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Chapter 11: Integrating physical and digital retail through adaptive experience and infrastructure blending

11.1. Introduction

The Covid-19 pandemic has brought unprecedented disruption to the global economy, supply chains, and our social lives. The retail industry was one of the hardest-hit sectors. While people could no longer visit brick-and-mortar stores, they turned to digital shopping and e-commerce scaled to new heights. In the aftermath of the pandemic, these two conflicting environments – the physical store and the digital space – are now being holistically integrated to create an enhanced customer experience. Retailers need to explore how to effectively blend physical and digital infrastructures by adapting them across their customer and employee journeys. With this research, we present a design-based management approach to explore how to achieve this experiential and infrastructural integration (Brynjolfsson et al., 2013; Piotrowicz & Cuthbertson, 2014; Pantano et al., 2020).

The essay showcases the use of Experience Exploration and Lab Environments as a think and do tank for retail teams to explore blending the two infrastructures and design the next-generation customer and employee experiences. Focusing on different kinds of blended experiences - from digital-assisted to seamless experiences that integrate physical and digital touchpoints - the retail teams iteratively create, test, and evaluate Experience Prototypes digitally and physically. Blending the physical and digital experience, the technologies applied and the way they are applied, result in very different blended customer experiences and require many iterations to uncover the details of an effective experience. The infrastructure that enables the integrated and enhanced seamless retail experience needs to be created with equal commitment. For this infrastructure development, digital technologies are emerging as the new enablers that help us close the gap between the physical and digital (Rigby, 2011; Verhoef et al., 2021).

11.2. The Evolution of Retail

Digitalization is sometimes described as the fifth stage of the evolution of retail. Indeed, it can be seen as a continuation of obvious trends in retailing that use technology to enhance the level of service offered by stores and the value for customers, while decreasing the cost at store level. However, the vision cherished by many is that the digital retailer is replacing the traditional store format, hence a new replacement cycle in retail. The increasing share of sales via the Internet in many countries suggests that those advocates of the radical new view may be vindicated. However, multichannel retailers have adopted models because they have realized that customers want the best of both worlds: the immediate satisfaction of purchases via the store and the better range of products available on the Internet. Therefore, the two formats have to be contrasted with respect to the value they create for customers. However, we can see that many are returning to the bricks and mortar store for sensory stimulation and assurance.

Fig 11.1: Transforming Retail Through Technology

We are only beginning to explore the blurring boundaries between the two formats. With restaurateurs, word-processors, and accountants all being pulled into selling on the web, how are the big digital-only players to respond? Shopbots that compare prices on the Internet already help turn pricing into a game of trivial pursuit. In this climate of downward pressure on margins, differentiation and the building of retail brands are indispensable for continued profitability. So, retailers have to ask themselves: In what

ways can we create a better experience for customers in our selected target market(s) in a way that is different from the other existing or potential channels? Digital retailers have been forced to adopt a physical presence to be seen as a trustworthy retailer. Bricks and mortar retailers must invest in technology to develop new ideas for supporting brands, securing loyalty, and converting occasion into sustained repeat purchase patterns at lower costs. Shoppers wish to interact with retailers and brands omnichannel in ways that they prefer. They seek enhanced direct experience and engagement with the brand or banner, be it tactile, audiovisual, other sensorial, informational, or ludic.

11.2.1. Historical Context

Retailing is an ancient trade. For centuries, it has been a central part of human social and economic life. Not only does retail provide people with needed goods and services, it also serves as a place of communal gathering and social commerce. As access to geographical marketplaces was limited by the means of transportation available until relatively recently, retailing took place at local physical points of accessibility - merchant shops and stalls, open markets, and their successors - markets and shops for the sale of specialized goods - growing year by year in accordance with the increasing demand from wealthier consumers and the rising availability of multiple goods and services and transport trade infrastructures.

The 18th century saw the rise of department stores which integrated a greater diversity of goods and slowly drifted toward more modern times. With the late 19th century waves of industrialization and population relocation, as well as the accompanying rising demand for good value goods, particularly in the post-war period, supermarkets and shopping mall hypermarkets came to dominate the retail landscape. From then until the start of the new millennium, that same landscape appeared to have been frozen in time, with minor innovations such as the introduction of gasoline stations and convenience stores, warehouse clubs, off-price stores, discount stores, and specialty stores. The appeal of these latter models would fade in face of the 1980s - first digital - huge multiplexes and the 1990s huge flat physical distribution centers introducing economies of scale to the wholesale market.

11.2.2. Current Trends in Retail

These forces of change have affected the retail industry significantly over the last two to three decades. Established brick-and-mortar retailers have faced a constant existential threat from digital-only native players, but there are many other digital marketplaces where such threats have existed in the past, and where they can exist again in the future. These threats have caused disintermediation, resulting in much more demanding customers who expect higher levels of service than they have previously received, and lower levels of cost than they have previously incurred. The digital-native players have been increasingly hard to compete against solely by price differentiation: thus brick-and-mortar players have turned to product differentiation, enhancing the experiential aspects of their customer offer. This trend has been significantly aided and abetted by the maturation of physical environment technology, rapidly increasing the scope and level of sophistication of all kinds of in-store customer experience.

Alongside the increasing trend towards creating richer in-store and mobile digital customer experiences, the complementarity of the digital and physical channels has also been increasingly recognized: people browse and research with the web in order to buy through the store, and vice versa. Thus, omni-channel retail, where the purchase can happen through any combination of channels, the customer service can happen through any combination of channels, and the returns can happen through any combination of channels, has become growingly more popular. And, more recently, the phygital trend, where the blending of the physical and digital worlds happens through technology-enabled services in both environments, has emerged.

11.3. Understanding Adaptive Experiences

Adaptive experiences are the modulated convergent experiences during the consumer journey. They comprise micro-experiences influenced by either stimuli and actions, sales associates' interactions or facilitations, augmented or virtual interfaces and modulations, or the hybridization of the former. In our framework, adaptive experiences create market salience, drive actual conversion, and establish lasting associations. They are tangible nodes mirroring the subliminal embedded-brands present in the convergent total experience that shape cultural frames and inform consumers' brand meanings, nudge conversions, and arise from those moments when you remember who you really are. By informing the physical-digital context and the hybridization of the experience precursors and facilitation capabilities, integration enables adaptive experience emergences and store performance patterns. Therefore, integration predisposes adaptive experience nodes or imperatives, at the critical junctures when consumers interact with product and brand stimuli or interfaces, social networks, sales facilitators, or digital applications, pushing while pulling towards action. Enabling the consumer journey to deliver unique

experiences means turning the total journey into experiences, cultures, and meanings that can be communicated around the world.

