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**The state of digitalization in Hungarian food and clothing retail
sectors - Key solutions through leading companies**

(A digitalizáció helyzete a magyar élelmiszer- és ruházati
kiskereskedelemben - Kulcsmegoldások a vezető vállalatokon
keresztül)



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I. Introduction

The retail industry is undergoing a continuous digital transformation on a global scale, which has a significant impact on the Hungarian market since it is dominated by large international businesses (Deloitte, 2017).

The recent pandemic has accelerated fundamental changes in consumer purchasing behavior, increasing the pressure on businesses to implement digital solutions. According to Ernst & Young (2022), 44% of customers intend to consolidate shopping trips and shop less frequently, while 36% plan to buy more online and only visit stores that offer exceptional experiences. Therefore, if retailers want to retain their customer base, they must not only increase their online presence but also adopt digitalization in their brick-and-mortar locations.

A new segment of consumers has emerged who have come to expect an integrated, consistent experience. They are willing to routinely switch channels and use various platforms simultaneously, and they expect a retail environment that provides consistency between their physical and digital experiences (Harms, 2022). As new solutions and business models emerge, the Hungarian retail industry is gradually adopting digitalization solutions to increase efficiency, reduce costs, and improve the customer experience, but there is still room for growth in digital innovation (McKinsey & Company, 2020).

Despite the fact that there have been a number of recent studies on digitalization as a factor of retail integration and analyses of some retail digitalization projects, a sector-wide framework for mapping the key digital solutions has not yet been implemented in the field of Hungarian retail research.

This study attempts to provide insights into the challenges and opportunities of digitalization in the Hungarian retail sector as well as identify best practices by examining the experiences and perspectives of industry experts in a unified framework.

The main question for the current topic of research was formulated as follows:

“How does digitalization affect companies' front- and back-end activities in the Hungarian food and apparel retail sectors?”

In addition, in order to improve the study's applicability, this article attempts to provide a response to the following research sub-question:

“What are the similarities and differences between the Hungarian food and apparel retail sectors in terms of digitalization?”

My thesis begins with a literature review that contextualizes the research and presents and synthesizes the most relevant retail digitalization solutions, followed by secondary market research to gain a deeper understanding of the specific market segments.

The current research seeks to investigate the digitalization solutions implemented in the Hungarian food and apparel retail sectors by conducting semi-structured in-depth interviews with six industry experts and analyzing key companies. In addition, the primary digital solutions of the selected market sectors are compared, and their similarities and differences are highlighted, along with their implications for retailers who are less digitally advanced.

II. Literature review

II.1. Literary research method

For the literature search, I employed two types of research methods: the systematic literature research methodology and the snowball sampling technique. The primary objective of my systematic literature research was to identify the most recent literature on the topic, while the snowball sampling's objective was to identify the comprehensive, traditional theories based on an influential work, of "The digitalization of retailing: an exploratory framework" by Hagberg et al. (2016).

Systematic literature research is defined by Fink (2005, p. 3,17) as "systematic, explicit, and comprehensive," as well as a method that assures replication, with the objective of identifying, evaluating, and synthesizing the writings of researchers, academics, and practitioners (Okoli & Schabram, 2010). The rigorous norms of systematic literature research permit a transparent search that others can replicate.

In order to accomplish this, I adhered to the methodological recommendations of Okoli & Schabram (2010), who outlined the eight stages for conducting a systematic literature review and research:

- 1. Purpose of the literature review*
- 2. Protocol and training*
- 3. Searching for the literature*
- 4. Practical screen*
- 5. Quality appraisal*
- 6. Data extraction*
- 7. Synthesis of studies*
- 8. Writing the review*

My research aimed to investigate the most recent literature on the digitalization of retail. On 1 March 2023, I conducted research in the Scopus database and ran a search that returned 353 results. I was only interested in articles published in English and Hungarian. To evaluate the dimensions of digitalization in the retail setting, various test searches were conducted to find how well searching the titles and abstracts of the articles works by keywords such as "digital" and "retail". Additionally, "retail*" was mandated in the title, abstract, or keywords to relate the search results with the retail domain. As the study focused on digitalization from the customer sources were limited to major scientific and practitioner journals. These two iterations

yielded an initial set of 353 articles. To narrow down the search, the articles were screened in three rounds (Figure 1). First, the titles were studied to identify whether the intended article was relevant to digital technologies in retail. To obtain the most recent and pertinent literature, I set a date range from 01.01.2015 to 02.31.2023. In addition, I have concentrated on certain topics, including business, management, and accounting. Other than that, the document categories were exclusively academic journal articles, and this yielded a set of 93 articles. In 36 instances, I removed articles unrelated to my research by examining their titles.

Then, the abstracts (n=67) were examined to clarify whether the core subject of the article was about applications, benefits, or values of digital technologies in retail, leading to the exclusion of 16 articles. Finally, the remaining set (n=51) were evaluated for full-text review eligibility. The research aimed to consider both empirical and conceptual studies. Thus, no filter was added associated with the research methodology. The articles related to consequences, outcomes, impacts, influences, values, etc. of the retail technologies were included for the analysis. The studies dealing with the adoption/acceptance of the technologies also remained since the benefits of the technologies have been discussed in most of them. Accordingly, nine studies were excluded in this round with no relevance to the topic, which reduced the number of articles to 42 (spanning the years 2015 to March 2023).

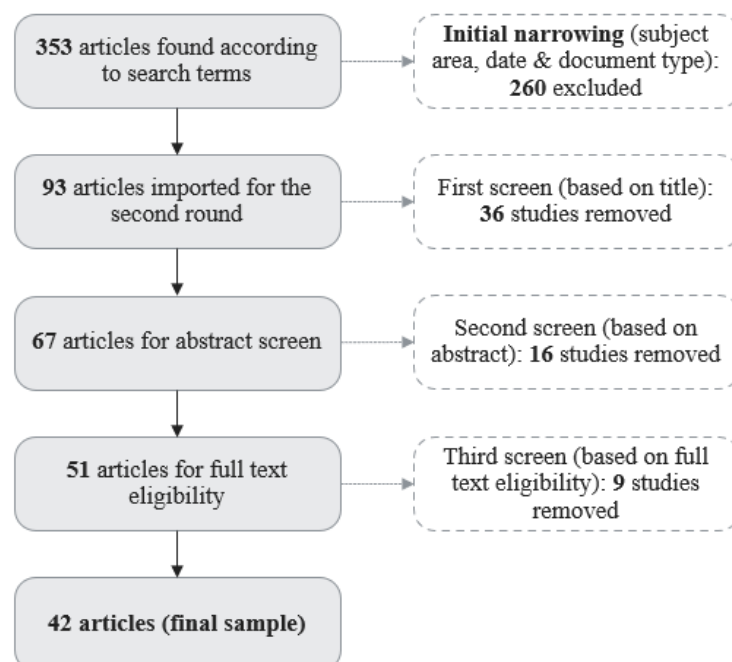


Figure 1: Systematic literature research screening process (Source: Own editing, based on Ziaie et al., 2021)

II.2. Descriptive analysis

II.2.1. Analysis using the systematic literature research method

The systematic literature search provided a total of 42 literature articles. The largest number of these articles, nine, was from 2016, while the second largest number was from the subsequent year (Figure 2). The distribution of articles by date aptly illustrates the fact that retail digitization began to emerge in the late 2010s.

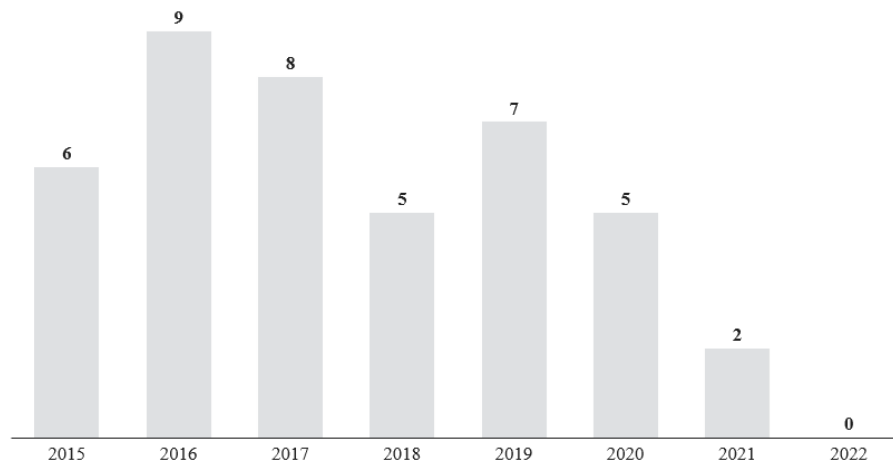


Figure 2: Distribution of relevant publications by year (Source: Own editing)

II.2.2. Analysis using the snowball method

With this approach, I intended to investigate as thoroughly as possible the retail digitalization literature that might be relevant to my topic. Hagberg's *The digitalization of retailing: an exploratory framework* (2016) and the bibliography of the 42 previously selected articles served as a starting point for this literature research. My methodology consisted of monitoring, while reading the literature, which theories and authors' names were mentioned most frequently, and then processing these articles and theories.

II.3. Retail digitalization

Digitalization is the transformation of a company's business model through the use of digital technologies, while providing companies with new opportunities to create value and increase revenue (Gartner Glossary, 2020). Digitalization requires companies to adapt continuously, and drives economic actors to evolve their processes, pushing them to try to meet consumer needs with ever more innovative solutions (Hagberg et al., 2016).

Technological developments lead to socio-cultural changes that have a long-term impact on the relationship between society and the economy and define new cultural values, thus shaping our daily lives (Fehér, 2017).

