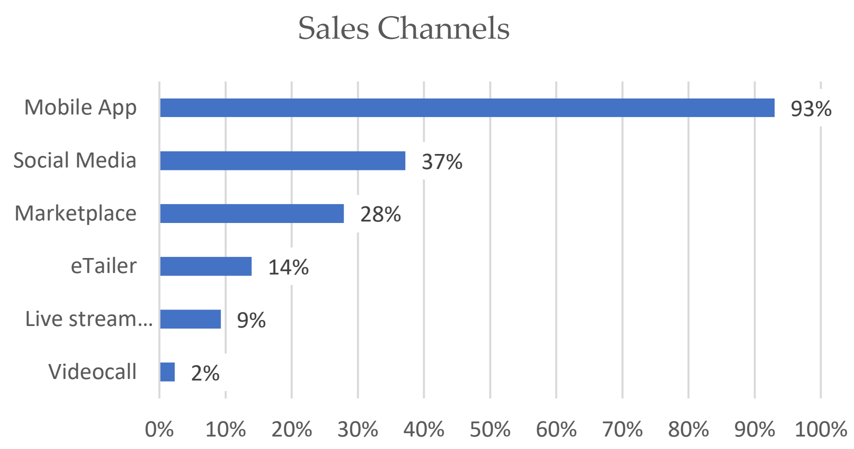


Chart 2.9: Distribution of scientific papers addressing sales channels' topic (base: 43 papers)

To implement a correct omnichannel strategy, retailers don't have to focus on a single sales channel but, instead, they need to pay more attention to how customers engage with brands. Additionally, they may need to concentrate on incorporating mobile as a new channel, finding a compromise between privacy and customisation, and restructuring their supply chain network, all while taking into account various customers' needs [37].

[38] analysed two distinct features of the mobile channel: ubiquitous access, the possibility to make the purchase whenever and wherever the customer wants, and limited search capability, the availability of information in the channel. According to their study, businesses that sell items that customers are likely to buy right away can take advantage of ubiquitous access and thus have higher conversion rates; on the other hand, firms that sell items that can be purchased at a later date are discovered to have lower conversion rates but higher sales. For the second case, it is likely that customers utilise the mobile sales channel more frequently to look up product information but complete the transaction later, which would result in lower conversion rates but more visits and larger sales.

Other important insights were highlighted by [39]. When it comes to marketing strategies, using a mobile SMS subscription service to attract customers to buy products turns out to be very effective. In addition, the possibility to access online reviews by mobile in order to learn more about the products appears to be a successful driver in the purchasing process.

Lastly, the adoption of the marketplace as a sale channel is continuously increasing in the last years, as expressed by [40]. Customer acquisition costs on the marketplace are likely cheaper than acquiring customers through the retailer's own website. Anyway, these positive effects are influenced by the retailer's assortment characteristics. For example, in order to benefit from complementarity effect, businesses need to offer a more extensive and specialized selection on their website. The findings suggest that "baiting" clients on the marketplace holds promising results in categories with cheap prices and a wide range of options.

2.2.4. Customer purchasing stages

Next category focuses on the various stages of a customers' purchase, from the problem recognition to the after-sale services. These variables were included in the analysis to understand which phases are more crucial and, as a result, more closely tied to a retailer's omnichannel plans. Chart 2.10 details each stage taken into consideration along with how often it was addressed in the scientific literature.

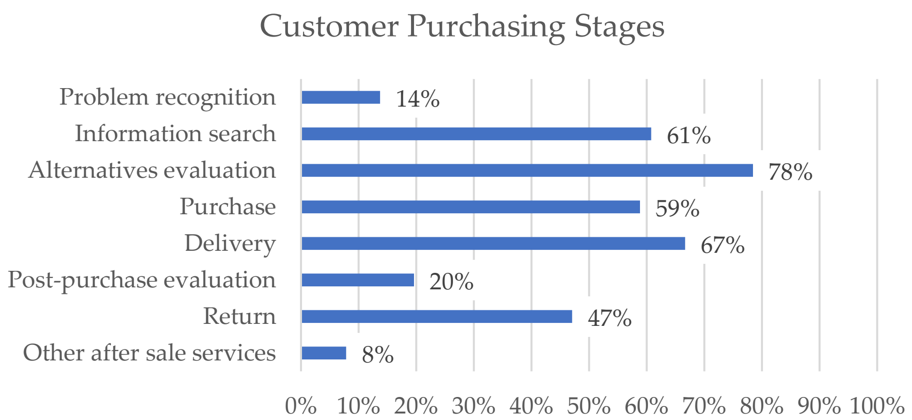


Chart 2.10: Distribution of scientific papers addressing customer purchasing stages' topic (base: 51 papers)

2.2.5. Logistics & operations

In this paragraph logistics and operations management is discussed, taking into account all the crucial steps that will deliver goods from the manufacturer to the final consumer. It is divided into three main areas that refer to company strategic decisions: *delivery service*, *distribution setting* and *operations management*. In each strategic area are included different logistics variables representing the design parameters implemented by retailers, with multiple options available for each dimension.

2.2.5.1. Delivery service

Companies operating in an omnichannel environment need to consider three main logistics variables relating to the delivery service: *delivery mode*, *velocity*, and *time slot*.

The first describes how online-purchased goods are delivered, built according the framework created [13]. Namely, companies can choose between home delivery (HD) and click-and-collect (C&C). The latter is when customers pick up their items at a designated pick-up site, which can be a retailer store (in-store C&C), a drive-through centre nearby a retailer store (attached C&C), a locker, or locations like a post office (solitary C&C). The former can be attended HD or unattended HD according to the extant literature [13]. The vast majority of omnichannel retailers deliver online orders with home delivery and in-store click-and-collect, as shown in Chart 2.11. Unattended HD and solitary C&C were poorly covered in the literature examined, but much more attention was given to attached C&C, perhaps as a result of the requirement to distribute goods from a secure distance in the wake of the pandemic, as is the case with the Curbside pick-up systems.

Concerning this topic, [41] identified the realignment of the physical distribution process for store-based retailers in their efforts to integrate the online channel into their business model. The authors evaluated multiple attributes of the physical distribution process to identify associations with order fulfilment methods adopted by omni-channel retailers.

Moreover, [42] deeply addressed last-mile logistics and e-commerce distribution models. In particular three configurations were found: Push-centric system, divided into Manufacturer - based pick, Distribution Centre – based pick, and Local Brick-and-mortar (B&M) store – based pick; Pull-centric system, divided into Local B&M store and Information store; and finally Hybrid system, divided into Attended Collection delivery point and Unattended Collection delivery point.

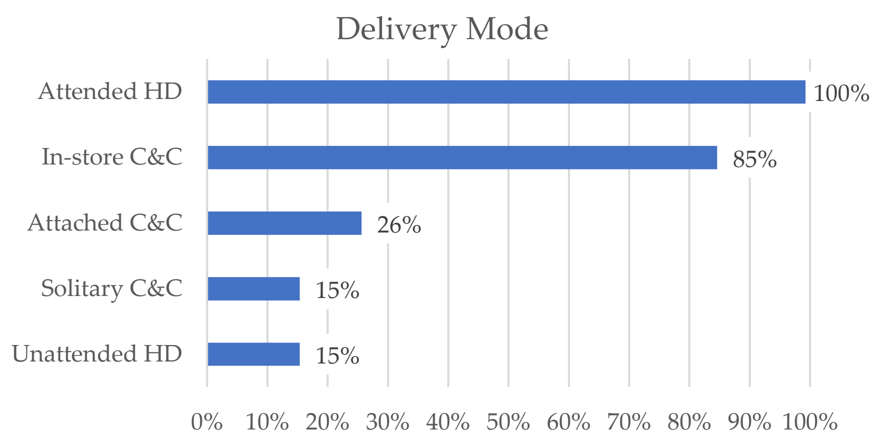


Chart 2.11: Distribution of scientific papers addressing delivery mode’s topic (base: 39 papers)

Delivery velocity is one of the most prominently shown aspects of a service and is significantly influenced by the sector (product kind and client needs). According to earlier contributions [43], the choices include the same day, the next day, and two or more days. For example, setting the picking site close to the consumer is necessary when there is a short lead time to complete and fulfil an order.

As shown in Chart 2.12, same-day delivery resulted to be an extremely popular subject, as the literature frequently discussed it. Customers have been demanding faster and faster deliveries in recent years, and to keep up, more and more innovative solutions, such as the utilisation of dark stores, are being deployed.

The importance of delivery time was further investigated by [44], where it was addressed the effect of delivery time interacting with shipping charges and purchase importance on customer satisfaction and purchase intentions in an eCommerce and omnichannel context. Results indicated that increased delivery time significantly increased customers' perceived ambiguity and perceived riskiness which reduced satisfaction as well as negatively impacted purchase intentions.

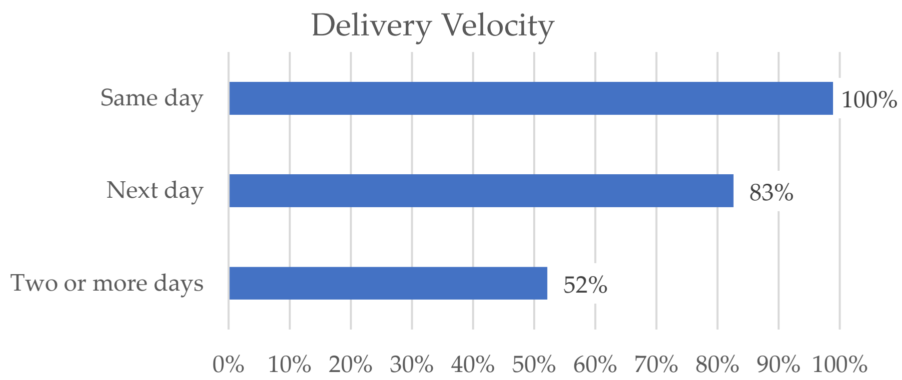


Chart 2.12: Distribution of scientific papers addressing delivery velocity's topic (base: 23 papers)

According to the literature [43], the time window may be specific or undefined. While the latter includes both HD with no pre-selected time slot and HD on appointment, the former indicates that buyers can select a time slot throughout the purchasing process. According to the literature [43], the time window may be specific or undefined. While the latter includes both HD with no pre-selected time slot and HD on appointment, the former indicates that buyers can select a time slot throughout the purchasing process.

Moreover, according to [45], slot price differentiation is apparently being progressively introduced by companies in different European countries and business sectors and it is crucial to differentiate between delivery of specific time slots with and without price differentiation. As shown in Chart 2.13, the three alternatives seemed to be equally relevant.

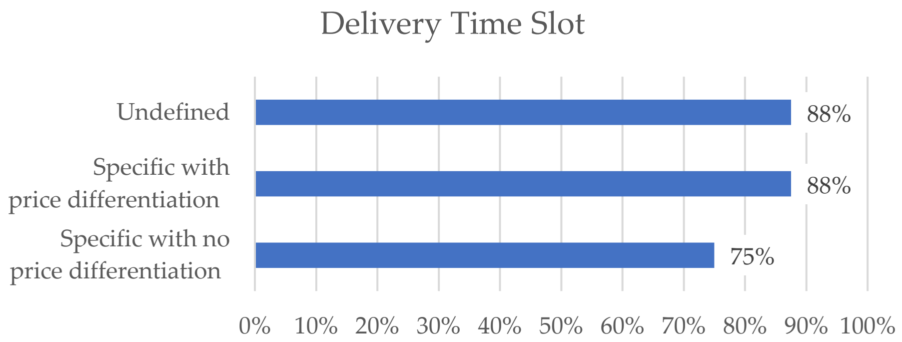


Chart 2.13: Distribution of scientific papers addressing delivery time slot's topic (base: 8 papers)

2.2.5.2. Distribution setting

In an omnichannel environment, the distribution setting involves three basic logistics variables: *online picking location*, *online delivery area* and *transport service*.

Looking at the online picking location, which indicates where online orders are filled, the choices include in-store, separate fulfilment centre (also known as dark store), and central warehouse (CW), as reported [45]. The second solution involves controlling replenishment from the CW to the e-fulfilment centre but assumes no interaction between online and traditional channels.

As shown in Chart 2.14, all the alternatives resulted to be equally implemented and relevant, highlighting how the external environment and the company strategic objectives are important factors in selecting the best option in each specific context.

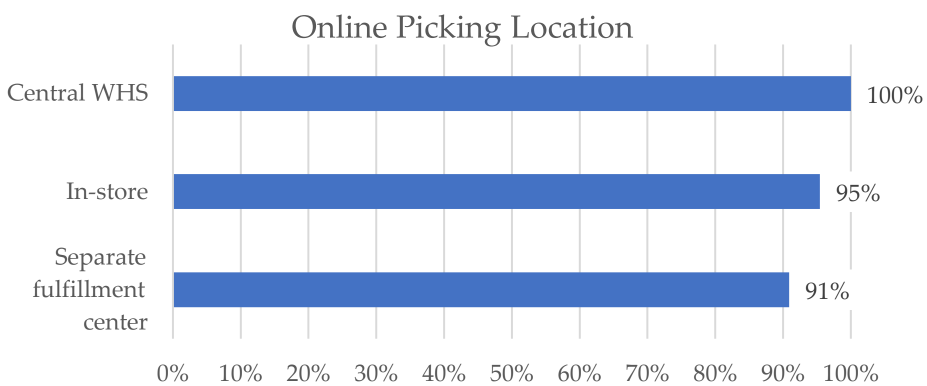


Chart 2.14: Distribution of scientific papers addressing online picking location's topic (base: 22 papers)

The online order delivery area for each logistics facility is another important factor. According to earlier works [43], this can be local (5 to 20 kilometre action radius), regional, national, and international.

As shown in Chart 2.15, the overwhelming majority were local and regional, demonstrating how there is a significant tendency toward being close to the client and accelerating deliveries.

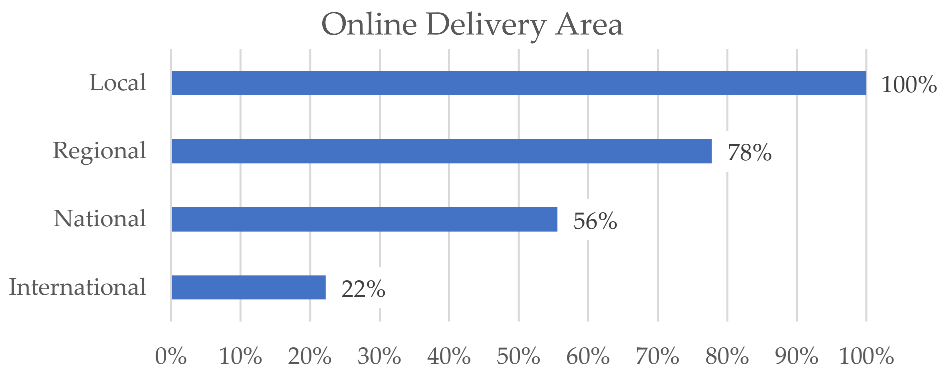


Chart 2.15: Distribution of scientific papers addressing online delivery area's topic (base: 9 papers)

Lastly, a key logistics variable affecting costs is transport costs and the options can be milk run, Less than Truck Load (LTL) express courier, LTL courier and Full Truck Load (FTL) with local distribution [45]. A vehicle travels closed-loop routes to deliver online orders during the milk run. Small packages are transported in LTL, usually by couriers. In FTL with local distribution, a full truck transfers items from the fulfilment centre to a network node (a store or a local depot), which serves as the beginning point for local distribution routes, and it can be planned by including both traditional and online flows into an omnichannel perspective.

This type of analysis received very little attention by the scientific paper addressed, making it impossible to get reliable insights.

2.2.5.3. Operations management

In the final section, operations are covered. Existing literature assessed largely this topic, for instance by [46] which provided a comprehensive overview of the operations structures of multi-channel retailing. This dimension focuses on the following categories: *order preparation management* (picking), *stock management*, *order management*, *fulfilment structures management* and *return management*.

Concerning the order preparation management, two key variables are taken into account: online picking automation and online picking integration; as suggested by [43]. Automation can be manual, semi-automated, or fully automated. Pickers prepare online orders in manual solutions using conventional picker-to-parts systems. Conveyors link several picking zones in semi-automated systems even when picking is done manually (pick-and-pass systems), whereas parts-to-picker systems are employed in fully automated systems.

As shown in Chart 2.16, there is a small tendency toward complete automation of picking procedures, however, like before, this topic did not receive much attention in the articles, so these findings should be interpreted with caution.

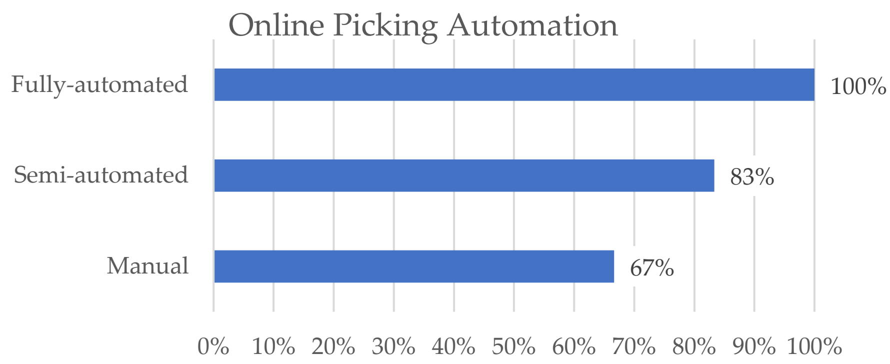


Chart 2.16: Distribution of scientific papers addressing online picking automation's topic (base: 6 papers)

Moving to the degrees of online picking integration, it can be separated, integrated, or capacity-optimised and integrated. The second option means that the business can either share current resources to incorporate online orders with the conventional channel selecting process or use dedicated resources (people and space) to fulfil online orders. The final option, "capacity-optimized and integrated", shows how to employ resources optimally to cut down on stock-outs and lead times.

The literature analysis showed a strong trend towards integrated models and a great interest in capacity optimised and integrated models, as reported in Chart 2.17.

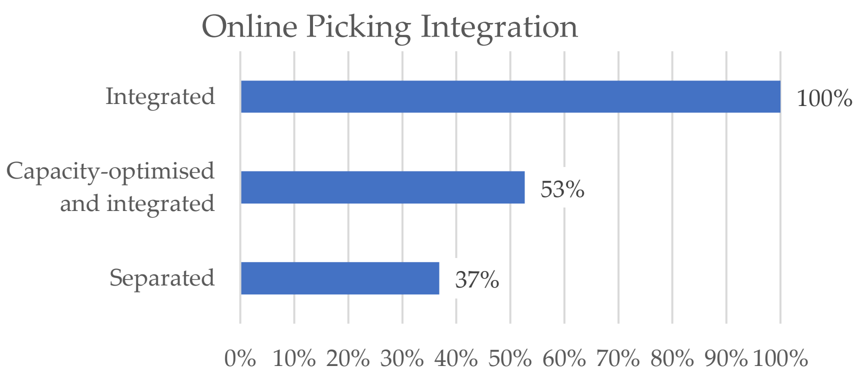


Chart 2.17: Distribution of scientific papers addressing online picking integration's topic (base: 19 papers)

Concerning the stock management, the main topic is the degree of integration. The stocks can be separated, integrated, or capacity-optimised and integrated using the same logic as before. In particular, the results turned out to be similar to the ones of online picking, showing a widespread application of integrated stock strategies and a trend to fully optimise it (Chart 2.18).

This topic was often discussed by the literature, for instance in "*Coordinated inventory policies for meeting demands from both store and online BOPS channels*" [47] different stock integration scenarios were compared to highlight the advantages and disadvantages.

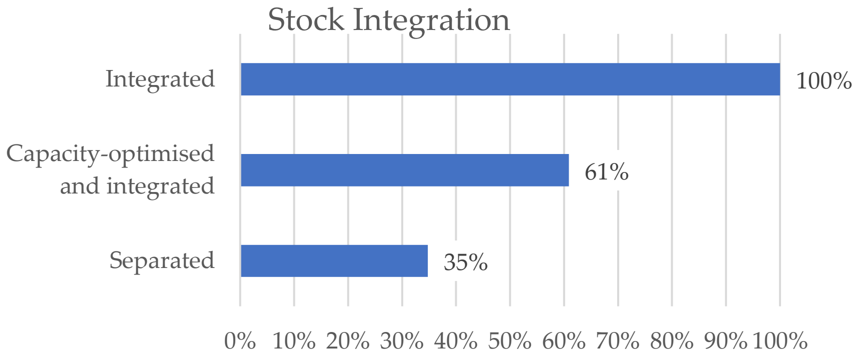


Chart 2.18: Distribution of scientific papers addressing stock integration's topic (base: 23 papers)

Moving to the order management, three key sub-areas can be identified: *order integration*, *order allocation* and *order priority*.

The former refers to the degree of integration (separated or integrated) of order management, considering how offline and online orders are managed and executed, involving both staff and IT systems. The analysis showed a great tendency towards an integrated order management (Chart 2.19).

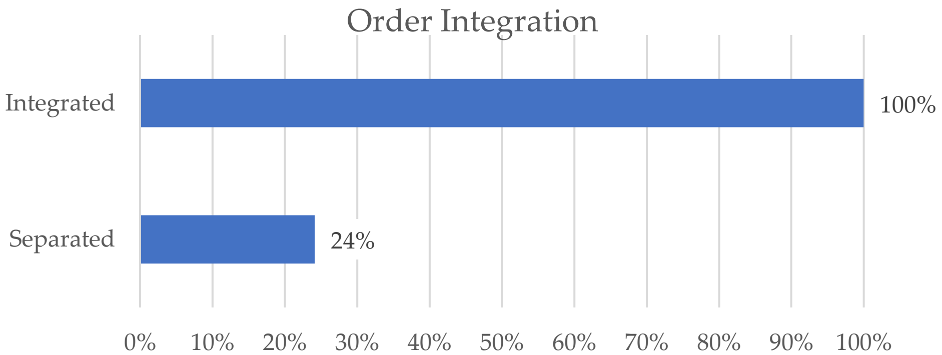


Chart 2.19: Distribution of scientific papers addressing order integration's topic (base: 29 papers)

The order allocation can be static or dynamic [45]. Online clients can view the full selection of items using dynamic allocation, in contrast to static allocation, which presupposes selecting the picking location for the online purchase in advance (with only the goods in that location being available to online customers). By looking at Chart 2.20 , the adoption of a dynamic allocation model seemed slightly more relevant.

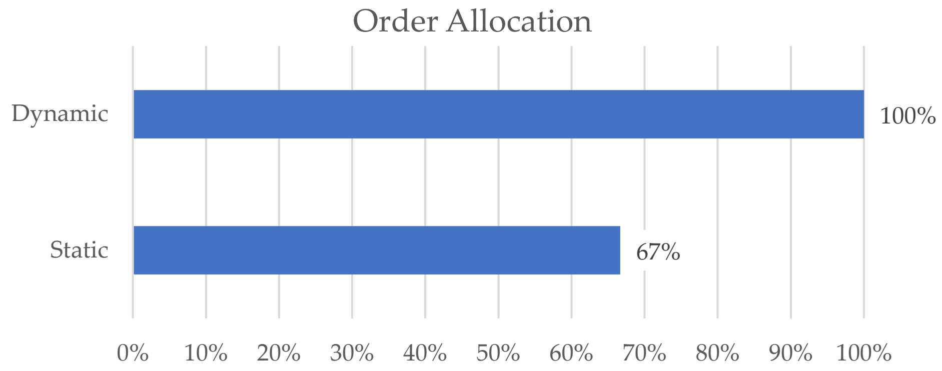


Chart 2.20: Distribution of scientific papers addressing order allocation’s topic (base: 6 papers)

Lastly, order priority refers to the retailer's decision to handle orders using one channel over another, and the possibilities include treating them equally (no priority) or giving one channel priority (online priority or offline priority). As shown in Chart 2.21, there isn't a single channel that dominates the other; instead, the best option between the two depends on the context and product offered, as highlighted by [48] and [49]. Furthermore, none of the articles that addressed the issue of order priority specifically described a strategy to balance the two channels, as all articles indicated a preference for one channel over the other.

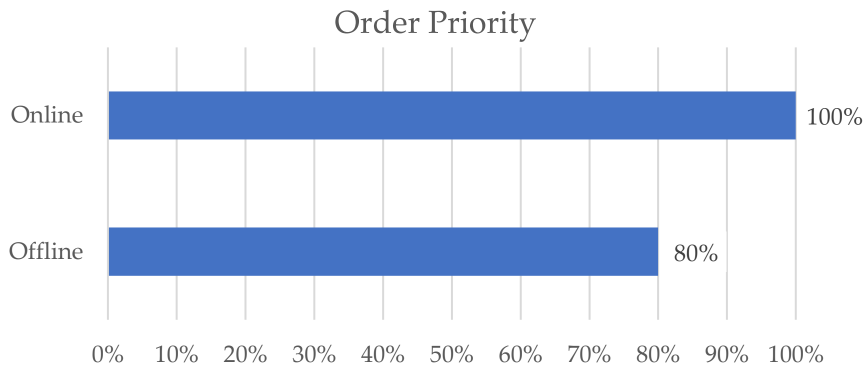


Chart 2.21: Distribution of scientific papers addressing order priority’s topic (base: 5 papers)

The next section refers to fulfilment structures management and the key dimension identified is the degree of integration. As before, it can be separated or integrated, meaning that an order can be fulfilled by different structures interacting, for example sharing and shipping orders between them (e.g., ship-to-store models or dark store fulfilment). The research revealed a strong shift toward integration, which is the foundation of the new omnichannel models, as it could be predicted (Chart 2.22).

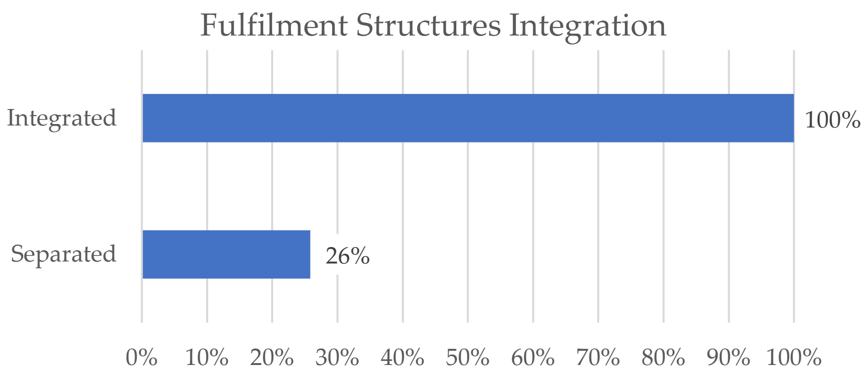


Chart 2.22: Distribution of scientific papers addressing fulfilment structures integration's topic (base: 31 papers)

Finally, return management is discussed, which is becoming more and more important in recent years and is often addressed in the literature. [50], [51] investigated in detail this topic enabling the detection of two key dimensions: return mode and return integration.

Concerning the former, it is possible to distinguish the different modalities to return orders. Based on literature, return can be in-store and by Courier, Express and Parcel delivery (CEP). The latter can be even more divided into CEP returns from home and from other sources, such as lockers and post offices.

Chart 2.23 shows a huge relevance of in-store returns and in-person interactions and the usage of integrated models, such as the ability to return goods purchased online to a store, received significant attention in the literature.

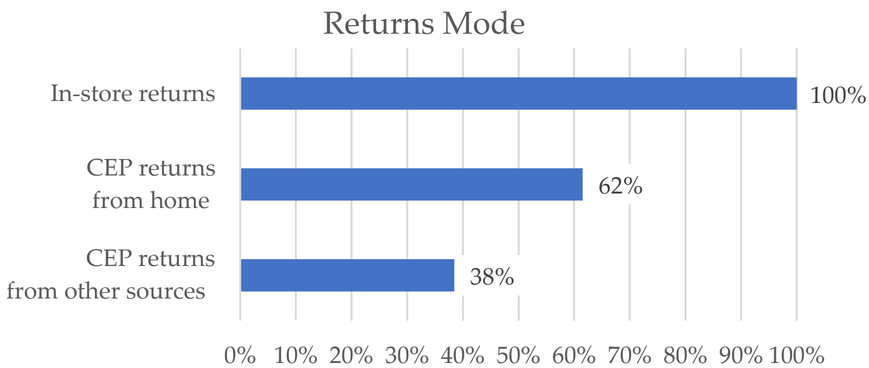


Chart 2.23: Distribution of scientific papers addressing return mode's topic (base: 26 papers)

With regard to this second point specifically, Chart 2.24 demonstrates how integration in this industry is essential, models like the one discussed above, as well as the ability to return by CEP goods purchased in store, are crucial in enabling companies to shift to omnichannel.

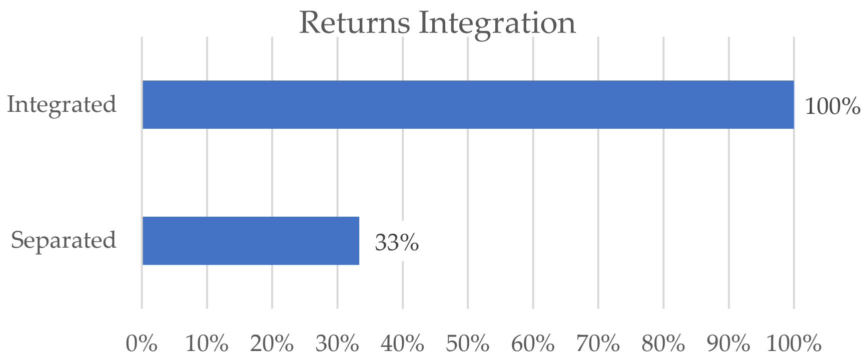


Chart 2.24: Distribution of scientific papers addressing returns integration's topic (base: 24 papers)

2.2.5.4. Logistics & operations: general overview

More interesting data can be gathered by extending the scope of the analysis. Only the second of the three major areas - delivery service, distribution setting, and operations management - appeared to be less important, as can be seen in Chart 2.25.

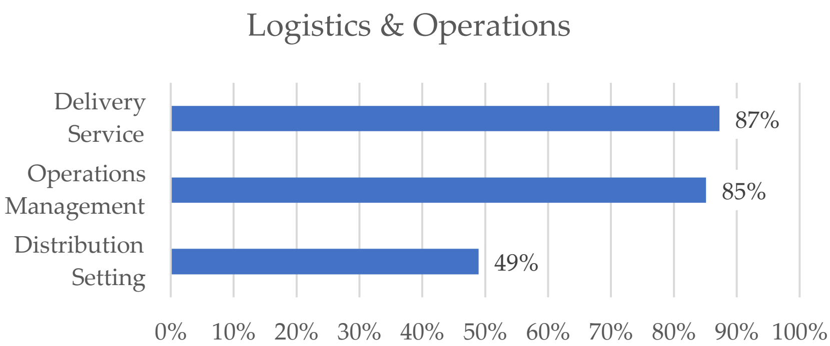


Chart 2.25: Distribution of scientific papers addressing logistics & operations' topic (base: 47 papers) (1)

Moreover, Chart 2.26 illustrates an in-depth investigation of the relevance of each individual variable examined. First, it is evident that the delivery mode was the most discussed topic dimension. Further, issues pertaining to the integration of their operations, particularly the fulfilment structures, return modes, and velocity, resulted to be of high significance. Finally, remaining variables, such as the transport service, appeared to be insignificant and of limited research significance.

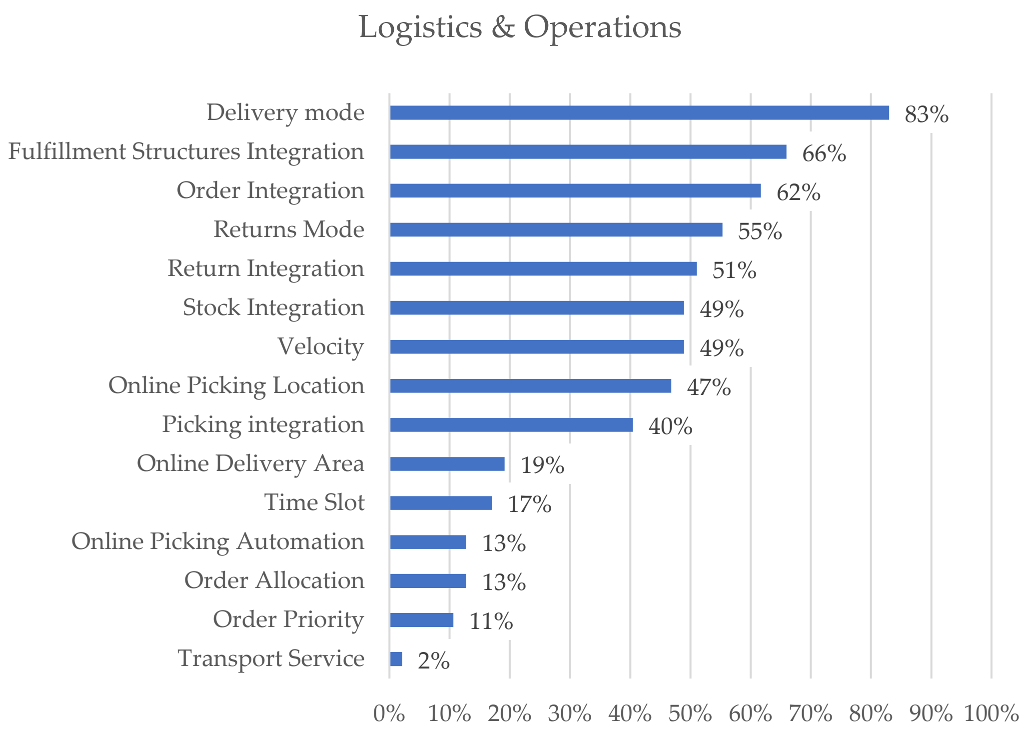


Chart 2.26: Distribution of scientific papers addressing logistics & operations' topic (base: 47 papers) (2)

2.2.6. Data strategy & digital innovations

In this paragraph, which digital tools are used by companies and which primary drivers are behind their data strategy are highlighted and discussed. [37] assessed these topics extensively by discussing the role of information technology in Retail, new business models, and the future role of traditional stores. Four key dimensions were identified: *type of data collected*, *back-end digital innovations*, *front-end digital innovations*, and *customer-visible data*.

2.2.6.1. Type of data collected

The company's data collection practices are examined in the first section, focusing mainly on customer data. Chart 2.27 illustrates how gathering contacts and personal data is a common practice and the cornerstone of every organization. Additionally, there is a strong emphasis on looking into purchase histories, particularly to better understand the preferences of one's clients. Finally, insufficient attention is paid to in-store routes and flows data, a probable symptom of limited implementation and attention in this area by businesses.