For service and retail actors and institutions, integration is the new model stage. It is not singular but plural, and does not homogenize everything. Integration shapes the peaks and valleys of respective journey lines that travelers proudly shape, pounding while pulling pride from the unique hybridities they embody, while modulating the brand physical-digital habits, associations, narratives, tastes, rituals, proximities, travels, suits. For adaptive experiences, integration is the way to structure everyday exchanges. Their power comes from being modulated. It’s a balance between push and pull but their emotional undertow comes from being modulated. Optimal execution requires intelligent integration capabilities and technologies. Transport systems facilitate flow.

11.3.1. Definition and Importance

Today's consumers expect personalized, fast service regardless of whether they are online or in a store, and experiences that seamlessly bridge these two worlds tend to result in greater customer loyalty and profits. Whether it's discovering digital options in-store or gaining product knowledge digitally before placing an order in-store for delivery a day or two later, connected customers expect the ability to personalize their shopping journey through the mini-ecosystem of digital touchpoints while also enjoying the benefits of in-store shopping when chosen. The consumer benefit of an integrated shopping experience goes beyond convenience or speed. More importantly, experiencing products in-store leads to increased confidence in product selection and an accelerating path to purchase. Today's connected consumers expect retailers to not only acknowledge their channel of choice but be able to adapt and switch channels within a shopping journey as they choose. A seamless, channel-adapting omnichannel experience along the entire journey leads to reduced shopping time and lower risk of error in complex item purchases. Successful retailers recognize the significance of adapting to consumers' favored channels as well as how they shop over time. With technology such as mobile apps and inventory visibility, a physically oriented retailer can lighten up on the shopping journey risk burden and build competence in every touchpoint along the journey.

Adaptive experiences go beyond the consumer's individual shopping journey sequentially connecting different functions from different stages, organizations, and locations. They transform store activity from a single point-in-time sales transaction into a collaborative process that creates value for both the retailer and the consumer over time. Consumer brand product experimentation and discovery increase foot traffic and store experience-related service demand. A collaborative in-store experience that relies

on well-informed store associates who help consumers connect with online services can serve to create store-based product engagement leading to future online sales.

11.3.2. Technological Influences

Adaptive experiences are made possible by the continuous access of technologies that store, collect, analyze, and interpret individual and group behavior data. In addition, technological development has allowed control and prediction of the flow of decisions and events, facilitating the decision-making process in physical and digital retail experiences. Increasingly, IT is considered the means by which individual consumers experience the effects of choice, uncertainty, and risk while experiencing a brand's retail physical and digital touchpoints. From a Pareto distribution perspective, the traditional 80/20 experience indicates that 80% of your retail experience is static but 20% is dynamic. Nowadays, the distribution is more balanced (50% Dynamic; 50% Static). In this scenario, advanced analytics and precision architecture come together to reshape physical and digital experiences as well as decision economics.

Adaptive experiences require an ecosystem of retail, social, mobile, technology, and logistics. When shoppers engage any touchpoint in this ecosystem of attributes and vendors, they expect a consistent and seamless experience along their decision path. The four quadrants of experience infrastructure that provide an individual with a full-service experience are design and planning services, communications and brand promotions, transacting and executing available offers, and logistics management and supply chain delivery. With retail experience architecture, the latent desire in consumers is to complete their experiences economically and efficiently.

11.4. Infrastructure Blending in Retail

Adaptive Experience and Infrastructure Blending consist of six variations: infrastructure only, experience only, infrastructure building blocks, experience building blocks, and experience thickening. Retail is full of infrastructures that shape what inhabitants do in stores. Store exposure also has a deeper meaning in retail than in places like malls. Stores narrow consumer choice and push consumers towards a limited set of products. This spatial structuring role of retail infrastructure is the only thing that sets it apart from services. People create experiences in the store, experience them, and leave the store, and infrastructure is ubiquitous in that flow. Positioning combines marketing and experience design. However, in portfolio design where the offerings are set and it is difficult to change them, the store itself is selected too. The keyword "store" in this context means brick-and-mortar physical retail. The intention is to re-establish the missing cliché; that store is a collection of signs leading shoppers to desired offerings

that best satisfy their objectives, if any. These interior signs can be real people or service or product facing inventories showing items with price tags. As their exterior counterparts, window displays with mannequins are physical signs too, unlike displays in the omnipresent physical and digital infrastructures nowadays. The creation, validation, and promotion of experiential concepts and the portfolio attributes of stores, helping the latter economically survive in digitized markets. Infrastructures are interactions that feed back into the infrastructure and shape it.

11.4.1. Physical Infrastructure

Retailing involves the interplay of stimuli and flows between the retailer offering physical and digital experiences, and the customer operating on physical and digital relationships. Analyzing the enablers of these stimulus and flow interactions, their composition and dimensions, outlines two levels of infrastructure blending: the digital blending in physical infrastructure, and the physical blending in digital infrastructure. Developing on the implications for research and practice, this chapter distinguishes the physical, and the digital infrastructure of retailing.

Physical infrastructure blends in retail through adjustable components that shift to meet the experience needs of customers, whether browsing product solutions for later purchase online at home or at work, or visiting the shop, browse-stock and smooth a purchase of product solutions to take home immediately, or any other shopping need via the physical or digital medium. The lines of retailers offering an adjusted assortment on their online shop, a very limited assortment in a back, or front shop, and pick or receive online orders, and a physical store mixing bulk and presenter stock assortments, are examples. Blending physical store infrastructure, it adjusts, juggles or switches products on display, the physical moderation of their product and retail experience during browsing while waiting at shop and product placement, and signaling elements and actions; with necessitating and supporting messages about customer actions and experiences phased in physical and digital infrastructure, their feasibility, expediting and amplifying, powered by digital procedures on locale remote devices; to finally come up with the product assortment decisions in the realm of influence of the passed stages of the shopper journey, and shop and experience patterns, count for a product, vendor and purchasing preference.

These settled per shopper and product category duration, which are unresolved in the standard journey or shopping outline for the long-term customer experiences and value to be sought by retail actors and scholars. Borders will be, move and drawn diagonally, at increasing instability. Frequency of visit and number of customers stands squarely on the side of digital or physical retailing, becoming an adjustable parameter for actors

experiencing the product solutions on offer, and to be accepted on merit, moment of truth and thresholds set by them alone.