The connection between machines and people is created by platforms where digital processes are made tangible to human senses. In terms of media, platforms are also capable of carrying data and content patterns. They collect and aggregate content, messages and data along certain parameters. Social media is one of these platforms (Wu, 2016). Today, the digital toolbox is changing and expanding at an ever more dynamic pace, and the resulting trends in service providers, sales and content producers are having a significant impact on decision-making (Fehér, 2017).

Alongside the digitalization of products and services, the transformation of sales and communication channels is having a combined impact on changing consumption patterns. In this way, the transformation of the retail sector is not simply the result of digitalization, but the retail sector itself is influencing the evolution of digitalization processes along consumer expectations and needs (Hagberg et al., 2016). By meeting new consumer demands, the integration of digitalization technologies can improve the efficiency of value creation processes and provide innovative means of generating value for customers and the business (Matt et al., 2015). Agárdi (2018, p. 52) discusses the integrative effects of the digitalization of retailing, stating that "digitalization is blurring the boundaries between offline and online channels, between retailer and consumer roles, and between products and services".

E-commerce is the sale of products and services over the internet or any network of computers (Pratt, 2022). In the process, both parties, in addition to products and services, share information with each other and with internal and external stakeholders. E-commerce can be B2B, which refers to a transaction between two companies, business partners, or B2C, which refers to the selling activity of companies to consumers. In addition to e-commerce, the literature also uses the term e-retailing, which refers to the online sale of retail products, but throughout this paper I will use the term e-commerce to refer to the different aspects of online sales (Singh & Srivastava, 2019). The term digitalization is closely associated with e-marketplaces in the sales context, but the potential of digitalization is not limited to the emergence of online marketplaces (Hagberg et al., 2016).

In the future, there will be an increasing focus on consumer trends such as personalization and presumably e-commerce will continue to grow, but the question is of course how. The demand for personalized service delivery from the consumer side is making the task of business

operators much more difficult. This is because, in addition to cost efficiency, greater emphasis will also have to be placed on individual needs, and efforts will have to be made to achieve this in the most optimal and resource-efficient way possible (Zhu, 2019).

II.3.1. Front-end retail digitalization solutions

Omnichannel business mindset in retailing

Although the omnichannel model has been referred to in the literature for many years, there are still many recent studies that have been published both on its analysis and its application in specific industries. The merging of traditional sales channels with innovative solutions using digital technology has transformed not only the retail sector as a whole, but also the decision-making process in the retail industry, and modern sales models are all pointing towards omnichannel (C Lazaris & A Vrechopoulos, 2014).

The omnichannel, which builds on and goes beyond the multichannel model, has evolved in parallel with the development of digital information technologies and allows consumers to move seamlessly between channels. While multichannel was characterized by the independent operation of channels, omnichannel relies on the combined use of channels (Table 1).

Characteristics	Multichannel strategy	Omnichannel strategy
Concept	Division between the channels	Integration of all widespread channels
Degree of integration	Partial	Total
Retail channel scope	Store, website, and mobile channel	Store, website, mobile channel, social media, and customer touchpoints
Customer relationship focus	Customer-retail channel focus	Customer-retail channel-brand focus
Objectives	Channel objectives (sales per channel, experience per channel)	All channels work together to offer a holistic customer experience
Salespeople	Do not adapt selling behavior	Adapt selling behavior depending on each customer's needs and knowledge of the product
Customers	No possibility of triggering interaction, using channels in parallel	Can trigger full interaction, using channels simultaneously
Retailers	No possibility of controlling integration of all channels	Control full integration of all channels
Channel management	Management of channels and customer touchpoints geared toward optimizing the experience with each one – Perceived interaction with the channel	Synergetic management of the channels and customer touchpoints geared toward optimizing the holistic experience – Perceived interaction with the brand

Table 1: Comparison of multichannel and omnichannel strategy (Source: Own editing, based on Juaneda-Ayensa et al., 2016)

The concept of channels in retail refers to the mediums through which a retailer and a customer interact. Neslin et al. (2006) define channels as such, emphasizing their importance in shaping the retail experience. Dennis et al. (2016) further distinguish three types of channels in retail: traditional or physical, web-based, and mobile devices. While physical retail stores have been

the dominant channel for decades, web-based and mobile channels have emerged in recent years due to advances in digital technology. In addition to these three channels, social media sites have also been recognized as an important channel for retail. Social retailing, or the use of social media to interact with customers and sell products, has become increasingly popular among retailers (Baxendale et al., 2015).

It is worth noting that each channel has its own unique touchpoints or points of interaction between a retailer and a customer. For instance, in a physical store, touchpoints might include store layout and design, product displays, and customer service interactions. In contrast, touchpoints in a web-based channel might include website design, ease of navigation, and checkout process. Mobile channels have their own unique touchpoints as well, such as mobile app design, push notifications, and in-app purchases (Gallino & Moreno, 2014). The use of multiple digital channels, which are emerging alongside brick-and-mortar stores, not only serves to differentiate but also provides a competitive advantage in the marketplace over sellers who either conduct their retail activities only through physical or only through online platforms (Sopadjieva et al., 2017).

According to Kokho Sit et al. (2018), customers are increasingly using multiple channels to engage with retailers during the same shopping process. This is exemplified by the practices of “showrooming” and “webrooming”, where a customer may discover a product in a physical store but choose to complete the purchase online, or vice versa. While changes in customer behavior cannot be controlled by retailers, there are examples of retailers implementing functionalities such as “click and collect” in response to observed changes (Gallino & Moreno, 2014). It is important to differentiate between shopper behavior and functionality implementation, as the former is not under the control of the retailer (N. Beck & Rygl, 2015).

The omnichannel retailing model refers to the integration of the three channels (physical, online, and mobile) and the facilitation of seamless cross-channel shopping by consumers (Brynjolfsson et al., 2013; Hagberg et al., 2016). This model adopts a customer-centric perspective to comprehend what motivates shopping behaviors and adapts value propositions that take such changes into account. Verhoef et al. (2015, p. 176) defined management of such channel configuration as "the synergetic management of the numerous available channels and customer touchpoints, in such a way that the customer experience across channels and the performance over channels is optimized."

However, having an omnichannel retailing model allows a business to maximize the potential of its existing channels by ensuring product quality, coordinating promotions, sharing data

among channels, and integrating logistical operations (Kozlenkova et al., 2015). Additionally, it is implied that channel integration boosts customer satisfaction and loyalty and that technology can be used to collect data in an omnichannel setting (Frasquet & Miquel-Romero, 2017; Grewal et al., 2017). The opportunities that may result from integrating mobile channels are highlighted, particularly those that could increase repurchase rates or give retailers the chance to redesign their current purchasing procedures (N. Beck & Rygl, 2015; Giuffrida et al., 2019).

And in this digitally-enabled environment, a new consumer segment has emerged who have come to expect the consistent, integrated experience that the omnichannel model provides. These consumers are willing to switch channels frequently and utilize multiple channels concurrently. Consumers can use their own electronic and mobile devices to access new information, compare products and brands, seek one another's opinions, and determine the optimal solution for their preferences, as a result of technological advancements that have created numerous possibilities. The autonomy provided by digitalization, with its unlimited access to information through channels, gives consumers the feeling that they have a greater influence on the sales process than before (Juaneda-Ayensa et al., 2016).

Customer experience

With the rise of e-commerce, many retailers expanded their physical stores by adding a second channel (Geyskens et al., 2002). The development of the omnichannel approach to retailing, which aimed to create a seamless interaction between the physical retail space and the abundance of online channels, such as web stores and social media, as well as a diverse range of technological devices, came next (Steinhoff et al., 2019). While studies on omnichannel marketing have drawn a lot of attention (Verhoef et al., 2015), less attention has been paid to how customers interact with actual stores in this modern era (Alexander & Kent, 2021). In order to understand the current customer experience, it is necessary to revisit the physical retail space, whether it be a town center, a supermarket, or a shopping center, given the changes brought on by the omnichannel retail environment.

The traditional definition of the customer experience is the observed result of the interaction between the business and the customer during the service process (Lemon & Verhoef, 2016). Today, customers co-create their experiences beyond limits or occasionally even completely independently of the underlying firm (Jaakkola et al., 2015). This is because customer experience is now seen from a contextual and systemic perspective. Value co-creation is a concept that has been used in a wide range of disciplines, including retailing and marketing

(Pantano et al., 2017; Vargo & Lusch, 2008). Different definitions of co-creation have emerged as a result of the variety of methods. The present paper operationalizes the value co-creation process as a value-enhancing activity that happens between actors, including such aspects as customer-to-customer communication and online interaction (Jaakkola et al., 2015; Minkiewicz et al., 2014). This interaction between various actors is a collaborative process in which value is mutually produced thanks to another actor's integrated resources (Leclercq et al., 2016).

Value co-creation can be compared to the customer experience, which can be described as a customer journey containing multiple touchpoints and interactions with various actors (Trischler et al., 2018). A number of touchpoints and exchanges are necessary for value co-creation, and how these are perceived will determine whether value is created or destroyed (Gummesson & Mele, 2010). As a result of this process, consumers will subjectively and experientially assess value based on contextual elements, such as social aspects (Edvardsson et al., 2011; Vargo & Lusch, 2008).