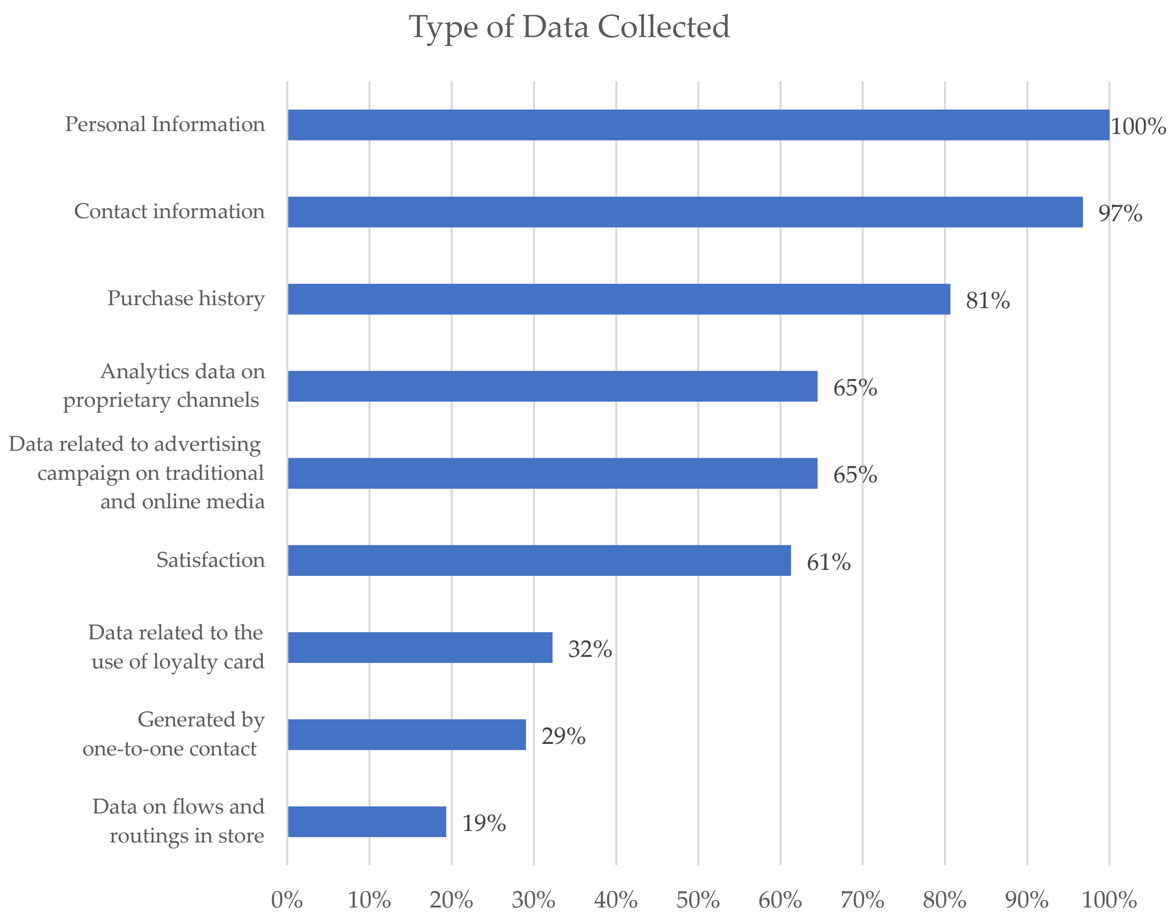


Chart 2.27: Distribution of scientific papers addressing type of data collected (base: 31 papers)

2.2.6.2. Back-end digital innovations

Regarding back-end digital innovations, integrated information systems and business intelligence systems were the most debated in the literature, followed by demand, inventory and distribution planning ones (Chart 2.28).

As described by [52], the integration of information systems is crucial to exploit synergies between online and offline channels, such access to new customer data and new cross-channel marketing capabilities.

Concerning business intelligence systems, they are increasingly applied to support management [53], such as in omnichannel segmentation and targeting techniques to support marketing activities [54], [55].

Planning for demand, inventory, and distribution is what emerges next. As shown by [56], finding and implementing ever-more-effective solutions is essential since supply chain complexity and uncertainty have increased significantly in recent years, mostly as a result of the numerous sales channels and their integration. These tools are a crucial component that underpins future growth and are, of course, often present.

On the other hand, RFId, WMS and in-store customer monitoring were not a topic that researchers focus on much.

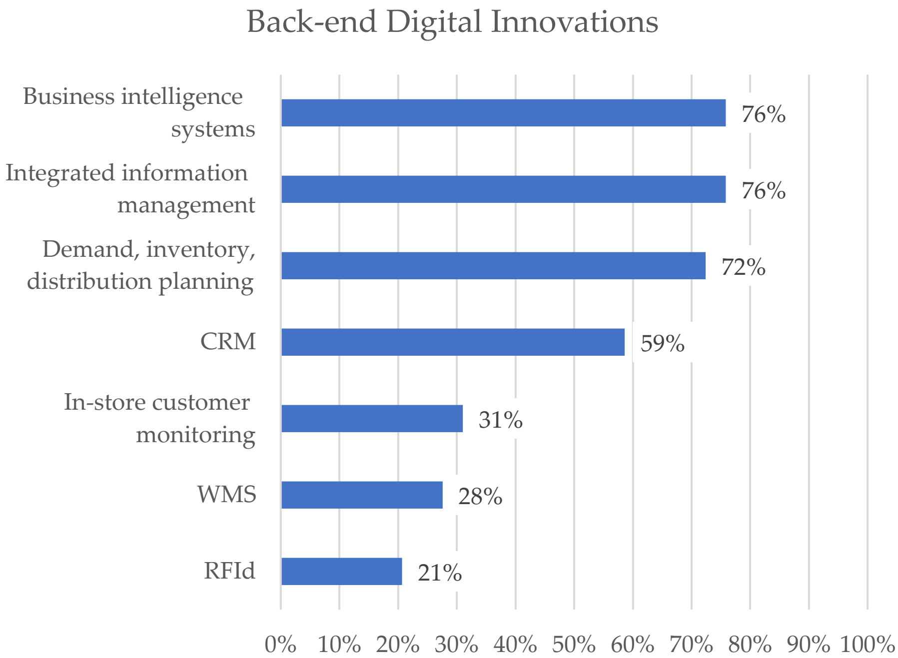


Chart 2.28: Distribution of scientific papers addressing back-end digital innovation's topic (base: 29 papers)

2.2.6.3. Front-end digital innovations

Moving to the front-end digital innovations, solutions in store, website and based on mobile are addressed. Researchers regularly focus on this topic. For instance, [57] proposed a model following an omnichannel consumer engagement approach, and blending at the same time the physical and digital shopping experience through an extended reality technology framework highlighting all the relevant engagement technologies.

As shown in Chart 2.29, sales force automation solutions, such the provision of an in-store tablet to staff to support online orders, and kiosks/totems/touchpoints to gather information in store were by far the most discussed.

Concerning the latter, [58] demonstrated that the ability to compare the offerings of online and offline channels is one of the most important driver behind consumer visits to omnichannel stores. For this reason, in order to increase consumer convenience, shops will need to put in more information kiosks, adequate room for product experiences, and precise comparison catalogues.

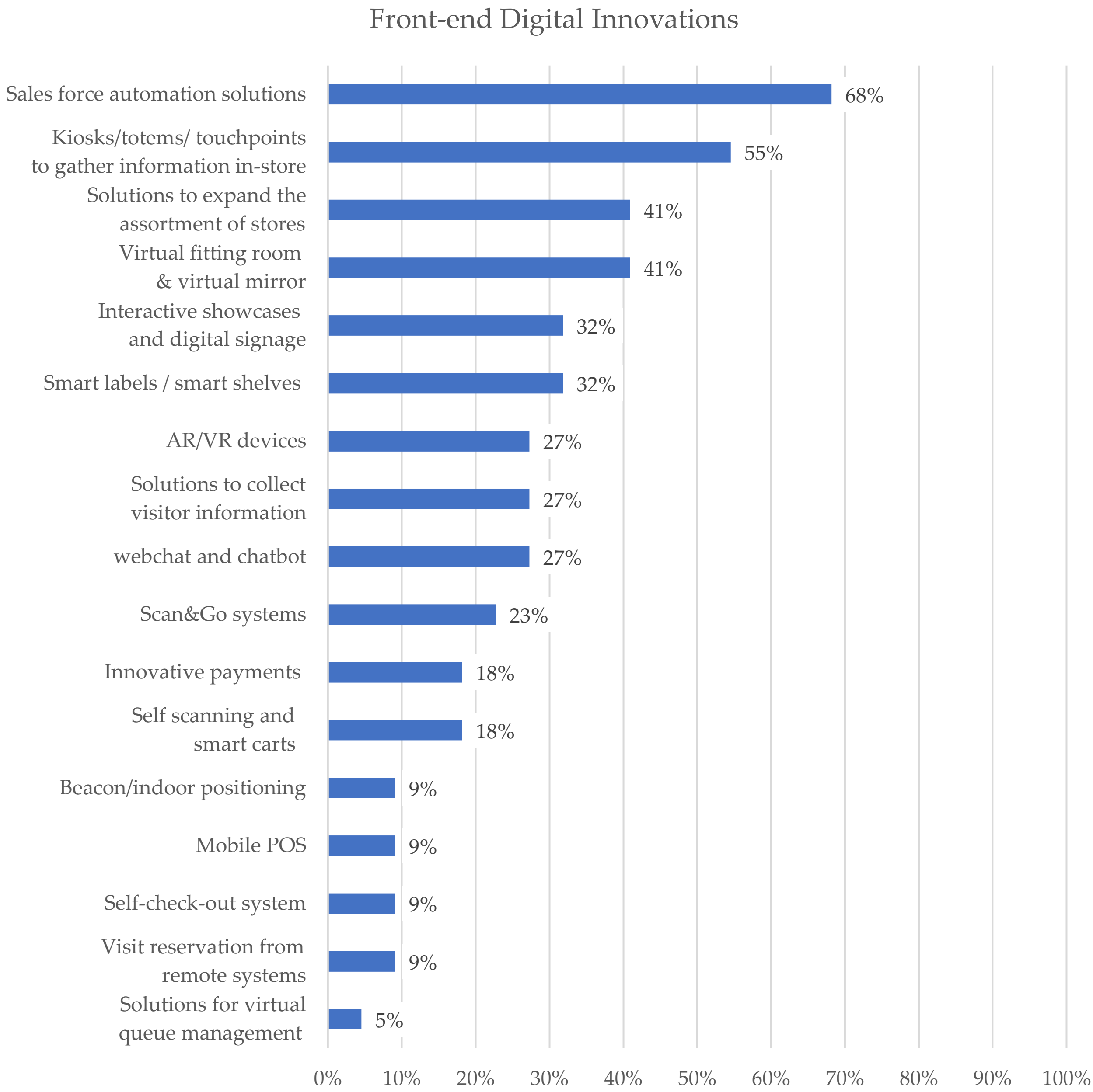


Chart 2.29: Distribution of scientific papers addressing front-end digital innovation's topic (base: 22 papers)

2.2.6.4. Customer-visible data

The literature showed the importance of company and supply chain visibility, particularly stocks, for efficient business management as well as for improving customer experience, lowering perceived risk, and increasing the perceived behavioural control of the consumers, particularly in the case of expensive goods [59], [60].

This section looks at the data that customers can access and how accurate and complete it is, investigating four key areas: stock availability, product, shipment tracking and environmental visibility. The results are illustrated in Chart 2.30.

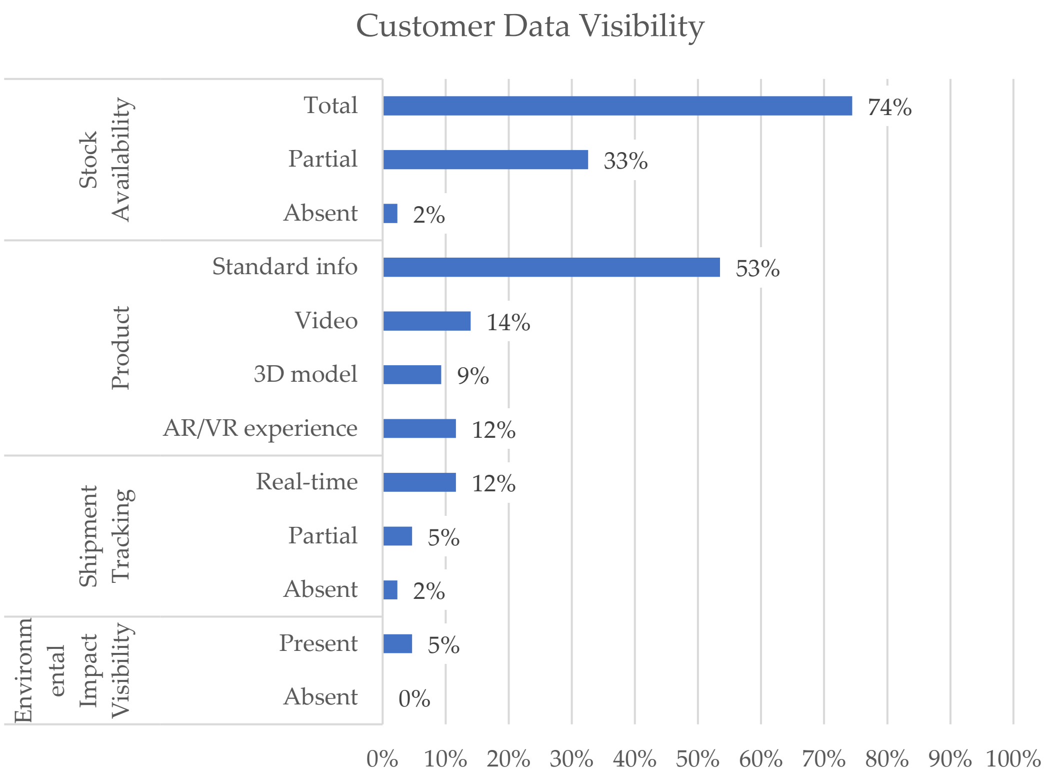


Chart 2.30: Distribution of scientific papers addressing customer data visibility's topic (base: 43 papers)

Stocks can be fully accessible, which allows customers to view precise and current quantities in-store, partially accessible, such as through a flag system, or absent. As expected, there is a strong trend to a total visibility.

Regarding products, the diverse methods of sharing information are examined by considering videos, the use of 3D models, augmented reality, and virtual reality experiences. It is shown that there is still no movement toward novel information exchange models, and that most businesses still use conventional techniques (photos and short descriptions).

The investigation of shipment tracking follows, and logically speaking, real-time data are typically preferred and adopted.

Finally, environmental visibility is evaluated. This refers to the customer's ability to learn information about the product's impact on the climate, for instance by imagining the corresponding amount of carbon dioxide equivalent that is emitted. The literature addressed poorly this topic, so it is impossible to get proper insights. However, some articles have highlighted the importance of environmental topics as a key purchase driver for customers, as described by [61].

2.2.6.5. Data strategy & digital innovation: general overview

In conclusion, it is possible to compare each variable individually (Chart 2.31). Stock availability was the most frequently mentioned subject, as expected given its relevance, and was closely followed by the type of data gathered. On the other hand, environmental impact visibility and shipment tracking were poorly discussed by researchers.

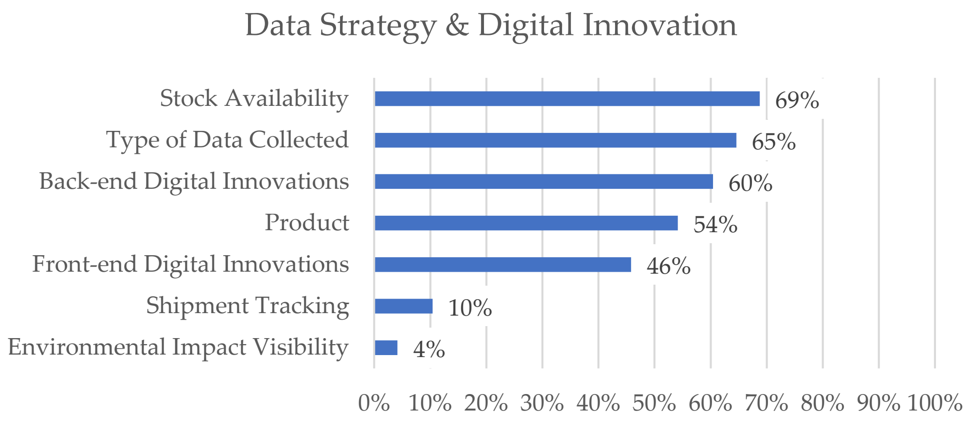


Chart 2.31: Distribution of scientific papers addressing data strategy & digital innovation's topic (base: 48 papers)

2.2.7. Store: spaces and employees

Recent research studied the effects on the shop and their significance in great detail, particularly in light of the Covid-19 and lockdown difficulties. For instance, [62] explored the future of the physical store within omnichannel Retail and, specifically, the prerequisites of the designed Retail environment in optimizing customer experience. The authors found 2 types of stores: slow Retail vs fast Retail. The former focused on localization, pursuit of pleasure, convivial experience, diversity, quality and slowing down. In the opposite direction, fast Retail emphasized standardized and homogenized efficiency, rapid response, convenience, and speed.

[63] explored the role of the store in managing post-purchase complaints for omnichannel shoppers analysing which individual characteristics, situational variables and channel variables lead to complaining at the store.

Lastly, concerning Covid-19, [6] studied how fast fashion industry companies faced the pandemic highlighting how the re-innovation of physical shops was crucial.

As found in the literature, scholars often concur that the role of stores is a very hot topic and in this new context they need to be reimagined. The physical channel must support online services with integrated operations and delivery solutions, such as ship-to-store or Click & Collect service. Moreover, their role is evolved from simply providing goods to one of engaging the customer completely and creating an experience for them.

There are two more crucial factors, in addition to the front-end digital innovations already discussed, that must be taken into account: new *store spaces* (Chart 2.32) and the role of *employees* (Chart 2.33).

Regarding the former, the implementations that received the most attention were analysed. Great attention was given to pick-up and return point in-store and their advantages to exploit the physical spaces to manage goods purchased online. Then, eCommerce order preparation areas and showroom followed highlighting the importance of guiding customers to purchase online even inside stores, giving them advice, making them try and know products and, if the good searched is not available, find alternative choices. Briefly, stores must enhance both the online and offline experiences in a coherent way. Even though Curbside pick-up and parcel lockers, which are labelled "external pick-up and return areas", gained popularity with Covid-19, they don't seem to be as important today as they resulted to be poorly addressed in the literature.

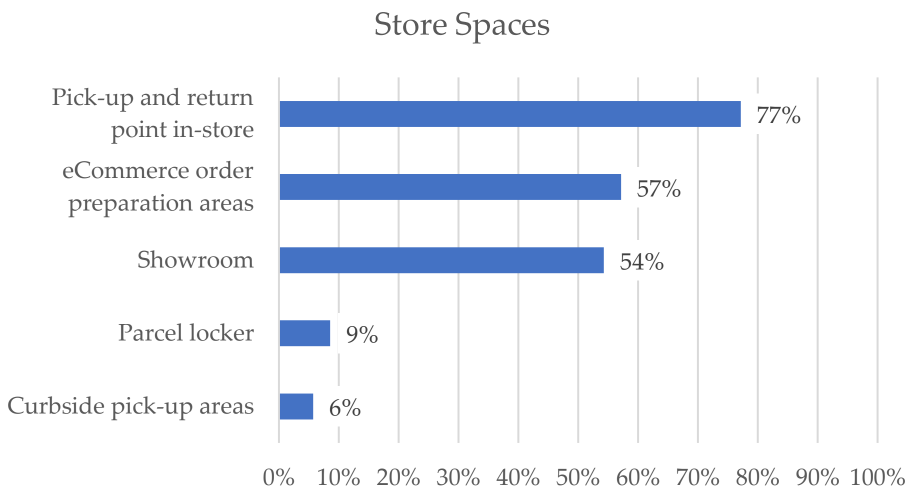


Chart 2.32: Distribution of scientific papers addressing store spaces' topic (base: 35 papers)

When it comes to the staff, the relationship activities with remote customers were the most talked-about driver. This could be related to the lockdown issue, in which solutions such as WhatsApp and webchat proliferated giving the opportunity to easily get in touch with staff members, for instance to find out information, such as stock availability, or to make a reservation.

Lastly, in Chart 2.34 spaces resulted to be slightly more addressed highlighting how this dimension is particularly relevant for the correct implementation of omnichannel strategies.

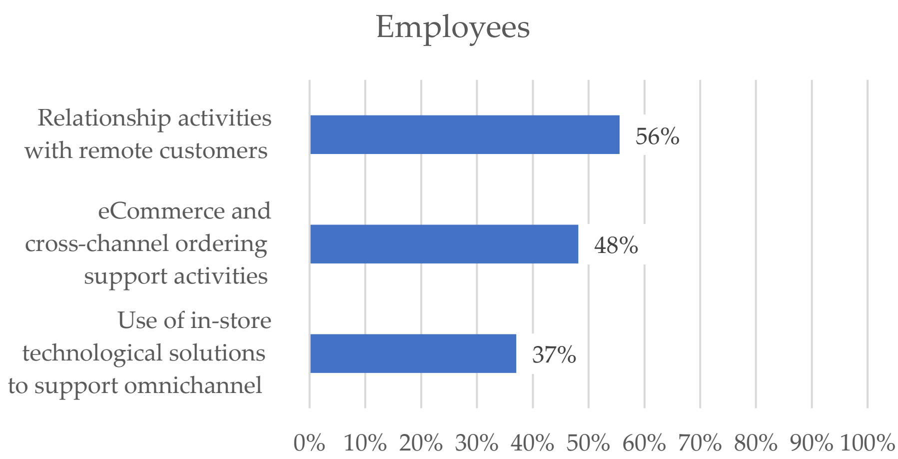


Chart 2.33: Distribution of scientific papers addressing employees' topic (base: 27 papers)

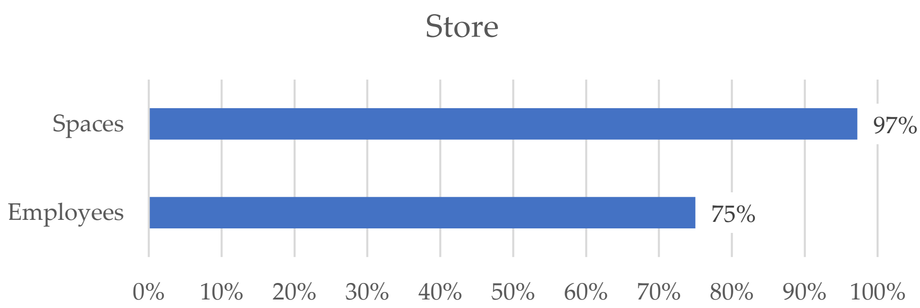


Chart 2.34: Distribution of scientific papers addressing store's topic (base: 36 papers)

2.2.8. Marketing

Lastly, the final section regards marketing strategy which was largely addressed by scientific research as shown in the following examples. [64] addressed deeply this topic by analysing differences between multichannel and omnichannel marketing, describing the advantages of the latter and explaining how retailers can best transition from one phase to the other, finding appropriate actions to be implemented and possible barriers.

[26] discussed the marketing–operations interdependencies throughout different stages of both the customer journey and the product flow from the perspective of omnichannel management, describing the related goals, tensions, and opportunities.

[65] explored the factors influencing omnichannel integration quality, defined as the ability to provide customers with a seamless service experience across multiple channels. Moreover, the relation between integration quality and cross buying intentions and impact on perceived value were analysed deeply.

Finally, [66] investigated how customers utilise multiple channels developing a framework able to identify the best customer clusters accordingly to a specific product typology. The analysis suggested that the understanding of consumer behaviour is essential for omni-channel retailers to determine their category selection strategy for online/offline channels and the results provide practitioners with values to define the appropriate strategy.

As shown, when reviewing literature on omnichannel strategies, many diverse factors had to be taken into consideration. The following subjects were covered in order to obtain a thorough overview: product assortment, price, advertising, promotions, and loyalty programs.

Products and prices are the first two strategies addressed and they can be differentiated or not among the various channels. A diverse product assortment strategy allows for the use of multiple product catalogues; for instance, some products might only be offered online or in-store. Concerning this topic, [52] found that retailers extended their offline offerings by interlinking them with online services. The retailers' rationale behind offering such cross-channel services was to make the shopping experience as convenient as possible, and to differentiate themselves from pure online retailers.

Similarly, there might be various techniques and pricing diversification among the various channels when it comes to price plans. A not differentiated pricing strategy, on the other hand, results from the aim to make both channels consistent and easily interchangeable for the client. As can be seen (Chart 2.35, Chart 2.36), companies tend to follow differentiated strategies demonstrating how channels are not yet fully integrated and being considered as a continuum.

Moving to the remaining topics, advertising, promotions and loyalty programs can be independent or integrated among the different channels. Advertising consists in the communication of a product with the user. It can be done through diverse channels, such as traditional ones (television, newspapers, radio, etc…) or digital (mobile, social network, etc…). When it comes to omnichannel marketing, the various sales channels and their interactions must be considered in the communication of those products. "Integrated" advertising refers to the seamless integration of communication channels,

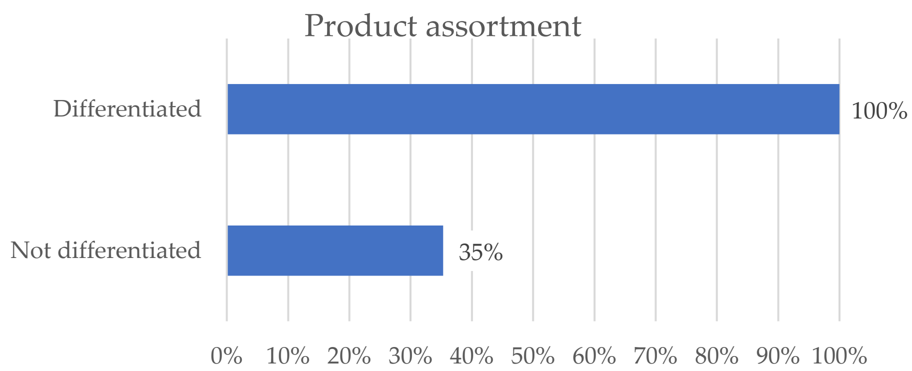


Chart 2.35: Distribution of scientific papers addressing product assortment's topic (base: 17 papers)

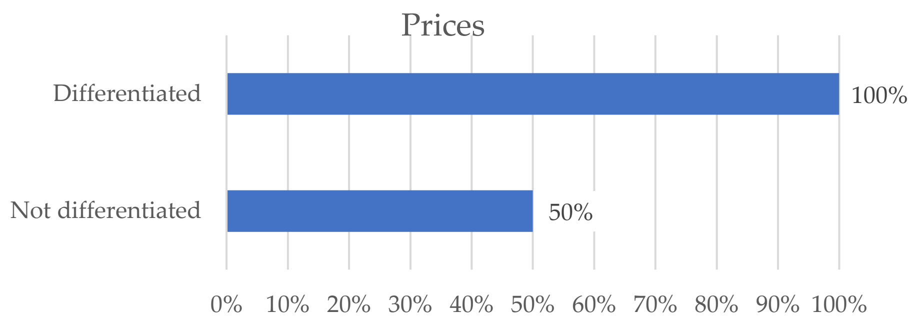


Chart 2.36: Distribution of scientific papers addressing prices' topic (base: 12 papers)

whereby all sales channels are equally advertised in the same media, for instance offline channels are advertised online and vice versa.

Concerning sales promotions, defined as a marketing strategy in which a business uses a temporary campaign or offer to increase interest or demand in its product or service, their integration refers to the execution of a shared campaign across various channels. For instance, purchasing in-store could result in discounts in online channels.

As reported by [67], [68], omnichannel promotions are more effective if they are tailored to individual consumers, making them more congruent with their shopping goal, and they are influenced by the categories of product (utilitarian or hedonic). Moreover, they could be used to obtain short-term (promotion redemption) or long-term effects (changing Retail brand attitude) on performance depending on the type of benefit offered. The authors found that for the former they should be largely utilitarian, while for the latter they could be both utilitarian and hedonic ones.

Then loyalty programs are taken into account. In this situation, integrated loyalty plans take into consideration all methods for providing extra services, such as additional discounts or point collection systems, shared and integrated among all the diverse channels.

As shown in Chart 2.37, Chart 2.38, and Chart 2.39, there is a strong trend towards the integration in all the discussed dimensions.

Finally, all marketing's dimensions can be furtherly analysed together. As shown in Chart 2.40, it can be assumed that none of them is more critical than the others, as the addressed variables resulted to be equally discussed by researchers.

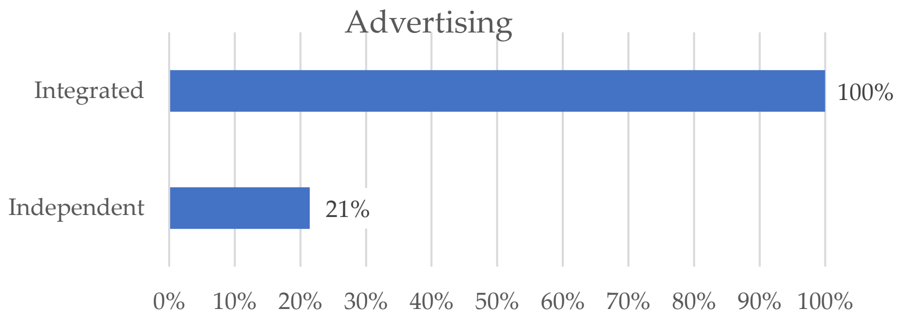


Chart 2.37: Distribution of scientific papers addressing advertising's topic (base: 16 papers)

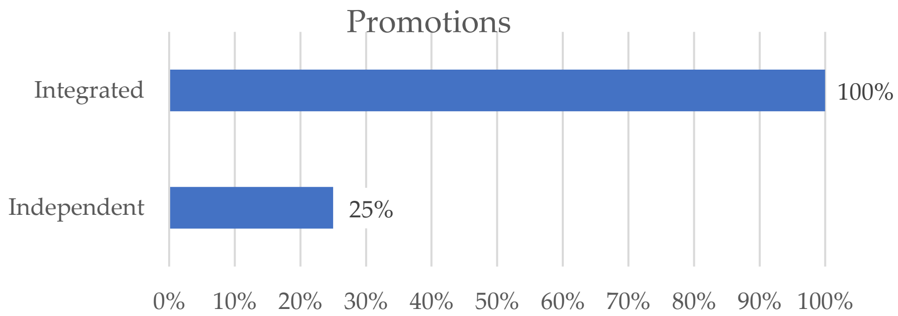


Chart 2.38: Distribution of scientific papers addressing promotions' topic (bas: 14 papers)

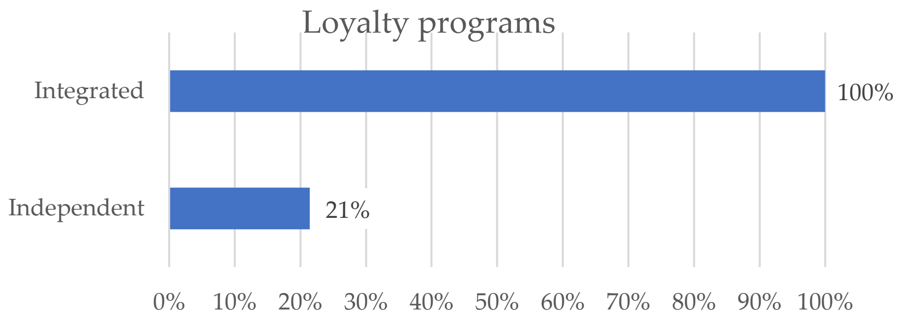


Chart 2.39: Distribution of scientific papers addressing loyalty programs' topic (base 14 papers)

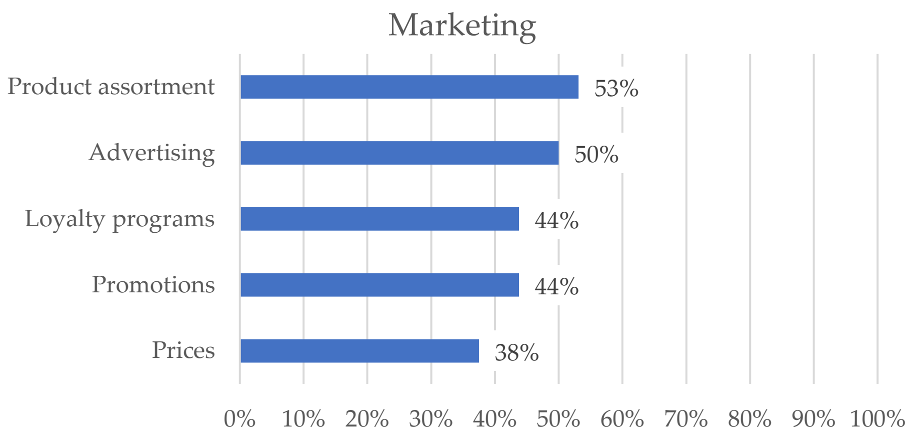


Chart 2.40: Distribution of scientific papers addressing marketing's topic (base: 32 papers)

3 The non-scientific literature review

3.1. Literature analysis

After having analysed in detail the papers coming from the scientific literature and investigated the outcomes of the single areas of interest, in this section the focus of the analysis moves to the non-scientific literature. The method used for choosing and categorizing articles is the same as the one previously described for academic papers.

The articles examined in this chapter were published by consulting firms, such as McKinsey, Boston Consulting Group, Accenture, together with reports from Osservatori Digital Innovation of Politecnico di Milano. In contrast to the scientific literature, these sources can give an overview of the key trends and the state of the Retail environment at the more present time.

Finally, 21 articles were selected and included in the analysis (see Bibliography for the entire list).

The chronological distribution of the examined non-scientific publications is highlighted in Chart 4.1. As already stated, these publications provide an overview of the present trend, indeed the majority of them were published in the most recent years.

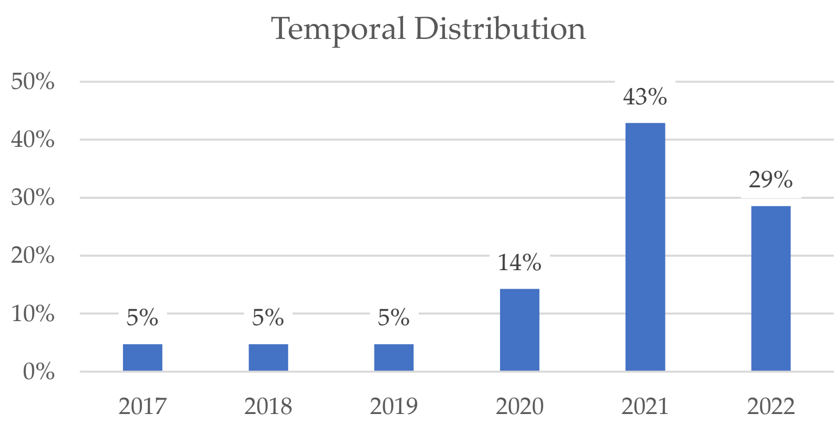


Chart 3.1: Temporal distribution of non-scientific reports (base: 21 reports)

3.1.1. Methodology

Starting from the methodology, Chart 3.2 displays the distribution between qualitative and quantitative approach. As can be seen, most publications used a mixed methodology, like the articles in the scientific literature that were previously analysed. The main distinction is that certain reports only used a quantitative technique; this is because reports, unlike academic papers, do not rely on literature analysis.

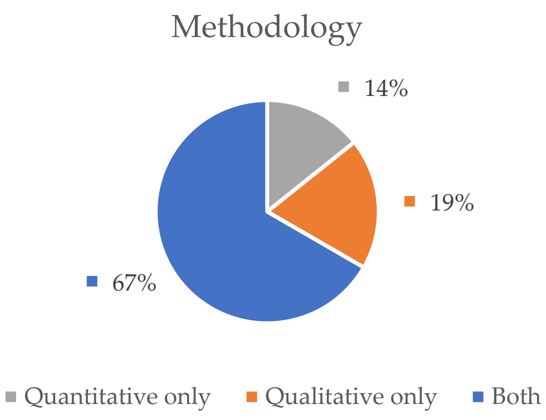


Chart 3.2: Methodologies adopted by non-scientific reports (base: 21 reports)

In Chart 3.3 and Chart 3.4, the precise typologies of both methods are displayed in depth. Concerning quantitative approaches, in the majority of cases authors used secondary data or survey. On the other hand, quantitative approaches adopted were mainly case studies, secondary data and interviews.

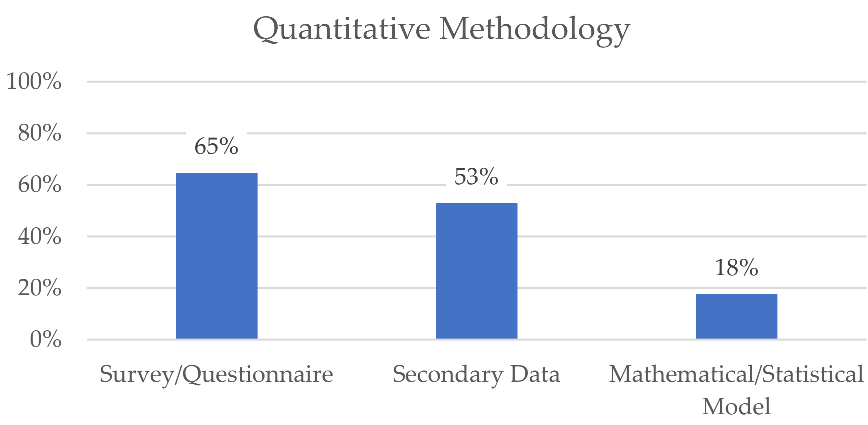


Chart 3.3: Quantitative methodologies adopted (base: 17 reports)

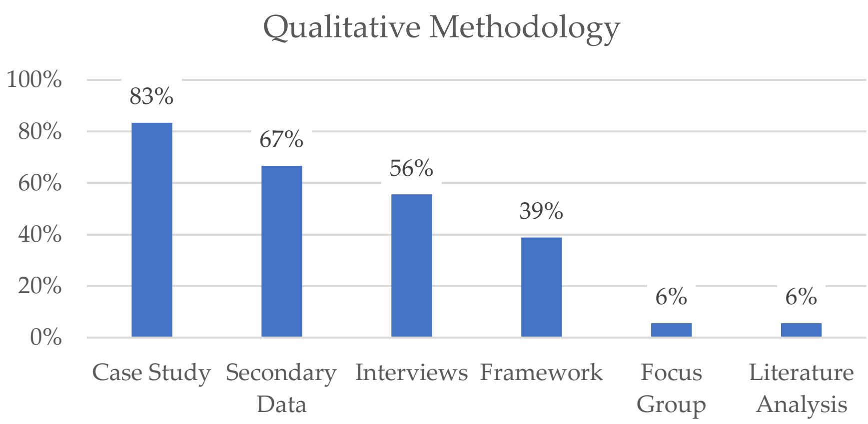


Chart 3.4: Qualitative methodologies adopted (base: 18 reports)

3.1.2. Market dimensions: nationality, sector, retailer size

According to the same methodology used in the scientific literature, the size, sector, and nationality of the retailers examined in the reports were taken into consideration when evaluating the market dimensions. Anyway, similar results to the scientific literature's distribution were observed.