11.4.2. Digital Infrastructure

Digital infrastructure encompasses the hardware and software components that facilitate data and information exchange. In today's digital economy, the shopping experience cannot be created simply by presenting merchandise for sale. Retailers need to create a full, rich customer experience at touchpoints combining physical and digital elements. New shopping channels have emerged, along with customer engagement-enhancing capabilities such as proximity and location-based marketing, loyalty programs, augmented and virtual reality, and gamification. Shoppers increasingly expect the shopping process to seamlessly blend physical and digital features. Integrated platforms offer pure-play online experiences that span the entire shopping process from product discovery to consideration to purchase to consumption to after-sale service and support. To compete with the online giants, retailers with brick-and-mortar stores have to install sensors and networks of kiosks, mobile devices, wireless and Bluetooth beacon-based location-based services, augmented reality and virtual reality applications, smartphone apps and other resources for customer engagement that unify their physical and online offerings. Retail deployments of digital infrastructure elements include self-checkout kiosks, stores with no checkout, touch tables with sensory feedback features, scan and bag kiosks, online-enabled interactive fitting rooms and dressing areas, kiosks and touch tables within stores, digital mannequins, mobile point-of-sale devices, smart mobile apps and sensory technologies for in-store shoppers, digital walls and product displays, and VR and AR product and brand experiences.

11.4.3. Integration Strategies

There currently seems to be some disjoint between strategic initiatives and physical and infrastructure blending tactics when it comes to retail. This disjoint extends across physical and digital retail itself affecting the capability of what some may refer to as omnichannel along with its gradual transition to unified commerce and more recently adaptive commerce with an adaptive experience blending and infrastructure blending as the tactics found within such maturity frameworks. Geospatial integration should have consideration for but also be separate from infrastructure. More physical locations do not ease the penalty with processing digital-only transactions relative to available capacity. Still, the system and operational management needs to account for that.

Infrastructure blending adds another element to the mix of providing digital services, being physical access points and allowing digital touchpoint customers to engage

product, service, and employees in parallel. The strategic direction of digital touchpoint enabling within the retail chain model may dictate what degree to pursue what degree of integration with prerequisites and what knowledge is to be transferred from the chain to the local touchpoint in regards to either supplier or customer, rescaling of what relationship and knowledge equals resources and capabilities within the dimensions of the ecosystem. Options with the use of others offerings in the underlying providers chosen is an additional dimension and should factor not only in pricing dynamics but also in the ability to differentiate. If digital is predominantly inward focused around managing transactions with an inbound focus to reduce costs then the impetus for such strategies is then quid pro quo at best.

11.5. Customer Experience in Retail

The customer experience (CX) is today a critical factor in the success of a store. The concept of customer experience was first defined as the "internal and subjective reaction customers have to any encounter with a representative of the organization that is the source of that interaction". The customer experience is the outcome of the individual customer interactions with a retailer over time. These interactions take place in the different stages of the customer journey: pre-purchase, purchase, consumption, and post-consumption. The customer, during the pre-purchase, searches for product information or engages in shopping in stores and online with the purpose of making a decision to execute the purchase or not. The purchase stage occurs when the customer pays for the product in a store or online, and the consumption stage takes place when he uses it.

The CX is today considered one of the most important factors determining the purchasing decision because its impact is therefore creation of positive memories. Many studies state the impact of the overall experience on loyalty and the repurchase decisions. To enhance the customer experience qualitatively and quantitatively, the retailer must keep in mind that his omni-channel activities must be coordinated. The activities attributable to one channel must not be at the expense of another one but must cooperate toward the same goal. This means that all data gleaned from different channels must be integrated, thus allowing the retailer to create personalized offers, incentives, and services for established customer relations. Moreover, the retailer must enhance the satisfaction and the connection with its brand through an emotional exchange with consumers, whose meaning will be acceptable for both.

11.5.1. Omnichannel Approach

The concept of customer experience refers to each of the interactions that a shopper or seller has with a retailer throughout their relationship. These interactions influence their

perception of the brand, and a retailer should always seek to positively impact all contact points. This means that both positive and negative encounters at different points before, during, and after a transaction can shape the customer's overall experience, satisfaction, or loyalty. Various platforms can facilitate customer interactions, including physical and digital channels. These channels enable the customer to research product details, check product availability and price, or obtain product suggestions or recommendations. Although they can find the same products on several channels, a customer's experience can differ across the channels.

Because these channels are interconnected, it is found that they create a unique customer journey that can change from one shopper to another and that seamlessly integrates physical and digital experiences. As a result, there are big efforts by retailers to align their digital and physical stores to make it easier for customers to browse and buy products across these connected contact points. This is popularly referred to as the omnichannel approach. Since the first mention of the omnichannel approach, retailers are shifting their legacy multichannel efforts to a cross-channel journey where the retailing channels are interconnected. In an omnichannel approach, a customer can choose how to interact with the brand and make their purchases, using any means available. They can research a product online and buy it later at the physical store. After presenting their digital coupons at the cash register, they can get the product online and pick it up at the store to avoid paying for shipping. They can return online orders to the physical store.

11.5.2. Personalization Techniques

Personalization techniques are a fast-growing field of interest in retailing and e-commerce. A plethora of studies and reports demonstrate the benefits of personalizing products and services. Personalization aims to tailor products to fit customers' needs, offer flexible delivery modes, allow customization of product design or appearance, provide a personalized customer experience, enable communication with customers, and target customers with relevant messages. More specifically, personalizing experiences can be achieved through the following personalization techniques. The first technique is basic personalization. In basic personalization, retailers can target segments of customers with predefined characteristics, such as demographics, exhibited behaviors, or product and service preferences, with targeted non-customized content. Basic personalization requires the least effort but can only deliver relatively low levels of relevance to customers.

Fig 11.2: Technology is Revolutionizing Retail Industry

The second technique is collaborative filtering. Collaborative filtering focuses on the preferences of other customers and analyzes the behavior and preferences of many users to deliver recommendations. This method generates recommendations based on the assumption that if two users have similar opinions on one item, they are likely to have similar opinions on other items. Collaborative filtering allows retailers to deliver more relevant content to customers but requires relatively large amounts of customer data. The third technique is content-based personalization. Content-based personalization looks at the data associated with the items rather than the data associated with customer preferences. The latter can incorporate information about product characteristics to help identify similar items favored by the customer in the past. Content-based personalization lets retailers deliver relatively more relevant recommendations for individual customers. However, to personalize the customer experience with this technique, retailers also require large amounts of product or service data and require constant product updates. The fourth technique is contextual customer segmentation. Retailers can also implement personalizations through context-based customer segmentation. Context-based customer

segmentation offers customers different experiences based on context variables, such as the time of day or the customer's location.