In-store experiences

Digitalization has evidently transformed the retail industry (Hagberg et al., 2016; Hoyer et al., 2020). According to Grewal et al. (2017), the retail and services sectors have already embraced numerous cutting-edge in-store and online technologies to better serve their customers, whether it be by easing the shopping process or guiding clients through every step of their customer path. Grewal et al. (2020) discuss advancements in in-store technologies like augmented reality, virtual reality, embodied robots, avatars, and smart displays on this unique issue. The promise made by these various convenience and social presence technologies to improve brick-and-mortar retailers' ability to compete with online merchants like Amazon is an intriguing feature. Amazon dominates a wide range of categories, and as it expands its store brand offerings, it creates new challenges for manufacturers and name brands as well as other retailers. These challenges are constant, wide-ranging, and steadily increasing for conventional retailers. But for manufacturers and retailers who want to improve their customers' in-store shopping experiences and thereby promote more sales and higher profits, in-store technologies might suggest some win-win opportunities.

Retailers now have access to an increasing number of technologies that can improve both operations and customer experience. It has been suggested that the most prosperous retailers are those who innovate and test these technologies (Grewal et al., 2020). According to recent research, a variety of devices have been created that innovate the shopping experience and store processes (Willems et al., 2017), with their distinguishing feature being that they are visible to

customers. They consist of augmented reality (Rauschnabel et al., 2019), self-checkout (Park & Lee, 2017), retail apps, and fit technology found in magic mirrors and virtual fitting rooms (M. Beck & Cri , 2016; Pantano & Priporas, 2016). According to their use and function, in-store technologies can be divided into five typologies: product display, shopping experience, information search, payment, and other uses (Pantano et al., 2017). Table 2 contextualizes these typologies in relation to retail.

Technology typology	Digital technology	Example
Product display	Digital screen/signage/window	Adidas's four-dimensional display screens showcasing product and campaigns
Shopping experience	AR/VR: Virtual mirror/fitting room, touch-screen, mobile app	Nike's "Speed Shop" customization studio Adidas's "inunersive" fitting rooms and app used for the 'Bring it to me" function
Information search	Tablet, QR code	Adidas's "Hype Wall": shoppers scan shoe QR codes to add drop dates to calendar Schuh's iScan tablet device; Ted Baker's interactive window
Payment	Self-checkout	Zara, Benetton, and Decathlon's express self-checkouts Target's mobile wallet; Radley's mobile checkout
Other (services)	Click and collect, self-service kiosk, vending machine	Nike offering instant check-out, reserve online, and try on in-store Walmart's 'Pickup Towers" self-service kiosks

Table 2: Typologies of in-store technologies (Source: Own editing, based on Alexander & Kent, 2021)

II.3.2. How digitalization is shaping the retail segment

The emergence of new business models

In the past ten years, new business models have emerged in an effort to keep up with the shifting needs and expectations of consumers. According to Suarez et al. (2013), digitalization has accelerated the shift from product- to service-based businesses, fundamentally altering how businesses compete and engage with consumers (Porter & Heppelmann, 2014.). For instance, in the retail sector, retailers have traditionally competed primarily on prices, selections, and locations (Popkowski Leszczyc et al., 2004). However, as information technology advances, it is now essential to develop concepts and services that add value for consumers.

Conventional retailers are under pressure to alter their business models in order to maintain their market shares as e-commerce and digital retailers gain traction. Numerous conventional brick-and-mortar retailers have gone online, created web-based shops and mobile apps, or increased the number of digital customer touchpoints they offer to customers (Jocevski, 2020). These business model innovations, however, have not proven to be simple, with well-known retailers finding it difficult to come up with convincing responses (Hokkanen et al., 2020). Conversely, "born digital" retailers like Amazon, eBay, and Zalando were successful in establishing strong positions in their respective markets. Two competing narratives—one of a "retail apocalypse" and the other of new opportunities in the retail market—have been created as a result of these opposing developments (Hokkanen et al., 2020). Innovation in digital business models will probably determine which narrative will take shape for each sector company.

In addition to conventional retailers, "born digital" retailers are also experimenting with innovative digital business models. Amazon entered brick-and-mortar retailing, for instance, by creating the Amazon Go physical store. Amazon Go, in contrast to conventional brick-and-mortar stores, incorporates digital innovations, such as enabling customers to scan barcodes on their mobile devices and leave with whatever they bought without undergoing a checkout procedure (Jocevski, 2020). These efforts by retailers who were "born digital" demonstrate the continued and widespread importance of digital business model innovation in the retail industry.

New digital businesses and business models aim to maximize the use of information technology advancements and have created entirely new rules for strategy. By facilitating novel types of digital consumer-to-firm engagement (Sashi, 2012), consumer experience (Minkiewicz et al.,

2014), and consumer value (Rintamäki et al., 2007), these business models provide consumers with more opportunities to satisfy superficial needs. As a result of digitalization, the concepts of multichannel and omnichannel retailing have emerged in retail literature, examining how retailers can create a consistent consumer experience regardless of the retail channel employed (Lemon & Verhoef, 2016; Verhoef et al., 2015). Blitz (2016), for instance, argues that successful omnichannel and multichannel retailers prioritize the maximization of consumer value over the optimization of short-term shareholder value.

Digital solutions in the organizational structure

Given that digitalization, understood as the incorporation of digital technologies, is arguably not a binary transition from one stage to another, but rather an ongoing process without a clear beginning or end (Hagberg et al., 2016), its investigation in retail requires a more process-oriented approach, particularly in terms of its impact on how retail organizations transform their businesses. Alongside frameworks addressing how retail businesses can integrate digitalization in various ways, it is necessary to investigate and model the actual processes that may result in digital integration. This requirement focuses our attention on the exploratory processes retail businesses may use to approach digitalization and, more specifically, how digitalization influences established business models as a result.

Despite extensive research on what constitutes an organization's structure, there are divergent perspectives on how to define, examine, and leverage one. According to Teece (2018), there are probably as many business model definitions as there are business models. As stated by Ritter & Lettl (2018), a company's business model is its "way of doing business." Considering how business models have been discussed in retail settings (Sorescu et al., 2011), I define the business model of a company in this paper as "the firm's distinctive logic for value creation and appropriation."

Digitalization is not an event, but rather an emergent, comprehensive, and uncertain phenomenon. Changes in business development and operations may be necessitated by a variety of external factors, but digitalization itself is not an event but rather an emergent, comprehensive, and uncertain phenomenon. Indeed, digitalization can impact multiple external and internal aspects of businesses, as well as individual business models in numerous ways. Despite the fact that scholars interested in digitalization have studied various approaches to innovating business models, ranging from gradual, evolutionary adjustments to radically altering them (Snihur & Wiklund, 2019), the manner in which the exploration phase of digitalization is understood and organized merits additional research.

According to Matyusz & Pistrui (2020), an analytical framework can be created to segment and categorize digital solutions. It builds on the value chain model of Porter (1985), while drawing insights from previous literature, and empirical research. The role of digitalization in value creation activities of firms is also well-established in consultancy research. By combining the described sources, Matyusz & Pistrui (2020) have analyzed the impact of digitalization separately on supporting and core activities, as depicted in Figure 3.

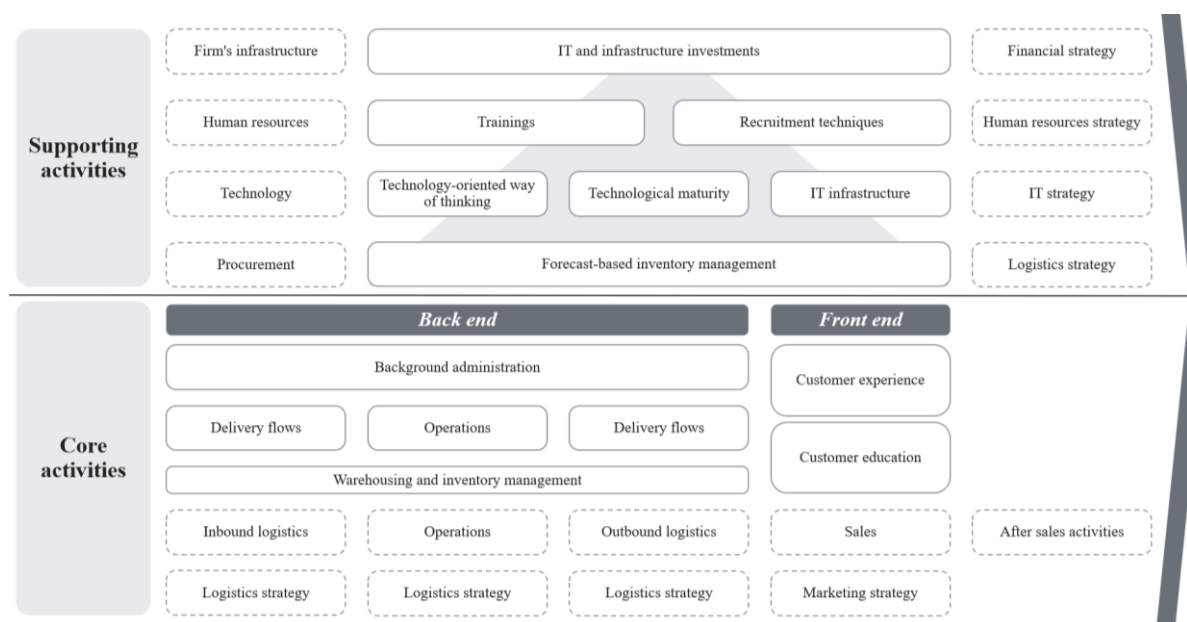


Figure 3: The impact of digitalization in the context of the Porter value chain model (Source: Own editing based on Matyusz & Pistrui, 2020)

The emergence of omnichannel capabilities and new business models has created a new environment for companies that affects how they build their value chains (Juaneda-Ayensa et al., 2016). Financial investment in IT and e-commerce infrastructure is crucial for corporate infrastructure, while digitalization solutions may affect hiring and training processes for human resource strategy. Developing an appropriate IT strategy requires an in-house technological mindset and a certain level of technological maturity and IT infrastructure for digitization efficiency. According to Willems et al. (2017), the forecast-based inventory management systems play a crucial supporting role in the procurement process, which has an impact on the company as a whole.