Regarding the nationality, the reports were mostly focused on a generic point of view, as it can be noted from Chart 3.5. The only exception were the reports from Osservatori Digital Innovation of Politecnico di Milano, which focused on Italy, "*Omnichannel analytics for today's Australian Retailers*" [69], which conducted a study about the value of data and data analytics tools in Australia, and lastly, "*Stores as a strategic asset in omnichannel retail*" [70], which discussed the possibility of German retailers to achieve same-day deliveries thanks to their network of physical stores.

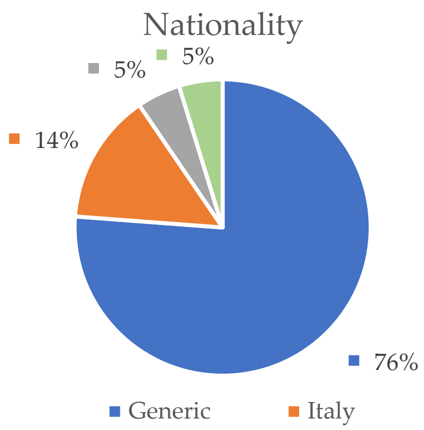


Chart 3.5: Nationality distribution of non-scientific reports (base: 21 reports)

With regard to the industries addressed in the reports, it was found that all the papers analysed did not refer to a single specific industry, but they typically investigate the Retail world in general and often comparing different sectors.

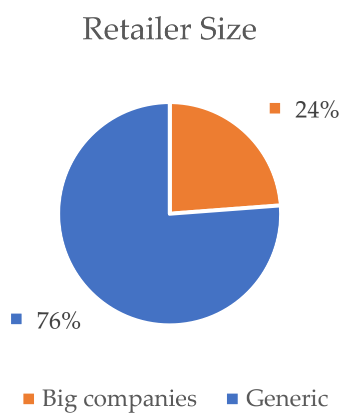


Chart 3.6: Retailer size distribution of non-scientific reports (base: 21 reports)

Finally, it was discovered that the distribution for the retailer sizes examined in the reports was similar to the one seen in the scientific literature. As shown in Chart 3.6, the vast majority of articles did not focus on a specific company size, while the remaining portion concentrated on large corporations. Still, there were no specific reports on small retailers.

3.1.3. Omnichannel: models and sales channels

The results of the non-scientific literature analysis turned out to be congruous with its previously mentioned scientific counterpart. As it can be noticed from Chart 3.7, the distribution is largely consistent with the one obtained from the analysis of the scientific literature, supporting the assumptions previously made.

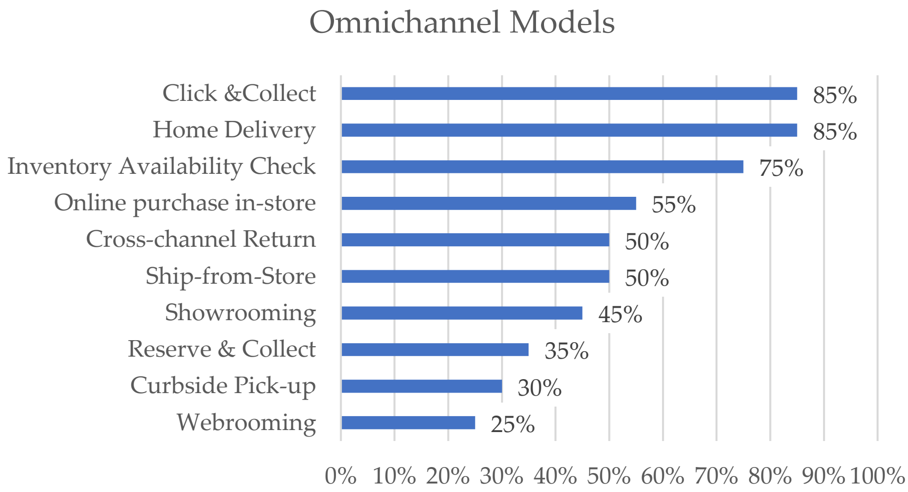


Chart 3.7: Distribution of non-scientific reports addressing omnichannel model's topic (base: 20 reports)

As was already mentioned in the prior analysis and as it can be seen from Chart 3.8, the mobile sales channel is gaining significant importance and it is evolving into a standard in Retail strategies.

The usage of smartphones is expanding steadily, as noted in the report *Retail - Learning Solutions in the Digital Age* [71]. Over the past few years, digital disruption has inspired a creative reworking of consumer habits collapsing some routines and birthing entirely new consumer behaviour. In order to avoid having to wait until their next shopping trip, consumers are switching to immediate satisfaction when it comes to their purchases. In a survey made in Asia, half of the respondents expressed their usage of smartphones to complete the payment at a bricks-and-mortar store, either through customised orders in advance, in-store apps, or a mobile payment platform at checkout.

Finally, the mobile app is essential to the implementation of a seamless customer experience [72]. The execution of this strategy, however, goes beyond simply having an app. Retailers must offer customers value that motivates them to download an app and, just as importantly, provide contact information.

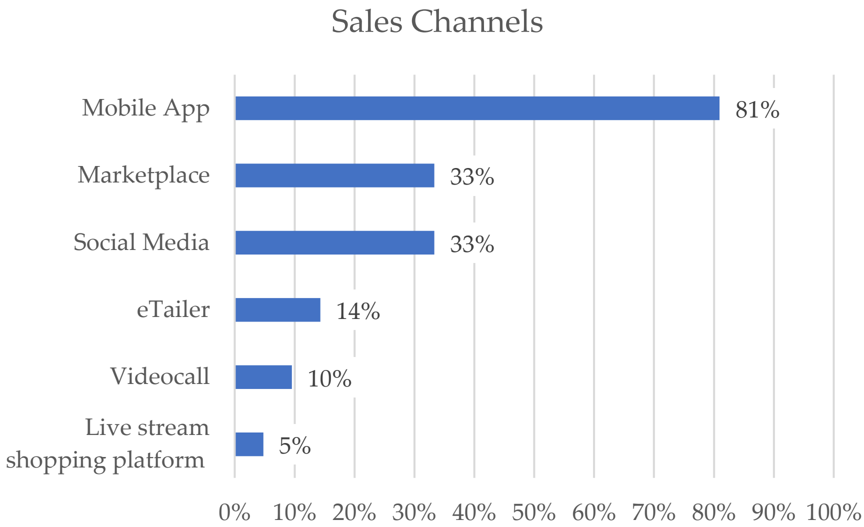


Chart 3.8: Distribution of non-scientific reports addressing sales channel's topic (base: 21 reports)

3.1.4. Customer purchasing stages

The findings regarding the most frequent customers purchasing stages in the non-scientific literature are similar to the scientific one. As it can be seen from Chart 3.9, the return phase is the lone exception, as it was determined by this analysis to be less important. Otherwise, the most common stages stay the same.

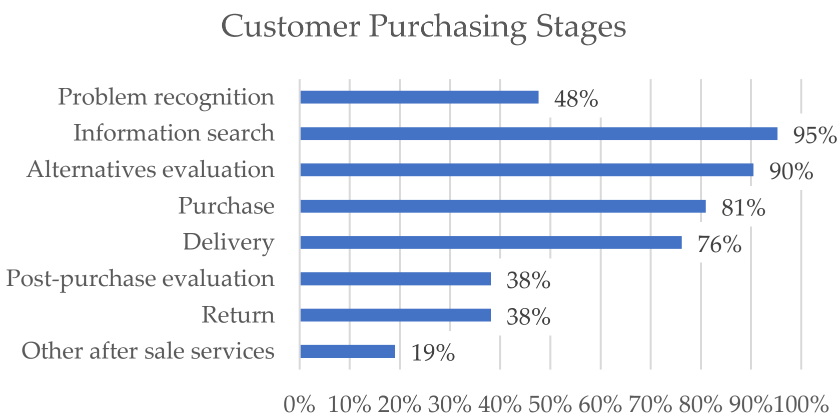


Chart 3.9: Distribution of non-scientific reports addressing customer purchasing stages' topic (base: 21 reports)

3.1.5. Logistics & operations

The studies in this section corroborated what was previously described by achieving results that were almost comparable to those of their scientific counterpart. As shown in Chart 3.10 and Chart 3.11, operations received significant attention, in particular integration issues which serve as an omnichannel strategy's backbone.

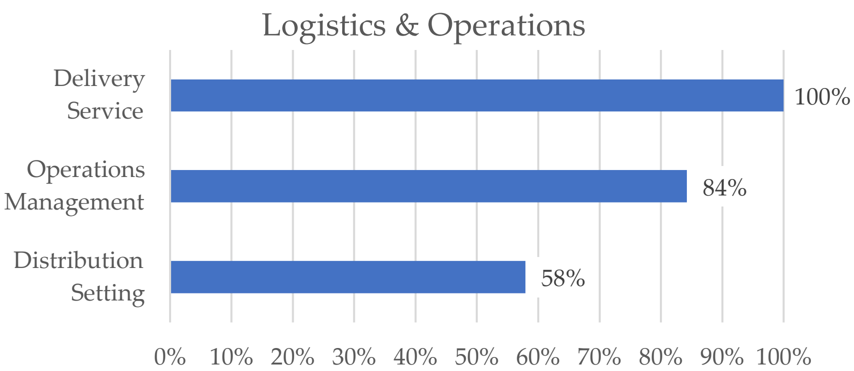


Chart 3.10: Distribution of non-scientific reports addressing logistics & operations' topic (base: 19 reports) (1)

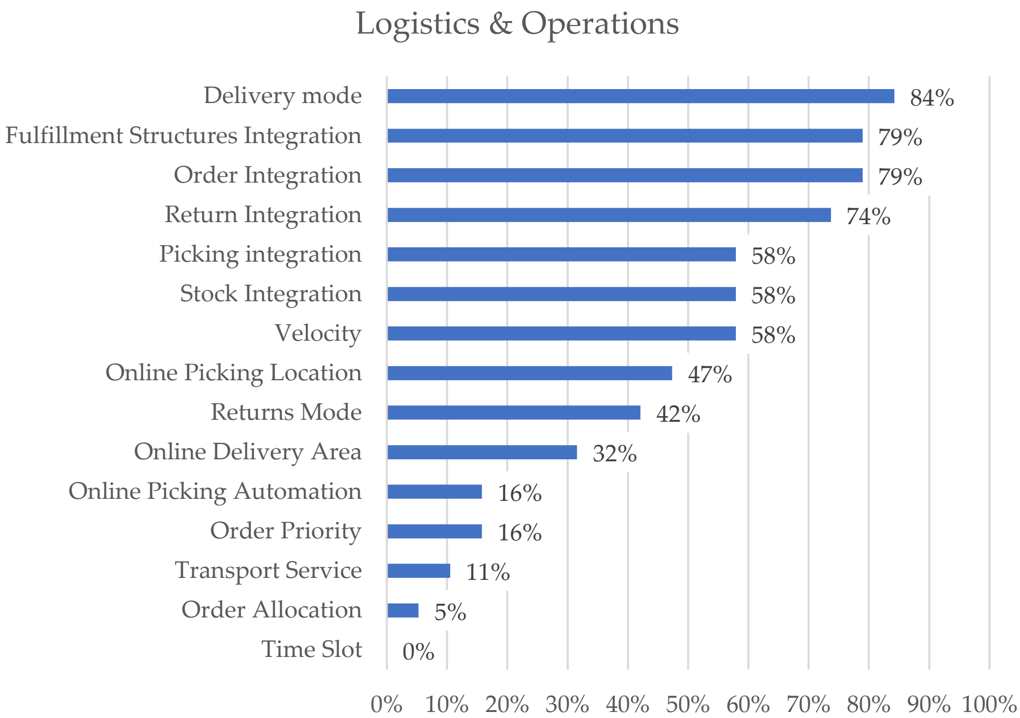


Chart 3.11: Distribution of non-scientific reports addressing logistics & operations' topic (base: 19 reports) (2)

For instance, this is explained in the report "*Omnichannel: The path to value*" [73] where 3 different omnichannel Retail strategies ("commerce", "personalization", "ecosystem") were discussed in detail and it was highlighted how important is integration, such as stocks, activities, data, to win and properly grow.

Finally, great attention was given to local approaches [74], [75]. As described, retailers must completely rethink the customer proposition they offer and the operating and economic models they use pushing towards a local Retail omnichannel system. A value proposition that is universally applicable is no longer a workable strategy.

Retailers must compete for customers at the local level with a strategy that prioritizes customer density rather than seeking to expand by putting the same model into place everywhere. This entails developing a successful network, localizing through in-depth consumer insight, and developing a customer journey across several touchpoints. Numerous aspects of logistics and operations are explored among the main fundamentals and shifts; in particular, it is emphasized how crucial it is to reconfigure the supply chain and Retail store network (new structure for nodes, locations, sizes...), micro target inventory placement, and reinvent last mile fulfilment (for example new sustainable and agile solutions).

3.1.6. Data strategy & digital innovations

Non-scientific research mostly addressed digital developments, data strategy, and their effects on the Retail industry.

[76] showed that retailers' ability to innovate using IT hinges on their investments in e-commerce infrastructure and on continued development of their omnichannel capabilities and, overall, there is still not enough IT-enabled innovation, limited in part by their lack of speed in adopting new tools and approaches.

[69] addressed the importance of data and data analytics tools in the omnichannel Retail world, focusing on the relevance of reliable data analytics, automatic reporting solutions, data visualisation platforms and real-time reporting.

[77] deeply discussed RFId in the Retail environments, highlighting how this technology is fundamental and it is a "must have" to sustain omnichannel models, such as Click & Collect, and other implementations, for instance self-checkout systems. Moreover, it is described its positive impact on ROI.

Lastly, [23] discussed the current state of Retail digital innovations and their adoption over the world and in particular Italy, focusing in particular on the current trends of enhancing the online channel and using digital to drive innovation and efficiency in physical stores.

Moving on to the Excel framework, there were no significant changes in the type of data collected, back-end digital innovations, and customer data visibility. On the other hand, some differences were found in front-end digital innovations. As observed in Chart 3.12, some innovations, such as AR/VR tools and self-checkout systems, were explored with greater regard towards their scientific counterparts.

In summary, front-end digital innovations seem to be by far the most pertinent topic, as shown in Chart 3.13, demonstrating how non-scientific literature cares about these aspects. Results for the other dimensions are consistent with their scientific equivalents.

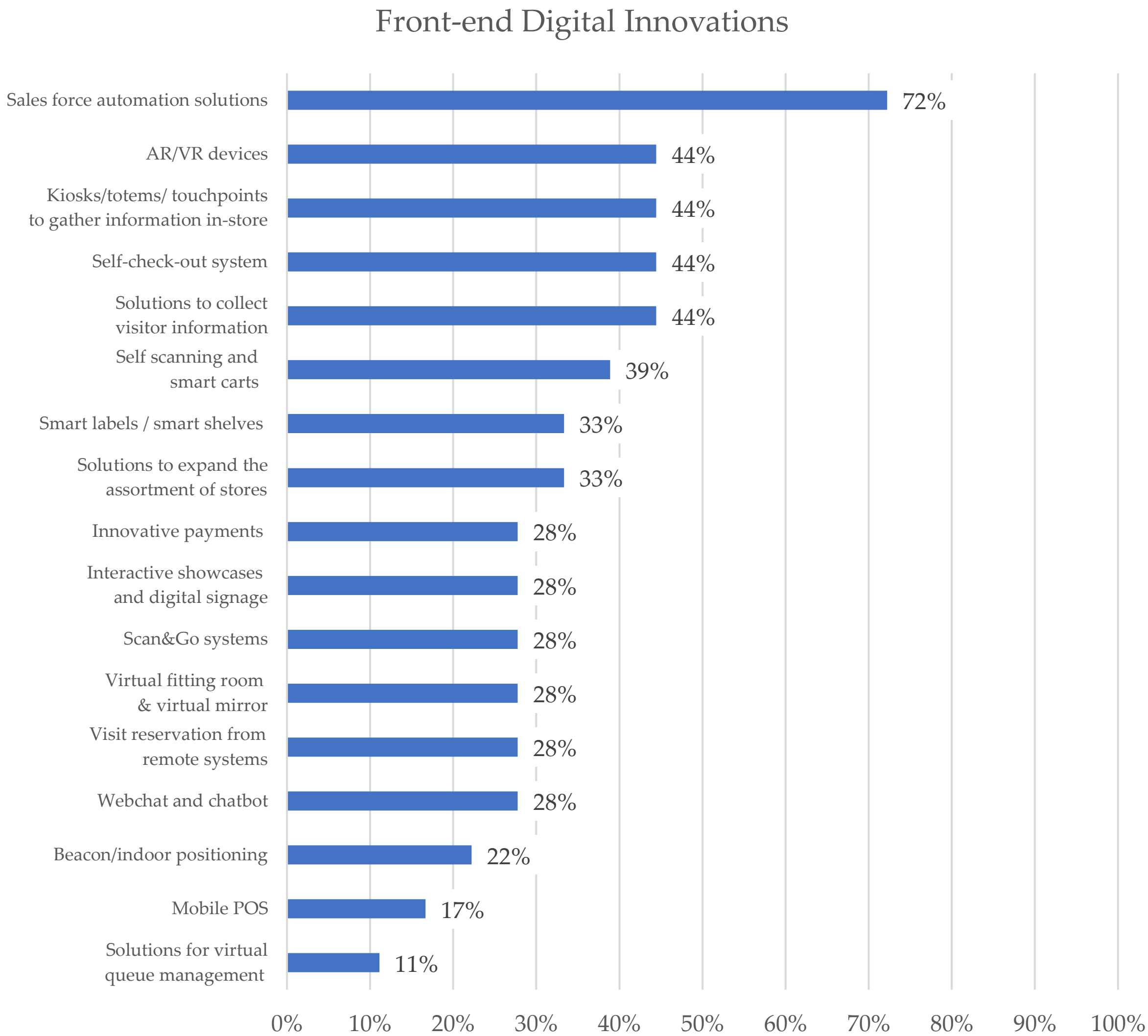


Chart 3.12: Distribution of non-scientific reports addressing front-end digital innovations' topic (base: 18 reports)

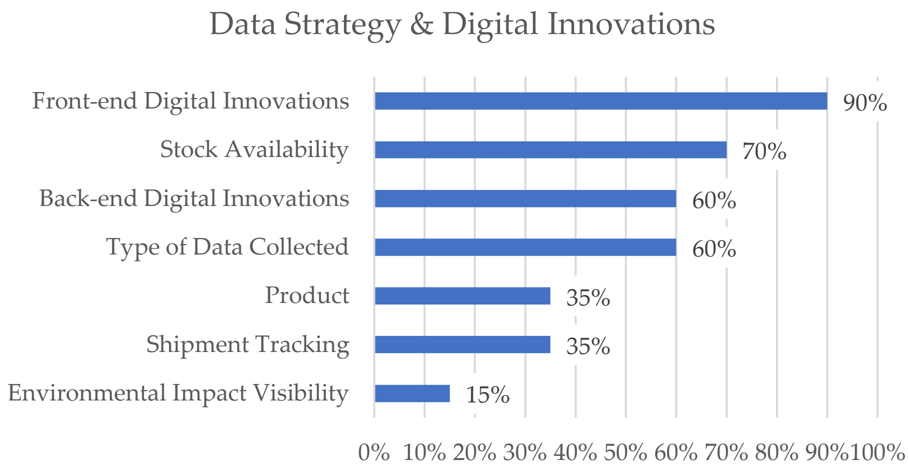


Chart 3.13: Distribution of non-scientific reports addressing front-end digital innovations' topic (base: 20 reports)

3.1.7. Store: spaces and employees

Physical store was a topic largely discussed in the non-scientific literature. [2] has developed an innovative new concept for the "Store of Tomorrow", applicable to all sectors of Retail. It is designed to be open, flexible, and adaptable in every respect, the concept combines the speed and simplicity of digital shopping with the automated efficiency of modern warehousing—while putting a greater emphasis on the human-centred physical shopping experiences customers still crave. In practice, the authors divided the Retail store into three complementary and necessary parts: "The Aisle", where shoppers use their smartphones to buy their favourite products; the "Dark Store", a micro-fulfilment centre that uses extensive automation to fulfil orders from both online and Aisle customers; and the "Promenade", which is a flexible playground area for product discovery and buying the products for which sight, touch, smell, and physical presence are all essential.

[78] explored the importance of introducing new digital technologies inside the physical store in order to improve the in-store Retail journey and what was primarily a purchasing transaction into an enjoyable experience, boosting foot traffic and the brand while also enhancing Retail productivity.

[70] assessed the role of the store and how it must be readapted. The authors presented 3 different archetypes of omnichannel store: traditional store with online picking and pick-up services; store with a dedicated area for order picking; and dark stores. Moreover, key dimensions have been found to guide the choice of the best type: consumer, infrastructure, and store operations.

[79] addressed how retailers can compete with market leader which increased customer expectations offering a free same-day delivery. Without invest hundreds of millions to catch up with their online competitor, retailers can rely on their physical stores, which, thanks to their dense store networks, can provide proximity and accessibility, achieving faster deliveries and convenient returns. To fully benefit from their networks, the authors found four areas of improvement for omnichannel players: (I) consumer preferences, shopping experience and delivery speed; (II) infrastructure and systems; (III) store operations; and (IV) economic mindset.

[80] introduced the concept of "Cognitive Store", the store of the future. It is an AI-driven digitally transformed physical location that delivers differentiated personalized experiences through interaction with superpowered associates, is orchestrated by intelligent workflows that are proactively supported by a smart operations centre and is powered by a Store Operating Platform. This model embraces AI at its core to enable key capabilities across these 5 areas: Personalized experiences, Superpowered associates, Intelligent workflows, Smart operations centre, and a Store Operating Platform.

Moving to the framework, the examination of physical spaces revealed some minor variations (Chart 3.14). The showroom resulted to be considerably less important and discussed respect what found in the scientific literature review. Additionally, the situation is quite the opposite with regard to employees (Chart 3.15), where the usage of in-store technological solutions to support omnichannel appeared to be the most important trend, pushing relationship activities with remote consumers to the side.

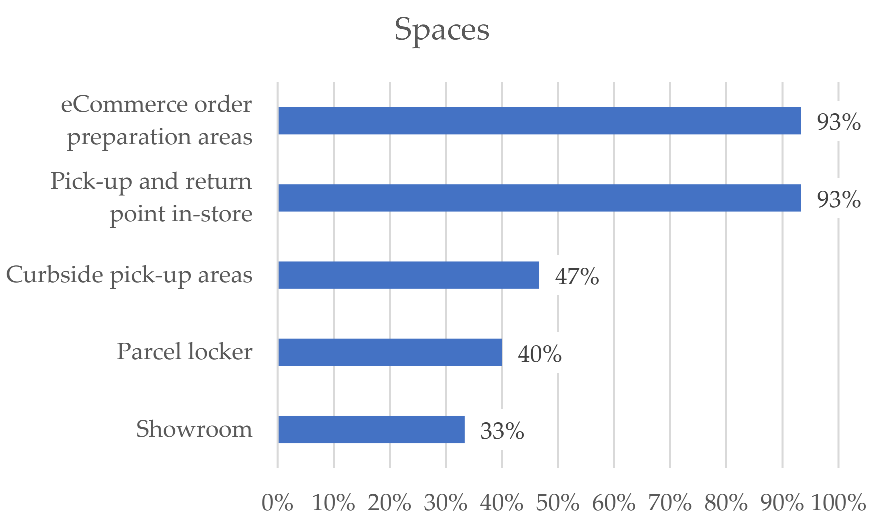


Chart 3.14: Distribution of non-scientific reports addressing spaces' topic (base: 15 reports)

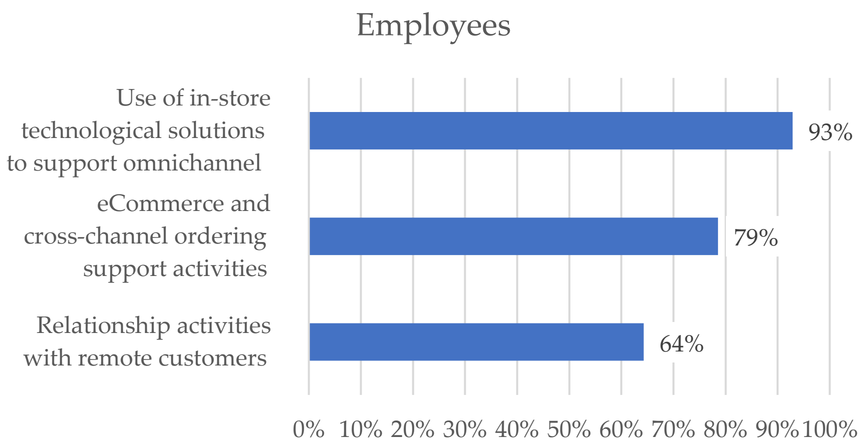


Chart 3.15: Distribution of non-scientific reports addressing employees' topic (base: 14 reports)

3.1.8. Marketing

Moving to the marketing strategies, the non-scientific literature deeply investigated these topics, in particular the role of customer and its characteristics.

New trends, behaviours and experiences were typically faced and discussed by [81]. In general, it was found that, globally, a new consumer is emerging – "one that is financially constrained, more advanced in their use of digital technologies, more thoughtful and selective in their decision-making, and keen to see Covid-19 as an opportunity to reset values in the world”. These changes are not temporary, yet they frequently affect the entire world. The authors identified several key themes, including the following: current trends, such as Covid-19, are fundamentally altering customer purchase priorities; customers are becoming more "digitally savvy" by requesting more digital services and tools and greater visibility on online orders; and the value of trust and respect for a company or brand is becoming increasingly important, particularly with regard to social and sustainable topics. The main worries are safety, rising customer expectations, and price pressure. Online shopping's convenience is a major factor in the rise of digital channels, and physical retailers will need to give customers new incentives to make offline purchases.

[82] assessed top retailers' customer service experience and capabilities across three key areas: (I) “Discovery”, defined as the availability of information and assistance at every step; (II) “Purchase”, ease of placing and receiving orders; and (III) “Customer Engagement and Service”, speed and effectiveness of customer service interactions. Subsequently, a rank among the considered retailers was developed using these criteria.

Finally, [83] presented the results of a global survey on how customers respond to the new waves of disruption, finding insights on purchasing obstacles, customer behaviour, use of new technologies and environmental issues.

When examining the framework's findings (Chart 3.16), analogous research results with regard to scientific study were obtained. Although less pronounced in this instance, differentiated pricing and product selection techniques still dominate. Then, integrated strategies are by much more pertinent than standalone strategies for the other concerns and this supports what was discovered in the scientific analysis.

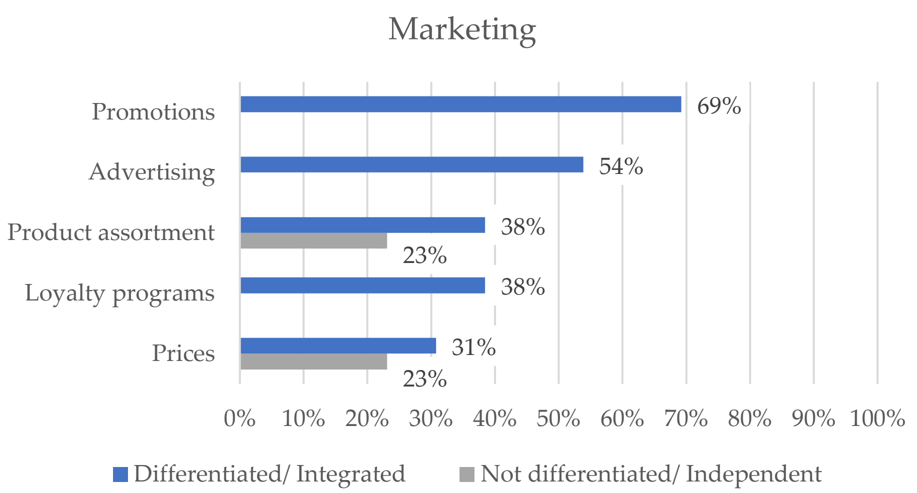


Chart 3.16: Distribution of non-scientific reports addressing marketing’s topic (base: 13 reports)

4 Gap identification

An exhaustive examination of the state of the art of the Retail environment in terms of the main omnichannel determinants and characteristics was made possible thanks to the scientific and non-scientific literature review.

It was observed that to implement a successful omnichannel strategy is necessary to consider multiple factors and how they must be coordinated with one another.

Starting with the front-end aspects, it is essential to introduce new omnichannel models, such as Click & Collect or cross-channel return, and successfully integrate the available sales channels in order to provide a seamless customer experience, exploit synergies and reduce operational costs.

Moving on, the physical store is becoming a relevant asset for the development of an omnichannel strategy, for this reason is crucial for retailers to redefine its role. With the support of the most recent technological advancements, the store is now able to serve a dual purpose: on the one hand, it can improve customer satisfaction by increasing the level of information available and providing a customized experience; on the other hand, it can function as a strategic logistic node, keeping inventories and fulfilling orders, enabling an improvement of the logistical performances, such as last-mile delivery speed. These newest store features obviously require the assistance of the staff, who must have the proper training and tools to implement these omnichannel techniques.

Then, operations, such as stock management and order preparation, must also be redesigned and integrated to improve both efficiency and effectiveness by exploiting synergies between channels.

Next, the integrated use of client data gathered through various channels and the improvement of information provided to the customers, for instance real-time stock visibility in-store or additional product information, are further critical components for a successful omnichannel strategy.

Finally, to enable these improvements, it is therefore required to introduce the appropriate back-end technology solutions, such as CRM, ERP or business analytics systems.

Therefore, it was investigated the presence in the literature of a comprehensive framework, containing all the above relevant strategic dimensions, allowing a detailed classification of retailers enabling them to comprehend their omnichannel maturity level and potential improvement areas. To perform such analysis, the Excel framework was used to classify existing models and the relative topics considered.

As shown in Table 4.1, only the 6 scientific and 2 non-scientific presented a framework aiming to classify omnichannel Retail strategies (11% of total papers addressed). Moreover, it could be seen that most of them focused on very few topics. In particular, only 1 article considered at least 3 topics simultaneously (1.4% of total papers addressed) and no one considered a higher number of topics out of the 5 identified as most relevant and discussed above.

Table 4.1: Classification of papers addressing an omnichannel classification framework across five topics

Omnichannel classification frameworks		**Omnichannel models**	**Mobile app & other sales channels**	**Store & Front-end technologies**	**Logistics & Operations**	**Data strategy & Back-end technologies**
Scientific literature	Hübner, Kuhn, et al., 2016	X			X	
	Kembro & Norrman (2019)				X	X
	Marchet et al. (2018)	X			X	
	Margetis et al., 2019		X	X		
	Neslin, 2022	X	X			
	Saghiri et al., 2017		X			
Non-scientific literature	Forrester & IBM, 2020	X	X	X		
	Incisiv, 2022			X		

To better explain this lack, some remarkable existing frameworks are going to be discussed and analysed in order to highlight their limitations.

Concerning the scientific literature, [43] developed a planning framework for last mile order fulfilment in omnichannel grocery retailing and discussed the advantages and disadvantages of different design concepts. Then, [45] further extended the aforementioned framework including additional significant logistics variables and considering a widespread range of sector, including food manufacturers and non-food retailers, in addition to grocery retailers already covered in the previous model (Figure 4.1:). These models' fundamental weakness was that they analyse omnichannel strategies mainly from only one perspective, in this case last mile fulfilment, which precluded them from seeing the big picture and leaving out important dimensions.

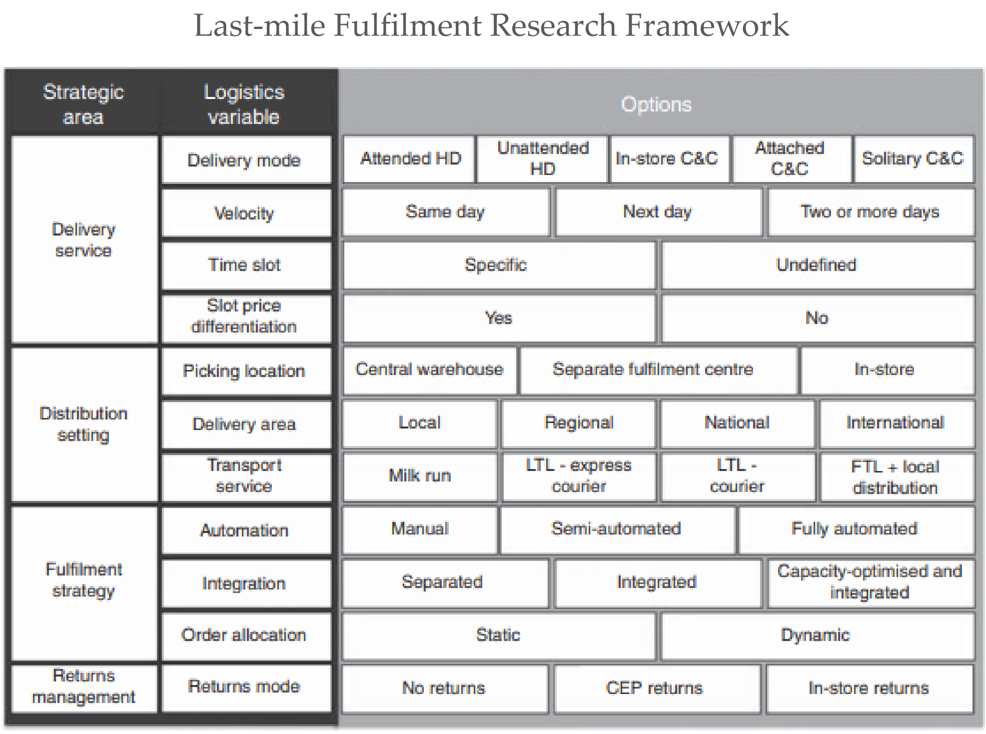


Figure 4.1: Last-mile fulfilment research framework (Marchet et al., 2018)

With regard to the non-scientific literature, the conceptual framework of [72] emerged. In "*The Omnichannel Maturity Assessment*" the authors tried to create a correct methodology to help firms self-evaluate themselves and to understand their current strategic position. Firstly, the authors divided the omnichannel maturity level across three dimensions, namely the digital customer experience, focusing on the action to enhance it across all the interactions; the digital operation experience, considering all the different activities related; and the omnichannel customer engagement, concerning a more generic point of view to offer a seamless customer experience. Then, to properly measure these dimensions, the authors defined a self-assessment framework divided into six categories, mostly related to the adoption of various omnichannel models, such Click & Collect and cross-channel returns, and the introduction of new digital technologies in-store. However, a more holistic point of view was still lacking because, by concentrating only on some dimensions, it neglected other elements of a successful implementation of an omnichannel strategy. By doing so, the framework fell short of capturing the full complexity.

As a result, it became clear how the gap of the current study matched the need to provide an objective and comprehensive framework of all omnichannel related aspects, starting from the models, proceeding with front-end solutions and data strategy, and concluding with back-end technologies and operations. Therefore, only through a comprehensive framework construction, it would be possible to classify and compare all the relevant aspects of retailers' strategies.