11.6. Case Studies of Successful Integration

Integration of digital and physical retail is a new challenge from a holistic point of view. Although many players are trying to adapt the adopted operational models and reorganizational frameworks to better respond to customers needs and to their evolution, not everyone has been successful. It is not only a matter of how many digital point-of-paids and/or service points have been implemented or how "digital" the physical experience is. There are fundamental questions that need to be answered, at strategic as well as tactical and operational levels. The answers cannot be easy, quick or casual; they need to be thought through, planned and carefully integrated over time.

Analysing the experiences of some of the key global players, how did they choose to implement the merger of two different habitats? In order to gain an understanding of new physical and digital retail models it is advisable to create a frame of reference, if only to efficiently classify and encode the experiences being utilised. Diversity can be useful but also risk misleading. Hence the need for a balanced classification, one which is sufficiently flexible to reflect different models while permitting a classification which is on the one hand formal and on the other useful for actual market analysis. Such a classification must reflect the fundamental need for integration and must also point to the essential role of structure and strategies over time. Although colour and atmosphere contribute greatly to experiential shopping in a retail environment, the experiential element is rarely made overt.

Brand A adopts the approach of smooth consumer customer journey. Digital – A retail touchpoint in a store or digitally – A website or App of the store – A linked page or account – Or, through customer service: An email or telephone call to the call center. Brand B has a different approach, betting on exploring the social dimension linked to their customers. Social cannot be governed or directed, but should instead be allowed to develop naturally, without interference. Brand B use social media as a tool with which to create community. It is a place for meeting and exchanging ideas, rather than one based only on commercial transactions.

11.6.1. Brand A: A Seamless Experience

Brand A is known worldwide for its carefully curated designs that resonate with its fashion-forward audience. Through this successful image, the brand has generated a strong emotional bond with its customers. In an effort to enhance its already highly

regarded positioning, the brand took part in an elaborate experiment. For a limited period, the brand created an immersive store wherein, together with its celebrity ambassadors, the brand's fans were invited to preview new collections and then order them via a retail app. In order to reserve the limited pieces, the fans could pay through the app and then later, once the pieces were designed and produced, they could pick them up in store. A few designs were also available for immediate purchase in-store. This experiment made the brand's fan experience quite unique; therefore, the brand was able to generate an exclusive community experience.

The brand had also launched a retail app and a localized web store that allowed customers to purchase items and ship to store for in-store pickup. All shop pictures and merchandise were the same as what appeared on the localized web store to ensure a seamless shopping experience. The app and localized web store enabled the brand to communicate directly with its customers and offer them customized promotional incentives, including exclusive content, birthday gifts, and members-only promotions tailored to their interests, preferences, and behaviors. Investing its efforts into providing a seamless experience, the brand ensured that both digital and physical channels exclusively served each other. This more customer-centric model not only encourages increased customer engagement but also fosters stronger brand loyalty while allowing the brand to clarify its overarching position, whether the transaction occurs in-store or online.

11.6.2. Brand B: Leveraging Technology

Building on the experience and integration already established in the first two case studies, luxury fashion label Loro Piana offers a more unique approach to bridging both the physicality of its retail spaces with a fully online functionality enhanced through mobile technology and other digital touchpoints. Wherever a customer may find themselves searching the range of products available—from international flat retailers to social media or the main Loro Piana eCommerce space—their experience is similar and consistently built on the brand's pillars of timelessness, excellence, and craftsmanship. The digital bridge serves both learning about its collections and means this exploration could occur at any moment even outside normal shop opening times. The seamlessness of the journey is supplemented and enhanced through the use of storytelling in each touchpoint. Brand heritage and values come together with the impact of the craftsmanship on the product through the images, language, and descriptions used to attract customers to the in-store and online experience. But the differentiation comes to life at the moment of product delivery in-store or online, with the details and quality of the packaging, the experience on receiving and unwrapping the product, and the staffing levels and training of the retailer touchpoints at this moment reflecting the core

values of the heritage. Whether physical or digital, both experiences are then complementary and not parallel, with eCommerce functions, catalogs, and browsing enabling the customer to engage while it suits them best, while the in-store touchpoint offers the best customer experience through the informative and tactile elements of the tangible experience at this point of trade.

11.7. Challenges in Integration

In spite of the extensive and rapid growth of these initiatives emphasizing physical and digital experiences, the adoption of infrastructure blending among retail companies represents a considerable change with challenges that generally come when dealing with novelty and uncertainties. As both bricks-and-mortar and online operations entail significant costs for each type of shopping experience, retailers cannot afford investment mistakes; this makes it difficult for them to adjust. The rapid growth of availability of social platforms, mobile services, and interactive experiences has created new expectations about common touchpoints. Yet, some retail companies are hesitating or moving slowly. These challenges come not only from the complexity of the technology integration but also from aspects related to the consumer behavior, acceptance, or inertia.

Difficulties in the full deployment of infrastructure blending are not purely technical. However, integration of systems is vital, as technology is the enabling tool in developing the relevant sets of physical and digital experiences, while creating value for retailers and customers. First of all, adoption would certainly require a significant investment in hardware and software resources. On the consumers' side, acceptance of a relevant use of cameras, sensors, and chips that would allow the collection of data in the stores would require a process of education for understanding the purpose of such use. It would be also important to ensure data security against the risk of hacking. Moreover, technological systems of retailers and third parties should be able to communicate and work together properly. These obstacles are relevant, but at the moment, they do not represent an insurmountable barrier to the widespread adoption of infrastructure blending.

Loyalty programs enhancing the shopper experience warrant a privileged position to retailers, who have direct relations with consumers and can manage a direct consumer dialogue. However, consumers are often skeptical about giving retailers access to their shopping and related behaviors. As visible from the functional wheel, in the new context, they can be served by third-party providers, who could play a pivotal role in directly coordinating both experiences. Integration would not only change the leverage that retailers could have but could also raise doubts about how to create value for all possible actors, as creating a new ecosystem always raises the question about which is the "cake" to be shared and on what criteria.