Core tasks can be separated into back-end and front-end activities claim Matyusz & Pistrui, (2020). Logistics and supply chain management tasks on the back-end include managing warehouses and inventories, transport procedures, and shop operations. Front-end activities

concentrate on sales and marketing tasks, such as offering a positive customer experience and teaching customers on digitalization tools to improve this experience. The integration of these processes is essential for maximizing value creation for consumers.

According to Deloitte's report (2017), there are three key areas in which digitization can bring improvement: 1) strategy, which requires business model innovation for pricing, location, scale, assortment, segmentation, and positioning; 2) front-end, which involves the design of the store, communication, promotions, pricing solutions, loyalty programs, and other factors affecting customer experience; 3) back-end, which includes supply chain, logistics, warehousing, digital procurement, vendor management, assortment design and planning, human resource management, and financial automation. The key digital solutions for each subsegment are detailed in Appendix 1.

III. Methodology

The primary objective of this study is to investigate the predominant digitalization measures employed in the Hungarian retail industry, with a focus on the food and clothing retail sectors. The objective of this study is to conduct exploratory research into the functional strategic solutions generated by digitalization, thereby determining the efficacy and scope of its impact in these sectors. The aim of the study is to explicate the key trends, patterns, and best practices that have emerged as a result of digitalization, as well as the underlying rationales and implications of these developments.

III.1. Research questions

To carry out the above study, I formulated the following main research question:

“How does digitalization affect companies' front- and back-end activities in the Hungarian food and apparel retail sectors?”

After researching the general digitalization trends in food and fashion retail, I examined how these trends can be framed and how companies are attempting to implement various digitalization projects in response. By segmenting digitalization solutions in the Hungarian food and apparel retail sector along the front- and back-end activities and key digital enabler factors, a complete picture can be created. The role of digital solutions in an organization's functional strategy provides a deeper understanding of the impact of digitalization on domestic retailing in the studied sectors.

The purpose of the study is not to create an exhaustive map of all potential digital approaches, but rather to identify the most significant digitization solutions. This can be made feasible by analyzing various retail segments in the given industry that cover important areas. When evaluating the food retail sector, for instance, the hypermarkets, discounters, and online retailers are considered because they are the most essential and largest areas.

In order to support the research question and to understand the digitalization of the Hungarian clothing and food retail sectors, I have defined the following sub-question:

“What are the similarities and differences between the Hungarian food and apparel retail sectors in terms of digitalization?”

By comparing digitalization solutions in the food and apparel sectors, we can gain an understanding of their similarities and differences. The selected industries are comparable in that they are both consumer-focused.

III.2. Data collection method

The research utilized data from a variety of sources. The secondary sources of data included industry analyses, articles, studies, public statistics, company websites, and financial reports. As a first step, I mapped the economic and digitalization characteristics of the Hungarian retail sector. The categories were chosen based on an analysis of which retail sectors provide consumers with the most digital solutions. According to McKinsey & Company (2020), the most innovative sectors were the fashion and food retailers. I then contacted the companies that met the analysis criteria and conducted semi-structured interviews with experts to investigate their digitalization processes.

As a methodological tool, the in-depth interview enables us to examine the researched topic from the interviewee's perspective, thereby gaining a better understanding of the interviewee's way of thinking (King, 1994). The English word interview also refers to the objective of the methodology, which is to obtain and comprehend the subject's different points of view (Sayrs, 1998). Due to its relative simplicity and efficacy, the in-depth interview is one of the most popular qualitative research method (Cook, 2008).

A specific type of in-depth interview is the expert interview. In this case, we want to get the views of individuals with certain expertise in our research topic. Expert interviews are usually conducted with company managers or with experts or researchers in a particular field, as they possess the most knowledge of the subject matter. They are able to provide information that cannot be obtained through other research techniques due to their expertise and knowledge (Gyulavári Tamás, 2017; Ogden, 2008). Typically, they are selected by name and then contacted and invited to participate in the research.

III.3. Specimen

To gain a more comprehensive understanding of the research questions posed, I conducted in-depth interviews with six different experts, about whom more information is provided in the summary table below:

Company code	Retail sector	Retail segment	Interviewee position
A	Food retail	Hypermarket	C-level company executive
B	Food retail	Discounter	Part of the national management
C	Food retail	Grocery e-commerce	C-level company executive
D	Apparel & Footwear	Fast fashion	Part of the national management
E	Apparel & Footwear	Footwear and fast fashion	Part of the national management
F	Apparel & Footwear	Apparel e-commerce	C-level company executive

Table 3: List of companies participating in in-depth interviews by retail sector, segment and position (Source: Own editing)

The selected companies in both segments are among the major players on the domestic market, and the majority are Hungarian subsidiaries of multinational chains, so they have a comprehensive understanding of international trends and are able to contextualize domestic market developments within them. They were chosen based on their role in the Hungarian retail industry, the digitalization solutions they provide, and their market position. Various digitization solutions are frequently kept secret from competitors, so I cannot mention the names of my company's experts, their positions, or the company itself in my research. From January to March 2023, semi-structured in-depth interviews were conducted online. Typically, interviews lasted between 45 and 60 minutes. The research EFOP-3.6.2-16-2017-00007 "Aspects of Developing a Smart, Sustainable, and Inclusive Society: Social, Technological, and Innovation Networks in Employment and the Digital Economy" served as the basis for the interview guide (Appendix 2), as the guiding principles outlined there perfectly matched my research questions.

III.4. Data analysis method

For the purpose of identifying the segments and functional strategies where digitalization is occurring in the lives of various retail companies, I drew on prominent previous studies. Based on this, I have developed a framework for comparing companies and even distinct retail

segments. I segmented the analytical framework into primary and supporting activities based on Porter (1985), followed the structure outlined by Matyusz & Pistrui (2020), as well as Sorescu et al. (2011) and incorporated Deloitte's (2017) mapping of key digital solutions into the model. The advantage of this is that we can analyze the companies within a single retail-segment-spanning framework and obtain a comprehensive picture of the various digitalization solutions.

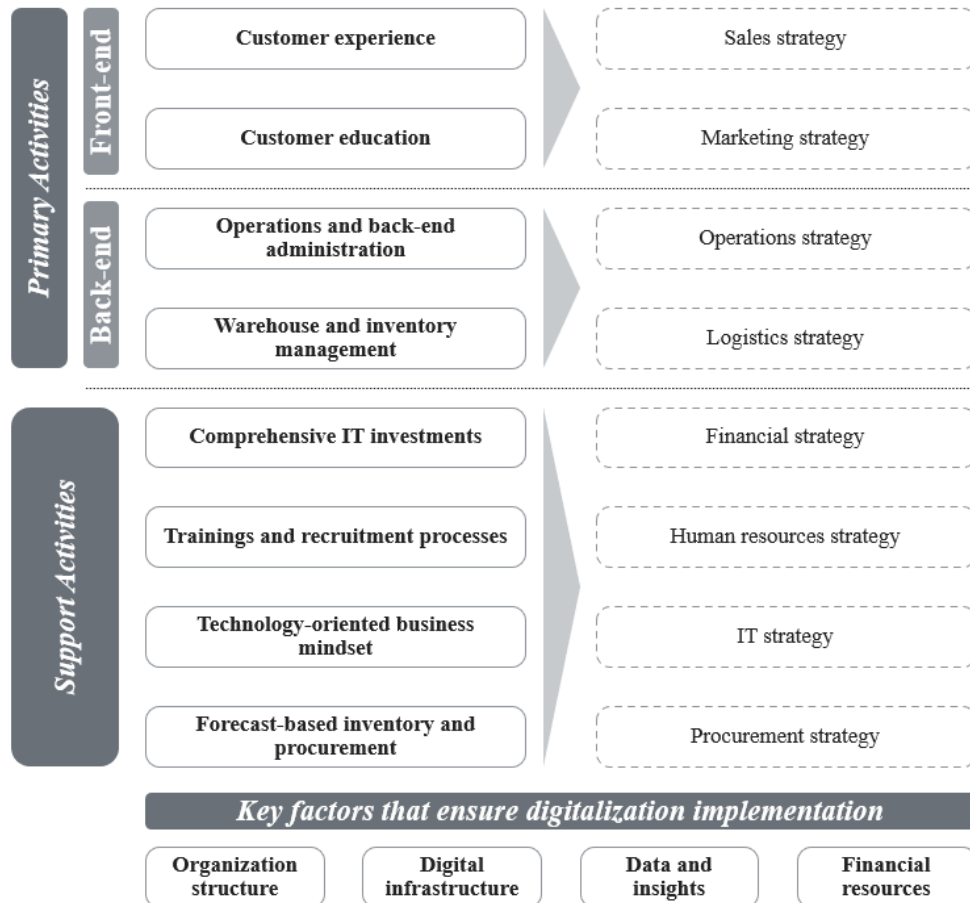


Figure 4: Digitalization analysis framework (Source: Own editing, based on Deloitte, 2017; Matyusz & Pistrui, 2020; Porter, 1985; Sorescu et al., 2011)

IV. Results

To conduct a comprehensive evaluation of the digitalization solutions implemented in the Hungarian retail industry, it is necessary to conduct a thorough examination of the entire retail industry. This necessitates delving into the diverse segments of the retail market and analyzing the key stakeholders and actors operating within this domain. One can obtain a greater understanding of the challenges, possibilities, and growing prospects that digitalization brings for the retail business by gaining an in-depth overview of the retail landscape in Hungary.