Indeed, such framework would be able to offer researchers a crucial tool to conduct a deeper analysis about the sector differences in omnichannel terms and to highlight the distinctive approaches taken by companies, laying the foundations for further research concerning omnichannel Retail. Additionally, its empirical application would allow to map the current state of omnichannel by taking into account both the front- and back-end aspects.

Furthermore, this model would benefit retailers by providing a comprehensive guide in the implementation and evaluation of an omnichannel strategy.

First, through such framework, retailers would be able to comprehend their current omnichannel maturity level. Then, they would be able to compare their current position with the market, either looking at their specific industry or from another sector, in order to have a wider view of their current omnichannel implementation levels. In particular, by comparing themselves with the market level, retailers would identify their own competitive advantages to leverage and, on the other hand, their own weaknesses to improve.

Finally, such framework would be used by retailers to support new implementations by defining which dimensions are most relevant, and therefore with a higher priority in implementing/improving them, specific to their sector. In such way, the executives may use this tool to support the drafting of a roadmap to improve their omnichannel level in the future.

5 Omnichannel Maturity Framework

5.1. Introduction

In order to cover the identified literature limitations and vacancies, an Omnichannel Maturity Framework was developed.

In particular, the empirical part is covered in detail in this section, from the construction of the Omnichannel Maturity Framework to the analysis and the outcomes obtained as a result of its application. Figure 5.1 illustrates the entire procedure that was used, after which each step will be thoroughly explained.

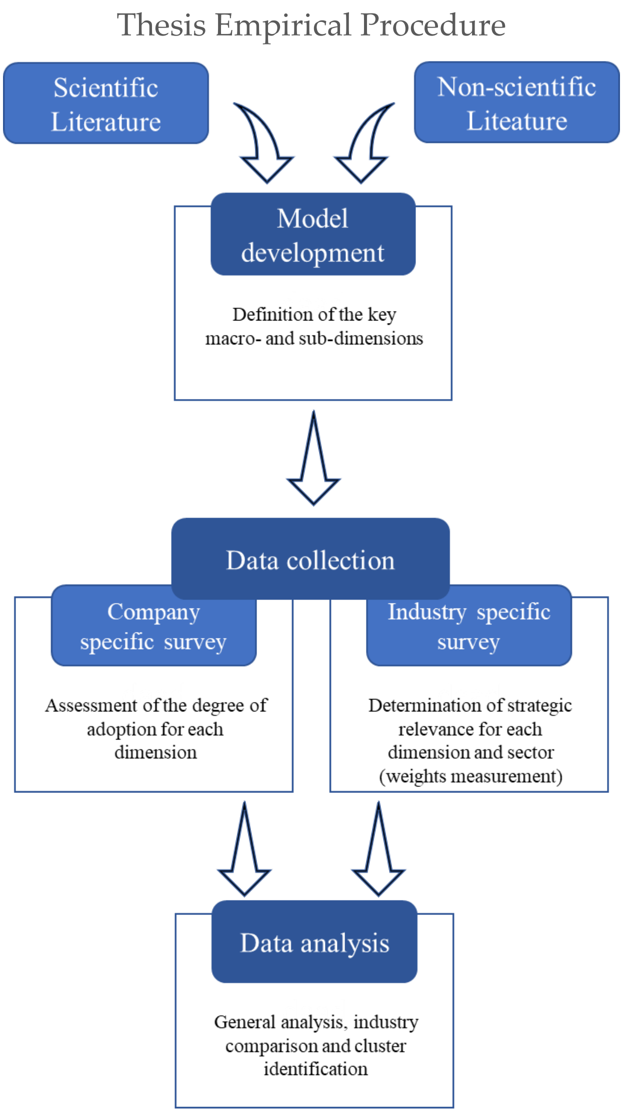


Figure 5.1: Thesis empirical procedure

Initially, evidence emerged from scientific and non-scientific literature was used to determine the macro- and sub-dimensions of the model, in a way that it was as comprehensive as possible. In this way, the aforementioned framework was built on 6 macro-dimensions:

- *Omnichannel models*
- *Store*
- *Mobile app*
- *Data integration*
- *Back-end digital technologies*
- *Operations*

Following the selection of all the variables, it was decided to classify each dimension according to the degree to which it had been adopted by each firm, taking into account 3 levels of implementation: no adoption, planned to be adopted in the future, and adopted. Additionally, a fourth intermediate level (partially adopted) was considered for the first two dimensions, omnichannel models and store, to define situations in which the solutions were only implemented in a few points of sales or regions (pilot projects). This technique made it possible to categorize firms' various adoption levels objectively.

The next stage was to figure out how to combine this data and assess each retailer's maturity level objectively. To evaluate the level of adoption of each specific macro dimension, it was chosen to employ an analytical technique applying a weighted average score system. To be more precise, a score ranging from 0 to 1 was given to each dimension based on the degree of adoption. The score for each macro dimension is then calculated as a weighted average taking into account the grades and weights associated with the relative importance of each sub-dimension.

To properly collect data and get the weights, two surveys were prepared and sent to Italian retailers' mid-top managers.

The first one was focused on collecting data about the current adoption of omnichannel strategies for each addressed retailer. For sake of simplicity, this survey will be referred as "*company specific survey*" (see Company specific survey for further details).

The second one was used to measure the weights by asking to the involved executives how relevant each dimension was to their sector. To address industry-specific market requirements and specificities, it was decided to have a variety of weights, one set for each sector, in order to obtain a maturity score that was as comparable as possible. In addition, this system will support retailers to identify the areas with the highest priority and help them in their growth process. For simplicity, this second questionnaire will be referred as *"industry specific survey"* (see Industry specific survey for further details).

Then, data obtained were used to quantitatively define the status of retailers in the Italian market and the main differences between the various sectors by comparing the macro-dimensions scores and weights. Going into detail, for each macro-dimension, results are going to be discussed and in particular the following analysis will be covered:

- Analysis of the *strategic relevance of each sub-dimension*, done through the study and comparison of the aforementioned weights, in order to provide insight into how the approaches in the diverse sectors differ from one another;
- Analysis of the *degree of maturity of each sub-dimension*, measured through the score system, to determine the current implementation status of each sub-dimension and to compare the various results across the diverse sectors;
- Analysis of the *degree of maturity of the macro-dimension,* measured as the weighted average score considering both the weights and single scores of each sub-dimension, in order to compare the current omnichannel maturity level of each industry and identify sectoral differences.

Finally, data were furtherly investigated through *cluster analysis* in a specific section to identify relevant omnichannel strategies and patterns in the Italian Retail scenario. To perform this analysis, hierarchical clustering with Ward distance was used to identify relevant clusters in each single macro-dimension. In particular, the obtained clusters were analysed in detail by investigating their composition in terms of sector and maturity levels shown.

5.2. Data gathering

Before analysing the framework, it is necessary to explain in detail the data gathering process, in particular highlighting how managers were selected and contacted, and which was the rate of response to questionnaires.

Firstly, it was decided to address the Italian market in order to facilitate the data collection phase, as it was easier and more effective to deal with company executives and obtaining data from them. Moreover, having participated in various workshops with the Politecnico di Milano, this market was covered in detail by understanding its specific aspects, current trends and critical issues.

To collect the population for the survey, a set of Retail businesses from different market segments were first chosen. To support this research, the AIDA database [84] was used to support the identification of the diverse retailers active in Italy. Moreover, only businesses with both online and offline presence were selected. It is important to highlight that companies involved were generally large for the reason just mentioned.

As discussed in the introduction, two questionnaires were prepared through Microsoft Forms and their structure will be explained much in detail in the following chapters.

Then, one or two candidates for each organization were selected using LinkedIn, usually one per survey. These were identified by filtering by level of seniority, prioritizing top management where possible, and role, by contacting people involved in omnichannel activities or working in the Retail, eCommerce, marketing, or digital functions.

The total population that received the questionnaire comprehends 100 retailers and around 200 executives. Considering the firms involved, the response rate of the first survey was 38% and the one of the second survey was 23%. Additional details about the population involved according to the different sectors can be seen in Table 5.1.

Table 5.1: Surveys' population

Sector	Retailers contacted	Responses company specific survey	Responses industry specific survey
Clothing and footwear, including sports equipment/outdoor & personal accessories and eyewear	44	14	8
Grocery	18	8	4
Do-it-yourself and home improvement & housewares and home furnishings	17	11	6
Beauty and personal care, including consumer healthcare	8	1	2
Consumer electronics and appliances	6	3	1
Traditional toys and games	3	0	0
Publishing	3	1	1
Pharmaceutics	1	0	1

Finally, data gathered was elaborated and it was checked the presence of missing values. In these cases, secondary data were used to fill blank spaces where possible in the company specific survey, for instance models visible online (e.g., Click & Collect) or mobile application functionalities. In case this was not sufficient, these firms were considered partially in the analysis, taking into consideration only their macro-areas which were completely filled.

To better explain how missing data were managed, an example is going to be discussed. For instance, a respondent belonging to the consumer electronics and appliances sector did not fill 9 out of 22 dimensions in the store macro-dimension. In such case, it was decided to not consider this company in the analysis of the related macro-dimension.

It is important to note that one responder left at least one dimension in each macro-dimension unfilled, making it impossible to use the information they provided. The entire response was not used in this instance.

5.3. Framework application

The Omnichannel Maturity Framework was built following the structure of the Excel framework used for the literature analysis, choosing the most relevant dimensions identified. This permitted to obtain a comprehensive methodology to describe the retailers' omnichannel strategy with a smaller number of variables.

Going into detail, the framework is structured according to six main macro-areas (Figure 5.2), each of them is then divided into their mid- and sub-dimensions, which will be further described in the next paragraphs.

Namely, it is divided in:

- *Omnichannel Models*, addressing the level of implementation of the different omnichannel models;

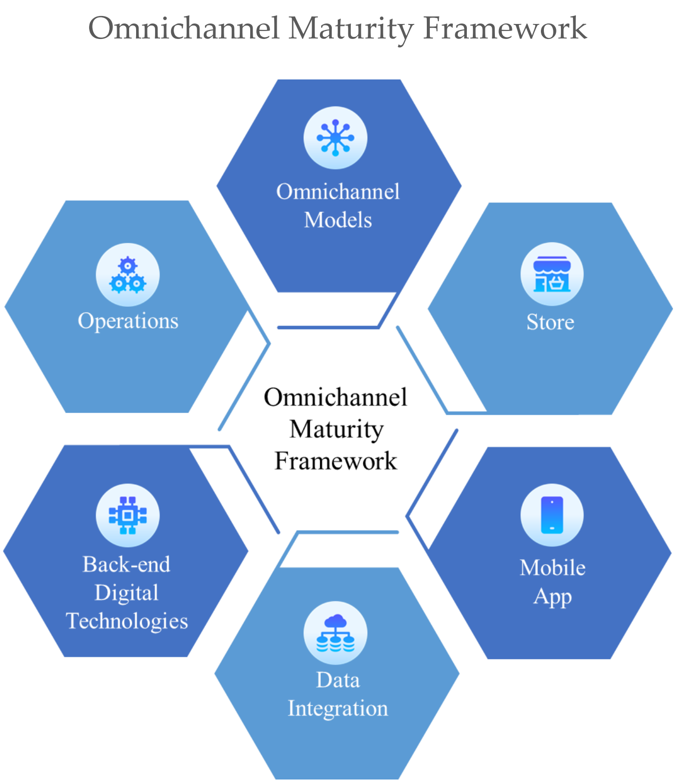


Figure 5.2: Omnichannel Maturity Framework

- *Store*, referring to the strategies adopted in store to enable an omnichannel strategy, such as spaces, role of the employees and new digital technologies;
- *Mobile App*, addressing the different functionalities of the retailer's mobile app along the costumer journey, considering all the diverse stages starting with the pre-purchase, going through the online purchase and the use in store, till the post-purchase and loyalty programs;
- *Data Integration*, considering the level of integration of data collected among the different channels in various applications;
- *Back-end Digital Technologies*, referring to the technologies adopted to enable the integration among the different activities in the channels, and so allowing the proper functioning of some of the solutions indicated in the framework;
- *Operations*, analysing the level of integration of the different back-end activities and processes.

Through this framework, it was possible to assign to any retailer a score, from 0 to 1, to each of its macro-dimensions. In relation to what was identified in the Gap analysis, this framework aim is to evaluate the retailer omnichannel maturity level according to 6 diverse dimensions.

In the next sections, each macro-dimension of the framework will be explained and examined in detail, in particular the current state of Retail in Italy will be analysed in depth thorough the assessment of the maturity level for each sector and their main differences.

5.3.1. Omnichannel models

The retailers' level of implementation of the different omnichannel models across the various sectors is investigated in detail in this first dimension. The solutions under consideration are drawn from the analysis of the literature, with exception for Showrooming and Webrooming which have not been taken into consideration since they more closely resemble customer behaviour than a model that a business may implement. The models taken into account are listed below:

- *Click & Collect (or Buy Online Pick-up in Store),* allowing people purchase or select items online and pick them up in-store or at a centralized collection point;
- *Reserve & Collect,* through which a customer can check the availability of an item in-store and reserve it before visiting, without the need to pay in advance;
- *Curbside pick-up (or Click & Drive),* allowing customers to place an order online and drive to their local store to pick it up. In such cases, the customer parks in a designated area near the store entrance, and when the order is ready, a store associate brings the customer's order out to them;

- *Inventory availability check,* possibility to check the availability of an item in-store;
- *Online purchase in store,* possibility for a customer to place an order online directly from the store;
- *Ship from store,* which is a fulfilment strategy where orders are filled from the store instead of the warehouse;
- *Cross channel return,* which indicates the possibility of returning products by a different channel than the one used at the time of purchase, like Buy Online Return in Store model and its opposite.

To proper measure and compare the diverse levels of omnichannel maturity, a score system was developed. The following parts will provide a detailed explanation of the entire procedure in order to fully describe how the data was classified and how the analysis was conducted.

Weights and score measurement

To objectively compare companies belonging to diverse sectors, a score system was introduced to assign a grade to each variable and then measure the overall score of the macro-dimension, in this case omnichannel models. This process will now be thoroughly discussed and used consistently for all the next sections.

First, a score was assigned to each dimension according to the relative response filled in the company specific survey. To each of those, a value from 0 to 1 was selected in such a way that scores were equally distant among the diverse degrees of adoption. For instance, concerning omnichannel models, responses were classified through 4 degrees of maturity, so scores were set to: 0, 0.33, 0.66, and 1. As will be shown, some other macro-dimensions were classified through just 3 degrees so the scores were set to: 0, 0.5, and 1.

In Table 5.2 it is presented a practical example which will be used below to better explain the score system and measurement.

Then, to proper measure the score of the macro-dimension, a weighted average score system was used by taking in input scores from company specific survey and weights from industry specific survey. In particular, an explanation of how the latter are calculated is going to be presented below.

As shown in Table 5.3, in the industry specific survey it was asked to retailers to assign a value from 1 to 5 to each dimension according to their strategic relevance (1: not very relevant; 5: extremely relevant) for its specific industry, and not for the retailer itself.

Table 5.2: Practical example of the company specific survey in the omnichannel models macro-dimension

Score	0	0.33	0.66	1
Omnichannel models: degrees of maturity	**Not adopted**	**Planned to be adopted in the short time (in 3 years)**	**Partially adopted (e.g., pilot project)**	**Adopted**
Click & Collect (or Buy Online Pick-up in Store)				X
Reserve & Collect (book online, pay and pick-up in store)		X		
Curbside pick-up (or Click & Drive)	X			
Inventory availability check		X		
Online purchase in store				X
Ship from store				X
Cross channel return				X

Table 5.3: Practical example of the industry specific survey in the omnichannel models macro-dimension

Omnichannel models: strategic relevance scores	**1**	**2**	**3**	**4**	**5**
Click & Collect (or Buy Online Pick-up in Store)				X	
Reserve & Collect (book online, pay and pick-up in store)		X			
Curbside pick-up (or Click & Drive)			X		
Inventory availability check				X	
Online purchase in store		X			
Ship from store				X	
Cross channel return					X

First, the responses from the industry specific survey were sorted into several sectors in order to obtain the weights of each industry. Then, for each dimension, the specific weights for each respondent were derived by dividing the relative score for the total of all the variables, as indicated in Equation 5.1.

Looking to the example in Table 5.3, the weights for this response can be easily computed. The total sum is 24 and each weight is respectively: 16.67% (=4/24), 8.33%, 12.5%, 16.67%, 8.33%, 16.67% and 20.83%.

Finally, the weights for the different sectors were computed as the average of the single weights of all the participants belonging to their respective category (Equation 5.2).

As a result, a total of I x J different weights were obtained, where I represents the number of variables in the different sections and J the number of sectors. As will be shown, this method enabled a more objective view on retailers omnichannel maturity and, for the next analysis, a better comparison between the different sectors.

$$Weight_{i,j,k} = \frac{Point_{i,j,k}}{\sum_{i=1}^{I} Point_{i,j,k}}$$

Equation 5.1: Weights calculation for each respondent

$Dimension\ i \in [1, I],\ \ I\ number\ of\ variables$

$Sector\ j \in [1, J],\ \ J\ number\ of\ sectors$

$Company\ k \in [1, n],\ \ K\ number\ of\ companies$

$$Weight_{i,j} = \frac{\sum_{k=1}^{n} Weight_{i,j,k}}{n}$$

Equation 5.2: Weights calculation for each sector

$n\ number\ of\ companies\ in\ sector\ j$

In such way it was possible to measure all the diverse sector weights for each macro-dimension. As shown in Table 5.4, weights related to omnichannel models are displayed. Once the weights were measured, it was possible to calculate the score of the macro-dimension using a weighted average (Equation 5.3).

$$Final\ Score_k = \sum_{i=1}^{I} weight_{i,j} * score_{i,k}$$

Equation 5.3: Macro-dimension score calculation

Concerning the presented example, the company operates in the clothing and personal accessories sector and the final score of omnichannel models can be measured by applying Equation 5.3, considering the relative sector weights and scores from Table 5.2, resulting to be equal to 0.685.

Table 5.4: Sector weights in the omnichannel models macro-dimension

Omnichannel models: weights	**Italian Retail average**	**Clothing and personal accessories**	**Grocery**	**Furniture and home improvement**	**Beauty and personal care**	**Consumer electronics and appliances**	**Publishing**	**Pharmaceutics**
Click & Collect (or Buy Online Pick-up in Store)	15.2%	13.8%	16.5%	14.8%	17.0%	16.7%	20.0%	11.8%
Reserve & Collect (book online, pay and pick-up in store)	13.5%	12.3%	13.1%	12.8%	17.0%	13.3%	20.0%	14.7%
Curbside pick-up (or Click & Drive)	11.2%	11.9%	13.3%	11.1%	5.2%	6.7%	10.0%	14.7%
Inventory availability check	17.1%	16.9%	16.7%	19.0%	13.4%	16.7%	20.0%	14.7%
Online purchase in store	13.9%	15.3%	13.1%	11.8%	17.0%	16.7%	10.0%	14.7%
Ship from store	13.4%	13.6%	12.2%	13.9%	13.4%	16.7%	10.0%	14.7%
Cross channel return	15.7%	16.2%	15.1%	16.5%	17.0%	13.3%	10.0%	14.7%

Weights discussion

After thoroughly describing the various approaches employed, it is possible to move to the data analysis.

By looking at the diverse sector weights in Table 5.4, some insights can be carried out.

First, Italian average, measured as the mean of company scores, highlighted Click & Collect, inventory availability check, and cross channel return as the models with the highest strategic importance, especially the second which is often fundamental to support the proper implementation of other solutions. Curbside pick-up, on the other hand, received incredibly low scores, proving that, despite the strong trend begun by the pandemic, this model turned out to be not as effective and competitive as the others.

Moving to the different sectors some interesting insights can be carried out by comparing them. The clothing and personal accessories sector was driven by online purchase in store and cross channel return, as well as inventory availability check which resulted to be typically very relevant for everyone. Moreover, this sector showed a low score for Click & Collect highlighting how this model seemed to be not particularly relevant for this type of goods.

Concerning grocery retailing and pharmaceutics, an interesting insight is that they showed a slightly higher weight for Curbside pick-up respect to the other industries. This demonstrated how this model was much more suitable for these kinds of goods.

In addition, beauty and personal care and consumer electronics and appliances showed extremely low scores for Curbside pick-up.

Furthermore, publishing and home improvement and beauty and personal care displayed respectively the highest and the lowest values for inventory availability check.

Finally, firms in the publishing sector put high emphasis on Click & Collect and Reserve & Collect models.

Scores discussion

Before going into detail about the scores, and so the maturity levels in the Italian Retail industry, it is important to point out how the analysis was carried out. Due to the paucity of data gathered in some industries, the study was conducted considering four sectors:

- *clothing and personal accessories*, also including footwear, sports equipment/outdoor and eyewear;
- *grocery;*
- *furniture and home improvement*, considering also do-it-yourself and housewares;
- *Other*, composed by beauty and personal care, consumer electronics and appliances, publishing, and pharmaceutics sectors.

With regard to the latter, even if this is a heterogeneous group which could lend to inaccuracies, this choice was made in order to include in the analysis the sectors which could not be analysed alone due to their scarcity of data. Moreover, it is important to mention that such final scores were still measured with the specific weights coming from the source sector. For instance, the final scores of a publishing retailer were measured only through the weights specific for publishing, and not an average for the class Other. To gather information about sector differences, in Other it was applied just a simple average of the final scores of the belonging sectors.

Proceeding with the analysis, in Table 5.5 it can be observed the results of each sub-dimension referring to omnichannel models.

First of all, by looking to the average score it can be noticed how the Click & Collect model became a standard strategy to adopt, showing the highest level of adoption. On the opposite, the Curbside pick-up resulted to be the less implemented, coherently with its respective strategic weight.

Concerning Curbside pick-up, it can be seen that furniture and home improvement and grocery firms typically did not implement such service, while it was much mature in the remaining sectors, in particular in Other.

Then, the next most adopted models resulted to be the inventory availability check and the cross-channel return. Going into detail, the former was strongly implemented in the furniture and home improvement sector, while resulted to be poorly adopted by grocery retailers. On the other hand, cross channel return was highly mature in the clothing and personal accessories industry, while grocery and Other companies lacked such implementation. Moreover, with regard to Reserve & Collect and ship from store, the average level of maturity is quite low, but Other companies showed a very high degree of adoption.

Furthermore, grocery sector resulted to be last in the adoption of quite all the different omnichannel models, except for the Click & Collect and Reserve & Collect.

Table 5.5: Sectors scores in the omnichannel models macro-dimension

Omnichannel models: scores	**Italian Retail average**	**Clothing and personal accessories**	**Grocery**	**Furniture and home improvement**	**Other**
Click & Collect (or Buy Online Pick-up in Store)	0.77	0.79	0.66	0.82	0.83
Reserve & Collect (book online, pay and pick-up in store)	0.49	0.31	0.62	0.48	0.83
Curbside pick-up (or Click & Drive)	0.21	0.05	0.08	0.39	0.58
Inventory availability check	0.62	0.62	0.25	0.85	0.75
Online purchase in store	0.51	0.60	0.25	0.60	0.50
Ship from store	0.51	0.62	0.38	0.63	0.75
Cross channel return	0.62	0.81	0.38	0.64	0.42

Next, Chart 5.1 shows the final scores of this macro-dimension, obtained through the diverse weights. Through these scores it is possible to properly compare the overall maturity level among the diverse sectors.

As expected from the previous results, grocery resulted to be the less advanced sector in the implementation of an omnichannel strategy. In contrast, Other companies showed the highest omnichannel maturity in this dimension, followed by furniture and home improvement with still a medium-high value, and then clothing and personal accessories.

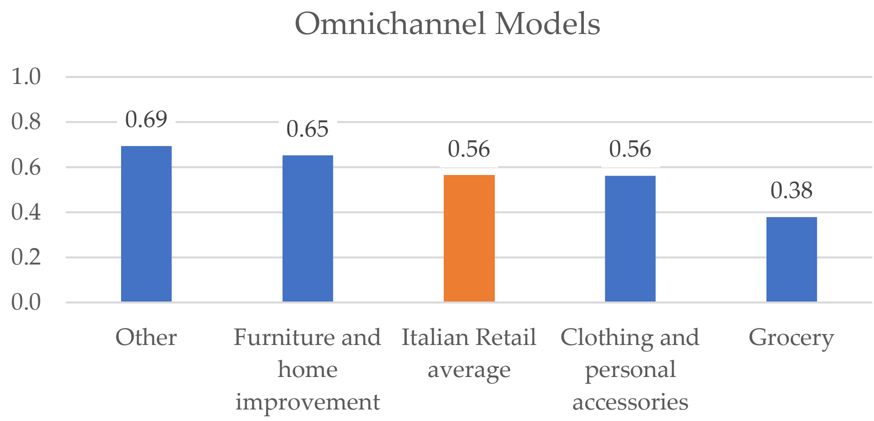


Chart 5.1: Cross-sector comparison of the final scores in the omnichannel models macro-dimension

5.3.2. Store

In the next section the thematic related to the point of sales is thoroughly analysed. Within this macro-dimension, 3 main categories were considered, referred as mid-dimensions.

- The first one is related to innovative *spaces* implemented in-store. As already shown in both the literature reviews, these solutions typically enable new omnichannel models, discussed in the first dimension.
- The next section regards *employees'* activities in the point of sales and how their roles are changing in the omnichannel landscape.
- Finally, the last section is related to *in-store digital technologies*. These solutions are adopted by retailers to provide a seamless experience to customers and reduce barriers with them.

Concerning the score measurement for this macro-dimension, it was assumed that each one of the three mid-dimensions had the same relevance, and so weight in the formula (1/3 per each). Lastly, Equation 5.4 illustrates the methodology used to calculate the finals score for store; in particular, each mid-score's calculation ($score_i$) will be thoroughly explained in the next paragraphs.

$$Store\ score = \sum_{i=1}^{3} \frac{1}{3} * score_i$$

Equation 5.4: Store score calculation

5.3.2.1. Spaces

In this section innovative physical changes of the point of sales are taken into account. These new store spaces are crucial to enable or enhance omnichannel models. As deeply discussed in the literature analysis, the role of the store is radically changing, and it is necessary to reinvent it in order to build the so called “store of the future”. Following the same approach, four different omnichannel enabling spaces were identified and studied.

- *eCommerce order preparation areas* refer to portions of the store layout repurposed for online order picking. Due to the proximity of shops to customers, these solutions are typically used in urban areas where shoppers expect deliveries in less than 24 hours.
- *Pick-up and return point in-store* are dedicated areas in store where clients can pick orders placed online or return the goods. For these reasons, these spaces are essential to the correct development of click & collect and cross-channel return models. The main advantage is related to the absence of a shipment which allows both the retailer and shopper to benefit from cost reduction. Furthermore, requiring customers to visit the store in person promotes client turnover and may boost sales.
- *Curbside pick-up areas* are dedicated spaces outside the store enabling customers to collect goods directly from their car without getting out of it. Recently, these solutions have gained much popularity due to the pandemic because they allow shoppers to collect goods maintaining the social safety distance.
- *Parcel locker* are automated postal boxes that allows users for a self-service collection of parcels as well as their return and dispatch. Lockers can be placed both inside and outside shops. The main advantages are related to the ease and speed of use of the service, which is often available 24 hours a day, and to the fact that customers are autonomous and they do not need to wait any line.

Weights discussion

Moving on with the analysis, in Table 5.6 there are shown the weights for each Retail sector.

Looking at the Italian Retail average weights, eCommerce order preparation areas and pick-up and return point in-store achieved a higher strategic importance than Curbside pick-up areas and parcel lockers.

Concerning clothing and personal accessories and publishing sectors, pick-up and return point in-store obtained extremely high scores and, on the other hand, the lowest one could be found in the beauty and personal care industry.

Regarding grocery retailing, this sector assigned a very high strategic importance to parcel lockers. On the contrary, publishing and pharmaceuticals assigned the lowest value to this variable, highlighting how in these industries such solutions are not so competitive.

Table 5.6: Sector weights in the store spaces dimension

Store spaces: weights	**Italian Retail average**	**Clothing and personal accessories**	**Grocery**	**Furniture and home improvement**	**Beauty and personal care**	**Consumer electronics and appliances**	**Publishing**	**Pharmaceutics**
eCommerce order preparation areas	27.2%	27.9%	24.9%	27.3%	29.2%	25.0%	33.3%	25.0%
Pick-up and return point in-store	28.8%	32.8%	27.6%	26.6%	23.6%	25.0%	33.3%	25.0%
Curbside pick-up areas	21.4%	19.7%	20.1%	22.2%	23.6%	25.0%	16.7%	33.3%
Parcel locker	22.6%	19.6%	27.3%	23.9%	23.6%	25.0%	16.7%	16.7%

Scores discussion

As it can be noticed in Table 5.7, store spaces data were collected through the company specific survey and classified with 4 different degrees of adoption. It is also shown a practical example that will be used later to better explain the calculation of the final score.

Then, average results in each sector for this section are displayed in Table 5.8.

By looking at the average scores obtained, it can be noticed a clear distinction between two groups of variables. Concerning the first one, eCommerce order preparation areas and pick-up and return point in-store typically showed medium-high level of adoption. On the other hand, Curbside pick-up areas and parcel locker appeared to be much less implemented by retailers.

In particular, grocery and the Other companies showed interesting peculiarities.

Table 5.7: Practical example of the company specific survey in the store spaces dimension

Score	0	0.33	0.66	1
Store spaces: degrees of maturity	**Not adopted**	**Planned to be adopted in the short time (in 3 years)**	**Partially adopted (e.g., pilot project)**	**Adopted**
eCommerce order preparation areas		X		
Pick-up and return point in-store			X	
Curbside pick-up areas		X		
Parcel locker	X			

The former reported an extremely high level of adoption in the pick-up and return point in-store highlighting how such services were fully implemented and mature. Moreover, grocery retailers possessed a higher maturity level concerning parcel locker than the other sectors. Last but not least, such firms declared the lowest degree of adoption regarding Curbside pick-up.

Then, the Other class instead expressed a slightly higher level of adoption regarding eCommerce order preparation areas and, more interesting, these companies showed a very high maturity level in Curbside pick-up areas respect other industries. Additionally, the pick-up and return point in store and parcel locker resulted to be poorly implemented.

Table 5.8: Sector scores in the store spaces dimension

Store spaces: scores	**Italian Retail average**	**Clothing and personal accessories**	**Grocery**	**Furniture and home improvement**	**Other**
eCommerce order preparation areas	0.54	0.55	0.58	0.45	0.67
Pick-up and return point in-store	0.54	0.43	0.92	0.54	0.00
Curbside pick-up areas	0.12	0.12	0.00	0.12	0.44
Parcel locker	0.24	0.14	0.54	0.21	0.00

Finally, in Chart 5.2 are displayed the final scores considering the sector related weights. It can be observed that in general companies appeared to be still poorly mature concerning store spaces.

Going into detail, grocery sector revealed to be much more mature respect other industries. Furniture and home improvement and clothing and personal accessories were in the second place with similar results, while Other showed the worst results.

Chart 5.2: Cross-sector comparison of the final scores in the store spaces dimension

5.3.2.2. Employees

As described extensively in both the literature reviews, the role of store staff is becoming crucial to support and enable the transition to omnichannel. In fact, it's crucial to underline that omnichannel salespeople in brick-and-mortar stores now have new responsibilities in addition to the more traditional physical sales activity. The intent of in-store staff is to close the gap between the online and offline worlds. This can be done by involving in a variety of activities.

The "employee experience" is a trend that has only recently emerged. It is becoming increasingly important to take into account not just the point of view of the client, but also the one of the employee, as staff members are now required to execute a broad range of tasks with a much higher degree of relevance. Companies are struggling to come up with innovative ways to help employees embrace this change in the best way possible, such as by helping them comprehend the value of their role.

To consider these aspects properly, the aforementioned dimension considers 3 variables concerning hybrid activities managed by store staff, directly taken from the literature framework.

- The first one concerns *Relationship and transactional activities with remote customers*. This dimension refers to all the activities related to the possibility to interact and manage orders with remote customers. For example, the interaction through chat (e.g., WhatsApp) or virtual calls.

- The second class is related to *eCommerce and cross-channel ordering support activities*. Those tasks are mainly related to their charge of preparing online orders (picking activities) and their charge of supporting customers to place online orders directly from the store.
- Finally, the last class concerns the *Use of in-store technological solutions to support omnichannel*, such devices for cross-channel orders (the most common is the use of a tablet) or clienteling apps.

Weights discussion

Moving to the weights, the ones specific for each industry are shown in Table 5.9.

Regarding Italian Retail average weights, the dimensions considered have comparable strategic relevance.

This was generally true for all the considered industries, except publishing and pharmaceutics where the former showed a much higher value for relationship and transactional activities with remote customers and, on the other hand, a much lower one for the other activities.

Table 5.9: Sector weights in the store employees dimension

Store employees: weights	**Italian Retail average**	**Clothing and personal accessories**	**Grocery**	**Furniture and home improvement**	**Beauty and personal care**	**Consumer electronics and appliances**	**Publishing**	**Pharmaceutics**
Relationship and transactional activities with remote customers	33.5%	33.0%	32.1%	32.5%	33.3%	33.3%	50.0%	35.7%
eCommerce and cross-channel ordering support activities	34.3%	35.8%	33.8%	35.6%	33.3%	33.3%	25.0%	28.6%
Use of in-store technological solutions to support omnichannel	32.2%	31.3%	34.0%	31.9%	33.3%	33.3%	25.0%	35.7%

Scores discussion

As shown in Table 5.10, the degree of adoption of these hybrid activities were collected in its specific section in the company specific survey, where executives could choose between 4 levels. As in the other sections, in the table it is also present a real example.

Table 5.10: Practical example of the company specific survey in the store employees dimension

Score	0	0.33	0.66	1
Store employees: degrees of maturity	**Not adopted**	**Planned to be adopted in the short time (in 3 years)**	**Partially adopted (e.g., pilot project)**	**Adopted**
Relationship and transactional activities with remote customers	X			
eCommerce and cross-channel ordering support activities	X			
Use of in-store technological solutions to support omnichannel		X		

By looking at Table 5.11, each average score per dimension and sector can be analysed in detail.

Concerning the Italian Retail average scores, the omnichannel features related to the employees in-store obtained middle-high evaluations and seemed to be quite well implemented but still not mature, like the use of in-store technological solutions to support omnichannel.

Going more in detail, this last one was poorly implemented by grocery and furniture and home improvement companies. On the other hand, firms belonging to Other showed a higher degree of adoption of such technologies.

Next, eCommerce and cross-channel ordering support activities resulted to have a good level of implementation, especially by Other.

Concerning relationship and transactional activities with remote customers, it could be seen that grocery retailers were generally less mature respect other sectors and, on the other hand, Other companies showed an extremely high score in such dimension.

Table 5.11: Sector scores in the store employees dimension

Store spaces: scores	**Italian Retail average**	**Clothing and personal accessories**	**Grocery**	**Furniture and home improvement**	**Other**
Relationship and transactional activities with remote customers	0.61	0.64	0.46	0.57	1.00
eCommerce and cross-channel ordering support activities	0.64	0.67	0.67	0.54	0.78
Use of in-store technological solutions to support omnichannel	0.53	0.57	0.46	0.48	0.66

Lastly, the final scores, measured considering the sector weights, are presented in Chart 5.3. In general, all the sectors managed to obtain medium-high results, highlighting good levels of implementation of these features.

In particular, as it could be expected, Other resulted to be extremely mature concerning store employees. The following sector turned out to be clothing and personal accessories and, finally, the remaining industries, which shared similar results.

Chart 5.3: Cross-sector comparison of the final scores in the store employees dimension

5.3.2.3. In-store Digital Technologies

As the last mid-dimension, in-store digital technologies were considered. On the one hand, these digital solutions are used to increase the comfort of customers along their whole journey in the brick-and-mortar store; on the other hand, they are fundamental to acquire data and support the business.

Unlike the dimensions included in the literature Excel framework (“*front-end digital innovations*”), the ones taken into account are only related to the point of sales because they appeared to be much more relevant. Moreover, some of them were cut in order to avoid redundant dimensions with those of the other sections, for instance *sales force automation solutions* was removed because it was already present in store personnel section. All of the solutions considered will now be discussed in greater detail.