The differences between physical and digital experiences represent another hurdle. On the operational side, offering the customer both outstanding experiences, possible 24/7, requires a thorough integration of systems, inventory and merchandise management, and pervasive training of workers. It is evident how important the use of the technology is in offering integration and personalization. However, technologies can help create more seamless experiences only if they are positioned behind the scenes and then adopted and used properly by workers in physical stores, thus enabling consumers to have a 360-degrees experience.

11.7.1. Technical Barriers

The improved blending of physical and digital retail infrastructures generates several technical hindrances and challenges that inhibit the further implementation of digital designs and experiences into the physical domain. The first one is the physical barrier regarding technological infrastructure that can create a smooth blending of the digital with the physical environment. With many definitions offered to what constitutes the physical layer, two aspects are particularly emphasized in the proposed concentrated perspective. The first is the convergence of user touchpoints, where the aim through the interface layer is to facilitate balance by enabling a seamless transition across touchpoints between autonomic, informatic, and human-to-human. The second aspect concerns the availability of algorithms and back-end architectures that can enable the blending of data available from the digital touchpoints with the flows of actions operating at the physical layer. Digital infrastructures implement the back-end for such processes.

The other technical barrier relates to the consumer ability to master the usage of technology embedded in the new architectures. Even if a new design provides help to overcome this aspect, its complexity may still limit adaptation. Indeed, one of the factors hindering the fastening evolution of the omni-channel model lies in the incapacity of many consumers to manage the digital opportunities available. Thus, further analysis on the factors unveiling the level of acceptance by consumers of the different new technologies embedded into the physical store experience is still needed to facilitate the acceptance by consumers of self-checkout systems or other interfaces. Balancing the consumer experience in those critical moments of tactile-human interaction is particularly salient when managing personnel assigned to activate the digital interface, making the dialogue less automatic and more human-oriented. Both logic elements, concerning accountability for back-end algorithms that track customer typology, and interact with personnel managing the front-end design, for instance, by defining different style rules for personnel, should be analyzed and designed carefully.

11.7.2. Consumer Behavior

The behaviors of consumers in digitally-enabled physical stores differ from other physical stores in several key facets. The availability of multiple channels from which to choose gives consumers more power and allows them to actively influence their physical shopping experience. Whereas previously they would have tuned out from the store environment, focusing solely on evaluating the product on hand, now they often interact with their mobile devices and with the brand or other customers. Armed with online information, consumers can create a store visit tailored to their preferences and add customized evaluations to the experience. Other customer/brand interactions, whether online or in-store, no longer exclusively happen at a specific point in time, but can happen continuously and hence shape brand perception and customer experience across different channels.

As stores can serve as brand showrooms rather than points of transaction only, creating an atmosphere where consumers want to explore, engage, be entertained, and satisfy social needs may be more important than closing a device-led transaction. Store design and associated services can create an appealing atmosphere for those customers who still prefer to visit a physical store, and provide the sensory experiences that are most effectively billed with. For those customers who see the in-store experience as a necessary evil, however, the challenge lies in rendering the store visit as convenient and speedy as possible. For both of these consumer groups, however, the in-store experience may very well be shaped by their digital device use. In this respect, close collaboration between both channels presenting a seamless experience for customers regardless of the channel used is vital.

11.7.3. Operational Hurdles

While digital retailing traditionally has been able to focus on a single service integration point – the website – harmonizing many in-store service integration points remains an operational challenge of integrating various physical experiences with digital infrastructure. The physical return of online purchases, and vice versa, requires a degree of co-ordination that may not yet be feasible, particularly for smaller retailers. Most of these retailers continue to see their digital and physical revenues develop along separate and discrete pathways. The operational hurdles can stem from not only the execution of touchpoint transactions but also what happens beforehand and afterwards. Operational challenges requiring attention to allow for blended infrastructures and experiences are many and include the following examples. Enabling in-store purchasing of digital-only products may require the installation of physical kiosks and interfaces. Providing the ability to adjust online orders in real-time for out-of-stock products may require on-the-spot order fulfillment. Allowing gift purchases from the store that are sent back to an

online recipient may require a setup that links the shopper to the recipient. Being able to ship product from the store at the point of declining online sales may require staff recourses to be redirected to the digital site. Digital devices can be used by customers to access services not offered in the store. Beneficially affecting profit via lower transaction-cost services does require costly connections to digital partners in order to achieve business process synchronization. The creation of a circular retailing ecosystem in which digital and physical can enhance and also affect the reliability of each other will result in competitive differentiation and profitability. Such reintegration does face possible limitations, though. These limitations can arise from not only cost increases but also from actual reductions in quality or reliability.

11.8. Future Trends in Retail Integration

The future of retail integration will be driven by two main directional forces. First, a progress on the enabling technological side, including online-offline-specific underlying infrastructures, will provide better tools for retailers to improve their adaptive experiences and adaptive infrastructure blending. Furthermore, new platforms will facilitate an easier implementation of improved integration standards. Second, emerging customer expectations will codevelop, reinforced by the new opportunities that a continuously improving integration will provide. The true enabler of any integration effort remains the customer experience. What is seen as integrated today will have moved on tomorrow. A seamless integrated operation-and resource management can never be an end goal, only a facilitator for enabling the best possible customer experiences. Therefore, retail must firmly focus on customer journeys, ensure complete customer interaction data transparency, and ensure the data personalized service offerings across all connection points. Such services must be based around precedence of connection goal needs but be designed with enough flexibility and relevance to be perceived as unique by each customer.

The integration of physical and digital shopping is not an end goal but a facilitator. Providing the full range of customer experiences for connection, interaction, or consumption will require real-time predictive capabilities. Technology progress is now allowing for data analysis, identification, and customer learning to transcend previous limitations. However, the experience design processes must account for forecasting limiting uncertainties in a specific customer journey when it is executed, based on internal customer understanding but also to a degree on forecasting the customer market environment based on external connections with weather forecast, supply failure information, and the like. Additional future technology will enable fast access to the latest sensing-tracking technologies and allow for constantly emerging augmented

interaction capabilities for engaging and truly captivating the customer in all planned interactions.

11.8.1. Emerging Technologies

Technology development-enabled innovation enable structured data accumulation and information sharing, as well as the manipulation of physical environments (infrastructure) – fostering the interoperability of the digital and physical domains through digital twins, autonomous robots and sensors networks, augmented reality, blockchain-based solutions, AI layers, and micro-moment mobile and omnichannel interfaces. Such advancements permit the seamless fusion of the information technology (that manage data and enable services such as product and price algorithms, recommendation engines, and customer relationship management) with the operation technology (that execute the physical activities associated with retail business, for example, instore product appliance, stock replenishment, customer assistance, payment, return and guiding to the delivery). The research community describes the processes associated with the emerging shopping experiences as digital retail metamorphosis.