IV.1. Market introduction – Overview of the Hungarian retail landscape

The retail market in Hungary is a dynamic and rapidly expanding sector. Due to the country's strong economic performance, rising disposable incomes, and expanding middle class, the retail sector in Hungary has experienced significant growth in recent years. In Hungary, year-over-year retail sales growth plummeted to 4.1% in 2020 due to COVID restrictions, but quickly rebounded to 9.8% in 2021. This resulted from the removal of pandemic restrictions in Hungary (Euromonitor, 2022).

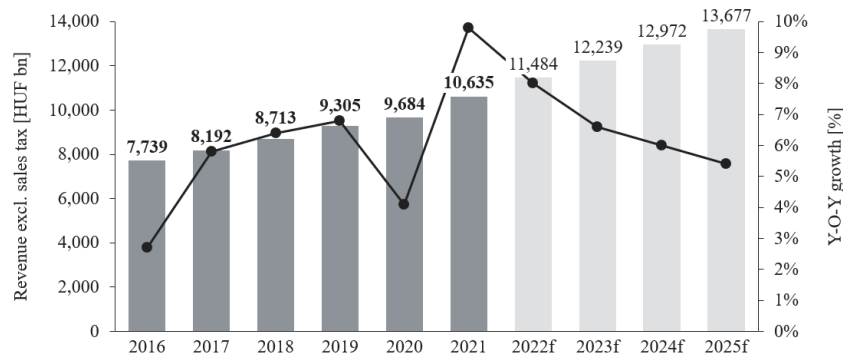


Figure 5: Hungarian retail revenue excluding sales tax [HUF bn] and Y-O-Y growth [%], 2016-2025 forecasted (Own editing, based on Euromonitor, 2022)

Modern grocers weathered the recession well, as they played a crucial role in supplying consumers with food and health-related products. However, channels that sell non-essential products, such as apparel and footwear specialists, beauty experts, and electronics and appliance retailers, did not perform as well, as consumers lost confidence and reduced their spending on non-essential items.

The COVID-19 pandemic strengthened the existing trend toward card payments and accelerated the industry's transition to virtual and mobile platforms in 2020 and 2021.

Technology infrastructure and the prevalence of card readers (which are required for all businesses with online cash registers, including shopkeepers) have also improved and are expected to continue to do so. This measure was gradually implemented by the Hungarian government to whiten the economy, particularly in retail and a wide range of consumer services. It is up to the consumer to decide how to pay, but retailers must offer the card payment option, and its adoption is accelerating. In 2021, nearly 90% of debit and credit card transactions were conducted without physical contact with the terminal, thereby accelerating the payment process in in-store retail channels (Euromonitor, 2022).

Customers are comparing shopping-related travel expenses with home delivery costs. There are instances in which the latter is not only more convenient but also cheaper. Therefore, this, combined with fewer interpersonal interactions (and consequently a lower risk of contracting COVID-19), increased home delivery for groceries, home care, baby care, and hygiene products. In 2021, 79% of e-commerce purchases were completed via home delivery, as opposed to package pickup or in-person collection (GKI Digital, 2022).

The retail sector in Hungary is quite varied with numerous retail formats and distribution channels available. Consumers still prefer traditional brick-and-mortar stores, but e-commerce is rapidly gaining popularity. In 2020, e-commerce accounted for only 8.5% of the total sales made by retailers, but by 2021, it had surged to 10.4% (GKI Digital, 2021, 2022). In terms of annual total turnover in 2021, the consumer electronics e-commerce sector ranked first with HUF 270 bn, followed by the apparel and footwear sector. Based on this indicator, the FMCG achieved fourth place. In 2021, the top five industries enumerated above accounted for 70% of the total Hungarian e-commerce market (GKI Digital, 2022).

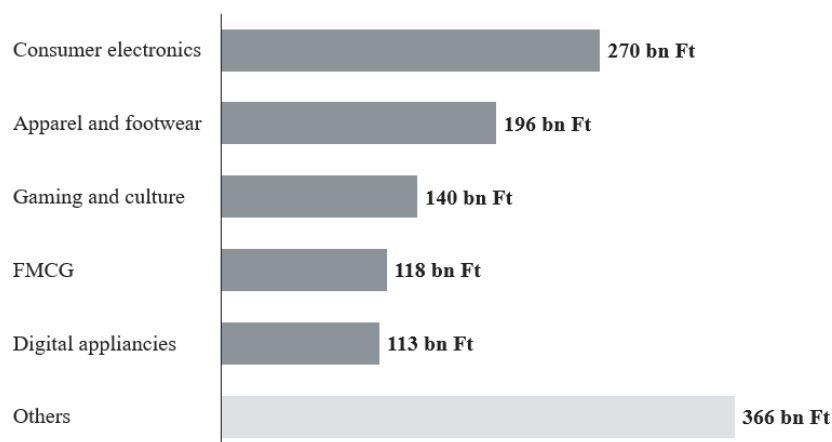


Figure 6: Top five Hungarian e-commerce sectors by gross turnover, 2021 (Source: Own editing, based on GKI Digital, 2022)

The expansion of e-commerce is being driven by the increasing availability of broadband connectivity, the growing adoption of smartphones, and the convenience of online shopping. By 2021, the majority of retail players had attempted to implement the multichannel or omnichannel strategy, which had become the new norm. In 2021, mobile devices accounted for 33.4% of Hungarian e-commerce transactions, illustrating the importance of this channel of commerce in the omnichannel marketing model (Euromonitor, 2022).

The Hungarian government has implemented a number of measures to support the retail industry, including a 5% reduction in the value-added tax on food products, subsidies for small and medium-sized businesses, and financial incentives for the development of e-commerce platforms (Euromonitor, 2022).

Despite the expansion and vitality of the Hungarian retail market, retailers still face challenges. The labor shortage, which has caused labor costs to rise, is one of the greatest obstacles. From an organization's perspective, the labor scarcity presents an opportunity to further digitalize operations (Mordor Intelligence, 2022). In addition, the increasing competition from online retailers and the introduction of new market participants have placed pressure on traditional retailers.

The Hungarian retail market provides significant opportunities for both domestic and international retailers. Increasing consumer spending creates a favorable environment for retailers to digitize their processes, while government policies contribute to the expansion and growth of the retail sector.

IV.1.1. Overview of the Hungarian food retail landscape

Last year, food retail in Hungary achieved a turnover of HUF 4,442.5 bn. This sector accounted for around 34.4% of Hungarian retail sales in 2022, excluding motor vehicle and fuel sales (KSH, 2022).

The food retail industry in Hungary has weathered a swift digital transformation. In recent years, the use of digital technologies in the food retail sector in Hungary has increased significantly. The expansion of e-commerce and retailers' incorporation of digital solutions are altering how consumers purchase food. The expanding use of technology is generating new opportunities for retailers to improve their consumer experience, increase their efficiency, and fuel their growth (Mordor Intelligence, 2022).

Increasingly, consumers seek convenience, and online purchasing offers a more flexible and convenient method of buying food products. To attract and retain consumers, retailers are investing in their online presence and providing a vast array of digital services. Magyar Telekom operates a program to encourage small businesses to incorporate online purchasing and customer service into their daily operations.

The adoption of digital technologies in the Hungarian food retail market is additionally driven by the need to increase efficacy and reduce expenses. Utilizing digital solutions, retailers are streamlining their operations, optimizing their supply chain, and cutting costs. Using digital inventory management platforms and automated purchasing systems, for instance, can help retailers improve warehouse governance and reduce waste.

On the Hungarian food retail market, the most prevalent digital solutions include purchasing groceries online, smartphone applications, and digital loyalty programs. Retailers such as Tesco, Auchan, and Spar have made significant investments in their online presence and offer a vast array of digital services, such as online ordering, home delivery, and click-and-collect options. Customer loyalty is typically only rewarded as part of retailers' comprehensive loyalty programs, for example Tesco and Lidl recently shifted its promotions to the corresponding digital platforms. However, Kifli.hu (a leading Hungarian e-commerce platform for groceries) went against convention by introducing a new subscription-based pricing model, drawing a cue from the software and video game industries.

Despite the accelerated digitalization of the Hungarian food retail market, retailers continue to face obstacles. The need to ensure data security and safeguard consumer privacy is one of the greatest challenges. In addition to addressing the digital divide, retailers must ensure that all customers have access to digital solutions. (Euromonitor, 2022)

IV.1.2. Overview of the Hungarian Apparel & Footwear retail landscape

In 2022, the apparel and footwear retail segment in Hungary had a revenue of HUF 1,150.6 bn. In this year, the sector accounted for approximately 8.9% of Hungarian retail sales excluding sales of motor vehicles and fuel (KSH, 2022).

The retail market for apparel and footwear in Hungary is intensely competitive, with both domestic and international competitors. The market is dominated by fast-fashion conglomerates such as H&M, or the Inditex Group, but the demand for sustainable and ethical fashion is escalating (Euromonitor, 2022). In recent years, there has been a rise in customer interest in

environmentally friendly items as well as products that are manufactured in Hungary, which has led to the popularity of Hungarian companies like Nanushka and Tisza Cipő.

In Hungary, the retail format for apparel and footwear is varied, consisting of both physical locations and e-commerce platforms. Traditional brick-and-mortar stores continue to dominate, but e-commerce is growing significantly due to its convenience and accessibility. Ecipo, Answear, About You, and Zalando have all started operations in the country within the past few years, which has caused a disruption in the online clothes retail sector. This is due to the fact that these businesses have frequently outcompeted traditional stores in terms of price competitiveness and product recommendation.