- *Kiosks/totems/touchpoints to gather information in-store* are digital tools that allow retailers to better manage communication and make the customers interact, automatizing their experience in-store.
- *Scan & Go systems* consist in mobile self-checkout technologies allowing customers to do their shopping all by themselves. That means choosing, scanning, and paying for their purchase with nothing but their own smartphone.
- *Self-check-out systems* are machines that provide a mechanism for customers to complete their own transaction from a retailer without needing a traditional staffed checkout.
- *Mobile POS* are wireless devices that perform the functions of a cash register or electronic point-of-sale terminal (POS terminal) wirelessly. Mobile POS are very useful for businesses that will take transactions on the go and as will be shown, this type of system is very common among retailers.
- *Solutions to expand the assortment of stores* are innovative ways to enlarge POS assortments. Also known as “endless aisle”, these solutions allow customers to scan, view and order online additional goods that, for instance, are out-of-stock.
- *Beacon/indoor positioning* are small radio transmitters, sending out Bluetooth signals to mobile devices in their vicinity, which provide smartphone users with information about their position within the store. They are generally used to support customers in their product search inside the point of sale.
- *Solutions to collect visitor information* are cheap and easy ways to gather in-store data from customers that can hugely reduce data collection costs. These systems allow to better understand customers’ shopping habits supporting retailers to provide them the best possible service.
- *Solutions for virtual queue management* allow customers to place in a virtual waiting line or queue, where they don’t have to physically wait in line to get a service. With a virtual queue management system, customers can wait remotely as they are not confined to any waiting spot. Then, with the advent of the pandemic this type of solution has become popular because it allows to keep social distancing.

- *Visit reservation from remote systems for in-store appointment* consist in offering your customers the possibility to make an appointment from remote, website or mobile app, to book a service in-store. These systems provide a certain autonomy to customers and allow retailers to set up a personalized experience for each customer.
- *Interactive showcases and digital signage* are innovative digital displays used to provide a greater advertising and communication impact, and a better service to customers, for instance by showing the advantages of retailers' products and services.
- *Virtual fitting room & virtual mirror* allow shoppers to virtually try on clothing items or beauty products without physically touching the item itself. During the pandemic, these solutions had great attention because people do not touch the products, so reducing the contagion risk dramatically. Moreover, they allow customers to try out-of-stock products and, for this reason, can be used by retailers to reduce and optimise stocks in-store. As will be shown later, these solutions are specific just for some types of goods so they will not be considered in all the sectors.
- *Smart labels / smart shelves* are digital solutions that support pricing and merchandising. They ensure price integrity, enable dynamic price strategies and provide also critical product information to the shelf edge. This allows to align pricing with critical merchandising levers like assortment, space, availability and promotion all in one place enabling retailers to greatly improve their business.
- *Self-scanning and smart carts* are innovative digital tools that help shoppers manage shopping lists and pay for items. In addition, these solutions may provide suggestions, alternatives or tips for shoppers. Moreover, they are very useful devices for data gathering, for instance regarding shopping lists, habits and routing in-store.
- *AR/VR devices* completely transform reality making customers see and feel everything just as if it was true. This immersive shopping experience creates a feeling of physical and emotional connection between the customers and a brand.
- *Innovative payments* refer to all those new technologies used to facilitate the payment phase, with the exception of the mobile, which has already been dealt with separately. For instance, biometrics payments are getting a lot of attention, such as facial recognition or fingerprint payments.

Weights discussion

Looking at Table 5.12, it can be found that in average mobile POS and solutions to collect visitor information were the digital implementations that had the higher strategic relevance and so priority. On the other hand, AR/VR, self-scanning and smart carts, and solutions for virtual queue management resulted to be not so relevant.

Concerning virtual fitting room & virtual mirror a separate discussion is required. In contrast to other solutions, these are not equally applicable to all sectors, thus it was required to approach them differently. In such situation, the weights that had no interest with this type of implementation were set to 0 (which were already quite low) and only the actual weights for clothing and personal accessories and beauty and personal care were kept. In such way, the weights of the sectors affected by this change have been adjusted so that they now have a sum equal to 100%.

By going into detail in each specific sector, additional insights can be carried out.

First, regarding publishing and consumer electronics and appliances industry the weight reported are by far the most dispersed (in terms of range). In particular, unlike the Italian average, the firms operating in the latter sector put a strong emphasis on visit reservation from remote systems for in-store appointment, solutions for virtual queue management and beacon/indoor positioning. On the other hand, kiosks/totems/touchpoints to gather information in-store and self-check-out system were much less popular respect the average. Concerning the publishing industry, firms assigned an extremely high strategic importance to kiosks/totems/touchpoints to gather information in-store and self-check-out system.

Then, it is interesting to highlight that furniture and home improvement and beauty and personal care gave a very low importance to self-check-out system, as opposed to grocery and the already cited publishing who placed a strong priority on it.

In addition, Scan & Go systems turned out to be particularly popular in grocery retailing and on the other hand these solutions were much less relevant for clothing and personal accessories and beauty and personal care.

Furthermore, visit reservation from remote systems for in-store appointment was particularly irrelevant for grocery retailer, in contrast to other industries which gave much higher importance to this type of service.

Finally, very interesting is the evaluation of self-scanning and smart carts in grocery and pharmaceutics industries where companies gave much greater scores respect the other sectors.

Scores discussion

Moving to the scores, the data collection was done though a 4-level classification, as displayed in Table 5.13 with an example coming from furniture and home improvement sector.

Table 5.12: Sector weights in the in-store technologies dimension

In-store technologies: weights	**Italian Retail average**	**Clothing and personal accessories**	**Grocery**	**Furniture and home improvement**	**Beauty and personal care**	**Consumer electronics and appliances**	**Publishing**	**Pharmaceutics**
Kiosks/totems/touchpoints to gather information in-store	7.1%	7.7%	6.9%	7.1%	7.4%	2.3%	12.5%	4.8%
Scan&Go systems	6.3%	5.4%	8.4%	6.5%	4.6%	7.0%	6.3%	7.9%
Mobile POS	8.6%	8.6%	7.9%	10.0%	8.4%	11.6%	6.3%	7.9%
Self-check-out system	7.0%	6.9%	9.3%	5.9%	5.5%	2.3%	12.5%	7.9%
Solutions to expand the assortment of stores	7.5%	8.0%	6.9%	7.7%	7.4%	11.6%	6.3%	6.3%
Beacon/indoor positioning	6.2%	5.4%	5.8%	7.1%	7.3%	9.3%	6.3%	6.3%
Solutions to collect visitor information	8.2%	7.3%	8.2%	9.4%	9.3%	11.6%	6.3%	7.9%
Solutions for virtual queue management	5.8%	4.4%	6.8%	6.9%	4.6%	11.6%	6.3%	6.3%
Visit reservation from remote systems for in-store appointment	7.1%	8.3%	4.1%	8.1%	6.6%	11.6%	6.3%	6.3%
Interactive showcases and digital signage	6.1%	7.5%	5.0%	5.2%	8.3%	2.3%	6.3%	7.9%
Virtual fitting room & virtual mirror	4.3%	5.4%	0.0%	0.0%	6.7%	0.0%	0.0%	0.0%
Smart labels / smart shelves	7.1%	6.9%	8.9%	7.2%	7.3%	2.3%	6.3%	7.9%
Self-scanning and smart carts	5.8%	5.1%	8.4%	5.8%	4.6%	2.3%	6.3%	7.9%
AR/VR devices	5.6%	4.9%	5.4%	6.3%	6.6%	7.0%	6.3%	6.3%
Innovative payments	7.3%	8.1%	8.1%	6.7%	5.5%	7.0%	6.3%	7.9%

Table 5.13: Practical example of the company specific survey in the in-store technologies dimension

Score	0	0.5	1
In-store technologies: degrees of maturity	**Not adopted**	**Planned to be adopted in the short time (in 3 years)**	**Adopted**
Kiosks/totems/touchpoints to gather information in-store			X
Scan&Go systems	X		
Mobile POS			X
Self-check-out system	X		
Solutions to expand the assortment of stores			X
Beacon/indoor positioning	X		
Solutions to collect visitor information	X		
Solutions for virtual queue management	X		
Visit reservation from remote systems for in-store appointment		X	
Interactive showcases and digital signage	X		
Virtual fitting room & virtual mirror	X		
Smart labels / smart shelves	X		
Self-scanning and smart carts	X		
AR/VR devices	X		
Innovative payments		X	

Then, in Table 5.14 are shown the average scores in each industry.

In general, it was reported a low level of adoption of the digital technologies in-store. The average value of the Italian retailers obtained very low scores in the majority of the variables, except for a few particular cases in which it got some satisfactory results. Namely, the most adopted technologies were mobile POS, kiosks/totems/touchpoints to gather information in-store and solutions to collect visitor information.

Concerning the first one, Others showed an extremely high level of adoption, and, on the other hand, grocery retailers appeared to have implemented such technologies significantly less.

With regard to the kiosks/totems/touchpoints to gather information in-store, clothing and personal accessories obtained a very low score, highlighting how such technologies were not so popular in this sector.

Then, solutions to collect visitor information turned out to be much less implemented among grocery retailers.

On the opposite, the technologies which showed the lowest level of adoption were virtual fitting room & virtual mirror, self-scanning and smart carts, AR/VR devices and solutions for virtual queue management.

The former, as expressed before, is not applicable to every sector and, for this reason, turned to have a null value for grocery and furniture and home improvement; still, it is important to highlight that also in the other sectors, especially in the clothing and personal accessories, this technology did not seem to be adopted in store.

Concerning self-scanning and smart carts, it is important to highlight that grocery implemented such technologies much more than others.

Other important results to remark are the very high levels of adoption for grocery and Other retailers regarding Scan & Go systems, self-check-out system, and smart labels / smart shelves.

Finally, in Chart 5.4, the final scores, obtained by multiplying each dimension for its specific weight, are reported.

As discussed before, the maturity levels concerning in-store digital technologies were quite low. The only sector that managed to achieve a decent result is the Other group, while all other retailers achieve worst results, especially clothing and personal accessories.

Table 5.14: Sector scores in the in-store technologies dimension

In-store technologies: scores	**Italian Retail average**	**Clothing and personal accessories**	**Grocery**	**Furniture and home improvement**	**Other**
Kiosks/totems/touchpoints to gather information in-store	0.49	0.25	0.69	0.64	0.50
Scan&Go systems	0.19	0.00	0.50	0.14	0.50
Mobile POS	0.63	0.68	0.38	0.64	1.00
Self-check-out system	0.35	0.11	0.69	0.27	0.83
Solutions to expand the assortment of stores	0.33	0.43	0.13	0.41	0.17
Beacon/indoor positioning	0.31	0.25	0.31	0.32	0.50
Solutions to collect visitor information	0.50	0.57	0.31	0.50	0.67
Solutions for virtual queue management	0.13	0.11	0.06	0.18	0.17
Visit reservation from remote systems for in-store appointment	0.33	0.39	0.13	0.36	0.50
Interactive showcases and digital signage	0.38	0.32	0.31	0.41	0.67
Virtual fitting room & virtual mirror	0.03	0.04	0.00	0.00	0.17
Smart labels / smart shelves	0.35	0.21	0.56	0.32	0.50
Self-scanning and smart carts	0.15	0.00	0.50	0.09	0.17
AR/VR devices	0.11	0.07	0.00	0.23	0.17
Innovative payments	0.26	0.18	0.25	0.36	0.33

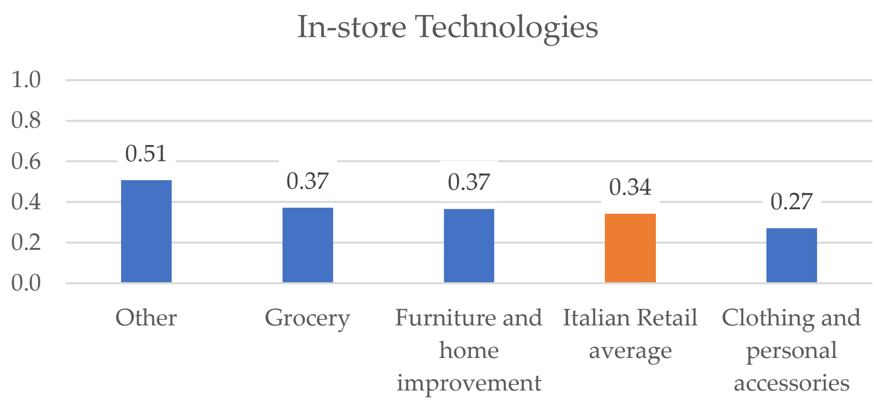


Chart 5.4: Cross-sector comparison of the final scores in the in-store technologies dimension

5.3.2.4. Store: final scores

In this last paragraph, the final scores concerning store is discussed.

As reported before, such result was obtained by considering equal weights for each mid-dimension (1/3 each). To properly explain this calculation, the final score of the practical example reported in the three previous sections will be measured. In particular, such company belongs to the furniture and home improvement industry so the relative weights will be considered. By considering its degrees of adoption and such weights, it is possible to obtain the following scores: 0.339 regarding spaces, 0.105 relative to employees, and 0.323 concerning in-store digital technologies. Finally, the score can be calculated obtaining a value equal to 0.256.

Moving to the analysis, by considering all the three dimension together it can be seen the level of maturity of the Italian retailers concerning the store macro-dimension.

As shown in Chart 5.5, the Other sector resulted to be the most advanced in the market and the only one that was able to reach a value higher than 0.5. The remaining industries obtained comparable results, with grocery retailers ended up with a slightly higher score.

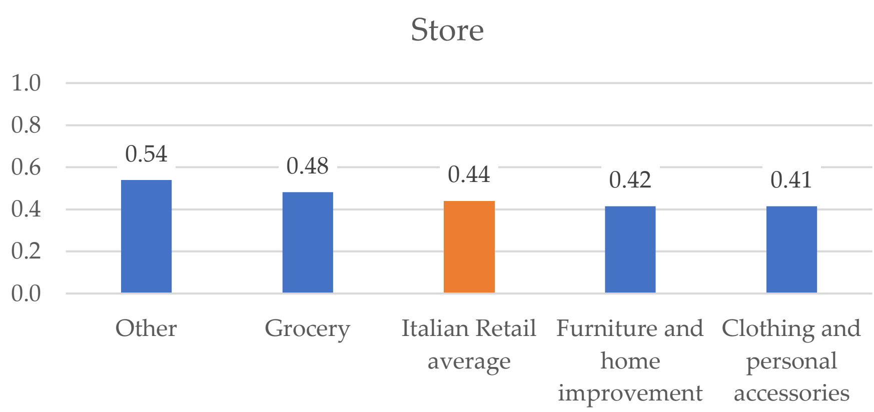


Chart 5.5: Cross-sector comparison of the final scores in the store macro-dimension

5.3.3. Mobile app

Through this macro-dimension, all the functionalities and features which can be implemented inside the retailers' mobile app in order to enhance the customer experience were explored. It was divided into five main categories, following the customer journey process:

- *Pre-purchase,* in this phase the main priority is to provide to the customers all the possible information to facilitate their research and let them understand what they are looking for;
- *In-store activities* involves all the functionalities which can be used in-store during the customer shopping process, enabling a seamless customer experience;
- *Online purchase* is the area related to the purchasing stage trough the mobile app;
- *Post-purchase* regards the features related to the after-sales services;
- *Loyalty* concerns the retailers loyalty program, enabling the connection between the customers account and their mobile phone.

Similarly to store macro-dimension, it was assumed that the different categories share the same relevance and, consequently, the same weight (1/5 each). In an analogue way the methodology used to calculate the score remain almost the same, as it can be seen in Equation 5.5.

$$Mobile\ app\ score = \sum_{i=1}^{5} \frac{1}{5} * score_i$$

Equation 5.5: Mobile app score calculation

5.3.3.1. Pre-purchase

This category is focused on the phase that precedes the purchasing. For this reason, the main attention is given to those functionalities that help the customers gain information about what they are looking for and facilitate their purchasing process. This dimension is composed by the following solutions:

- *Possibility to see the stock availability,* both for online and in-store, allowing the customers to know in advance where to find the product they are looking for;
- *Possibility to see product prices* to help the customers in their research phase;
- *Possibility to see full product range* to let the customers discover the full retailer's offering;

- *Possibility to see current discounts*, either directly in the catalogue or in a dedicated area, enabling the customers to know what the current offers are and where to find them;
- *Possibility to see the location of stores*, in order to let the consumers know which point of sale are closest to them and know their opening hours;
- *Cross-selling* which consists in recommending to the shoppers a similar or supplementary product based on their interest in one of the retailer's products;
- *Up-selling*, instead, encourages clients to purchase an upgraded or premium version of the product they originally intended to buy.

Weights discussion

Next, in Table 5.15 sector weights, computed with the industry specific survey, are present. Through these, it could be measured the score referring to pre-purchase features.

Looking at the sector weights, it can be found that they resulted to be generally well balanced and typically there were no features with a strategic relevance much higher or lower than the others.

By analysis the Italian average, the possibility to see product prices and current discounts received slightly higher evaluations, and so strategic importance. On the other hand, up-selling features were typically less important.

Regarding this last feature, it is interesting to highlight the grocery and consumer electronics and appliances retailers gave much higher importance respect other industries, like publishing companies which assigned little importance to this feature.

Finally, beauty and cosmetics and publishing gave very diverse results concerning the possibility to see the stock availability. The former assigned the lowest score, while the latter considered this feature extremely relevant.

Table 5.15: Sector weights in the pre-purchase dimension

Mobile app pre-purchase: weights	**Italian Retail average**	**Clothing and personal accessories**	**Grocery**	**Furniture and home improvement**	**Beauty and personal care**	**Consumer electronics and appliances**	**Publishing**	**Pharmaceutics**
Possibility to see the stock availability (both for online and in-store)	13.9%	14.4%	12.9%	14.4%	9.3%	14.3%	22.2%	12.5%
Possibility to see product prices	15.4%	15.5%	15.5%	16.0%	16.0%	14.3%	11.1%	15.6%
Possibility to see full product range	13.5%	12.7%	13.4%	14.3%	16.0%	14.3%	11.1%	12.5%
Possibility to see current discounts (e.g., flyer)	15.4%	15.5%	14.8%	15.4%	16.0%	14.3%	16.7%	15.6%
Possibility to see the location of stores	14.9%	15.3%	14.0%	14.4%	16.0%	14.3%	16.7%	15.6%
Cross-selling (recommending a complementary or related products)	14.2%	13.5%	14.7%	13.3%	16.0%	14.3%	16.7%	15.6%
Up-selling (recommending a comparable higher-end product)	12.7%	13.1%	14.8%	12.2%	10.8%	14.3%	5.6%	12.5%

Scores discussion

Concerning the maturity evaluation, the addressed functionalities were evaluated trough a 3-level classification, as shown in Table 5.16. As in the other sections, in the table is presented a practical example of data gathered through the company specific survey.

Moving on with the analysis, from Table 5.17 it can be seen the results obtained from the company specific survey.

Table 5.16: Practical example of the company specific survey in the pre-purchase dimension

Score	0	0.5	1
Mobile app pre-purchase: degrees of maturity	**Not adopted**	**Planned to be adopted in the short time (in 3 years)**	**Adopted**
Possibility to see the stock availability (both for online and in-store)	X		
Possibility to see product prices			X
Possibility to see full product range			X
Possibility to see current discounts (e.g., flyer)			X
Possibility to see the location of stores			X
Cross-selling (recommending a complementary or related products)			X
Up-selling (recommending a comparable higher-end product)			X

Coherently with the average weights, the most adopted solutions in this section were the possibility to see the product prices and to see the current discounts. Such solutions appeared to be much more implemented in the Other sector, and much less in the clothing and personal accessories sector.

With regard to the features adopted less, the possibility to see the stock availability turned out to be le least adopted. In particular, grocery and clothing and personal accessories presented very bad scores. On the other hand, companies belonging to Other performed much better.

The possibility to the location of stores achieved a medium-high average maturity. In particular, Other and furniture and home improvement performed very well showing a very high degree of maturity.

Then, the possibility to see the full product range, up-selling and cross-selling features were typically less implemented, especially in the clothing and personal accessories and grocery sectors.

Table 5.17: Sector scores in the pre-purchase dimension

Mobile app pre-purchase: scores	Italian Retail average	Clothing and personal accessories	Grocery	Furniture and home improvement	Other
Possibility to see the stock availability (both for online and in-store)	0.42	0.31	0.13	0.64	0.75
Possibility to see product prices	0.69	0.62	0.75	0.68	0.88
Possibility to see full product range	0.58	0.62	0.31	0.64	0.88
Possibility to see current discounts (e.g., flyer)	0.74	0.54	0.81	0.86	0.88
Possibility to see the location of stores	0.65	0.46	0.63	0.82	0.88
Cross-selling (recommending a complementary or related products)	0.57	0.50	0.31	0.73	0.88
Up-selling (recommending a comparable higher-end product)	0.53	0.35	0.38	0.73	0.88

Moving to the final scores, as shown in Chart 5.6 grocery and clothing and personal accessories sectors resulted to be the ones with the lowest maturity level regarding the implementation of pre-purchase features in the mobile app.

With regard to the remaining industries, they achieved high results, especially Others which obtained a significant high score in such dimension.

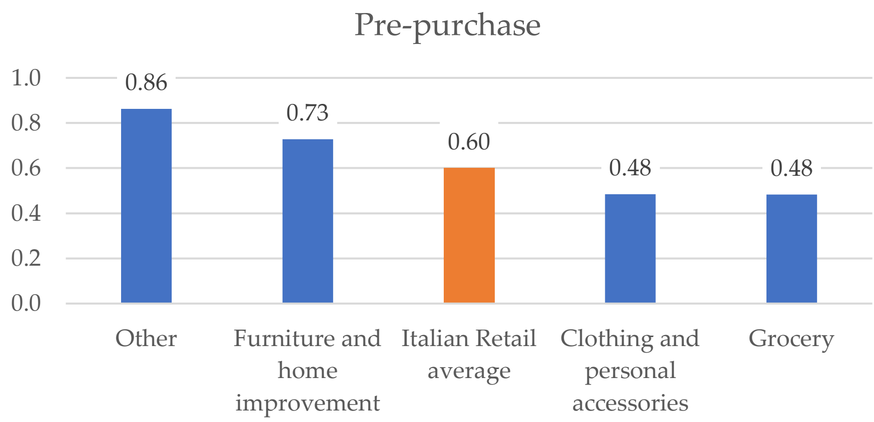


Chart 5.6: Cross-sector comparison of the final scores in the pre-purchase dimension

5.3.3.2. In-store Activities

Nearly 60% of shoppers look up product information and prices while using their mobile phones in stores, making a mobile strategy critical for retailers [85]. Nowadays, it is becoming a standard behaviour for customers to use their mobile phones while shopping in brick-and-mortar stores, hence the need to consider these functionalities inside retailers' mobile app in order to provide a support to the customers during their shopping process and enable a seamless experience. Below there are described the solutions considered.

- *Access to additional info about products,* in order to expand the customers research while shopping in-store, obtaining more detailed information about products characteristics or similar ones and enabling a price comparison. An example could be the introduction of QR codes which can be scanned trough your phone.
- *Wayfinding and/or store map* which allow the consumers to get highly accurate and interactive ways to find directions and locate places inside the store, facilitating and enhancing their shopping experience.
- *Shopping lists* to give shoppers the chance to find what they need over time and create a list of items that they are interested in. For example, a further functionality could be the identification of the aisle location for all the products registered, simplifying the purchasing process.
- *Possibility to purchase online directly in-store* for all the products which are not available in-store, this feature enables to buy them directly from the app while being in-store, planning the pick-up location.

Weights discussion

Next, strategic weights were measured through the industry specific survey and displayed in Table 5.18.

By analysing the Italian Retail average, the strategic relevance of the analysed dimensions was quite balanced except for wayfinding and/or store map that appeared to be less relevant.

Going into detail of the diverse sectors, clothing and personal accessories companies assigned a significative importance to the access to additional information about products, which on the other hand was not so relevant for pharmaceuticals.

Moreover, clothing and personal accessories firms considered the presence of wayfinding and/or store map poorly relevant, in contrast to other companies, such as grocery, consumer electronics and appliances, and publishing, which considered these features much more crucial.

Finally, regarding the possibility to purchase online directly in-store, publishing companies found this feature much irrelevant.

Table 5.18: Sector weights in the in-store activities dimension

Mobile app in-store activities: weights	**Italian Retail average**	**Clothing and personal accessories**	**Grocery**	**Furniture and home improvement**	**Beauty and personal care**	**Consumer electronics and appliances**	**Publishing**	**Pharmaceutics**
Access to additional info about products	28.8%	33.6%	23.2%	29.8%	28.6%	25.0%	27.3%	17.6%
Wayfinding and/or store map	20.6%	17.6%	24.5%	19.1%	19.8%	25.0%	27.3%	23.5%
Shopping lists	26.3%	23.0%	28.2%	27.7%	28.6%	25.0%	27.3%	29.4%
Possibility to purchase online directly in-store	24.4%	25.8%	24.1%	23.3%	23.0%	25.0%	18.2%	29.4%

Scores discussion

Moving to the scores, Table 5.19 displays how these dimensions were classified and a practical example is provided.

Table 5.19: Practical example of the company specific survey in the in-store activities dimension

Score	0	0.5	1
Mobile app in-store activities: degrees of maturity	**Not adopted**	**Planned to be adopted in the short time (in 3 years)**	**Adopted**
Access to additional info about products			X
Wayfinding and/or store map		X	
Shopping lists			X
Possibility to purchase online directly in-store		X	

Moving to the scores analysis, in Table 5.20 the obtained results are presented.

The level of maturity in the Italian market regarding such features appeared to be quite low, especially the wayfinding and/or store map and the possibility to purchase online directly in-store.

Concerning the former, clothing and personal accessories showed an extremely low score while Other presented a medium evaluation, which was much higher respect the average value.

With regard to the possibility to purchase online directly in-store, no major differences emerged between the various sectors. In particular, it can be noticed that grocery retailer adopted such solution much less than the others.

Then, Other and furniture and home improvement achieved good results concerning the access to additional information about products.

Moreover, grocery retailers showed a much higher degree of implementation concerning shopping lists than the other industries.

Table 5.20: Sector scores in the in-store activities dimension

Mobile app in-store activities: scores	**Italian Retail average**	**Clothing and personal accessories**	**Grocery**	**Furniture and home improvement**	**Other**
Access to additional info about products	0.57	0.46	0.50	0.68	0.75
Wayfinding and/or store map	0.15	0.04	0.13	0.18	0.50
Shopping lists	0.54	0.46	0.75	0.45	0.63
Possibility to purchase online directly in-store	0.36	0.38	0.25	0.41	0.38

Finally, final scores can be analysed in detail to have a better comparison between the diverse sectors.

In Chart 5.7 it can be noticed that all the sectors obtained a medium-low score, appearing to be still not very mature in this field.

In particular, the Other sector achieved the best result, slightly higher than the other industries, while clothing and personal accessories turned out to be the industry least mature.

Chart 5.7: Cross-sector comparison of the final scores in the in-store activities dimension

5.3.3.3. Online Purchase

As highlighted from the literature analysis, the mobile sale channel is increasingly becoming a standard to adopt for the retailers. Therefore, this section describes the features related to the purchase from the mobile app.

- *Possibility to order from the app,* namely it is the functionality inside the app which enable the purchase and the possibility to choose the deliver location, either at home, in-store or through other solutions such as lockers.
- *Shared shopping cart between app and website,* which is an integrated functionality between the website and the mobile app that allows the customers, properly logged in with their account, to share the same shopping cart, providing them an integrated purchasing journey.
- *Link to wallet apps during payment,* in order to facilitate the payment process improving the use of mobile channel and the customer experience.

Weights discussion

It can be seen, from the weights displayed in Table 5.21, that the dimensions analysed received comparable evaluations of strategic relevance in most of the cases.

The only remarkable difference could be found in the publishing sector, where firms considered the link to wallet apps during payment less relevant, giving greater importance to the possibility to order from the app and shared shopping cart between website and app.

Table 5.21: Sector weights in the online purchase dimension

Mobile app online purchase: weights	**Italian Retail average**	**Clothing and personal accessories**	**Grocery**	**Furniture and home improvement**	**Beauty and personal care**	**Consumer electronics and appliances**	**Publishing**	**Pharmaceutics**
Possibility to order from the app	33.2%	33.4%	33.5%	31.9%	33.2%	33.3%	36.4%	33.3%
Shared shopping cart between app and website	32.7%	32.2%	31.4%	33.4%	33.5%	33.3%	36.4%	33.3%
Link to wallet apps during payment	34.1%	34.4%	35.1%	34.6%	33.2%	33.3%	27.3%	33.3%

Scores discussion

As shown in Table 5.22, these dimensions were classified with 3 degrees of implementation and a practical example is provided to better explain the data collection and score measurement.

Table 5.22: Practical example of the company specific survey in the online purchase dimension

Score	0	0.5	1
Mobile app online purchase: degrees of maturity	**Not adopted**	**Planned to be adopted in the short time (in 3 years)**	**Adopted**
Possibility to order from the app		X	
Shared shopping cart between app and website		X	
Link to wallet apps during payment			X

By analysing the average scores, in Table 5.23 it can be seen that Italian retailers poorly adopted mobile app solutions concerning online purchases. In particular, shared shopping cart between app and mobile achieved very low evaluations.

With regard to the last mentioned dimension, furniture and home improvement showed an extremely low score, while Other achieved a significantly higher one.

Concerning the possibility to order from the app, grocery and Other obtained medium-high level of implementation, while furniture and home improvement companies showed a strong lack of implementation.

Then, it was found that clothing and personal accessories companies implemented the link to wallet apps during payment much less than the others.

Table 5.23: Sector scores in the online purchase dimension

Mobile app online purchase: scores	**Italian Retail average**	**Clothing and personal accessories**	**Grocery**	**Furniture and home improvement**	**Other**
Possibility to order from the app	0.38	0.35	0.63	0.14	0.63
Shared shopping cart between app and website	0.26	0.23	0.31	0.09	0.75
Link to wallet apps during payment	0.39	0.23	0.56	0.36	0.63

Finally, the final scores can be analysed in detail. As shown in Chart 5.8, very different results can be seen as the sector varies.

In particular, Other achieved a medium-high level of maturity in such dimension, followed by grocery retailers. The remaining two sectors, clothing and personal accessories and furniture and home improvement, instead, achieved extremely minimal levels of implementation.

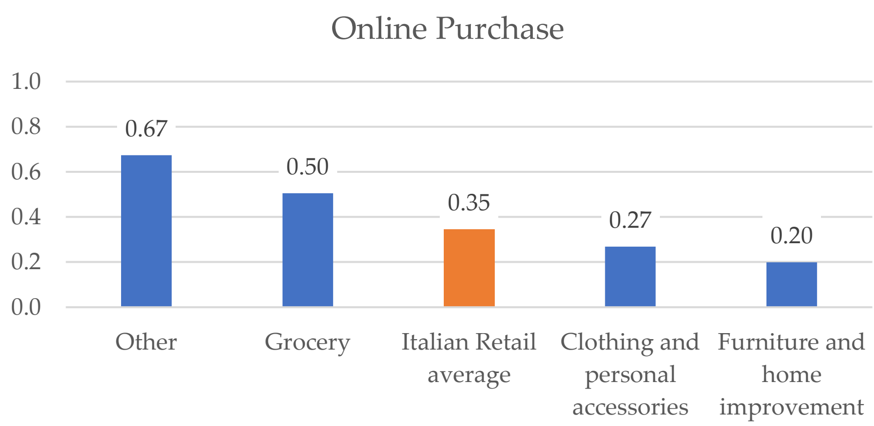


Chart 5.8: Cross-sector comparison of the final scores in the online purchase dimension

5.3.3.4. Post-purchase

In the following section it will be analysed the post-purchase stage. This phase is very important for the retailers because it can impact customer retention, improves brand reputation and repeated sales. Customers who are impressed by a company's post-purchase care are more likely to bypass the initial stages of the customer lifecycle and go straight into their intent to purchase. For this reason, the following variables were considered.

- *Connection to the customer service,* a designated area inside the app where the customers can ask and receive support. This can be accomplished in a variety of methods, including direct contact with the employee, such as a phone conversation or video chat, indirect contact, such as mail, SMS, or WhatsApp messaging, or by using a bot.
- *Possibility to give feedbacks,* related to any type of good or service provided, such as products, staff, store, in order to let companies know the level of satisfaction provided and where there could be improvements.
- *Possibility to plan a return,* which can be done both in-store or by CEP from home or other sources, allowing the customers to start the return practice directly from their mobile app.

Weights discussion

As shown in Table 5.24, these mobile app features resulted to have typically the same strategic importance in quite all the sectors.

In particular, publishing companies put a much higher emphasis on the possibility to give feedbacks and a much lower to the possibility to plan a return.

Table 5.24: Sector weights in the post-purchase dimension

Mobile app post-purchase: Weights	**Italian Retail average**	**Clothing and personal accessories**	**Grocery**	**Furniture and home improvement**	**Beauty and personal care**	**Consumer electronics and appliances**	**Publishing**	**Pharmaceutics**
Connection to the customer service	34.0%	33.5%	35.5%	34.2%	33.3%	33.3%	33.3%	30.8%
Possibility to give feedbacks	33.7%	33.5%	32.2%	33.3%	33.3%	33.3%	50.0%	30.8%
Possibility to plan a return	32.3%	33.0%	32.3%	32.6%	33.3%	33.3%	16.7%	38.5%

Finally, it is interesting to highlight that companies belonging to the pharmaceutical sector assigned a slightly higher evaluation to the possibility to plan a return.

Scores discussion

Moving to the scores, Table 5.25 displays how data, gathered with the company specific survey, were classified and a practical example is provided.

Table 5.25: Practical example of the company specific survey in the post-purchase dimension

Score	0	0.5	1
Mobile app online purchase: degrees of maturity	**Not adopted**	**Planned to be adopted in the short time (in 3 years)**	**Adopted**
Connection to the customer service			X
Possibility to give feedbacks (e.g., products, staff, store, home delivery…)			X
Possibility to plan a return		X	

Following the same procedure of the previous sections, in Table 5.26 the scores related to the post-purchase features in the mobile app are shown.

Table 5.26: Sector scores in the post-purchase dimension

Mobile app post-purchase: scores	Italian Retail average	Clothing and personal accessories	Grocery	Furniture and home improvement	Other
Connection to the customer service	0.44	0.23	0.63	0.41	0.88
Possibility to give feedbacks	0.47	0.27	0.63	0.45	0.88
Possibility to plan a return	0.35	0.31	0.25	0.36	0.63

Such features appeared to be poorly implemented by the Italian retailers, especially the possibility to plan a return which obtained slightly worst results.

Going more in detail, the connection to customer service and possibility to give feedbacks achieved similar results. In particular, these features ended up being poorly adopted by clothing and personal accessories and furniture and home improvement, while grocery and Other achieved much higher scores.

Concerning the possibility to plan a return, grocery retailers obtained the worst evaluation and, instead, companies belonging to the Other sector seemed to be much more mature than the counterparts.

Looking at the final scores from Chart 5.9, very dispersed values can be seen.

First, it can be noticed that Other reached a very high score and position highlighting their high maturity level in such dimension.

Next, grocery and furniture and home improvement obtained medium-low results, showing that such features seemed to be partially implemented.

Finally, clothing and personal accessories demonstrated to have a very low level of maturity obtaining by far the worst result.

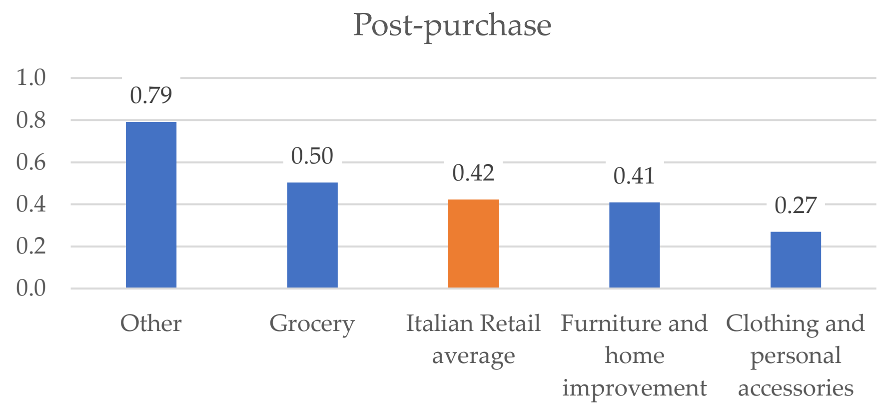


Chart 5.9: Cross-sector comparison of the final scores in the post-purchase dimension

5.3.3.5. Loyalty

Lastly, the final section concerning mobile app involves the area dedicated to the retailers' loyalty program. In order to provide a seamless experience, retailers need to digitalize and manage their loyalty program across all their sales channels simultaneously. The mobile app could be used as a supportive tool for the customers to check their user account and discover the available rewards, as better explained in the following functionalities considered.