Digital twins are gaining attraction among retailers and scholars alike, being defined as a 3D virtual replica of the physical world and its properties. Their enhanced immersive visualizations solutions advanced through AR and mixed reality, at the same time, support retailers in tracking and monitoring the real world stores' conditions, allowing for testing of retail strategies virtually, predicting future sales, and developing, managing and simulating product designs and lifecycles, thus enabling omnichannel planning and supply chain integration. Personalized digital guidance can provide customers with access to accurate, up-to-date information through mobile and omnichannel interfaces, whereas robots are poised to assist employees in physical stores and warehouses, and to automate some processes, contributing to efficient order picking processes and reducing fulfillment costs. Interoperability can be solved through blockchain solutions, enhancing security and customer trust regarding the lack of data fraud messages. AI, in its turn, plays today an essential role in omnichannel, allowing for predicting demand, personalizing communications and optimizing promotions and stores' assortment. Its capacity of analyzing vast amounts of data is enabling retailers to manage operational tasks such as stock inventory and loss prevention.

11.8.2. Shifts in Consumer Expectations

Today's digitally-savvy consumers have unprecedented access to information, brands and products. They expect to engage with brands in a manner and time that works best for them and not make a distinction between the digital or physical world. Retailers have

long segmented consumers and created products, messaging and offers targeting markets or market segments. However, we are entering an era where consumers are more empowered as they share product opinions through social media, negatively impacting a retailer's reputation, creating expectations of service that are constant and universal, requiring policies and service strategies that produce consistent responses, engagement and information regardless of channel. Consequently, integrating the physical and digital experiences creates a greater set of expectations for the consumer.

These heightened consumer expectations are challenging retailers to deliver immersive and seamless experiences and become proficient in blending product discovery, pre- and post-purchase research, convenience, assurance and fulfilment, selling and service support. An omnichannel world requires that brands and retailers strive to satisfy the expectation that consumers can leverage all available channels for their own preferred experience. What the consumer expects is easy access to explore, understand, inspect, and interact with both products and people — from product characteristics and availability to shipping options and support. That means digital channels must enable convenient discovery of products, services, and abilities through a known universe specific to that consumer: Their contacts, preferences, interests, browsing history, social interactions, purchase history, payment preferences, locations, etc.

11.9. The Role of Data Analytics

Tapping into the significance and potential of customer experience and digital commerce enhances economic prospects. However, any business strategy will only be useful if integrated across the digital platform and physical touchpoints, beneficial for revenues and positive effects not just from sales growth but bottom-line engagement and profitability, along the entire customer journey and lifetime with the brand. To enable omnichannel business, to understand the brand network from the customer perspective and engage it successfully, requires blending the digital and physical services, products, operations, customer experiences, and tools together. Moreover, the blend must consist of the optimal interplay of the physical and digital touchpoints, products, and services for enabling lower operating costs, and higher sales and profit performance by becoming a facilitator for both a cost-efficient customer journey in all its digital and physical stages, as well as for attentive differentiated customer care for selecting customer segments with high-future revenues.

Mastering the omnichannel capabilities requires a real-time feedback loop from customers via their device or the business integrated sensor technologies of the physical touchpoints. The looping information should be converted into action-oriented insights that drive business decisions for either pulling customer traffic and engagement into the physical touchpoint blend while pushing travelers from the physical touchpoints into the

digital platform. In order to strengthen and become a leader in digitally enabled omnichannel business, the key strategic objective is to integrate the physical and digital platforms and the ecosystem around the brand and the customer experience. Data capabilities providing insight into the current and future changing maelstrom of customer experience preferences along the entire customer journey with all its differences, are a precondition, and require both a sensor mensuration technology capturing the right data variables, with quality as well as quantity throughout the entire customer journey.

11.9.1. Data Collection Methods

Data collection is one of the key needs for every research, and this paper is no exception. Several qualitative and quantitative research methods were used to gather empirical data for both content and context analysis. Information from existing scientific literature, reports, and on-going seminars form the source for content analysis, while interviews, observations, and pilot study model the source for context analysis.

Content analysis has the ability to be reliable over time and makes available a big amount of data which is easily manageable. For better accuracy; research on adapting adaptive experience and infrastructure blending, have been used as context analysis technique. The authors have exploited interview as affective technique to gather contextual data for research on major area of interest for presents work In total, six semi-structured interviews were performed with absolute professionals having similar interest in and job to research on area and three focused discussion after pilot study model have been performed, but one of the interviews was not tape because of its simplicity. The accessibility of these persons was achieved because of the collaboration of consultancy and manufacturing companies. The interviewees explored data their job experiences in relation to abdication of physical and digital blending to enhance everyday usability of resources integrated physical and digital services which are interesting to participants, and then comparative discussion was conducted to gather additional data. The above research has been performed in a “semi-structured” informant interview format, followed by discussion to gather maximum data possible within limited time. The questions asked were generally open-ended, and the respondents were encouraged to answer in depth.

11.9.2. Utilizing Data for Decision Making

Data analytics is utilized to make many different types of business decisions, including strategic decisions to enter a new market, tactical decisions to change price, or operational decisions to optimize the labor schedule. Business leaders also use reports

that summarize analytic findings rather than having operational decisions driven by analytic processes; however, regardless of how data-based decisions are implemented, there are many opportunities for data analytics to support and drive business decisions. In addition to general insights about store sales and traffic, there are many specific types of reports and analysis available from data collected using outside-in methods. Business metrics are descriptive or historical metrics that are largely painlessly exported from systems. Examples include costly reports that provide summary information, such as total sales per store, sort or product category, or total store footfall and conversion inferred from conversion rate benchmarks. While the intent of these standardized reports is to support decision making, they are often unsatisfying and insufficient.

Models are more flexible than reports and summarize data in a way that may not be included in standard reports. However, they typically do not handle all possible scenarios and do not offer all the answers. For example, regression or cluster analysis can be used to model relationships that support decisions about the determinants of store sales. For example, sales can be analyzed to find underlying characteristics that predict high sales for a limited range of comparable stores, and then those characteristics can be used to drive location-based supply-chain decisions, such as which stores should be getting stock from which distribution center on each day. Information provided to accounting systems used for financial reporting is, in principle, gathered anyway and is essentially free.