Additionally, the pandemic accelerated the long-term trend of store closures in certain channels, such as clothing and footwear specialty retailers. Retailers are investing in their online presence and omnichannel services to provide consumers with a streamlined purchasing experience (Euromonitor, 2022).

Despite being one of the fastest-growing consumer product categories in the e-commerce sector, fashion has historically struggled to adapt to the opportunities offered by digitalization. Certainly, consumer uncertainty regarding online apparel sales has contributed to this phenomenon. Almost 20% of online-purchased clothing is returned due to sizing issues (Wang, 2020). Trying on some products in-store is typically required, such as when purchasing clothing and footwear. To combat this, Nyúlcipőbolt, which is a Hungarian footwear retailer developed an online video call platform in which a dedicated shop assistant consults with the customer (and only that customer, without interruption – in some instances for up to 30 minutes) to select the appropriate running shoe. The customer is able to demonstrate how he or she runs, examine available sizes and receive expert advice on the most suitable shoe. During the virtual conversation, he/she is able to buy the shoe immediately.

The apparel and footwear retail market in Hungary is enduring a profound digital transformation. The use of digital technologies is altering the manner in which consumers purchase for clothing and footwear, and retailers are responding by investing in their online presence and providing a variety of digital services (Mordor Intelligence, 2022). Despite the expansion and vibrancy of the Hungarian apparel and footwear retail market, retailers continue to face difficulties. One of the greatest obstacles is the dominance of the market by international fast fashion brands. Rising labor costs and a lack of qualified labor have made it difficult to locate skilled employees, which is another obstacle for companies.

IV.2. Key digitalization solutions in Hungarian food retail sector

IV.2.1. Hypermarket retail segment

Hypermarkets are large retail establishments that sell a variety of products, including food, electronics, apparel, and household goods. These stores typically encompass a large area and provide consumers with a one-stop shopping experience. This segment of the retail industry in Hungary is dominated by a small number of companies, all of which are international behemoths. Tesco has a market share of approximately 50%, followed by Auchan (27%) and Interspar (23%).

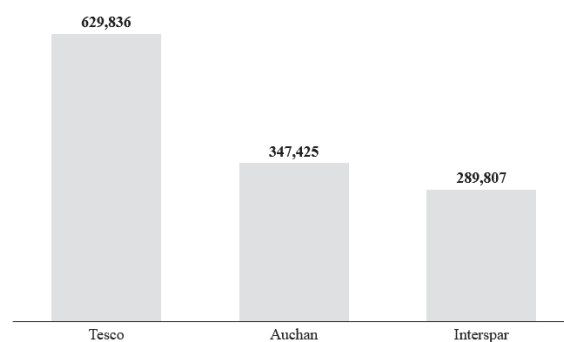


Figure 7: Hungarian hypermarket retail value excl. sales tax, 2022 [HUF m] (Source: Own editing based on company data)

The many different approaches taken by the major retailers are exemplified by the hypermarket's store number. There are currently 112 stores under Tesco's management. After Tesco, there is a significant gap in the number of hypermarkets in Hungary between Interspar and Auchan, with Interspar having only 35 and Auchan having only 19 hypermarket-sized retail locations respectively.

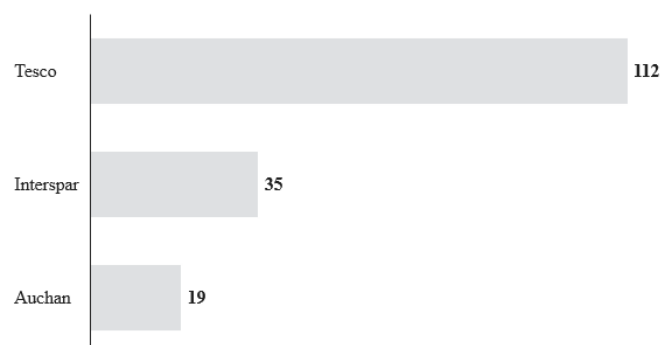


Figure 8: Number of hypermarket stores in Hungary, 2022 (Source: Own editing based on company data)

These retailers have made substantial investments in their hypermarket chains and carry an extensive selection of products, including both domestic and international brands. These retailers have expanded their online presence by offering home delivery and click-and-collect options in addition to their physical stores.

In Hungary, the hypermarket retail segment is also enduring a substantial digital transformation. Retailers are investing in their online presence and providing a vast array of digital services, such as online ordering, home delivery, and click-and-collect options.

IV.2.1.1. Hypermarket in-depth interview analysis

I conducted a comprehensive expert interview with a multinational retailer that is a significant player in the hypermarket retail segment in Hungary. In the subsequent paragraphs, I will refer to this organization as "Company A".

Key factors that ensure digitalization implementation

Each level of the organizational structure is designed to be digitized. Their service model can be divided into their ten highest-level processes. The primary processes of "Company A" include the creation and development of customer proposals, procurement, logistics, and offline and online customer service. These processes are at the core of retail and generate the most value, making them the most crucial areas for innovation. There is a formal expectation for digitalization across the organization.

As a market leader in technology within the hypermarket segment, the company has increased its investments in digital capability, both in technology and across the business. The anticipated payback period for digital projects within the organization is approximately two years. This is not always desirable due to the fact that some tasks take longer and the value is difficult to quantify. But as long as decision-makers are shown quantifiable benefits, the digital initiative can continue to receive funding.

More than 5,000 people are employed in the company's global technology and development department. The company tends to outsource the standard and low-value-added digitization processes, such as those in legal, compliance, and finance. Developing solutions internally for high value-added processes, such as customer-facing systems, back-office systems, supply chain platforms, and loyalty card systems, allows for complete control over the development process.

Key digital solutions for front-end primary activities

Despite the fact that the majority of sales still take place in physical stores, "Company A" was one of the first major grocery retailers to introduce online shopping in the late 1990s. This established the basis for an omnichannel experience. In addition to the numerous digital solutions, such as advanced data analytics, that the business has implemented over time, the customer experience is more individualized than ever before.

Throughout the customer journey, there are multiple digital touchpoints, but it all begins with a loyalty card system tied to a loyalty club membership. This loyalty card allows users to shop online and receive delivery or click-and-collect on their purchases. Due to the moderate adoption of innovation by mainstream shoppers, this card is available as both a physical card and a smartphone app. The company has eliminated all in-store discounts in favor of membership in a loyalty club. This means that customers without loyalty club membership are not eligible for discounts, providing an incentive to join the program. In addition, the traditional paper discount leaflet has been ditched as all discounts have been migrated to digital channels, such as the webshop and the loyalty program app.

This enables the business to collect a vast amount of data about their customers' habits, including what recurring items they purchased, where they live, where they shopped, how much they spent, and many other patterns that can be uncovered by analyzing this data. The company can provide customers with personalized offers and recommendations based on information gathered about them over a long period of time. This information is collected through in-store and online loyalty card purchases. If a customer typically purchases ground coffee every two weeks, but has missed a purchase in the previous weeks, the algorithm can automatically generate a personalized discount for ground coffee.

Another alternative for "Company A" is to form partnerships with fast-moving consumer goods (FMCG) companies and use the platform as a digital advertising space. This takes the form of sponsored FMCG discounts, which the customer can recognize as a good deal. Through data, the corporation is able to know its client base and personalize the customer experience by displaying what they want, upselling on the most relevant products, and growing loyalty along the way. This concept is referred to as "share of wallet"; the objective is to make consumers feel rewarded with loyalty points and personalized discounts, so that they spend more at this retailer and less at others.

Customers can select from four different payment options. First, there is the traditional method of payment, which occurs at a standard checkout where the cashier performs the majority of the work. The second is assisted self-checkout, which is a system that allows customers to scan and pay for their items without the assistance of a cashier, but occasionally with the help of a designated employee. This method can increase customer engagement and significantly reduce labor costs for the employer. The third type of shopping solution is the scan-as-you-go system. This is a dedicated service for loyalty club members that allows them to manually scan their purchases as they walk through the store using a scanner. This scanner can be obtained by identifying your personal loyalty card at the entrance. Once all items are gathered, shoppers can access a staffed checkout within minutes. The fourth is essentially the same scan-as-you-go journey using only the loyalty app on their personal smartphone. After completing their purchase, they only need to complete the transaction using Apple Pay or Google Pay, pay for their items, and exit the store. This journey offers FMCG brands more opportunities for collaboration and personalization, by promoting their offers on this platform as well.

Key digital solutions for back-end primary activities

In comparison to other hypermarket competitors, the firm was able to achieve nearly fully automated pricing decisions, which gave it an advantage in terms of value-based pricing. The significance of this solution is growing as a result of the recent economic downturn and the skyrocketing inflation rates seen around the world, but most notably in Hungary. “Company A” is able to keep their prices the lowest in a number of different product categories, both food and non-food related. The pricing decisions are determined by the algorithm based on a set of criteria that are specific to a market segment. As a consequence of this, it is possible for the company to differentiate itself from its competitors by providing a “low price guarantee”.

The back-end administration is digital to a degree of 95%, allowing the business to reduce costs for these processes as well. Managing processes digitally requires employees to perform tasks independently. They have access to a set of in-house administration systems, either on their own devices or on a corporate tool, which they can use to complete the paperwork themselves. Everything is done digitally, directly to input, which can be automated and processed far more quickly and inexpensively than if it were done on paper.

“Company A” uses digital, forecast-based supply chain management systems that utilize digital technologies and forecasting tools to enhance supply chain efficiency and reduce inventory costs. It uses a combination of data analytics, artificial intelligence, and machine

learning to predict future demand, improve inventory management, and reduce lead times. This decides and calculates on a store product level, what do they forecast they're going to sell.