- *Possibility to connect the loyalty card,* allowing the customers to connect their loyalty card or account to the mobile app.
- *Possibility to access to the reward system linked to the user loyalty account,* allowing the clients to access a dedicated area with all the information linked to the reward system, such as the amount of earned point or the owned coupons.

- *Possibility to access to the rewards catalogue,* allowing the customers to know which discounts, coupons or other prizes are available and how many points are needed to redeem them.

Weights discussion

By looking at the weights shown in Table 5.27, it can be noticed that the Italian Retail average showed no remarkable differences among the strategic relevance of the dimensions considered. In particular, the possibility to access to the reward system linked to the user loyalty account received a slightly higher evaluation.

Going into detail, clothing and personal accessories companies assigned a slightly higher importance to the possibility to connect the loyalty card, unlike some sectors such grocery, furniture and home improvement, and publishing which put higher emphasis on the possibility to access to the reward system linked to the user loyalty account.

Finally, pharmaceutical companies considered the possibility to access to the rewards catalogue much less relevant.

Table 5.27: Sector weights in the loyalty dimension

Mobile app loyalty: weights	**Italian Retail average**	**Clothing and personal accessories**	**Grocery**	**Furniture and home improvement**	**Beauty and personal care**	**Consumer electronics and appliances**	**Publishing**	**Pharmaceutics**
Possibility to connect the loyalty card (to use online or in-store)	33.7%	35.4%	30.5%	34.2%	33.3%	33.3%	28.6%	38.5%
Possibility to access to the reward system linked to the user loyalty account (e.g., see the amount of earned points)	34.3%	32.3%	35.5%	35.6%	33.3%	33.3%	35.7%	38.5%
Possibility to access to the rewards catalogue	32.0%	32.3%	34.0%	30.2%	33.3%	33.3%	35.7%	23.1%

Scores discussion

Moving to the scores, Table 5.28 show how data were collected and classified, and moreover a practical example is presented.

Table 5.28: Practical example of the company specific survey in the loyalty dimension

Score	0	0.5	1
Mobile app loyalty: degrees of maturity	**Not adopted**	**Planned to be adopted in the short time (in 3 years)**	**Adopted**
Possibility to connect the loyalty card (to use online or in-store)		X	
Possibility to access to the reward system linked to the user loyalty account (e.g., see the amount of earned points)		X	
Possibility to access to the rewards catalogue		X	

Analysing the Italian average scores presented in Table 5.29, results highlighted medium-low degrees of implementation concerning loyalty features. The most adopted solution was the possibility to connect the loyalty card, followed by the possibility to access the reward system from the mobile app. Lastly, the accessibility of the reward catalogue seemed to be not so implemented in the Italian retail market.

Table 5.29: Sector scores in the loyalty dimension

Mobile app loyalty: scores	**Italian Retail average**	**Clothing and personal accessories**	**Grocery**	**Furniture and home improvement**	**Other**
Possibility to connect the loyalty card (to use online or in-store)	0.56	0.35	0.88	0.55	0.63
Possibility to access to the reward system linked to the user loyalty account (e.g., see the amount of earned points)	0.49	0.31	0.88	0.36	0.63
Possibility to access to the rewards catalogue	0.36	0.23	0.50	0.32	0.63

Going more in detail, the first two appeared to be highly implemented by grocery retailer, while in the clothing and personal accessories sector such solutions resulted to be much less adopted and mature.

With regard to the possibility to access to the rewards catalogue, both clothing and personal accessories and furniture and home improvement sectors achieved low scores.

Moving to the final scores, shown in Chart 5.10, interesting differences among sectors were found.

First, grocery retailers achieved the best results with a high level of maturity regarding loyalty features in the mobile app. Then, Other managed to obtain a slightly lower score but still highlighting a good level of implementation.

Finally, clothing and personal accessories and furniture and home improvements sectors do not rely too much on their mobile app for loyalty features, resulting in a low level of maturity, especially the former.

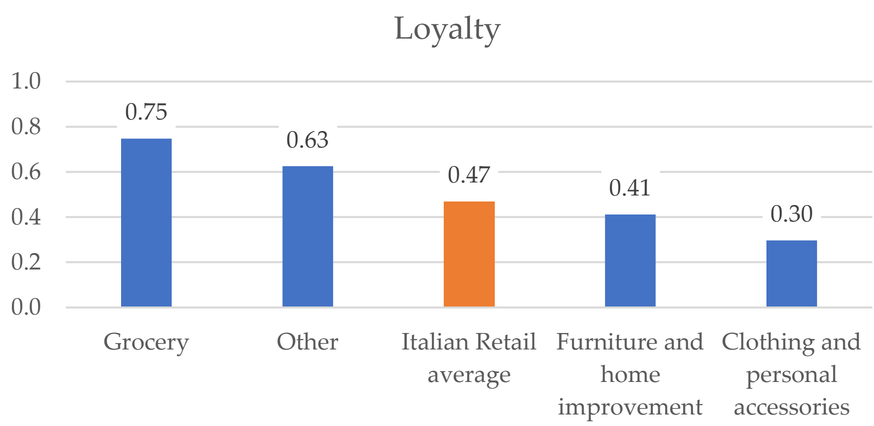


Chart 5.10: Cross-sector comparison of the final scores in the loyalty dimension

5.3.3.6. Mobile app: final scores

Finally, in this paragraph are provided the final scores regarding the mobile app, enabling a wider overview on the maturity level of the diverse sectors in such macro-dimension.

Before analysing the final scores obtained, the calculation method must be clarified. The procedure used was similar to the previous one adopted for the store section, with the only exception that mobile app category was built on 5 different mid-dimensions rather than 3. For such reason, their respective weights were set to 1/5 each. To furtherly explain the used methodology, the final score of the presented example in each section is going to be measured. Its scores in each mid-dimension turned out to be 0.856 for the pre-purchase, 0.788 for the in-store activities, 0.673 for the online purchase, 0.837 for the post-purchase, and 0.5 for the loyalty section. By considering all these values and their weights, the overall score resulted to be 0.731.

Moving to the analysis, the final scores obtained are presented in Chart 5.11.

As it could be expected from the previous paragraphs, Other resulted to be the sector with the highest maturity level achieving medium-high result.

Then, grocery and furniture and home improvement obtained medium results, with the former achieving a slightly higher score.

Finally, clothing and personal accessories resulted to possess a much lower level of mobile app adoption in comparison to the other Italian Retail industries.

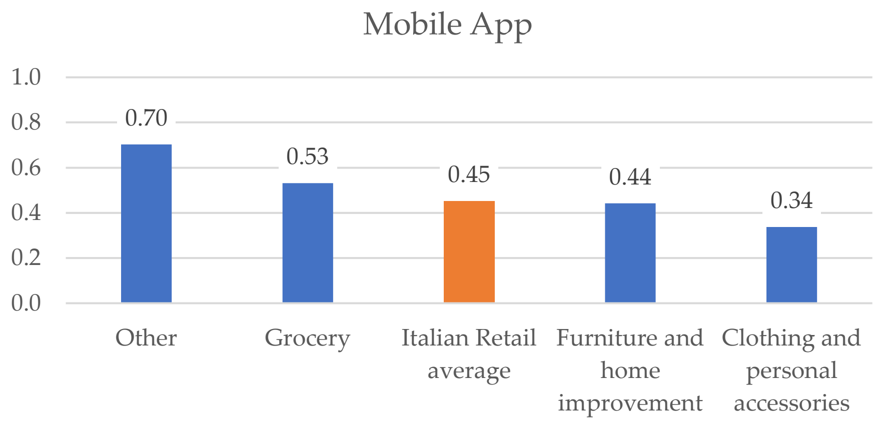


Chart 5.11: Cross-sector comparison of the final scores in the mobile app macro-dimension

5.3.4. Data integration

This macro-area examines the extent to which retailers have integrated their data. The focus of the literature review was on the types of data that were gathered; here, however, it has been assessed if retailers integrate data collected from the various channels and touchpoints in the following activities from a holistic perspective.

- *Segmentation and targeting,* concerning all marketing activities that aim to identify customer clusters in an integrated way, and so creating single customer profiles for all the diverse channels, to properly target them with the right propositions.
- *Generation of ad hoc promotions and discounts,* based on integrated data and able to provide cross-channel usages.
- *Inventory planning,* concerning all the activities related to stock forecasting which can be strongly improved by an integrated data approach reaching better cost optimisation and lower stock-outs.
- *Production capacity planning,* referring to the planning of production quantities and machineries.
- *Order management,* concerning to all activities related to the processing of orders.

- *Delivery management¸* which refers to all transportation related activities.
- *Optimisation of fulfilment structures,* concerning the improvement of resources, such as staff and spaces, in order fulfilment sites.
- *Demand analysis,* related to all the activities to plan customer demand.
- *Creation and monitoring of omnichannel specific KPIs,* specifically for governance usage and based on integrated data.

Weights discussion

The study of Italian retailers showed that variables are well balanced with comparable evaluations (Table 5.30).

Table 5.30: Sector weights in the data integration macro dimension

Data integration: weights	**Italian Retail average**	**Clothing and personal accessories**	**Grocery**	**Furniture and home improvement**	**Beauty and personal care**	**Consumer electronics and appliances**	**Publishing**	**Pharmaceutics**
Segmentation and targeting (omnichannel single profiling)	12.4%	13.0%	12.4%	12.4%	11.2%	11.1%	11.8%	12.5%
Generation of ad hoc promotions and discounts	11.6%	11.8%	10.7%	11.9%	11.2%	11.1%	11.8%	12.5%
Inventory planning	11.6%	11.4%	11.0%	12.3%	11.2%	11.1%	11.8%	12.5%
Production capacity planning	9.5%	9.8%	9.3%	9.5%	11.2%	11.1%	5.9%	7.5%
Order management	11.3%	11.4%	11.2%	11.3%	11.2%	11.1%	11.8%	10.0%
Delivery management (e.g., planning, optimal bundling)	11.0%	10.5%	12.3%	10.4%	10.1%	11.1%	11.8%	12.5%
Optimisation of fulfilment structures (spaces, staff, resources…)	9.9%	9.4%	10.4%	8.6%	11.2%	11.1%	11.8%	12.5%
Demand analysis	10.3%	9.8%	10.2%	10.8%	11.2%	11.1%	11.8%	7.5%
Creation and monitoring of omnichannel specific KPIs	12.5%	12.9%	12.3%	12.7%	11.2%	11.1%	11.8%	12.5%

Going more in detail, this analysis highlighted a higher strategic relevance of data integration in segmentation and targeting, and creation and monitoring of omnichannel specific KPIs, both particularly relevant for clothing and personal accessories firms. On the other hand, in general an enhancement of production capacity planning and optimisation of fulfilment structures through data integration seemed to be not so popular.

Concerning the former, firms belonging to the publishing sector assigned an extremely low value. Instead, moving to the latter, this dimension was slightly less relevant for furniture and home improvement companies, and, on the other hand, pharmaceutics firms gave a much higher score.

Finally, it is intriguing that grocery and pharmaceutical retailers typically put a higher emphasis on data integration in delivery management than other sectors.

Scores Discussion

The degrees of adoption of these dimensions were classified in the company specific survey through a 3-levels scheme. This classification is reported in Table 5.31 with a practical example from the clothing and personal accessories industry.

Proceeding with the analysis, from Table 5.32 it can be seen a high level of data integration for segmentation and targeting, generations of ad hoc promotions and discounts, and the creation and monitoring of KPIs.

From this prior analysis, it seemed that companies mainly focus on the utilisation of the data gathered trough their various touchpoints as a support of the marketing and governance activities; instead, it turned out to be not so diffused the usage of data to enhance the operations activities, especially for production capacity planning and delivery management.

Table 5.31: Practical example of the company specific survey in the data integration macro-dimension

Score	0	0.5	1
Data integration: degrees of maturity	**Not adopted**	**Planned to be adopted in the short time (in 3 years)**	**Adopted**
Segmentation and targeting (omnichannel single profiling)			X
Generation of ad hoc promotions and discounts		X	
Inventory planning	X		
Production capacity planning	X		
Order management		X	
Delivery management (e.g., planning, optimal bundling)		X	
Optimisation of fulfilment structures (spaces, staff, resources…)		X	
Demand analysis		X	
Creation and monitoring of omnichannel specific KPIs			X

It is remarkable to highlight that clothing and personal accessories retailers obtained an extremely high score concerning segmentation and targeting, while firms belonging to Other partially integrated data in such dimension.

Another interesting insight can be carried out by analysing inventory planning and delivery management. These dimensions typically showed low maturity levels for all sectors except furniture and home improvement retailers which managed to get significant scores.

With regard to the creation and monitoring of omnichannel specific KPIs, retailer showed excellent degrees of maturity, except Other companies which seemed to not fully integrate the data on this dimension.

Table 5.32: Sector scores in the data integration macro-dimension

Data integration: scores	**Italian Retail average**	**Clothing and personal accessories**	**Grocery**	**Furniture and home improvement**	**Other**
Segmentation and targeting (omnichannel single profiling)	0.83	0.93	0.75	0.82	0.67
Generation of ad hoc promotions and discounts	0.79	0.82	0.81	0.77	0.67
Inventory planning	0.58	0.46	0.63	0.77	0.33
Production capacity planning	0.39	0.36	0.31	0.50	0.33
Order management	0.69	0.71	0.69	0.77	0.33
Delivery management (e.g., planning, optimal bundling)	0.54	0.46	0.44	0.77	0.33
Optimisation of fulfilment structures (spaces, staff, resources…)	0.56	0.61	0.44	0.64	0.33
Demand analysis	0.69	0.75	0.63	0.68	0.67
Creation and monitoring of omnichannel specific KPIs	0.85	0.89	0.81	0.91	0.50

Moving to the final scores of data integration, shown in Chart 5.12, furniture and home improvement sector appeared to drive the Retail sector with a very high maturity level.

It is followed by clothing and personal accessories and then by grocery which still obtained good results.

Finally, companies belonging to the Other sector resulted to have a medium-low score, highlighting how such firms have to better empower data related strategies.

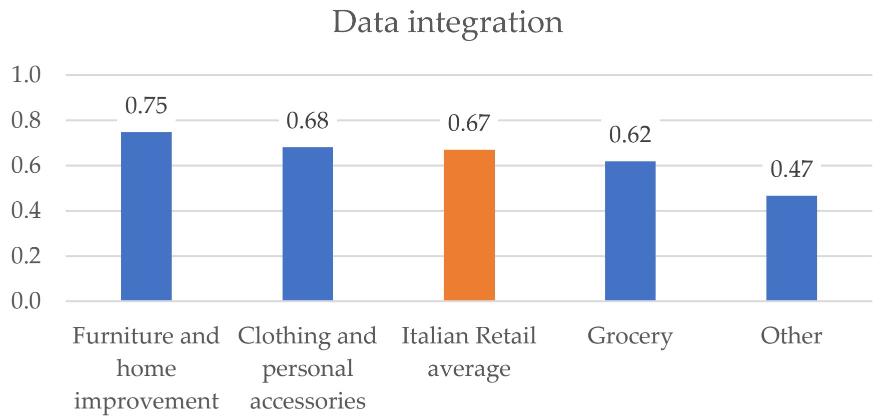


Chart 5.12: Cross-sector comparison of the final scores in the data integration macro-dimension

5.3.5. Back-end digital technologies

The following macro-area is related to the adoption level of the back-end digital solutions, essential to enable an integration between different business processes and as a support of the operations, discussed more in detail in the next macro-dimension. The considered digital solutions will then be distinctly described.

- *CRM (Customer Relationship Management)* enables Retail businesses to comprehend their customer base better. With the help of CRM systems, you can amass a wealth of data about your clients, such their demographic profiles or preferred methods of payment, which, in an omnichannel strategy, come from all the different sales channels.

- *WMS (warehouse management system)* is a software designed to support and optimize warehouse and distribution operations. Retailers employ this automated technology to make planning, organizing, staffing, and controlling available resources across the supply chain easier. In an omnichannel context, it plays a crucial role in managing all the various flows.

- *RFId (Radio-frequency identification)* technology is used by retailers to detect products via radio waves. It provides reliable, real-time inventory monitoring data by transmitting data from an RFID tag to a reader. This solution has become fundamental for today's omnichannel retailers as supply chain visibility and inventory accuracy are becoming more crucial.

- *In-store customer monitoring* refers to the techniques used to keep track of how clients move around stores. Customer loyalty will be ensured by gathering information on consumer shopping behaviour and using it to quickly adjust to their preferences and needs. How retailers communicate with their customers may alter as a result of in-store customer tracking. It provides the knowledge to know precisely when to engage and when to avoid doing so.

- *Demand, inventory, distribution planning* software are needed in order to handle the rise in complexity brought on by the integration of the retailers' channels. To control the introduction of new and multiple factors in an omnichannel setting, these solutions are crucial.
- *Business intelligence system* make it possible for the process to analyse customer data in order to uncover insightful information that can be used to make informed business decisions. Based on the customers' spending patterns and behaviours, these methods enable the retailer to provide a tailored customer experience.
- *Integrated information management system* is a comprehensive set of applications, processes, and technologies that are used to collect, store, and manage data obtained from all the retailers' channels in an integrated way. The goal is to provide better access to information for decision-making purposes.

Weights discussion

Moving to the weights, it is possible to analyse the results obtained with the industry specific survey presented in Table 5.33.

By looking at the Italian Retail average, CRM resulted to be the most relevant dimension, and this was true for quite all the sectors. On the other hand, RFId turned out to be not so popular. In particular, the furniture and home improvement and publishing sectors assigned to this last solution a very low evaluation highlighting how it was not so crucial.

Moreover, companies belonging to consumer electronics and appliances sector assigned an extremely low score to the in-store customer monitoring solutions, showing that the related competitive advantages might be not so relevant.

Finally, publishing sector showed very different priorities from the Italian average. In particular, despite WMS received low evaluations in the other sectors, it was considered crucial for publishing companies. In addition, this sector considered that integrated information management was poorly important, in contrast to other sectors that emphasized its necessity.

Table 5.33: Sector weights in the back-end digital technologies macro-dimension

Back-end digital technologies: weights	**Italian Retail average**	**Clothing and personal accessories**	**Grocery**	**Furniture and home improvement**	**Beauty and personal care**	**Consumer electronics and appliances**	**Publishing**	**Pharmaceutics**
CRM	16.5%	16.0%	16.8%	16.3%	14.7%	17.9%	22.7%	15.2%
WMS	13.5%	12.2%	14.0%	13.1%	14.7%	14.3%	22.7%	12.1%
RFId	10.1%	10.1%	12.6%	8.2%	11.7%	10.7%	4.5%	12.1%
In-store customer monitoring	13.5%	15.3%	11.8%	13.6%	14.7%	3.6%	13.6%	15.2%
Demand, inventory, distribution planning	15.1%	15.1%	14.1%	16.0%	14.7%	17.9%	13.6%	15.2%
Business intelligence system	15.6%	15.7%	15.4%	16.1%	14.7%	17.9%	13.6%	15.2%
Integrated information management (between the online and offline channels)	15.5%	15.5%	15.4%	16.7%	14.7%	17.9%	9.1%	15.2%

Scores discussion

Moving to the omnichannel maturity assessment, it was analysed the degree of implementation of all the digital solutions with 3 diverse classes. To better explain how data has been collected and managed, Table 5.34 displays the classification done in the company specific survey and a practical example.

Table 5.34: Practical example of the company specific survey in the back-end digital technologies macro-dimension

Score	0	0.5	1
Back-end digital technologies: degrees of maturity	**Not adopted**	**Planned to be adopted in the short time (in 3 years)**	**Adopted**
CRM			X
WMS			X
RFId	X		
In-store customer monitoring			X
Demand, inventory, distribution planning			X
Business intelligence system			X
Integrated information management (between the online and offline channels)		X	

Then, in Table 5.35 are displayed the average scores obtained.

By looking at the Italian Retail average, CRM is the most adopted and, on the contrary, RFId and WMS are the lowest ones, consistently to their relative importance observed in the previous paragraph.

Going into detail, the former generally obtained very high maturity levels in quite all the sectors, with exception of grocery retailers that implemented it much less.

Concerning RFId and WMS, the only sector that achieved good results is Other. In particular, grocery and furniture and home improvement showed extremely low scores regarding the adoption of the first technology.

Moreover, companies belonging to the Other sectors possess strong implementation level in both in-store customer monitoring and demand, inventory, distribution planning.

Then, it is remarkable to notice that grocery retailers obtained an extremely high score regarding business intelligence system.

With regard to the clothing and personal accessories sector, such retailers showed a much higher maturity in integrated information management than other industries.

Table 5.35: Sector scores in the back-end digital technologies macro-dimension

Back-end digital technologies: scores	**Italian Retail average**	**Clothing and personal accessories**	**Grocery**	**Furniture and home improvement**	**Other**
CRM	0.81	0.89	0.63	0.82	0.83
WMS	0.47	0.46	0.50	0.41	0.67
RFId	0.39	0.57	0.19	0.23	0.67
In-store customer monitoring	0.65	0.61	0.56	0.73	0.83
Demand, inventory, distribution planning	0.74	0.68	0.75	0.73	1.00
Business intelligence system	0.76	0.75	0.94	0.68	0.67
Integrated information management (between the online and offline channels)	0.64	0.79	0.44	0.64	0.50

Overall, it can be noticed from Chart 5.13 that Italian retailers are performing well in such dimension.

Other is the most mature sector regarding the back-end digital technologies with a significant final score. Then, it is followed by clothing and personal accessories, positioning before furniture and home improvement. In the last position, instead, it can be found the grocery sector.

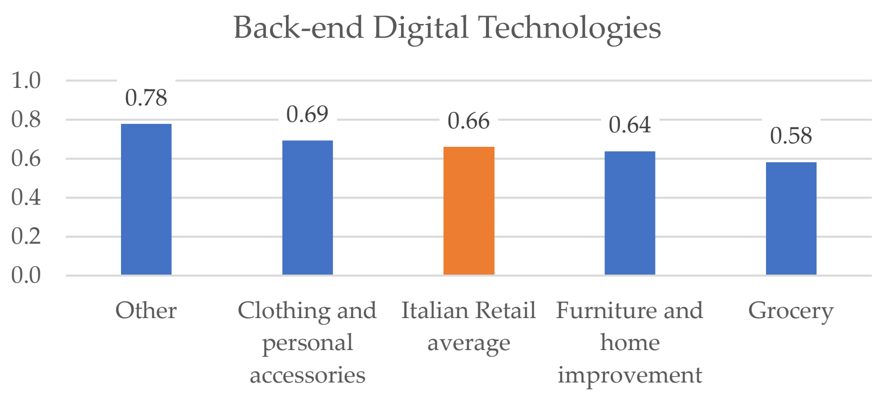


Chart 5.13: Cross-sector comparison of the final scores in the back-end digital technologies macro-dimension

5.3.6. Operations

The last dimension considered in the framework is related to operations. As already shown in the literature analysis, 5 main drivers can be found and considered.

- *Stock management* is the practice of ordering, storing, tracking, and controlling inventory. In other words, stock management covers every aspect of a business's inventory.
- *Fulfilment structures management* concerns the administration and integration of the centres that handle inventory, process orders and ship goods.
- *Order preparation management* is the activity of picking, sorting and distributing material from one loading unit to several others, for instance from a pallet load to boxes.
- *Order management* refers to the activity of monitoring orders received, optimising people's work, and improving processes. In short, it mainly means keeping track of orders and managing customer data.
- *Return management* is the process by which activities associated with returns, reverse logistics, gatekeeping, and avoidance are managed within the firm and across key members of the supply chain. The correct implementation of this process enables management not only to manage the reverse product flow efficiently, but to identify opportunities to reduce unwanted returns.

Regarding these dimensions, the omnichannel maturity level of companies was measured according to their integration across the diverse channels, online and offline. Efficiency, via improving operational performance and lowering costs, and effectiveness, through delivering goods much more quickly and avoiding stock-outs, are often the linked major benefits of omnichannel integration.

Weights discussion

Concerning the diverse strategic importance of each dimension, their weights are displayed in Table 5.36.

By looking at the Italian average, it can be found that the considered drivers received comparable strategic importance.

In particular, order and stock management obtained slightly higher evaluations. Regarding the former, the sectors concurred that it was marginally more pertinent, especially grocery retailers. With regard to the latter, the situation seemed to be similar, but it can be noted that pharmaceutical companies considered stock management not so relevant as the other sectors.

Still analysing the Italian Retail average evaluations, fulfilment structures management received a low weight and, going more in detail, furniture and home improvement and publishing considered it much less relevant respect the other dimensions.

Moving to the diverse sectors, it can be seen that clothing and personal accessories considered order preparation management less strategic than other drivers.

Finally, grocery retailers are the ones who gave return management the least consideration.

Table 5.36: Sector weights in the operations macro-dimension

Operations: weights	**Italian Retail average**	**Clothing and personal accessories**	**Grocery**	**Furniture and home improvement**	**Beauty and personal care**	**Consumer electronics and appliances**	**Publishing**	**Pharmaceutics**
Stock management	20.5%	21.0%	21.1%	20.1%	20.0%	20.0%	21.1%	17.4%
Fulfilment structures management	18.7%	20.4%	18.0%	16.9%	20.0%	20.0%	15.8%	17.4%
Order preparation management	19.8%	18.3%	20.9%	20.2%	20.0%	20.0%	21.1%	21.7%
Order management	20.9%	20.4%	22.1%	21.0%	20.0%	20.0%	21.1%	21.7%
Return management	20.1%	20.0%	18.0%	21.8%	20.0%	20.0%	21.1%	21.7%

Scores discussion

In the company specific survey, it was asked to respondent which of these operations drivers were integrated across the diverse channels. As shown in Table 5.37, a 3-levels classification were used to determine their integration level and finally a practical example is given.

Moving to the results obtained, Table 5.38 displays the average scores of the whole population analysed and each sector.

As shown by the Italian average scores, retailers managed to obtain high maturity levels in all the considered dimensions, with a slightly higher value concerning order management and a lower one in return management.

Table 5.37: Practical example of the company specific survey in the operations macro-dimension

Score	0	0.5	1
Operations: degrees of maturity	**Not adopted**	**Planned to be adopted in the short time (in 3 years)**	**Adopted**
Stock management			X
Fulfilment structures management			X
Order preparation management	X		
Order management			X
Return management			X

Coherently with the weights discussed before, quite every sector achieved a high level of implementation in order management, especially Other and clothing and personal accessories. The only exception was the furniture and home improvement industry, which differed from the others showing a much lower maturity level, despite the great importance given to this dimension.

Table 5.38: Sector scores in the operations macro-dimension

Operations: scores	**Italian Retail average**	**Clothing and personal accessories**	**Grocery**	**Furniture and home improvement**	**Other**
Stock management	0.73	0.81	0.63	0.64	1.00
Fulfilment structures management	0.74	0.81	0.69	0.64	1.00
Order preparation management	0.74	0.73	0.81	0.64	1.00
Order management	0.81	0.92	0.88	0.59	1.00
Return management	0.66	0.88	0.50	0.45	0.83

Moving on it can be noticed how stock management, fulfilment structures management and return management shared the same level of adoption. In all these cases the results showed a significantly high level of implementation of clothing and personal accessories and Other sectors, while, conversely, a low level reached by grocery and furniture and home improvement.

Regarding order preparation management, Other reached the highest score, followed by grocery. On the other hand, furniture and home improvements showed a much lower score respect the other industries.

Finally, as in the other sections, the level of maturity of each sector concerning operations was measured through the weighted average of the scores and strategic relevance evaluations.

As shown in Chart 5.14, results obtained are very dispersed. Companies belonging to the Other sector achieved an extremely high maturity level. Then, clothing and personal accessories followed with a very high score. Next, grocery retailers showed good results. Finally, in the last place it can be found furniture and home improvement sector with a medium-high score, highlighting how such industry still has a long way to go to achieve full integration of operations across the diverse channels.

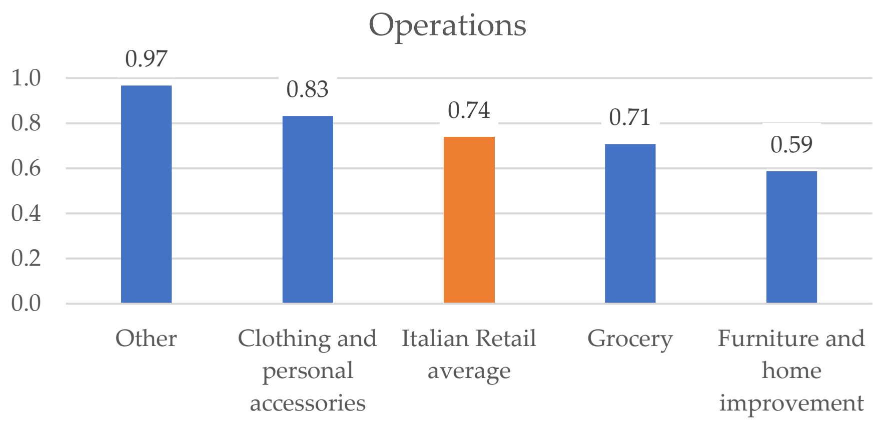


Chart 5.14: Cross-sector comparison of the final scores in the operations macro-dimension

5.3.7. Italian Retail general overview

Finally, a broader analysis can be carried out by analysing the scores achieved by the Italian retailers in general, considering all the diverse industries as an aggregate.

In Chart 5.15 the final Italian scores in the various macro-dimensions of the framework can be observed. Such maturity levels were calculated as the average scores of all the retailers, considering for each one of them their respective sector's weights.

Operations resulted to be the most implemented macro-area, achieving a final score of 0.74. This highlights a higher level of maturity in this topic in Italy showing how such subject is frequently addressed and improved.

Moving on, the following most mature macro-dimensions resulted to be the data integration and the back-end digital technologies, achieving respectively an overall score of 0.67 and 0.66. As the previous, also these results are quite high and show how such dimensions are typically implemented by Italian retailers.

Then, it can be noticed from the omnichannel models' macro-dimension, that achieved a medium score equal to 0.56, that the Italian retailers are progressively adopting such innovative features. With the Click & Collect slowly becoming a standard model, an increasingly number of companies are empowering their current strategies in order to offer a seamless experience to their customers.

Lastly, it can be noticed how the mobile app and the store are the less mature macro-areas, with a final score of 0.45 and 0.44 respectively, pointing out how front-end topics seems to receive less attention.

In general, such results highlighted how the current Italian landscape appear to be much mature concerning back-end activities, while the renovation of the role of the bricks-and-mortar store or the efficient use of the mobile channel and its features seemed less significant.

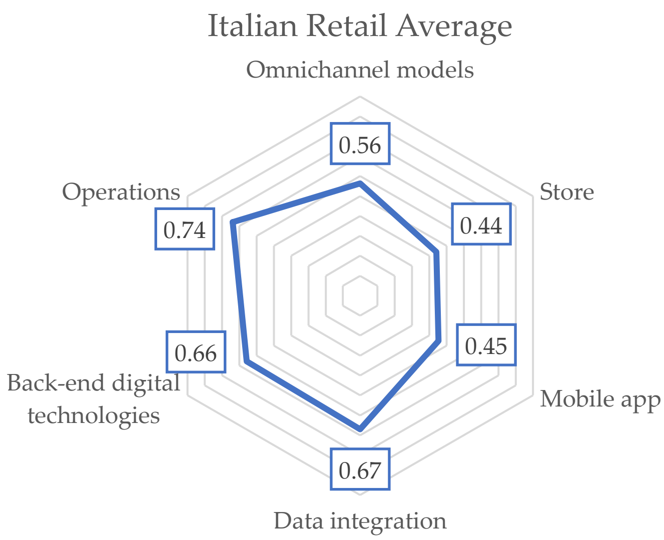


Chart 5.15: Overview of the Italian Retail average in the Omnichannel Maturity Framework

5.4. Cluster analysis

In this last section, data collected through the framework were furtherly analysed through cluster techniques. As already mentioned, such analysis allowed an additional detailed analysis concerning the omnichannel strategies currently adopted by Italian retailers.

It was decided to apply cluster techniques in order to find, if present, recurrent patterns showing which strategies are typically adopted by retailers.

5.4.1. Methodology

To properly conduct such analysis, hierarchical clustering was used to identify and investigate the main omnichannel strategies adopted by Italian retailers. Since the desired number of clusters was not known in advance, it was chosen to utilize this method rather than K-means because it allowed a more comprehensive evaluation of the findings and the determination of the ideal number of clusters.

Moreover, it was decided to apply such analysis through Ward's method which seemed to perform much better than other techniques, such as single, complete, and average linkages.

Moving to the process followed, the results from the company-specific survey were first uploaded and analysed using RStudio, which was used for the entire analysis.

Then, hierarchical clustering with Ward's method was performed for each macro-dimension and the relative dendrograms were plotted, which showed the sequence in which clusters were merged. By analysing the latter, it was possible to define which was the optimal number of clusters for each macro-dimension.

Finally, once decided the desired number of clusters, the final partitions were extrapolated and studied. In particular, two distinctive analyses were made.

First, with regard to each sector, it was investigated its distribution across the diverse clusters in order to define the main strategies adopted by Italian retailers.

As in the previous analysis, sectors were divided in the same 4 macro classes: clothing and personal accessories, grocery, furniture and home improvement, and Other.

Finally, clusters were investigated by analysing their scores, and so maturity levels, to properly identify their key characteristics and the main differences among them.

Additional information concerning the code used and dendrograms obtained is presented in Cluster analysis methodology.

5.4.2. Omnichannel models

Starting with omnichannel models, hierarchical clustering suggested the presence of 3 relevant clusters, as shown in its specific dendrogram (Annex 14).

As displayed in Table 5.39, clothing and personal accessories and furniture and home improvement resulted to belong more to the first cluster. Then, grocery retailers were typically represented by the third cluster and finally Other showed a very high similarity and belonging to the second cluster.

Table 5.39: Sector distribution across the diverse clusters in the omnichannel models macro-dimension

Omnichannel models: sector distribution	Cluster 1 (16)	Cluster 2 (9)	Cluster 3 (12)
Clothing and personal accessories (14)	57%	14%	29%
Grocery (8)	25%	13%	63%
Furniture and home improvement (11)	55%	27%	18%
Other (4)	0%	75%	25%

In order to determine the current maturity levels of the various groups, the centroids of each cluster were examined in more detail.

As shown in Table 5.40, cluster 3 represents those retailers with a very low level of maturity concerning omnichannel models, thus it was renamed as "Models Laggard". In such class, all the diverse dimensions obtained the lowest score, especially online purchase in store, ship from store, and Curbside pick-up. Coherently with the previous analyses, such cluster is typically composed by grocery retailers which got the worst final score.

Moving to the other two clusters, it appeared that cluster 2 is much more mature than the first cluster in quite all the considered dimensions except cross channel return and, for such reason, it was renamed as "Sales Leader". In fact, such retailers, mainly Other, are not very interested in reverse flows but they are much more focused on direct sales as they resulted to be significantly mature concerning Click & Collect, Reserve & Collect, ship from store, and inventory availability check.

On the other hand, cluster 1 obtained an extremely higher score respect the counterparts concerning cross channel return, highlighting how retailers belonging to such cluster, mainly clothing and personal accessories and furniture and home improvement, focus on reverse flows, so it was renamed as "Returns Oriented".

Moreover, it showed high evaluations concerning Click & Collect, online purchase in store, and ship from store.

Table 5.40: Centroid scores of the diverse clusters in the omnichannel models macro-dimension

Omnichannel models: centroid scores	**Cluster 1 Returns Oriented**	**Cluster 2 Sales Leader**	**Cluster 3 Models Laggard**
Click & Collect (or Buy Online Pick-up in Store)	0.77	1.00	0.61
Reserve & Collect (book online, pay and pick-up in store)	0.37	1.00	0.25
Online purchase in store	0.75	0.74	0.03
Ship from store	0.77	0.96	0.06
Curbside pick-up (or Click & Drive)	0.25	0.41	0.03
Cross channel return	0.85	0.44	0.44
Inventory availability check	0.62	1.00	0.33

5.4.3. Store

Concerning store dimension, it was decided to select four different clusters, according to the dendrogram shown in Annex 15, while the sector distribution is represented in Table 5.41.