11.10. Marketing Strategies for Integrated Retail

From the information we gathered, the following marketing strategies for integrated retail are commonly used:Digital Marketing Techniques: Digital marketing techniques are often focused on in integrated retailers. Numerous advantages of using digital marketing techniques to support integration in retailing have been discussed. For example, digital marketing is an inexpensive method to easily maintain consumer relationships. Digital marketing provides a direct marketing link; consumers can easily gain new information and the channel is open at all times. Furthermore, consumers are kept updated on new products or promotions and they can respond immediately by giving feedback to the retailer. However, integrated retailers seem to lack strategies on how to use such tools effectively. Digital marketing techniques should encompass both a wide range of digital tools and online tools. For integration to be successful, these marketing tools should be used for both channels and the provided value message should be similar for both. Yet, it is essential that the retailer's uniqueness is offered by the right digital marketing techniques in the right location during the right time.

●In-Store Promotions: Over recent years, consumers have made a return to physical retail. This presents countless opportunities for retailers to invest in in-store promotions and cross-channel marketing. As the physical retail landscape adapts in the wake of

fierce competition, retailers need to at least understand the benefits of in-store promotions. Store visits are often influenced by physical factors, such as store layout and location. It can be concluded that the consumer is also impacted by discount; therefore, retail discounts on products may influence the shopper to visit the store channel rather than the online channel. In-store promotions also appeal to consumers due to the shopping atmosphere. Some shoppers believe that an attractive store atmosphere elicits a positive emotional state, which leads to negotiation and interaction with the products.

11.10.1. Digital Marketing Techniques

Digital marketing tools have also enabled retailers to exploit the phygital retailing offering. Retail-generated content is often consumed online before being transferred into the physical space whereas user-generated content is often shared online during the physical shopping experience. Retailers can leverage both formats of content by incorporating user-generated content in emails and newsletters or by developing branded hashtags or prizes to encourage content creation during the store visit. Furthermore, analyzing customers' online interactions with the retailer is critical for optimizing travel and purchase decisions, and ultimately for boosting conversions. Using marketing techniques such as retargeting ads is especially important during this stage. Physical interactions are also an important part of the customer's experience and should be carefully preserved. In this respect, digital communication is essential in saving time and preventing out-of-stock situations at the store, as well as reinforcing in-store social interactions and brand storytelling by offering advice, tips, and tutorials before and during the physical shopping experience.

Mobile shopping apps offer a variety of ways for offering additional digital content during the in-store shopping journey. By providing browsing and buying-related capabilities to customers while they are physically engaged in the shopping process, retailers can engage them with special offers that boost margins. They can redistribute in-store traffic by sending location-based messaging to shoppers already in the store but clicking away from it. Finally, they can use push notifications to build storytelling and encourage social interactions as well as facilitate contactless payments in a moment of in-store queuing.

11.10.2. In-Store Promotions

Though retail sales are steadily seeping into the digital domain, they still continue to be the most important sources of sales in most markets. As the most distinguishing features of physical stores as compared to online retail channels, immediacy of possession and the sensory experience of looking at, feeling, trying-on, and sampling products are the

key attributes that motivate customers to find an excuse to patronize stores personally. Therefore, the greatest challenge to brick-and-mortar stores is thus to convert on-site visits to purchases, and in-store promotions are probably the most effective techniques in this regard to spur immediate decisions. Generally, in-store promotions can be classified into two types: price promotion techniques and non-price promotion techniques.

Price promotion techniques are some of the tactic variations of the pricing techniques for stimulating demand addressed earlier. Coupons, discounts, and price reductions are effective methods to create traffic in stores. Coupons are vouchers for getting discounts, either at the time of purchase or at a later date, and are delivered via mail, social media apps, or through traditional print media to consumers at home, or through retailers online channels to potential customers registered on their websites. Coupons can be used for any day of the year, but they create a stampede for the stores only on select days when the coupons are valid. Discounts and price reductions are offered on store shelves to every customer, even when they are discounted prices.

Non-price promotions are methods of stimulating demand without using price cuts. They create a desire in customers through various techniques that channel their attention and increase their willingness to pay and take action to shop at the store. Non-price promotions are usually for a limited duration during certain weekends or holidays, which may be focused on building sales for a specific day or weekend or on building sales volume over an extended period.

11.11. Sustainability in Retail Integration

11.11. Sustainability in Retail Integration In a world characterized by increasing urbanization and digitalization processes, the challenge for sustainability has become significant as these processes imply considerable energy costs. At the same time, retailing is attributed to a significant share of global emissions and energy use. This brings about the question of families allowed to perform online shopping to compensate an initial disadvantage in the absence of food proximity. However, both physical and digital retail are highly resource-intensive due to the supply of innovative products and usually low pricing. This may also apply to selection and sorting of products favored by families willing to perform food shopping in a sustainable manner. As offers in physical and digital retail are characterized by national and store-specific varieties in terms of price and sustainability, there is an opportunity to sort and select product, logistic, and environmental characteristics of retailers into a shared platform, such that sustainability guarantees, also supported by public authorities, will also contribute to enhancing the food supply of families suffering from food poverty.

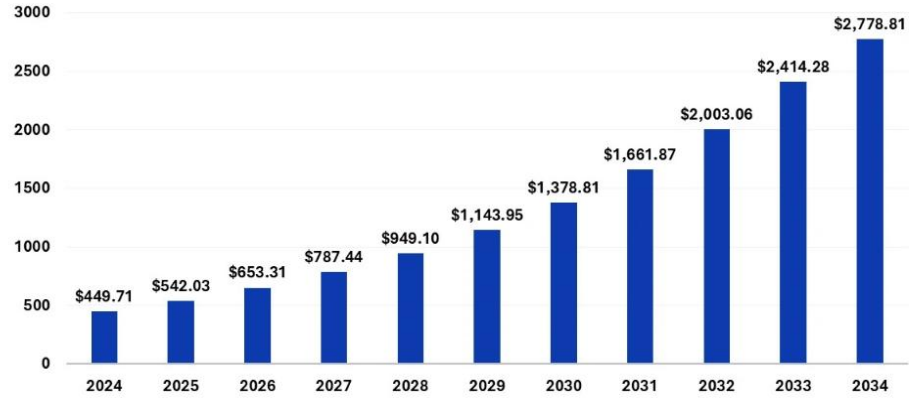

Fig : Smart Infrastructure Market Size

Eco-Friendly Practices In order to reduce their impact on the ecosystem, supermarkets have favored the adoption of eco-friendly practices, such as reducing carbon dioxide emissions and the excessive use of natural resources, by promoting demand-side solutions. However, catalogs that simply present suppliers that claim sustainable actions, relative to energy-saving and pollution-reduction solutions, are not able to channel demand toward an actual reduction of emissions and consumption of natural resources. Therefore, the aim of this work is to focus on a unified library-centered ecosystem that promotes the sustainable practices of firms and simplifies consumers' collaboration, making them involved in promoting change.