Key digital solutions for support activities

As a result of the entirely digital supply chain management system that has been put into place, the procurement system has also been digitalized in the majority of its steps.

Over the past decade, the company has made substantial technological investments. The relatively high wage levels in the countries where the company operates have made the business aspects of digitization possible. Inflation and the COVID pandemic have contributed to this digitization pressure, paving the way for additional investments. The company believes that digital change and digital transformation cannot be accomplished through technology alone, but rather require a paradigm shift and a change in the entire business's mentality. They have shifted their operations to agile project management and implemented product methodology, setting the groundwork for the digital initiatives.

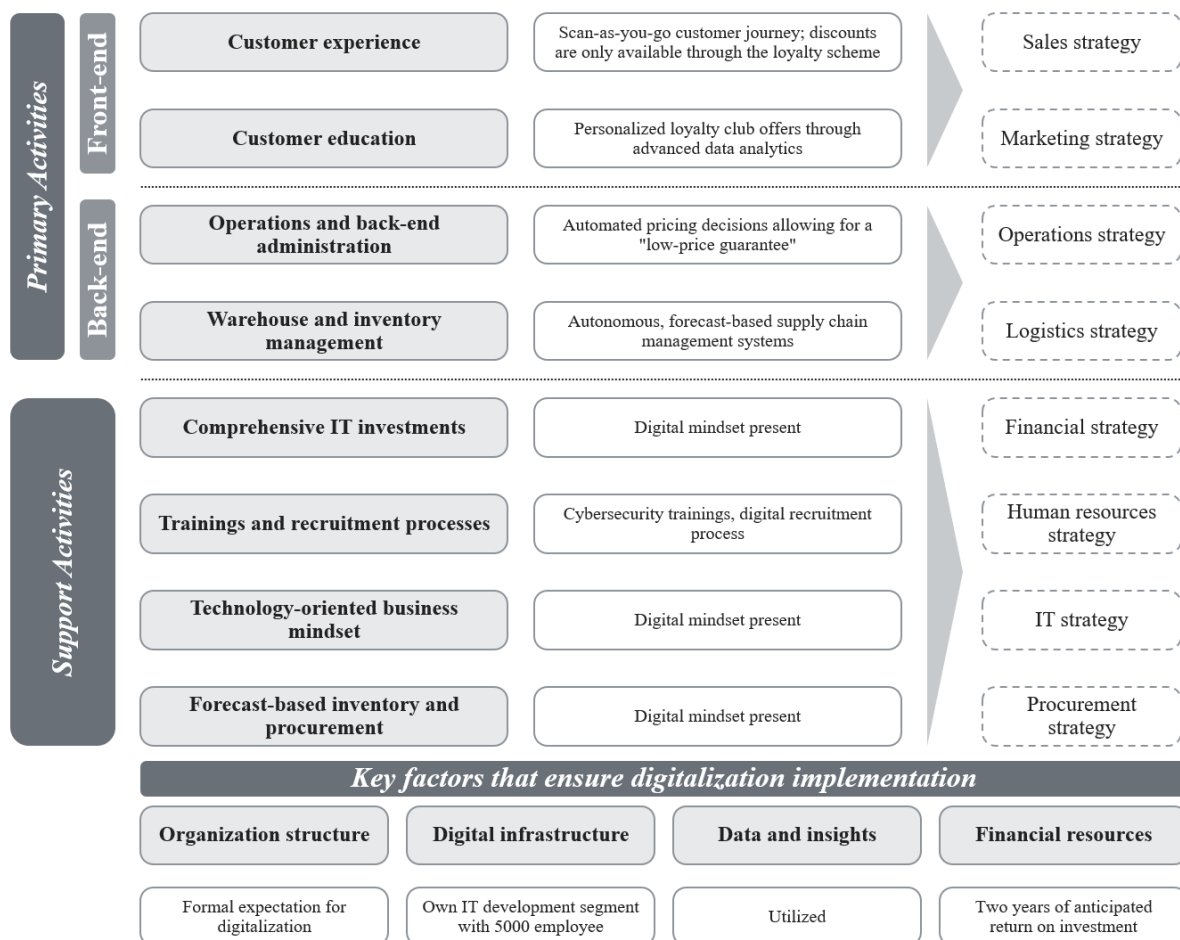


Figure 9: Key digital solutions of "Company A" (Source: Own editing based on in-depth expert interview)

IV.2.2. Discount retail segment

The discount retail segment in Hungary is a highly competitive and complex market that has experienced substantial expansion in recent years. The segment is dominated by three major players, Lidl, Aldi, and Penny Market, who have heavily invested in their store networks and supply chains in order to provide consumers with a limited selection of products at lower prices. Following closely behind Lidl with a market share of approximately 58% is Aldi, which is followed by Penny Market with a share of 20%.

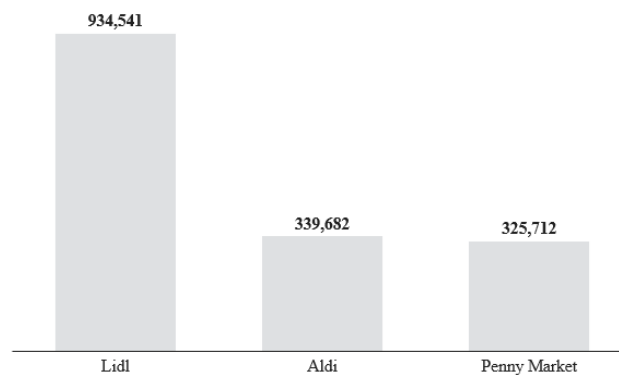


Figure 10: Hungarian discounter retail value excl. sales tax, 2022 [HUF m] (Source: Own editing based on company data)

Although Lidl is only present with 191 store locations in Hungary, it has been able to achieve a market share that confidently leads the competition. Penny Market comes in first place in terms of store number in Hungary with approximately 227 locations, while Aldi has the fewest number of stores overall in the country. This indicates that Lidl's average turnover per store is significantly higher than that of their rivals, making them the market leader in this metric.

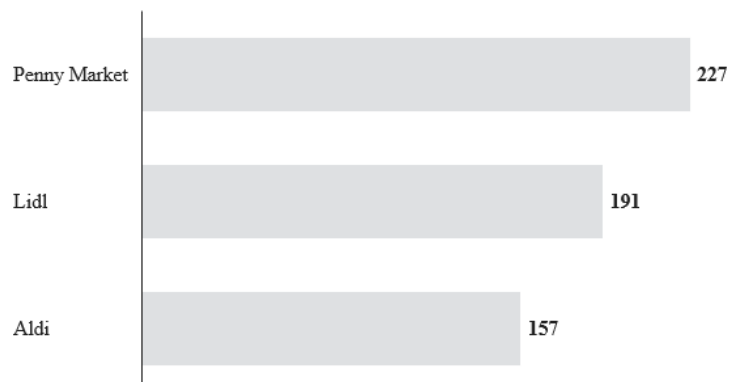


Figure 11: Number of discount stores in Hungary, 2022 (Source: Own editing based on company data)

In Hungary, discount retailers are gaining popularity among consumers seeking alternatives to conventional retailers at lower prices. The discount retailers in Hungary are constantly searching for ways to set themselves apart from rivals. One of the major strategies employed by discounters is the provision of a vast selection of private-label products. Private-label products are typically less expensive than other brands because they are manufactured by the retailer. This strategy enables merchants to offer a cheaper option while maintaining their profit margins.

Another established model for keeping prices low in discounters is to offer a smaller selection of products, resulting in a quicker turnover of stock, which necessitates maintaining smaller facilities and employing fewer people. They typically have more, smaller premises than super- or hypermarkets, but because their inventory is smaller, they do not have to put up buildings in out-of-use locations like hypermarkets, thereby increasing their turnover.

IV.2.2.1. Discounter in-depth interview analysis

I conducted an in-depth expert interview with a multinational retailer that is a major player in Hungary's discount retail segment. In the following paragraphs, this organization will be referred to as "Company B".

Key factors that ensure digitalization implementation

Formal digitalization exceptions are currently in place throughout the entirety of the company. Each country has its own unique set of goals to accomplish, but answering the question of 'how to accomplish these goals' falls under the authority of the subsidiaries. This indicates that there are no funds set aside for digitalization projects, and that national subsidiaries are responsible for independently allocating the necessary financial resources.

The development work that is associated with digitalization is typically contracted out to a third party; however, the Hungarian company does have an in-house development team. The majority of the time, it is their responsibility to coordinate improvements to optimize costs, as well as the digitization of back-end operations and making those activities more efficient.

Key digital solutions for front-end primary activities

"Company B" has not yet reached the point in its digital transformation where it exclusively publishes its coupon booklet online, but it frequently displays them on in-store virtual merchandising displays. They believe that Hungarian consumers are not prepared for an online shift, so they attempt to combine digital innovations with conventional tools.

In addition, they use a loyalty card system, which may utilize either physical plastic cards or virtual cards. With this loyalty card, customers can gain access to additional discounts that would otherwise be unavailable. These discounts are not, however, customer-specific. The loyalty program consists primarily of opportunities to accumulate points redeemable for discounts on select promotional products.

The chosen discount retailer will also utilize cashback programs to attract younger generations. It employs a third-party provider that provides automatic cashback on purchases up to 5% of the sale value. It is a mobile application that enables users to earn cashback rewards for ordinary purchases. The app is available for free download on iOS and Android devices and automatically credits the user's account with cashback rewards when they shop at participating retailers, as determined by location-tracking. Within the app, users can view their cashback balance and history and redeem their rewards for cash or gift cards from a variety of retailers. Users can earn additional cashback rewards by referring their friends to the application.