The majority of retailers belonging to the clothing and personal accessories sector were found to fall in the last cluster, with a minor presence also in the first two groups. Additionally, it was found out that this industry was not represented by the third cluster.

On the contrary, the vast majority of the grocery retailers turned out to belong to the third cluster, with just few companies being also in the first and last one.

Moving on, furniture and home improvement sector resulted to be present mainly in the second and fourth clusters, with the last one containing a much higher number.

Finally, Other companies turned out to be predominantly concentrated in the second cluster, with the remaining part in the third one.

Table 5.41: Sector distribution across the diverse clusters in the store macro-dimension

Store: sector distribution	**Cluster 1 (7)**	**Cluster 2 (7)**	**Cluster 3 (7)**	**Cluster 4 (15)**
Clothing and personal accessories (14)	36%	14%	0%	50%
Grocery (8)	13%	0%	63%	25%
Furniture and home improvement (11)	9%	27%	9%	55%
Other (3)	0%	67%	33%	0%

Moving on with the analysis, from Table 5.42 it can be seen the centroid scores regarding the store spaces.

With strong performances, particularly in the first two dimensions, the third cluster emerged as the most mature across all dimensions. Coherently with the previous analysis, in which grocery retailers demonstrated a very high level of maturity, this class turned out to be mainly composed by these retailers.

Then, clusters 1 and 4 presented similar characteristics. In particular, the latter showed slightly better results in all the dimensions, especially parcel locker which obtained in the first cluster an extremely low value.

Finally, the second cluster resulted to have the lowest maturity level for each dimension. As reported above, the majority of Other companies fell in such cluster highlighting their low maturity level.

Table 5.42: Centroid scores of the diverse clusters in the store spaces dimension

Store spaces: centroid scores	Cluster 1 Employees Oriented	Cluster 2 Digital Innovator	Cluster 3 Purchase Accelerator	Cluster 4 Store Laggard
eCommerce order preparation areas	0.48	0.38	0.71	0.55
Pick-up and return point in-store	0.52	0.05	0.86	0.62
Parcel locker	0.00	0.19	0.52	0.24
Curbside pick-up areas	0.09	0.09	0.14	0.13

Looking at Table 5.43, it can be observed the results related to the store employees.

The first two classes presented very high maturity levels in all the dimensions, with the second one showing a lower value concerning eCommerce and cross-channel ordering support activities. In particular, as the majority of Other companies fell in the latter class, it could be possible to remark their high maturity levels concerning relationship and transactional activities with remote customers and the use of in-store technological solutions to support omnichannel.

On the other hand, the remaining clusters presented much lower scores, with cluster 4 being the worst in all dimensions.

Coherently with the previous analyses, as grocery retailers mainly belonged to the third cluster, such companies showed middle-low maturity levels.

Lastly, the fourth cluster, which was typically addressed by clothing and personal accessories and furniture and home improvement, resulted to contain the retailers with the lowest implementation level in the market.

Table 5.43: Centroid scores of the diverse clusters in the store employees dimension

Store employees: centroid scores	**Cluster 1** Employees Oriented	**Cluster 2** Digital Innovator	**Cluster 3** Purchase Accelerator	**Cluster 4** Store Laggard
Relationship and transactional activities with remote customers	0.95	0.95	0.57	0.31
eCommerce and cross-channel ordering support activities	0.90	0.67	0.62	0.51
Use of in-store technological solutions to support omnichannel	0.90	0.81	0.43	0.27

Finally, in-store technologies were analysed with Table 5.44 showing the clusters obtained.

Starting with the first one, retailers belonging to this group resulted to be mature in few dimensions. Going more in detail, such retailers mainly based their strategies on mobile POS, visit reservation from remote systems for in-store appointment and solutions to expand the assortment of stores, reaching the highest scores. On the other hand, this cluster achieved very low levels of implementation regarding the other ones, especially self-check-out system, virtual fitting room & virtual mirror, and self-scanning and smart carts.

With regard to the second cluster, retailers showed an extremely level of adoption concerning solutions to collect visitor information and interactive showcases and digital signage. Moreover, such retailer achieved the highest score regarding innovative payments, smart labels / smart shelves, and AR/VR devices. Lastly, it can be noted that this this cluster is the only one which implemented virtual fitting room & virtual mirror, highlighting how in such class are belonging those retailers which applied such solutions, typically from clothing and personal accessories and beauty and personal care sectors.

Moving to the third sector, the strategy followed by such retailers is based on kiosks/totems/touchpoints to gather information in-store, self-check-out system, beacon/indoor positioning, self-scanning and smart carts, and scan&Go systems, achieving the highest maturity levels.

Lastly, the fourth cluster showed a low maturity level in almost all the variables considered, with the only exception related to the mobile POS, kiosks/totems/touchpoints to gather information in-store, and solutions to collect visitor information.

Table 5.44: Centroid score of the diverse clusters in the in-store technologies dimension

In-store technologies: centroid scores	**Cluster 1 Employees Oriented**	**Cluster 2 Digital Innovator**	**Cluster 3 Purchase Accelerator**	**Cluster 4 Store Laggard**
Kiosks/totems/touchpoints to gather information in-store	0.29	0.29	1.00	0.43
Innovative payments	0.07	0.43	0.21	0.30
Self-check-out system	0.00	0.36	0.79	0.30
Solutions to collect visitor information	0.21	1.00	0.50	0.40
Beacon/indoor positioning	0.07	0.36	0.64	0.23
Interactive showcases and digital signage	0.29	0.93	0.36	0.17
Virtual fitting room & virtual mirror	0.00	0.14	0.00	0.00
Solutions for virtual queue management	0.21	0.21	0.00	0.10
Self-scanning and smart carts	0.00	0.07	0.50	0.10
Scan&Go systems	0.07	0.07	0.64	0.10
Mobile POS	0.93	0.71	0.43	0.53
Smart labels / smart shelves	0.29	0.57	0.43	0.23
Visit reservation from remote systems for in-store appointment	0.79	0.50	0.29	0.07
Solutions to expand the assortment of stores	0.71	0.29	0.29	0.20
AR/VR devices	0.14	0.29	0.00	0.07

In conclusion, the four clusters can be analysed from a wider perspective.

The first cluster showed medium attention to store spaces and a much lower to in-store technologies, except some specific such as mobile POS, while it showed an extremely high maturity level concerning employees. For such reason it was defined as “Employees Oriented”.

Moving to the second cluster, it was renamed as “Digital Innovator” due to its high implementation levels in innovative technologies typically less adopted by the market. In particular, this group showed significant results in innovative payments, smart labels / smart shelves, AR/VR devices, and virtual fitting room & virtual mirror.

Concerning the third cluster, such retailers showed the highest scores regarding store spaces, especially pick-up and return point in-store, and also some in-store technologies, specifically regarding kiosks/totems/touchpoints to gather information in-store, self-check-out system, beacon/indoor positioning, self-scanning and smart carts, and Smart labels / smart shelves. Such cluster was defined “Purchase Accelerator” as it is focused on solutions aiming to facilitate and accelerate the purchasing process, in particular through ad hoc spaces and smart technologies.

Finally, cluster 4 showed a medium-low level in quite all the dimensions highlighting a low implementation level and so it was renamed as “Store Laggard”.

5.4.4. Mobile app

Proceeding with the analysis, in Table 5.45 there are displayed the sector distribution regarding the mobile app macro-area. The number of clusters considered were three, according to this section dendrogram (Annex 16).

As shown, the furniture and home improvement sector presented a great similarity towards the first cluster.

On the other hand, the other sectors showed a scattered distribution across the different clusters. In particular, clothing and personal accessories resulted to be more or less equally distributed while grocery and Other retailers turned out to be mainly contained in the first two clusters.

Table 5.45: Sector distribution across the diverse clusters in the mobile app macro-dimension

Mobile app: sector distribution	**Cluster 1 (19)**	**Cluster 2 (10)**	**Cluster 3 (7)**
Clothing and personal accessories (13)	38%	23%	38%
Grocery (8)	38%	50%	13%
Furniture and home improvement (11)	82%	9%	9%
Other (4)	50%	50%	0%

Before starting with the analysis of the clusters' maturity levels, it is important to point out the characteristics of the third cluster. As it is going to be seen in the following paragraphs, this cluster is composed exclusively of retailers with an extremely low level of maturity in most of the dimensions. These results occurred since the majority of these companies had not implemented yet a mobile app inside their current business strategy so retailers belonging to this cluster were defined as "Mobile App Laggard". For this reason, the following considerations will regard the first two clusters, excluding the third one from the analysis.

Going back to the cluster results, in Table 5.46 it can be seen that the first two clusters showed overall high scores, with medium scores regarding the possibility to see the stock availability, the possibility to see full product range and the up-selling techniques.

In particular, the second one resulted to be more mature than the first one in the majority of the cases. The only exceptions were the possibility to see full product range and the up-selling techniques, which presented in the first cluster much higher maturity levels highlighting a greater attention towards such features.

Table 5.46: Centroid scores of the diverse clusters in the pre-purchase dimension

Mobile app pre-purchase: centroid scores	**Cluster 1 Information Search Supporter**	**Cluster 2 Mobile App Leader**	**Cluster 3 Mobile App Laggard**
Possibility to see the stock availability (both for online and in-store)	0.47	0.60	0.00
Possibility to see product prices	0.84	0.90	0.00
Possibility to see full product range	0.79	0.50	0.14
Possibility to see current discounts (e.g., flyer)	0.89	0.95	0.00
Possibility to see the location of stores	0.76	0.80	0.14
Cross-selling (recommending a complementary or related products)	0.71	0.70	0.00
Up-selling (recommending a comparable higher-end product)	0.66	0.55	0.14

Moving to in-store activities, in Table 5.47 the related results are provided.

Cluster 2 achieved high evaluations concerning the access to additional info about products and shopping lists, while presented medium-low scores regarding wayfinding and/or store map and the possibility to purchase online directly in-store.

On the other hand, the first cluster presented a comparable maturity level regarding shopping lists and a slightly higher one concerning the possibility to purchase online directly in-store. Moreover, such cluster achieved much lower results with regard to the remaining dimensions.

Table 5.47: Centroid scores of the diverse clusters in the in-store activities dimension

Mobile app in-store activities: centroid scores	Cluster 1 Information Search Supporter	Cluster 2 Mobile App Leader	Cluster 3 Mobile App Laggard
Access to additional info about products	0.66	0.80	0.00
Wayfinding and/or store map	0.13	0.30	0.00
Shopping lists	0.68	0.65	0.00
Possibility to purchase online directly in-store	0.50	0.35	0.00

Moving to the next mid-dimension, the results related to the online purchase phase are going to be discussed and in Table 5.48 are represented the scores obtained.

Concerning this stage, it can be noticed a clear distinction between the first two clusters.

From one side, the first class resulted to have a low maturity level, while from the other, the second one achieved higher scores.

Going into detail the latter ended up with medium scores concerning the implementation of the shared shopping cart and the link to wallet apps. Moreover, such cluster achieved a significant high score regarding the possibility to order from app.

On the other hand, cluster 1 performed much worst, with a slightly worst score concerning the link to wallet apps during payment and very low maturity levels with regard to the remaining dimensions.

Table 5.48: Centroid scores of the diverse clusters in the online purchase dimension

Mobile app online purchase: centroid scores	Cluster 1 Information Search Supporter	Cluster 2 Mobile App Leader	Cluster 3 Mobile App Laggard
Possibility to order from the app	0.29	0.80	0.00
Shared shopping cart between app and website	0.21	0.55	0.00
Link to wallet apps during payment	0.47	0.50	0.00

Moving to the post-purchase phase, from Table 5.49 it can be observed that the results were similar to the previous mid-dimension but amplified.

Here the distinction between the first two clusters was even clearer. The second group turned out to be highly mature in each dimension and, on the contrary, the first cluster resulted to adopt poorly each feature.

Coherently with prior analyses, the obtained scores highlighted how retailers belonging to the furniture and home improvement sector typically present low implementation levels in such features.

Table 5.49: Centroid scores of the diverse clusters in the post-purchase dimension

Mobile app post-purchase: centroid scores	Cluster 1 Information Search Supporter	Cluster 2 Mobile App Leader	Cluster 3 Mobile App Laggard
Connection to the customer service	0.39	0.85	0.00
Possibility to give feedbacks	0.39	0.85	0.14
Possibility to plan a return	0.29	0.70	0.00

Lastly, the results related to loyalty features in the mobile app are represented in Table 5.50.

The maturity levels shown followed the previous scores. Once again, the first cluster showed low maturity levels, especially the possibility to access to the rewards catalogue.

On the other side, the second cluster obtained nearly the maximum degree of implementation in all the dimensions, highlighting how the companies belonging to this cluster resulted to be significantly mature concerning loyalty features.

Table 5.50: Centroid scores of the diverse clusters in the loyalty dimension

Mobile app loyalty: centroid scores	**Cluster 1 Information Search Supporter**	**Cluster 2 Mobile App Leader**	**Cluster 3 Mobile App Laggard**
Possibility to connect the loyalty card (to use online or in-store)	0.53	1.00	0.00
Possibility to access to the reward system linked to the user loyalty account (e.g., see the amount of earned points)	0.39	1.00	0.00
Possibility to access to the rewards catalogue	0.18	0.95	0.00

Finally, once defined in detail the strategies adopted by clusters 1 and 2, it was possible to define their strategies from a wider perspective.

The first cluster showed good results typically in the pre-purchase phase and also concerning the access to additional information in the store phase. For such reasons, these retailers showed high attention to supporting information search and facilitating the purchase in the early stages, so this cluster was defined as "Information Search Supporter".

Concerning second cluster, as shown, retailer presented extremely high values in all the dimensions considered so the cluster was renamed as "Mobile App Leader".

5.4.5. Data integration

Moving to data integration, the hierarchical clustering analysis suggested the presence of 4 relevant clusters (Annex 17).

As shown in Table 5.51, clothing and personal accessories and grocery appeared to be quite distributed across clusters 1, 3, and 4, showing that retailers belonging to such sectors are not following a unique strategy, but they seem very diversified.

Furniture and home improvement appeared to belong much more to clusters 1 and 2.

Finally, Other showed a very strong affiliation to cluster 4.

Table 5.51: Sector distribution across the diverse clusters in the data integration macro-dimension

Data integration: sector distribution	Cluster 1 (11)	Cluster 2 (7)	Cluster 3 (10)	Cluster 4 (8)
Clothing and personal accessories (14)	29%	14%	36%	21%
Grocery (8)	25%	0%	38%	38%
Furniture and home improvement (11)	45%	36%	18%	0%
Other (3)	0%	33%	0%	67%

By analysing each cluster in detail (Table 5.52), two groups of clusters were found: from one side clusters 1 and 4, and on the other side clusters 2 and 3.

The former resulted to have very low implementation levels. In particular, the fourth cluster obtained extremely low scores concerning operations related dimensions, such as inventory and production capacity planning and order and delivery management. On the other hand, this cluster showed high maturity level concerning the generation of ad hoc promotions and discounts, thus it was renamed as “Marketing Oriented”. Moving to the first cluster, the creation and monitoring of omnichannel specific KPIs obtained a very high score highlighting how retailers belonging to this class, typically from furniture and home improvement, are highly concerned about such dimension so such cluster was defined as “KPIs Oriented”.

Concerning clusters 2 and 3, these classes presented very high implementation levels. With regard to the second cluster, it was defined “Data Leader” as the retailers showed an extremely high maturity level, as it can be noted from the fact that quite all the dimensions achieved the maximum score. Moving to the third cluster, it is significantly different from the second one, as generation of ad hoc promotions and discounts received a much higher score highlighting the high maturity level of such dimensions across the retailers belonging to this group, typically from clothing and personal accessories and grocery sectors. Anyway, it can be noticed the extremely low performance achieved in the production capacity planning, highlighting a possible area for improvement. Due to the very high performances but not fully developed, such cluster was defined as “Data Challenger”.

Table 5.52: Centroid scores of the diverse clusters in the data integration macro-dimension

Data integration: centroid scores	**Cluster 1** **KPIs Oriented**	**Cluster 2** **Data Leader**	**Cluster 3** **Data Challenger**	**Cluster 4** **Marketing Oriented**
Segmentation and targeting (omnichannel single profiling)	0.68	1.00	1.00	0.69
Generation of ad hoc promotions and discounts	0.59	0.79	1.00	0.81
Inventory planning	0.50	1.00	0.85	0.00
Production capacity planning	0.41	1.00	0.25	0.00
Order management	0.68	1.00	1.00	0.06
Demand analysis	0.59	1.00	0.75	0.50
Delivery management (e.g., planning, optimal bundling)	0.41	1.00	0.80	0.00
Creation and monitoring of omnichannel specific KPIs	0.91	1.00	0.85	0.63
Optimisation of fulfilment structures (spaces, staff, resources…)	0.23	1.00	0.95	0.13

5.4.6. Back-end digital technologies

Concerning the back-end digital technologies, the related dendrogram suggested the presence of 4 diverse clusters (Annex 18).

As shown in Table 5.53, all the sectors generally turned out to belong to the second cluster, highlighting how in such macro-dimension it was impossible to get insights about significant differences among the diverse industries. For such reason, it is possible to assume that retailers concerning back-end digital technologies adopt similar and comparable strategies.

Table 5.53: Sector distribution across the diverse clusters in the back-end digital technologies macro-dimension

Beck-end digital technologies: sector distribution	**Cluster 1 (8)**	**Cluster 2 (16)**	**Cluster 3 (7)**	**Cluster 4 (5)**
Clothing and personal accessories (14)	29%	43%	7%	21%
Grocery (8)	13%	50%	38%	0%
Furniture and home improvement (11)	18%	36%	27%	18%
Other (3)	33%	67%	0%	0%

Going into detail, by looking at Table 5.54 cluster 1 presented the highest maturity level concerning CRM, RFId, integrated information management, in-store customer monitoring, and demand, inventory, distribution planning. On the other hand, such retailers showed low implementation level regarding WMS and business intelligence system. Due to the high attention to customer-oriented and planning technologies, this cluster was renamed as "Customer & Planning Leader".

With regard to the second cluster, which, as mentioned before, resulted to be the one containing the majority of Italian retailers, it showed comparable results to the previous class with some major differences. First of all, WMS received an extremely high maturity level, the highest among all the clusters, and a very high score concerning business intelligence system and demand, inventory, distribution planning. On the other hand, this class turned out to have a low implementation of RFId and in-store customer monitoring. For these reasons, it was defined as "Efficiency Leader", as it turned out to be the only group highly focused on these aspects.

Moving to cluster 3, it received by far the lowest value regarding CRM and, on the other hand, obtained the maximum value referring business intelligence system, so it was defined as "Business Intelligence Oriented". Moreover, such retailers presented low implementation level concerning integrated information management.

Finally, cluster 4 showed extremely low scores for quite all the addressed dimensions except CRM, which received a high evaluation comparable to the ones received by the first two groups, highlighting how such companies are giving much more relevance to the implementation of this technology. For this reason, this cluster was renamed as "CRM Oriented".

Table 5.54: Centroid scores of the diverse clusters in the back-end digital technologies macro-dimension

Back-end digital technologies: centroid scores	**Cluster 1 Customer & Planning Leader**	**Cluster 2 Efficiency Leader**	**Cluster 3 Business Intelligence Leader**	**Cluster 4 CRM Oriented**
CRM	1.00	0.91	0.29	0.90
WMS	0.13	0.88	0.29	0.00
RFId	0.56	0.41	0.29	0.20
Integrated information management (between the online and offline channels)	0.94	0.78	0.21	0.30
Business intelligence system	0.50	0.97	1.00	0.20
In-store customer monitoring	0.94	0.59	0.86	0.10
Demand, inventory, distribution planning	1.00	0.88	0.57	0.10

5.4.7. Operations

Concerning the final macro-dimension, hierarchical clustering returned 2 clusters, as shown in its relative dendrogram (Annex 19).

As in the previous section, there are no particular sector differences among the analysed clusters, as the first one turned out to be addressed by the majority of retailers of each industry, especially Other (Table 5.55).

Table 5.55: Sector distribution across the diverse clusters in the operations macro-dimension

Operations: sector distribution	**Cluster 1 (24)**	**Cluster 2 (11)**
Clothing and personal accessories (13)	77%	23%
Grocery (8)	63%	38%
Furniture and home improvement (11)	55%	45%
Other (3)	100%	0%

By looking at the clusters' maturity levels in Table 5.56, it can be found that the two clusters represent two divergent strategies, specifically high and low maturity level. For such reason, no particular insights could be carried out through such analysis. The former was defined as "Operations Leader" due to its very high integration levels and, on the other hand, the latter was defined as "Operations Laggard".

By investigating the relative dendrogram more in depth (Annex 19), no additional observations could be found concerning cluster 2. On the other side, cluster 1 could be divided in two additional classes, but this did not lead to any relevant results.

Table 5.56: Centroid scores of the diverse clusters in the operations macro-dimension

Operations: centroid scores	**Cluster 1 Operations Leader**	**Cluster 2 Operations Laggard**
Stock management	0.92	0.32
Fulfilment structures management	1.00	0.18
Order preparation management	0.92	0.36
Order management	0.98	0.45
Return management	0.83	0.27

6 Conclusion and future developments

6.1. Conclusions

The purpose of this paper is to provide a thorough examination of all the factors involved in an omnichannel strategy in the Retail industry. The research focused on the creation of the Omnichannel Maturity Framework, enabling the analysis and mapping of the current Italian Retail scenario and the identification of the most adopted omnichannel strategies.

The work's introduction provided a thorough overview of the Retail industry, analysing the expansion and development of the eCommerce industry, the renovation of the role of physical stores and how omnichannel strategies can merge the diverse channels to provide a seamless customer experience. In particular, it was comprehended the progression of Retail from single channel, passing through multichannel and crosschannel, to omnichannel.

Moving on, an in-depth analysis of the scientific and non-scientific literature review allowed to identify the most relevant factors addressing such innovative topic, laying the foundations for a more thorough comprehension of this phenomena.

First, this study permitted to comprehend the relevance of back-end activities and solutions that can be implemented to dynamically integrate channel management. The integration in the logistics and operations, such as stock, order and delivery management, has been deeply examined, understanding the efficiency and effectiveness benefits achievable. Additionally, it emerged the importance to implement digital solutions to assist and simplify such supply chain processes.

Secondly, the importance of the integrated use of data was noted. Customers now use several channels in an integrated approach rather than being restricted to a single one. Because of this, different sales channels must be handled and optimized together rather than independently. In such environment, the integrated use of data is crucial to enable the effective management and optimisation of an omnichannel model, where activities such as planning or marketing are conducted taking into account all the pertinent factors together.

Then, the relevance of front-end aspects was highlighted, from the renovation of the physical point of sale, which is gradually evolving into a technology-rich environment, supporting eCommerce activities and even providing an enhanced customer experience, to improvements related to the role of employees and their new tools and skill required.

The above-mentioned literature investigation revealed the necessity of developing a classification framework that could assess the maturity level of omnichannel retailers, evaluate their current status respect the industry average and could highlight areas for further improvement providing a more precise understanding of the strengths and weaknesses of each unique firm.

The identification of the most relevant variables in the literature analysis, allowed the development of The Omnichannel Maturity Framework. This model is composed by six macro-dimensions, each one addressing a relevant topic concerning omnichannel strategies, and can evaluate for each of them the current level of implementation by assigning a score from 0 to 1.

Additionally, this model was designed to objectively compare retailers operating in various industries. The framework was supported by the usage of a survey, through which the strategic importance of each variable for each sector was measured. This made it possible to obtain percentual weights specific to each industry and allowed the final score, measured as a weighted average of single dimensions scores, to be objective and widely comparable.

Proceeding with the analysis, the application of the framework on 38 Italian retailers allowed for a thorough investigation of the omnichannel phenomena. It appeared that omnichannel Italian retailers have reached an overall medium-high maturity level, especially regarding the back-end activities. Moreover, significant differences between industries and between the different macro-dimensions were highlighted.

Finally, the framework was used jointly to hierarchical clustering techniques in order to identify the most relevant omnichannel strategies by means of clusters. Regarding the last ones, some interesting insights emerged from the analysis. Through the hierarchical clustering each macro-dimension was assessed, allowing an additional detailed study concerning the omnichannel strategies currently most adopted by Italian retailers. In particular, such analysis remarked different approaches and priorities, revealing additional differences among sectors.

In conclusion, the framework's benefits are doubled, as it applies both to an academic and a managerial perspective:

- Starting with the academic and research level, such framework offers researchers a crucial tool to conduct a deeper analysis about the sector differences in omnichannel terms and to highlight the distinctive approaches taken by companies, laying the foundations for further research concerning omnichannel Retail. Additionally, its empirical application allows to map the current state of omnichannel by taking into account both the front- and back-end aspects.
- Looking at the managerial side, retailers can use this model to map their current omnichannel level of maturity and comprehend their position in the market. Moreover, they can determine their strengths and weaknesses and, thus, use that information to support the drafting of a roadmap to improve their omnichannel areas in the future.

6.2. Limitations & Further Research

After the discussion of the empirical results obtained during the research, primary limitations of the framework and the analysis performed as well as potential areas for future investigation to deepen and enrich the work must be taken into account.

The main limitations regard the data collection.

First, the number of the answers collected turned out to be 38 from the first survey and 24 from the second one, resulting to be an overall low number. This could have an impact on the precision and reliability of the conducted studies and outcomes.

Secondly, the usage of the surveys implied to rely on the veracity of the interviewees, which could submit inaccurate data overestimating their situation or, conversely, underestimating it, thus altering the results. This limitation is accentuated given that there was just one respondent per company to compile all the information coming from different topics, consequently the latter may not have been totally aware of the company’s maturity level for all the variables considered.

Once considered the main model's limitations, several concepts can be expanded for future research.

Regarding the framework, new variables for the classification of an omnichannel strategy may always emerge, so the model can be updated with new dimensions or furtherly explore the selected ones with new variables. An example could be the governance and financial aspects, like considering the monetary correlation with the maturity level of the retailers.

Concerning the data, by expanding the number of retailers involved in the analysis, the accuracy of the results would increase, starting from the evaluation of the strategic relevance of dimensions for the diverse sectors till the final maturity levels and clusters obtained.

Moreover, the analysis carried out in this paper specifically addressed only the Italian Retail scenario so it could be interesting to enlarge the scope of analysis by considering other countries. Thus, it may allow additional research in comparing the diverse maturity levels between countries and identify additional differences.

Finally, it might be interesting to explore also the historical data and future trends of company strategies, in addition to their current maturity level. This would enable the analysis to be expanded by providing a greater understanding of the market's transition and the strategic factors driving it.

7 Bibliography

[1] B. Ratchford, G. Soysal, A. Zentner, and D. K. Gauri, 'Online and offline retailing: What we know and directions for future research', *J. Retail.*, vol. 98, no. 1, pp. 152–177, Mar. 2022, doi: 10.1016/j.jretai.2022.02.007.

[2] Accenture, 'Store of Tomorrow', Mar. 2022. Accessed: Sep. 21, 2022. [Online]. Available: https://www.accenture.com/us-en/insights/retail/store-tomorrow-future

[3] 'Spc-retail.com. What are the Different Retail Store Types?' Accessed: Nov. 22, 2022. [Online]. Available: https://spc-retail.com/what-are-the-different-retail-store-types/

[4] 'Liveabout.com. Types of Retail Ownership and How Each Might Work for You'. Accessed: Nov. 22, 2022. [Online]. Available: https://www.liveabout.com/top-types-of-retail-ownership-2890489

[5] 'Investopedia.com. What Is a Franchise, and How Does It Work?' Accessed: Nov. 22, 2022. [Online]. Available: https://www.investopedia.com/terms/f/franchise.asp

[6] K. Bilińska-Reformat and A. Dewalska-Opitek, 'E-commerce as the predominant business model of fast fashion retailers in the era of global COVID 19 pandemics', *Procedia Comput. Sci.*, vol. 192, pp. 2479–2490, Jan. 2021, doi: 10.1016/j.procs.2021.09.017.

[7] 'Statista.com. E-commerce as percentage of total retail sales worldwide from 2015 to 2021, with forecasts from 2022 to 2026'. Accessed: Nov. 22, 2022. [Online]. Available: https://www.statista.com/statistics/534123/e-commerce-share-of-retail-sales-worldwide/

[8] 'Shopify.com. The 11 Most Important Sales Channels for Ecommerce Stores [+ Examples].' Accessed: Nov. 22, 2022. [Online]. Available: https://www.shopify.com/blog/sales-channel

[9] 'Rockcontent.com. 10 Sales Channels For You To Develop Your Business Strategy.' Accessed: Nov. 22, 2022. [Online]. Available: https://rockcontent.com/blog/sales-channel/

[10] 'Bigcommerce.com. What are flash sales?' Accessed: Nov. 22, 2022. [Online]. Available: https://www.bigcommerce.com/ecommerce-answers/what-are-flash-sales/

[11] E. Voropanova, 'Conceptualizing smart shopping with a smartphone: implications of the use of mobile devices for shopping productivity and value',

Int. Rev. Retail Distrib. Consum. Res., vol. 25, no. 5, pp. 529–550, 2015, doi: 10.1080/09593969.2015.1089304.

[12] K. L. Ailawadi and P. W. Farris, 'Managing Multi- and Omni-Channel Distribution: Metrics and Research Directions', *J. Retail.*, vol. 93, no. 1, pp. 120–135, Mar. 2017, doi: 10.1016/j.jretai.2016.12.003.

[13] A. Hübner, J. Wollenburg, and A. Holzapfel, 'Retail logistics in the transition from multi-channel to omni-channel', *Int. J. Phys. Distrib. Logist. Manag.*, vol. 46, no. 6–7, pp. 562–583, 2016, doi: 10.1108/IJPDLM-08-2015-0179.

[14] M. Yrjölä, H. Saarijärvi, and H. Nummela, 'The value propositions of multi-, cross-, and omni-channel retailing', *Int. J. Retail Distrib. Manag.*, vol. 46, no. 11/12, pp. 1133–1152, Jan. 2018, doi: 10.1108/IJRDM-08-2017-0167.

[15] S. A. Neslin, 'The omnichannel continuum: Integrating online and offline channels along the customer journey', *J. Retail.*, vol. 98, no. 1, pp. 111–132, Mar. 2022, doi: 10.1016/j.jretai.2022.02.003.

[16] 'Statista.com. Total retail sales worldwide from 2020 to 2025.' Accessed: Nov. 22, 2022. [Online]. Available: https://www.statista.com/statistics/443522/global-retail-sales/

[17] 'Statista.com. Projected retail sales growth worldwide from 2022 to 2025.' Accessed: Nov. 22, 2022. [Online]. Available: https://www.statista.com/statistics/232347/forecast-of-global-retail-sales-growth/

[18] 'Statista.com. Regional e-commerce share of retail in 2020, with a forecast for 2025.' Accessed: Nov. 22, 2022. [Online]. Available: https://www.statista.com/statistics/1192717/ecommerce-share-of-retail-by-region/

[19] Deloitte, 'Global Powers of Retailing 2022', 2022. Accessed: Nov. 10, 2022. [Online]. Available: https://www2.deloitte.com/global/en/pages/consumer-business/articles/global-powers-of-retailing.html

[20] PricewaterhouseCoopers, 'The 2017 Global Omnichannel Retail Index', 2017. [Online]. Available: https://www.strategyand.pwc.com/de/en/industries/consumer-markets/the-2017-global-omnichannel-retail-index/the-2017-global-omnichannel-retail-index.pdf

[21] PricewaterhouseCoopers, 'The future of consumer markets', Mar. 2021. Accessed: Sep. 21, 2022. [Online]. Available: https://www.pwc.com/gx/en/industries/consumer-markets/publications/future-of-consumer-markets.html

[22] Osservatorio eCommerce B2c, 'L'eCommerce B2c in Italia nel 2021: valori e trend in atto', 2021. [Online]. Available: https://www.osservatori.net/it/home

[23] Osservatorio Innovazione Digitale nel Retail, 'Il Retail in Italia e nel mondo: lo stato dell'arte dell'innovazione digitale', 2021. [Online]. Available: https://www.osservatori.net/it/home

[24] Osservatorio Innovazione Digitale nel Retail, 'Il Retail tra online e offline: strategia omnicanale e impatti sul negozio', 2021. [Online]. Available: https://www.osservatori.net/it/home

[25] J. Kembro and A. Norrman, 'Exploring trends, implications and challenges for logistics information systems in omni-channels: Swedish retailers' perception', *Int. J. Retail Distrib. Manag.*, vol. 47, no. 4, pp. 384–411, 2019, doi: 10.1108/IJRDM-07-2017-0141.

[26] T. H. A. Bijmolt *et al.*, 'Challenges at the marketing–operations interface in omni-channel retail environments', *J. Bus. Res.*, vol. 122, pp. 864–874, Jan. 2021, doi: 10.1016/j.jbusres.2019.11.034.

[27] O. Johnson and S. A. Ramirez, 'The influence of showrooming on Millennial generational cohorts online shopping behaviour', *Int. J. Retail Distrib. Manag.*, vol. 49, no. 1, pp. 81–103, Jan. 2020, doi: 10.1108/IJRDM-03-2020-0085.

[28] G. Salvietti, C. Ziliani, C. Teller, M. Ieva, and S. Ranfagni, 'Omnichannel retailing and post-pandemic recovery: building a research agenda', *Int. J. Retail Distrib. Manag.*, vol. 50, no. 8–9, pp. 1156–1181, 2022, doi: 10.1108/IJRDM-10-2021-0485.

[29] A. Herrero-Crespo, N. Viejo-Fernández, J. Collado-Agudo, and M. J. Sanzo Pérez, 'Webrooming or showrooming, that is the question: explaining omnichannel behavioural intention through the technology acceptance model and exploratory behaviour', *J. Fash. Mark. Manag. Int. J.*, vol. 26, no. 3, pp. 401–419, Jan. 2021, doi: 10.1108/JFMM-05-2020-0091.

[30] M. Jocevski, N. Arvidsson, G. Miragliotta, A. Ghezzi, and R. Mangiaracina, 'Transitions towards omni-channel retailing strategies: a business model perspective', *Int. J. Retail Distrib. Manag.*, vol. 47, no. 2, pp. 78–93, 2019, doi: 10.1108/IJRDM-08-2018-0176.

[31] F. Gao and X. Su, 'Omnichannel Retail Operations with Buy-Online-and-Pick-up-in-Store', *Manag. Sci.*, vol. 63, no. 8, pp. 2478–2492, Aug. 2017, doi: 10.1287/mnsc.2016.2473.

[32] M. Jara, D. Vyt, O. Mevel, T. Morvan, and N. Morvan, 'Measuring customers benefits of click and collect', *J. Serv. Mark.*, vol. 32, no. 4, pp. 430–442, 2018, doi: 10.1108/JSM-05-2017-0158.

[33] M. Serkan Akturk, M. Ketzenberg, and G. R. Heim, 'Assessing impacts of introducing ship-to-store service on sales and returns in omnichannel retailing: A data analytics study', *J. Oper. Manag.*, vol. 61, no. 1, pp. 15–45, 2018, doi: 10.1016/j.jom.2018.06.004.

[34] Y. Guo, M. Zhang, and V. Lynette Wang, 'Webrooming or showrooming? The moderating effect of product attributes', *J. Res. Interact. Mark.*, vol. ahead-of-print, no. ahead-of-print, Jan. 2021, doi: 10.1108/JRIM-08-2020-0161.

[35] S. K. Jena, 'Impact of bundling on the omnichannel supply chain under price competition', *J. Bus. Ind. Mark.*, 2022, doi: 10.1108/JBIM-06-2021-0315.

[36] A. L. Jones, J. W. Miller, S. E. Griffis, J. M. Whipple, and C. M. Voorhees, 'An examination of the effects of omni-channel service offerings on retailer performance', *Int. J. Phys. Distrib. Logist. Manag.*, vol. 52, no. 2, pp. 150–169, 2022, doi: 10.1108/IJPDLM-06-2020-0175.

[37] W. Piotrowicz and R. Cuthbertson, 'Introduction to the Special Issue Information Technology in Retail: Toward Omnichannel Retailing', *Int. J. Electron. Commer.*, vol. 18, no. 4, pp. 5–16, Jul. 2014, doi: 10.2753/JEC1086-4415180400.