Consumer Awareness Environmental awareness can partially help solve the problem of negative externalities. Tougher laws could be implemented or regulations could be adopted that would allow supermarkets to settle a price for the environment. However, even considering that a lot of people are ready to pay more to protect the planet, some of them are poor and contribute less to the emission of negative externalities. Thus, a tax or a tariff that would reduce the income of "polluters" to subsidize the people living in poverty and "victims" of ecological damage, would be difficult to manage.

11.11.1. Eco-Friendly Practices

Forcing manufacturers and firms to take responsibility for their products throughout all stages of their lifecycle has been a trend in sustainability practices. Traditionally consumers have an attitude of ignoring the impact of products as they demand. Firms are responsible for imposing environmental and ethical standards on their supply chains, enabling innovation and providing information in their stakeholders, impacting positively in a future perspective. Eco-Management and Audit Scheme, Environmental Management System, and AM070 applies Agile Product Development and therefore

Lean, Robustness, Safety and Green product development processes. As a global concern, the establishment of present-day sustainability practices has not only been driven by governments through taxes and subsidies nor internationally important corporations through Corporate Social Responsibility. It has to be present in a large scale in trade, finance, and information, as well as policymakers. The awareness of consumers regarding sustainability plays an important role in prompting an eco-friendly practice in products of the industry, mainly in eco-design established on principles and using methodologies to assess and support the integration of environment issues when designing.

At a general level in product life cycle assessment have the role of quantifying potential environmental impacts of comparatively evaluating products, considering impact in nature and sustainability of products and several dimensions such as resources, emissions, health, market, stakeholders, social conflicts, economy, etc. It might be at national, regional, industrial, or firm level, it might involve multiple systems or be single, and it becomes an important tool for green retailers. Retail can therefore position its offering on the green consumer spectrum and provide its suppliers with information about product returns at the eco-design level. Factor 50 requires radical improvements not only in markets and consumer practices but also in technical systems and production processes creating through chain value sustainability and at the same time consume less resources.

11.11.2. Consumer Awareness

Consumer awareness is primarily reflected in the choices consumers make when purchasing products and services. For example, a consumer's decision to purchase ethically sourced products is a reflection of consumer awareness. The level of consumer awareness can have a significant impact on retail businesses, encouraging them to adopt sustainable practices and informing their development and management in order to improve overall operational efficiency. Measurable levels of environmental concern and consumer awareness are critical considerations influencing the adoption and successful implementation of environmentally friendly practices in retail channel integration. This influence is particularly prevalent among segment target and market-driven sectors. In retail, awareness of sustainability related to product offerings and omni-channel decisions is based on consumer values, particularly those connected to social responsibility. Retail channel choice may be driven by varying motives of perceived value for both consumers and retailers. It is not uncommon that a value-based analysis regarding decisions made by both parties may deviate regarding product acquisition in a physical, online, and/or hybrid environment. Consequently, hedonic factors such as pleasure or impulse-based emotional motives often override utilitarian factors such as

cost or environmental impact, further complicating the eco-efficiency vs. eco-effectiveness debate. It is also typically the case that consumers' perceptions of a retailer's use of a sustainable retail integration strategy will only be positive if the retailer has a good reputation and offers high quality products.

11.12. Conclusion

This chapter discusses blending and adaptive experience within the context of the blending of physical and digital retail environments. Merchandise hybridization, retail access hybridization, and retail experience hybridization is provided as a typology of the kinds of blending. It argues that existing research is currently deficient in descriptive theory regarding the creation of blended experiences between existing retail environments. The chapter concludes with a description of a model of the blending of experience that is based on infrastructure and experience. Adaptive affordances regarding the blending process emerge from experience requirements, experience enhancing affordances, opportunity requirements, and opportunity enhancing affordances. The contribution of this chapter is to provide an integrative framework and research agenda for both the blending of experience and how it occurs, through the exploration of adaptive affordances. The process of blending is driven by experience hybridization, experience and interface requirements, and by the supporting interplay of both the infrastructure and experience of the blended environment. Where experience and interface provide blended behaviours, the three types of hybridization function as different approaches to answering the interface and experience requirements for the constellation of visitors to the blended retail space. The blending can be either visitor-driven, infrastructure-driven, or an emergent interdependence that expands opportunities and experience. The concept of affordance describes the dispositions and capabilities of objects and infrastructures in a way that allows analysis of the process of the interface and experience blending. To provide a coherent multilevel theory of blending, a balanced model of affordances related to infrastructure and experience becomes necessary. The contribution of this chapter is to provide such a model to allow for theory-driven design processes and to inspire empirical research.

References

Pantano, E., Pizzi, G., Scarpi, D., & Dennis, C. (2020). Competing during a pandemic? Retailers' ups and downs during the COVID-19 outbreak. Journal of Business Research, 116, 209–213.https://doi.org/10.1016/j.jbusres.2020.05.036

Verhoef, P. C., Broekhuizen, T., Bart, Y., Bhattacharya, A., Qi Dong, J., Fabian, N., & Haenlein, M. (2021). Digital transformation: A multidisciplinary reflection and research agenda. Journal of Business Research, 122, 889–901.https://doi.org/10.1016/j.jbusres.2019.09.022

Piotrowicz, W., & Cuthbertson, R. (2014). Introduction to the special issue: Information management in retail. International Journal of Information Management, 34(3), 235–238.https://doi.org/10.1016/j.ijinfomgt.2014.03.001

Brynjolfsson, E., Hu, Y. J., & Rahman, M. S. (2013). Competing in the age of omnichannel retailing. MIT Sloan Management Review, 54(4), 23–29.https://sloanreview.mit.edu/article/competing-in-the-age-of-omnichannel-retailing/

Rigby, D. (2011). The future of shopping. Harvard Business Review, 89(12), 65–76.https://hbr.org/2011/12/the-future-of-shopping