[38] Y.-C. Chou and B. B. M. Shao, 'Adoption and Performance of Mobile Sales Channel for e-Retailers: Fit with M-Retail Characteristics and Dependency on e-Retailing', *Inf. Syst. Front.*, vol. 23, no. 3, pp. 681–694, Jun. 2021, doi: 10.1007/s10796-020-09989-0.

[39] S. Park and D. Lee, 'An empirical study on consumer online shopping channel choice behavior in omni-channel environment', *Telemat. Inform.*, vol. 34, no. 8, pp. 1398–1407, Dec. 2017, doi: 10.1016/j.tele.2017.06.003.

[40] E. Maier and J. Wieringa, 'Acquiring customers through online marketplaces? The effect of marketplace sales on sales in a retailer's own channels', *Int. J. Res. Mark.*, vol. 38, no. 2, pp. 311–328, Jun. 2021, doi: 10.1016/j.ijresmar.2020.09.007.

[41] R. Ishfaq, C. C. Defee, B. J. Gibson, and U. Raja, 'Realignment of the physical distribution process in omni-channel fulfillment', *Int. J. Phys. Distrib. Logist. Manag.*, vol. 46, no. 6–7, pp. 543–561, 2016, doi: 10.1108/IJPDLM-02-2015-0032.

[42] S. F. W. T. Lim, X. Jin, and J. S. Srai, 'Consumer-driven e-commerce: A literature review, design framework, and research agenda on last-mile logistics models', *Int. J. Phys. Distrib. Logist. Manag.*, vol. 48, no. 3, pp. 308–332, 2018, doi: 10.1108/IJPDLM-02-2017-0081.

[43] A. Hübner, H. Kuhn, and J. Wollenburg, 'Last mile fulfilment and distribution in omni-channel grocery retailing: A strategic planning framework', *Int. J. Retail Distrib. Manag.*, vol. 44, no. 3, pp. 228–247, 2016, doi: 10.1108/IJRDM-11-2014-0154.

[44] S. Ma, 'Fast or free shipping options in online and Omni-channel retail? The mediating role of uncertainty on satisfaction and purchase intentions', *Int. J. Logist. Manag.*, vol. 28, no. 4, pp. 1099–1122, Jan. 2017, doi: 10.1108/IJLM-05-2016-0130.

[45] G. Marchet, M. Melacini, S. Perotti, M. Rasini, and E. Tappia, 'Business logistics models in omni-channel: a classification framework and empirical analysis', *Int.*

J. Phys. Distrib. Logist. Manag., vol. 48, no. 4, pp. 439–464, 2018, doi: 10.1108/IJPDLM-09-2016-0273.

[46] A. Hübner, A. Holzapfel, and H. Kuhn, 'Operations management in multi-channel retailing: an exploratory study', *Oper. Manag. Res.*, vol. 8, no. 3–4, pp. 84–100, 2015, doi: 10.1007/s12063-015-0101-9.

[47] J.-C. Lu, Y. Yang, S.-Y. Han, Y.-C. Tsao, and Y. Xin, 'Coordinated inventory policies for meeting demands from both store and online BOPS channels', *Comput. Ind. Eng.*, vol. 145, 2020, doi: 10.1016/j.cie.2020.106542.

[48] J. Kembro and A. Norrman, 'Warehouse configuration in omni-channel retailing: a multiple case study', *Int. J. Phys. Distrib. Logist. Manag.*, vol. 50, no. 5, pp. 509–533, 2020, doi: 10.1108/IJPDLM-01-2019-0034.

[49] A. Hübner, A. Holzapfel, H. Kuhn, and J. Wollenburg, 'Configuring Retail Fulfillment Processes for Omni-Channel Customer Steering', *Int. J. Electron. Commer.*, vol. 22, no. 4, pp. 540–575, Oct. 2018, doi: 10.1080/10864415.2018.1485085.

[50] D. Jin, O. Caliskan-Demirag, F. (Youhua) Chen, and M. Huang, 'Omnichannel retailers' return policy strategies in the presence of competition', *Int. J. Prod. Econ.*, vol. 225, p. 107595, Jul. 2020, doi: 10.1016/j.ijpe.2019.107595.

[51] A. Hübner, A. Holzapfel, and H. Kuhn, 'Distribution systems in omni-channel retailing', *Bus. Res.*, vol. 9, no. 2, pp. 255–296, 2016, doi: 10.1007/s40685-016-0034-7.

[52] M. Wiener, N. Hoßbach, and C. Saunders, 'Omnichannel businesses in the publishing and retailing industries: Synergies and tensions between coexisting online and offline business models', *Decis. Support Syst.*, vol. 109, pp. 15–26, May 2018, doi: 10.1016/j.dss.2018.01.008.

[53] M. Trabucco and P. De Giovanni, 'Achieving resilience and business sustainability during COVID-19: The role of lean supply chain practices and digitalization', *Sustain. Switz.*, vol. 13, no. 22, 2021, doi: 10.3390/su132212369.

[54] S. Afjeh and M. Darvishi, 'Segmentation and profiling consumers in a multi-channel environment using a combination of self-organizing maps (SOM) method, and logistic regression', *Manag. Sci. Lett.*, vol. 4, pp. 1009–1014, May 2014, doi: 10.5267/j.msl.2014.3.010.

[55] A. De Keyser, J. Schepers, and U. Konuş, 'Multichannel customer segmentation: Does the after-sales channel matter? A replication and extension', *Int. J. Res. Mark.*, vol. 32, no. 4, pp. 453–456, Dec. 2015, doi: 10.1016/j.ijresmar.2015.09.005.

[56] M. M. Pereira and E. M. Frazzon, 'Towards a Predictive Approach for Omni-channel Retailing Supply Chains', presented at the IFAC-PapersOnLine, 2019, vol. 52, no. 13, pp. 844–850. doi: 10.1016/j.ifacol.2019.11.235.

[57] G. Margetis, S. Ntoa, and C. Stephanidis, 'Smart Omni-Channel Consumer Engagement in Malls', *Commun. Comput. Inf. Sci.*, vol. 1034, pp. 89–96, 2019, doi: 10.1007/978-3-030-23525-3_12.

[58] W. Lee and W. Lee, 'Unravelling Consumer Responses to Omni-Channel Approach', *J. Theor. Appl. Electron. Commer. Res.*, vol. 15, no. 3, pp. 37–49, Sep. 2020, doi: 10.4067/S0718-18762020000300104.

[59] S. Saghiri, R. Wilding, C. Mena, and M. Bourlakis, 'Toward a three-dimensional framework for omni-channel', *J. Bus. Res.*, vol. 77, pp. 53–67, 2017, doi: 10.1016/j.jbusres.2017.03.025.

[60] X. Xu and J. E. Jackson, 'Examining customer channel selection intention in the omni-channel retail environment', *Int. J. Prod. Econ.*, vol. 208, pp. 434–445, Feb. 2019, doi: 10.1016/j.ijpe.2018.12.009.

[61] C. Milioti, K. Pramatari, and I. Kelepouri, 'Modelling consumers' acceptance for the click and collect service', *J. Retail. Consum. Serv.*, vol. 56, p. 102149, Sep. 2020, doi: 10.1016/j.jretconser.2020.102149.

[62] B. Alexander and M. Blazquez Cano, 'Store of the future: Towards a (re)invention and (re)imagination of physical store space in an omnichannel context', *J. Retail. Consum. Serv.*, vol. 55, p. 101913, Jul. 2020, doi: 10.1016/j.jretconser.2019.101913.

[63] M.-J. Miquel-Romero, M. Frasquet, and A. Molla-Descals, 'The role of the store in managing postpurchase complaints for omnichannel shoppers', *J. Bus. Res.*, vol. 109, pp. 288–296, Mar. 2020, doi: 10.1016/j.jbusres.2019.09.057.

[64] B. Berman and S. Thelen, 'Planning and implementing an effective omnichannel marketing program', *Int. J. Retail Distrib. Manag.*, vol. 46, no. 7, pp. 598–614, 2018, doi: 10.1108/IJRDM-08-2016-0131.

[65] T. M. T. Hossain, S. Akter, U. Kattiyapornpong, and Y. Dwivedi, 'Reconceptualizing Integration Quality Dynamics for Omnichannel Marketing', *Ind. Mark. Manag.*, vol. 87, pp. 225–241, May 2020, doi: 10.1016/j.indmarman.2019.12.006.

[66] F. N. Kondo and T. Okubo, 'Understanding multi-channel consumer behavior: A comparison between segmentations of multi-channel purchases by product category and overall products', *J. Retail. Consum. Serv.*, vol. 64, p. 102792, Jan. 2022, doi: 10.1016/j.jretconser.2021.102792.

[67] A. Blom, F. Lange, and R. L. Hess, 'Omnichannel promotions and their effect on customer satisfaction', *Eur. J. Mark.*, vol. 55, no. 13, pp. 177–201, Jan. 2021, doi: 10.1108/EJM-12-2018-0866.

[68] A. Blom, F. Lange, and R. L. Hess, 'Omnichannel-based promotions' effects on purchase behavior and brand image', *J. Retail. Consum. Serv.*, vol. 39, pp. 286–295, Nov. 2017, doi: 10.1016/j.jretconser.2017.08.008.

[69] KPMG, 'Omnichannel analytics for todays' Australian retailers', Apr. 2022. Accessed: Sep. 21, 2022. [Online]. Available: https://home.kpmg/au/en/home/insights/2022/04/australian-retail-outlook-2022-omnichannel-reporting.html

[70] McKinsey, 'Stores as a strategic asset in omnichannel retail', Dec. 2021. Accessed: Sep. 21, 2022. [Online]. Available: https://www.mckinsey.com/industries/retail/our-insights/stores-as-a-strategic-asset-in-omnichannel-retail

[71] PricewaterhouseCoopers, 'Retail - Learning Solutions in the Digital Age', 2019. [Online]. Available: https://www.pwc.com/it/it/services/consulting/assets/docs/retail-solution.pdf

[72] Forrester and IBM, 'The Omnichannel Maturity Assessment', Oct. 2020. Accessed: Sep. 21, 2022. [Online]. Available: https://www.ibm.com

[73] McKinsey, 'Omnichannel: The path to value', Apr. 2021. Accessed: Sep. 21, 2022. [Online]. Available: https://www.mckinsey.com/capabilities/growth-marketing-and-sales/our-insights/the-survival-guide-to-omnichannel-and-the-path-to-value

[74] Accenture, 'Retail Supply Chain Fulfillment', May 2021. Accessed: Sep. 21, 2022. [Online]. Available: https://www.accenture.com/us-en/insights/retail/supply-chain-fulfillment

[75] BCG, 'Win the Town to Win the Future of Retail', Jul. 2022. Accessed: Sep. 21, 2022. [Online]. Available: https://www.bcg.com/publications/2022/win-the-town-the-new-strategy-for-retailers

[76] BCG, 'Accelerating Digital Innovation in Retail', Jun. 2018. Accessed: Sep. 21, 2022. [Online]. Available: https://www.bcg.com/publications/2018/accelerating-digital-innovation-retail

[77] Accenture, 'A New Era of RFID Technology', May 2021. Accessed: Sep. 21, 2022. [Online]. Available: https://www.accenture.com/us-en/insights/retail/new-era-rfid

[78] BCG, 'Scaling the Store of the Future', Feb. 2020. Accessed: Sep. 21, 2022. [Online]. Available: https://www.bcg.com/it-it/publications/2020/scaling-store-of-future

[79] McKinsey, 'Reimagining the role of retail in omnichannel', Dec. 2021. Accessed: Sep. 21, 2022. [Online]. Available: https://www.mckinsey.com/industries/retail/our-insights/reimagining-the-role-of-physical-stores-in-an-omnichannel-distribution-network

[80] IBM, 'The next-generation retail store: Accelerating the hybrid shopping journey with AI and cloud', Mar. 2022. Accessed: Sep. 21, 2022. [Online]. Available:

https://www.ibm.com/thought-leadership/institute-business-value/report/next-generation-retail-store

[81] KPMG, 'Consumers and the new reality', 2020. Accessed: Sep. 21, 2022. [Online]. Available: https://home.kpmg/xx/en/home/insights/2020/09/consumers-and-the-new-reality.html

[82] Incisiv, 'Omnichannel Customer Service 2022', 2022. Accessed: Sep. 21, 2022. [Online]. Available: https://www.incisiv.com/report-omnichannel-customer-service-2022

[83] PricewaterhouseCoopers, 'PwC's Global Consumer Insights Survey 2022', Jun. 2022. Accessed: Sep. 21, 2022. [Online]. Available: https://www.pwc.com/gx/en/industries/consumer-markets/consumer-insights-survey.html

[84] 'Bvdinfo.com. Aida.' Accessed: Nov. 22, 2022. [Online]. Available: https://www.bvdinfo.com/it-it/le-nostre-soluzioni/dati/nazionali/aida

[85] 'Retaildive.com. How shoppers use their smartphones in stores.' Accessed: Nov. 22, 2022. [Online]. Available: https://www.retaildive.com/news/how-shoppers-use-their-smartphones-in-stores/444147/

A Appendix

A.1. Industry specific survey

Survey on sectors used to classify measure the relative weights of strategic importance for each dimension. It was created and shared with Microsoft Forms and written in Italian.

Annex 1: Section related to omnichannel models in the industry specific survey

In relation to your industry (and not your company specifically), please assign a value from 1 to 5 to the following omnichannel models according to their strategic relevance. (1: not very relevant; 5: extremely relevant)

- Click & Collect (or Buy Online Pick-up in Store)
- Reserve & Collect (book online, pay and pick-up in store)
- Curbside pick-up (or Click-and-Drive)
- Inventory availability check
- Online purchase in store
- Ship from store
- Cross channel return

Annex 2: Section related to store in the industry specific survey

1. Spaces.

In relation to your industry (and not your company specifically), please assign a value from 1 to 5 to the following services/features to be implemented in your point of sales according to their strategic relevance. (1: not very relevant; 5: extremely relevant)

- eCommerce order preparation areas
- Pick-up and return point in-store
- Curbside pick-up areas
- Parcel locker

2. Store personnel.

In relation to your industry (and not your company specifically), please assign a value from 1 to 5 to the following services/features to be implemented in your point of sales according to their strategic relevance. (1: not very relevant; 5: extremely relevant)

- Relationship and transactional activities with remote customers
- eCommerce and cross-channel ordering support activities
- Use of in-store technological solutions to support omnichannel (device for cross-channel orders, clienteling apps, ...)

3. In-store technologies.

In relation to your industry (and not your company specifically), please assign a value from 1 to 5 to the following digital technologies to be implemented in your point of sales according to their strategic relevance. (1: not very relevant; 5: extremely relevant)

- Kiosks/totems/touchpoints to gather information in-store
- Scan&Go systems
- Mobile POS
- Self-check-out system
- Solutions to expand the assortment of stores (Infinite shelf systems, ...)
- Beacon/indoor positioning
- Solutions to collect visitor information (In-store customer behavior monitoring systems, sensors...)
- Solutions for virtual queue management
- Visit reservation from remote systems for in-store appointment
- Interactive showcases and digital signage
- Virtual fitting room & virtual mirror
- Smart labels / smart shelves
- Self-scanning and smart carts
- AR/VR devices
- Innovative payments (Biometrics, new forms of payment, etc.)

Annex 3: Section related to mobile app in the industry specific survey

1. Pre-purchase.

In relation to your industry (and not your company specifically), please assign a value from 1 to 5 to the following services/features to be implemented in your mobile application according to their strategic relevance. (1: not very relevant; 5: extremely relevant)

- Possibility to see the stock availability (both for online and in-store)
- Possibility to see product prices
- Possibility to see full product range
- Possibility to see current discounts (e.g., flyer)
- Possibility to see the location of stores

- Cross-selling (recommending a complementary or related products)
- Up-selling (recommending a comparable higher-end product)

2. In-store activities.

In relation to your industry (and not your company specifically), please assign a value from 1 to 5 to the following services/features to be implemented in your mobile application according to their strategic relevance. (1: not very relevant; 5: extremely relevant)

- Access to additional info about products
- Wayfinding and/or store map
- Shopping lists
- Possibility to purchase online directly in-store

3. Online purchase.

In relation to your industry (and not your company specifically), please assign a value from 1 to 5 to the following services/features to be implemented in your mobile application according to their strategic relevance. (1: not very relevant; 5: extremely relevant)

- Possibility to order from the app
- Shared shopping cart between app and website
- Link to wallet apps during payment (e.g., google pay, samsung pay…)

4. Post-purchase.

In relation to your industry (and not your company specifically), please assign a value from 1 to 5 to the following services/features to be implemented in your mobile application according to their strategic relevance. (1: not very relevant; 5: extremely relevant)

- Connection to the customer service
- Possibility to give feedbacks (e.g., products, staff, store, home delivery…)
- Possibility to plan a return

5. Loyalty.

In relation to your industry (and not your company specifically), please assign a value from 1 to 5 to the following services/features to be implemented in your mobile application according to their strategic relevance. (1: not very relevant; 5: extremely relevant)

- Possibility to connect the loyalty card (to use online or in-store)
- Possibility to access to the reward system linked to the user loyalty account (e.g., see the amount of earned points)
- Possibility to access to the rewards catalogue

Annex 4: Section related to data integration in the industry specific survey

In relation to your sector (and not your company specifically), please assign a value from 1 to 5 according to the strategic relevance of the integrated use of data collected in the different channels (online and offline) in the following activities. (1: not very relevant; 5: extremely relevant)

- Segmentation and targeting (omnichannel single profiling)
- Generation of ad hoc promotions and discounts
- Inventory planning
- Production Capacity planning
- Order management
- Delivery management (e.g., planning, optimal bundling)
- Optimisation of fulfillment structures (spaces, staff, resources…)
- Demand analysis
- Creation and monitoring of omnichannel specific KPIs

Annex 5: Section related to back-end digital technologies in the industry specific survey

In relation to your industry (and not your company specifically), please assign a value from 1 to 5 to the following digital technologies according to their strategic relevance. (1: not very relevant; 5: extremely relevant)

- CRM
- WMS
- RFId
- In-store customer monitoring
- Demand, inventory, distribution planning
- Business intelligence system
- Integrated information management (between the online and offline channels)

Annex 6: Section related to operations in the industry specific survey

In relation to your industry (and not your company specifically), please assign a value from 1 to 5 to the strategic importance of integrating the following drivers related to operations across channels. (1: not very relevant; 5: extremely relevant)

- Stock management
- Fulfillment structures management
- Order preparation management
- Order management
- Return management

A.2. Company specific survey

Annex 7: Section related to omnichannel models in the company specific survey

What is the level of adoption of the following omnichannel models in your company?

	Adopted	Partially adopted (pilot project or not fully implemented)	Planned to be adopted in the short time (in 3 years)	Not adopted
Click & Collect (or Buy Online Pick-up in Store)				
Reserve & Collect (book online, pay and pick-up in store)				
Curbside pick-up (or Click-and-Drive)				
Inventory availability check				
Online purchase in store				
Ship from store				
Cross channel return				

Annex 8: Section related to store in the company specific survey

1. Spaces.

Which of these services/features are implemented in store?

	Adopted	Partially adopted (pilot project or not fully implemented)	Planned to be adopted in the short time (in 3 years)	Not adopted
eCommerce order preparation areas				
Pick-up and return point in-store				
Curbside pick-up areas				
Parcel locker				

2. Store personnel.

Which of these services/features are implemented in store?

	Adopted	Partially adopted (pilot project or not fully implemented)	Planned to be adopted in the short time (in 3 years)	Not adopted
Relationship and transactional activities with remote customers				
eCommerce and cross-channel ordering support activities				
Use of in-store technological solutions to support omnichannel (device for cross-channel orders, clienteling apps, ...)				

3. In-store technologies.

Which of these services/features are implemented in store?

	Adopted	Planned to be adopted in the short time (in 3 years)	Not adopted
Kiosks/totems/touchpoints to gather information in-store			
Scan&Go systems			
Mobile POS			
Self-check-out system			
Solutions to expand the assortment of stores (Infinite shelf systems, ...)			
Beacon/indoor positioning			
Solutions to collect visitor information (In-store customer behavior monitoring systems, sensors...)			
Solutions for virtual queue management			
Visit reservation from remote systems for in-store appointment			
Interactive showcases and digital signage			
Virtual fitting room & virtual mirror			
Smart labels / smart shelves			
Self-scanning and smart carts			
AR/VR devices			
Innovative payments (Biometrics, new forms of payment, etc.)			

Annex 9: Section related to the mobile app in the company specific survey

1. Pre-purchase.

Which of these features are implemented in your mobile application?

	Adopted	Planned to be adopted in the short time (in 3 years)	Not adopted
Possibility to see the stock availability (both for online and in-store)			
Possibility to see product prices			
Possibility to see full product range			
Possibility to see current discounts (e.g., flyer)			
Possibility to see the location of stores			
Cross-selling (recommending a complementary or related products)			
Up-selling (recommending a comparable higher-end product)			

2. In-store activities.

Which of these features are implemented in your mobile application?

	Adopted	Planned to be adopted in the short time (in 3 years)	Not adopted
Access to additional info about products			

Wayfinding and/or store map			
Shopping lists			
Possibility to purchase online directly in-store			

3. Online purchase.

Which of these features are implemented in your mobile application?

	Adopted	Planned to be adopted in the short time (in 3 years)	Not adopted
Possibility to order from the app			
Shared shopping cart between app and website			
Link to wallet apps during payment (e.g., google pay, samsung pay…)			

4. Post-purchase.

Which of these features are implemented in your mobile application?

	Adopted	Planned to be adopted in the short time (in 3 years)	Not adopted
Connection to the customer service			
Possibility to give feedbacks (e.g., products, staff, store, home delivery…)			
Possibility to plan a return			

5. Loyalty.

Which of these features are implemented in your mobile application?

	Adopted	Planned to be adopted in the short time (in 3 years)	Not adopted
Possibility to connect the loyalty card (to use online or in-store)			
Possibility to access to the reward system linked to the user loyalty account (e.g., see the amount of earned points)			
Possibility to access to the rewards catalogue			

Annex 10: Section related to data integration in the company specific survey

Are the data collected in the various channels (online and offline) used in an integrated way for the following activities?

	Yes	Planned to be done in the short time (in 3 years)	No
Segmentation and targeting (omnichannel single profiling)			
Generation of ad hoc promotions and discounts			
Inventory planning			
Production Capacity planning			
Order management			

Delivery management (e.g., planning, optimal bundling)			
Optimisation of fulfillment structures (spaces, staff, resources…)			
Demand analysis			
Creation and monitoring of omnichannel specific KPIs			

Annex 11: Section related to back-end digital technologies in the company specific survey

What is the level of adoption of the following back-end technologies in your company?

	Adopted	Planned to be adopted in the short time (in 3 years)	Not adopted
CRM			
WMS			
RFId			
In-store customer monitoring			
Demand, inventory, distribution planning			
Business intelligence system			
Integrated information management (between the online and offline channels)			

Annex 12: Section related to operations in the company specific survey

Which of the following operations drivers are integrated across channels?

	Yes	Planned to be integrateted in the short time (in 3 years)	No
Stock management			
Fulfillment structures management			
Order preparation management			
Order management			
Return management			

A.3. Cluster analysis methodology

In this section the main functions used to perform the whole cluster analysis are presented. The following code was used for each macro-dimension.

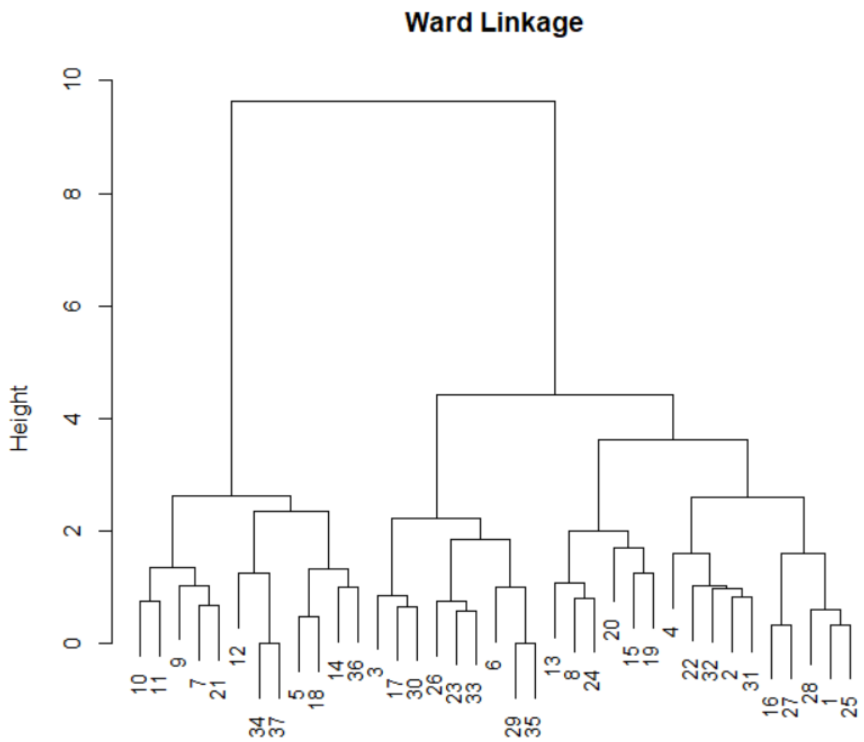
A.1.1. Code R

Annex 13: Code R used for cluster analysis

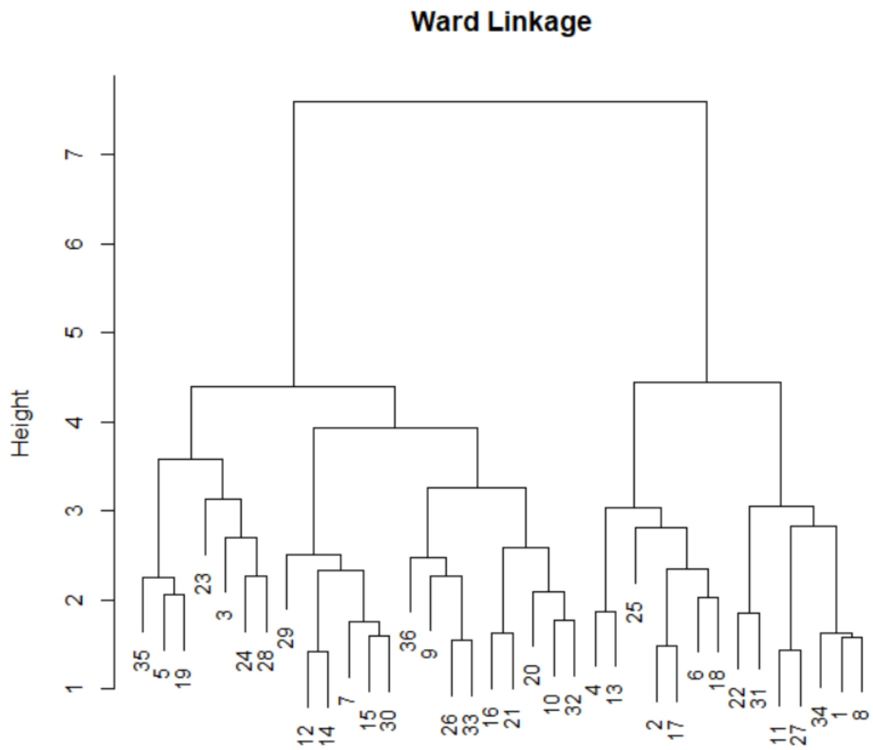
Code R Hierarchical clustering with Ward's method

```
hc.ward <- hclust(dist(df), method="ward.D")
# Dendrogram & choice of k
x11()
plot(hc.ward, main="Ward Linkage", xlab="", sub="", cex=.9)
# Cluster analysis after the choice of k (e.g., k=3)
k=3
clusters = cutree(hc.ward, k)
# Cluster centroids analysis
cluster_center = aggregate(df,list(clusters=clusters),mean)
```

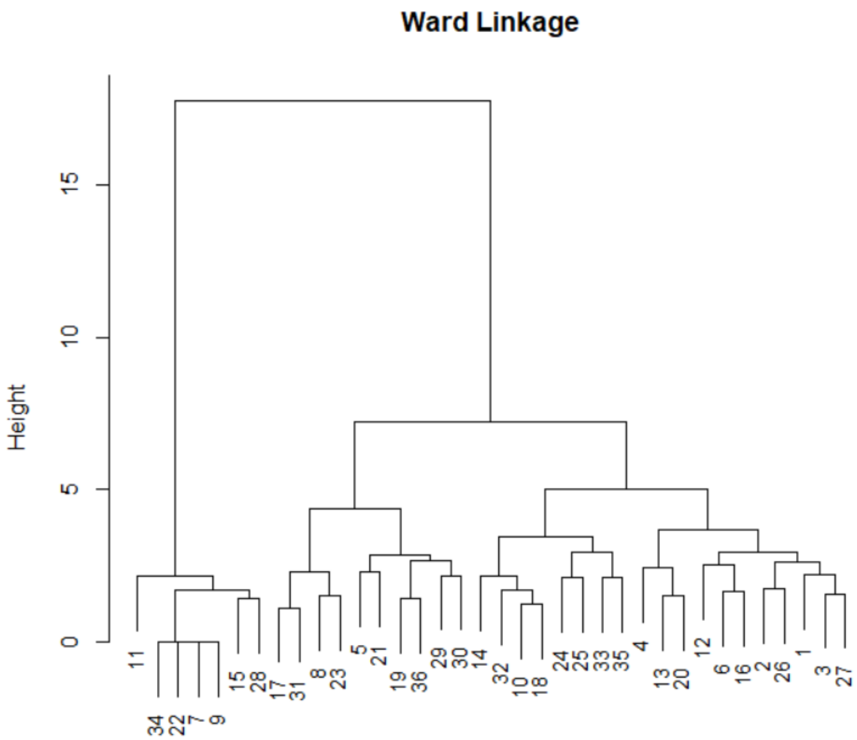
A.1.2. Dendrograms



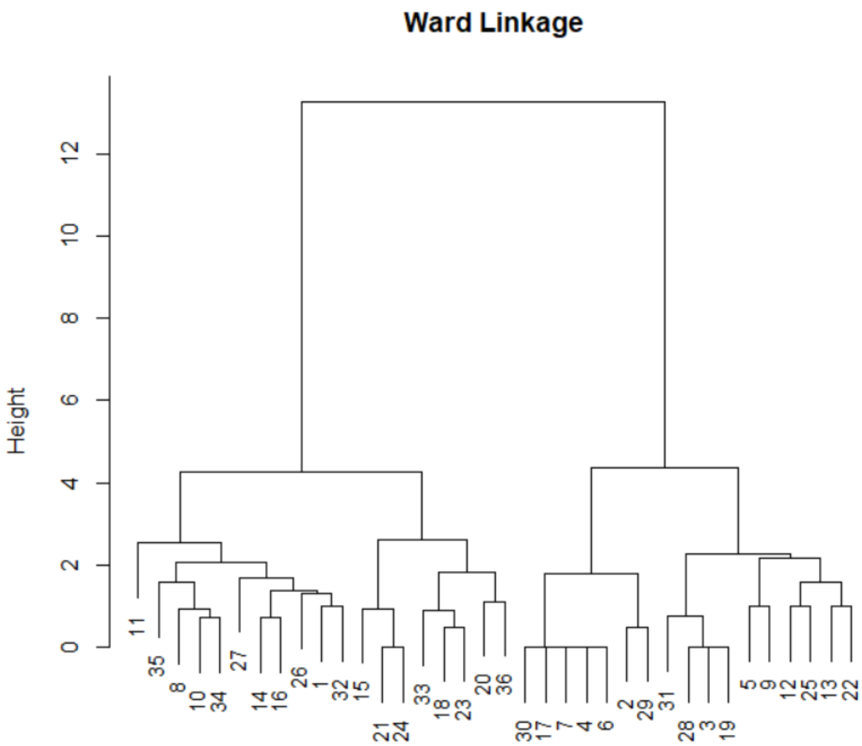
Annex 14: Dendrogram representation in omnichannel models macro-dimension (RStudio)



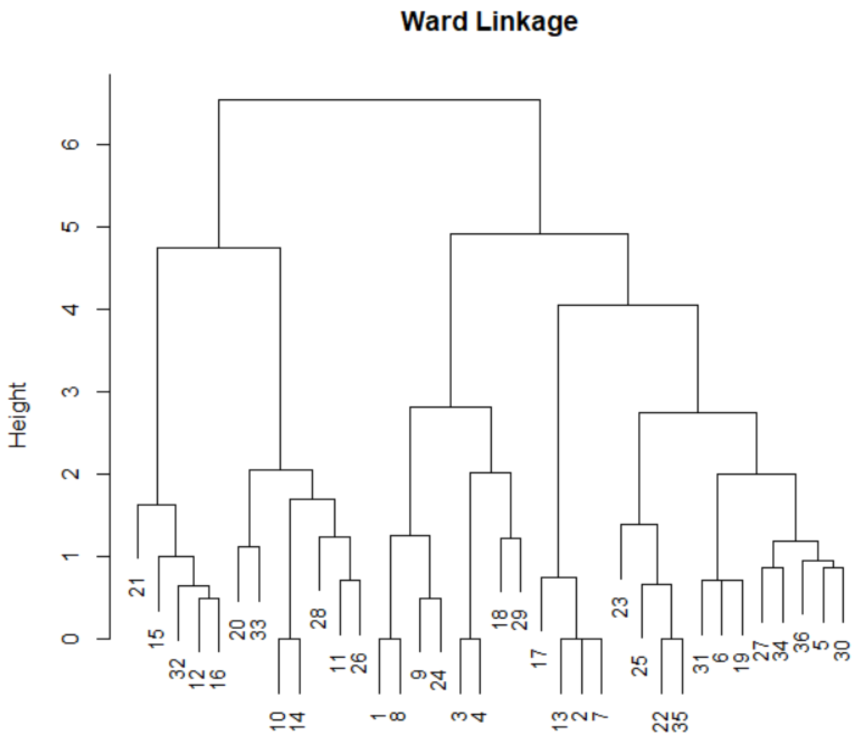
Annex 15: Dendrogram representation in store macro-dimension (RStudio)



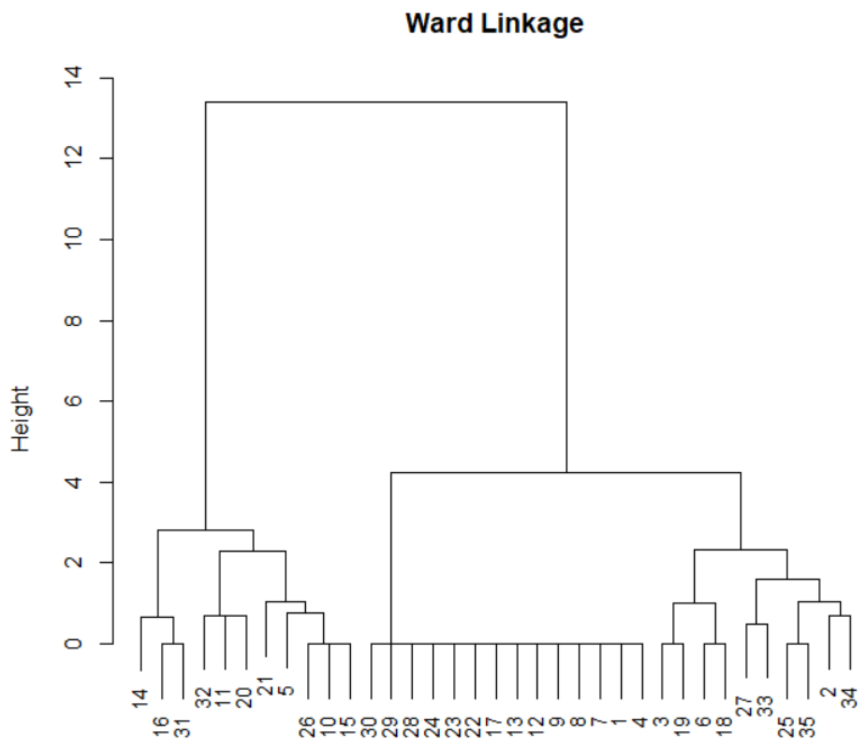
Annex 16: Dendrogram representation in mobile app macro-dimension (RStudio)



Annex 17: Dendrogram representation in data integration macro-dimension (RStudio)



Annex 18: Dendrogram representation in back-end digital technologies macro-dimension (RStudio)



Annex 19: Dendrogram representation in operations macro-dimension (RStudio)

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9 List of Charts

10 List of Equations

11 List of Figures

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13 Acknowledgments

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