"Company B" was the first discounter in Hungary to implement the scan-as-you-go customer journey, although this is accomplished through the application of a third-party provider. This indicates that the company does not have complete control over the entire ecosystem and that personalization options are limited. The payment is still made at the cash register, but users can pay by presenting a QR code to the cashiers. As there is currently only one scan-as-you-go store in Budapest, the nationwide rollout is still in the future.

Key digital solutions for back-end primary activities

During the COVID pandemic, home delivery was introduced. Due to its business model, this is not the primary sales channel, but the company believes it is crucial to leverage this channel. After calculating the return on investment, "Company B" decided to use a third-party e-commerce provider instead of developing its own webshop to enter the FMCG e-commerce segment. By the first quarter of 2021, they were present in twelve of Hungary's largest cities. They incur no additional logistical expenses because the consumer-ordered products are prepared in the local store and shipped by a third-party company.

The in-store scheduling system is, however, 95% algorithm-driven and automated. Everything else is organized in a conventional manner, but by digitizing its employees' schedules, the company can significantly reduce costs. The other significant digitization effort has been in the operations administration department, where the automated fruit and vegetable

checking system saves field managers nearly eight hours of work per week. Complementing this is an employee-specific, in-house knowledge database. On this platform, they can carry out a variety of administrative tasks and receive information and assistance regarding company operations.

To digitize back-end solutions, "Company B" has committed to a "paperless strategy" for its Hungarian operations by 2025. This means that they intend to digitalize at least 95% of their back-end processes. While there are not many innovative digital solutions in this field at present, this initiative allows for further development.

Key digital solutions for support activities

Given that it is based on a discount business model, the company does not prioritize the development of cutting-edge digital solutions in support activities. Despite the fact that the majority of the processes have been digitized, individuals are still responsible for making the decisions in the procurement process.

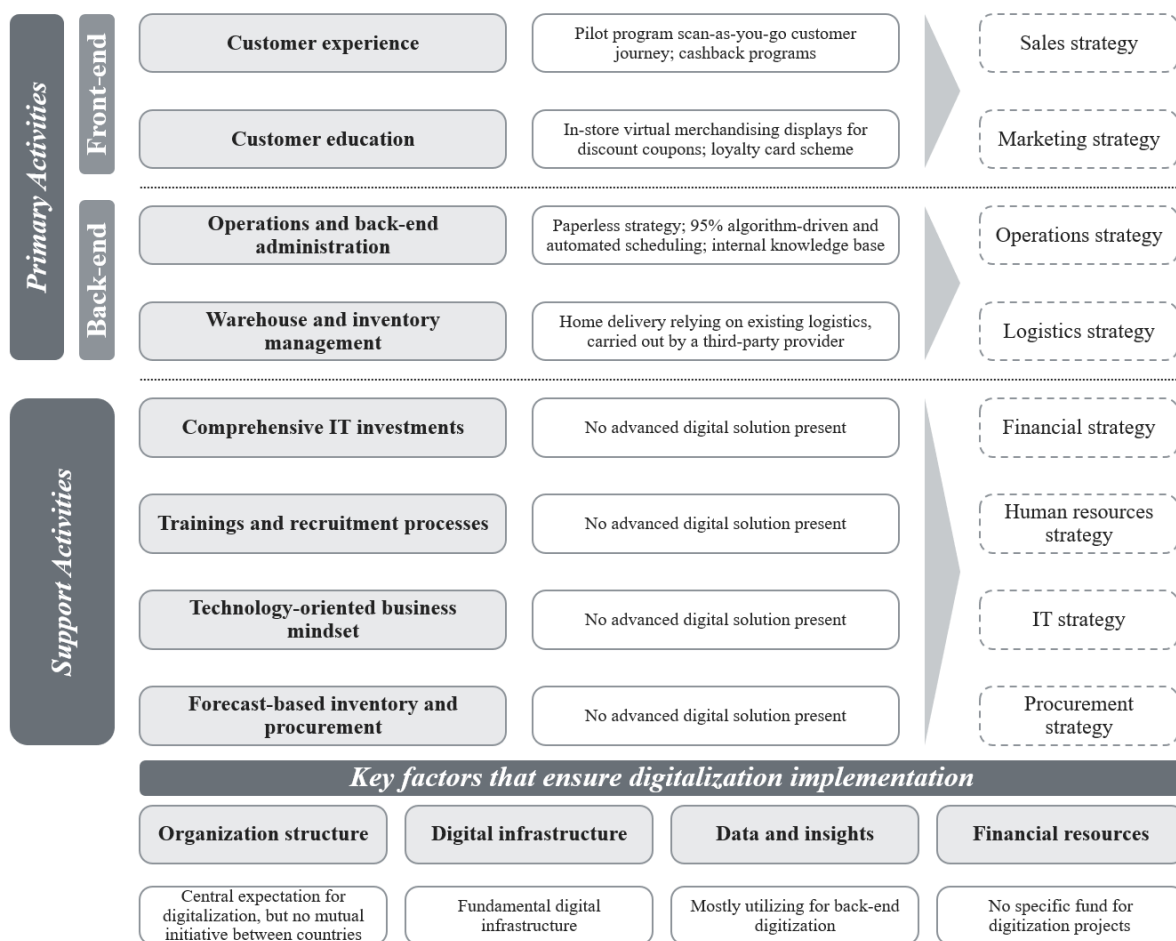


Figure 12: Key digital solutions of "Company B" (Source: Own editing based on in-depth expert interview)

IV.2.3. Food e-commerce segment

The food e-commerce retail market in Hungary is experiencing significant growth, which is being fueled by shifting consumer preferences as well as the increasing adoption of digital technologies. Customers have the option of shopping for groceries without having to leave the comfort of their own homes thanks to the availability of a wide range of digital services, including home delivery, online ordering, and subscription-based models of shopping.

The COVID-19 pandemic has accelerated the growth of the online food retail market in Hungary. As a result of lockdowns and other social distancing measures, consumers have turned to online shopping as an alternative method of purchasing food. Because of this, there has been a significant increase in demand for grocery shopping online, which has resulted in fierce competition between conventional supermarkets and online-only retailers for a portion of the market.

Retailers are making significant investments in their online platforms and the logistics infrastructure of their supply chains in order to meet the rising demand for online grocery shopping. They are also offering mobile apps, websites that are easy to use, and flexible delivery options in order to provide customers with a shopping experience that is both streamlined and convenient.

Traditional retailers were able to capitalize on the e-commerce market, but during the pandemic, new, digital-only retailers have flooded the sector. The ten largest online retailers by online revenue in 2021 are displayed in the table below. This demonstrates that although a hypermarket chain came in first, the runner-up was an entirely digital player.

Rank by online turnover	FMCG brand name
#1	Tesco
# 2	Kifli.hu
# 3	Auchan
# 4	Rossmann
# 5	Spar
# 6	DM
# 7	GRoby
# 8	Foodpanda

Table 4: The biggest FMCG companies by online turnover, 2021 (Source: Own editing, based on GKI Digital, 2022)

On the Hungarian food e-commerce retail market, home delivery services are particularly popular, and businesses are expanding their delivery capabilities to meet consumer demand. Numerous retailers have expanded their delivery networks in order to reach more customers and provide faster delivery times within a predetermined time window.

IV.2.3.1 Food e-commerce in-depth interview analysis

I conducted an in-depth expert interview with a major player in Hungary's digital FMCG retail segment for e-commerce retailers. The following paragraphs will refer to this organization as "Company C".

Key factors that ensure digitalization implementation

As "Company C" is a delivery company that provides a grocery delivery and pick-up service, digitalization-supporting factors are intrinsic to its structure. The business provides its services via a website and a mobile application. The service enables customers to order fast-moving consumer goods from multiple participating retailers while a personal shopper handles the shopping. Due to the fact that the company was co-founded by an e-commerce developer, its digital infrastructure resources are assured.

Key digital solutions for front-end primary activities

The company's business model is based on charging a delivery charge for each order and taking a commission from the retailer based on the order's total value. On the dedicated app or website, customers can browse and purchase supplies from participating retailers. The application utilizes location-based technology to display nearby retailers to users. Customers can choose a delivery window and monitor the status of their shipments in real-time. "Company C" utilizes a network of independent workers known as shoppers to fulfill orders. The app is utilized by retailers to receive orders, locate items in-store, and deliver them to consumers. In some instances, shoppers may also contact customers to validate substitutions or order alterations.

The subscription choice may present users with the opportunity to sign up to a certain order and establish it as a recurrent purchase. The business intends to expand on this subscription model in the near future so that it may provide customers with options that are derived from their most recent purchases using predictive analytics.

Key digital solutions for back-end primary activities

From the perspective of “Company C”, the sharing economy model is beneficial in several ways. It allows the company to scale quickly without having to invest in building its own infrastructure or hiring additional employees. By using independent contractors (shoppers) to fulfill orders, the company can rapidly expand into new markets without the need to build warehouses or hire additional staff.

The organization is connecting all establishments to its central purchasing network. This company is digitalizing smaller and independent retailers by providing them with digital inventory management solutions. For instance, a butcher may not have digital inventory, and the company could offer them with their computerized system.

The shoppers and the couriers each have their own applications that allow them to perform their administrative duties digitally. This allows the company to reduce expenses even further.

Key digital solutions for support activities

Given the company's nature and business model, the majority of supporting activities are automated or at least digitized. Comprehensive IT investments are at the heart of business operations, as well as the technology-driven business thinking. As the company relies on its current supply chain of retail partners, forecast-based inventory solutions are unnecessary.

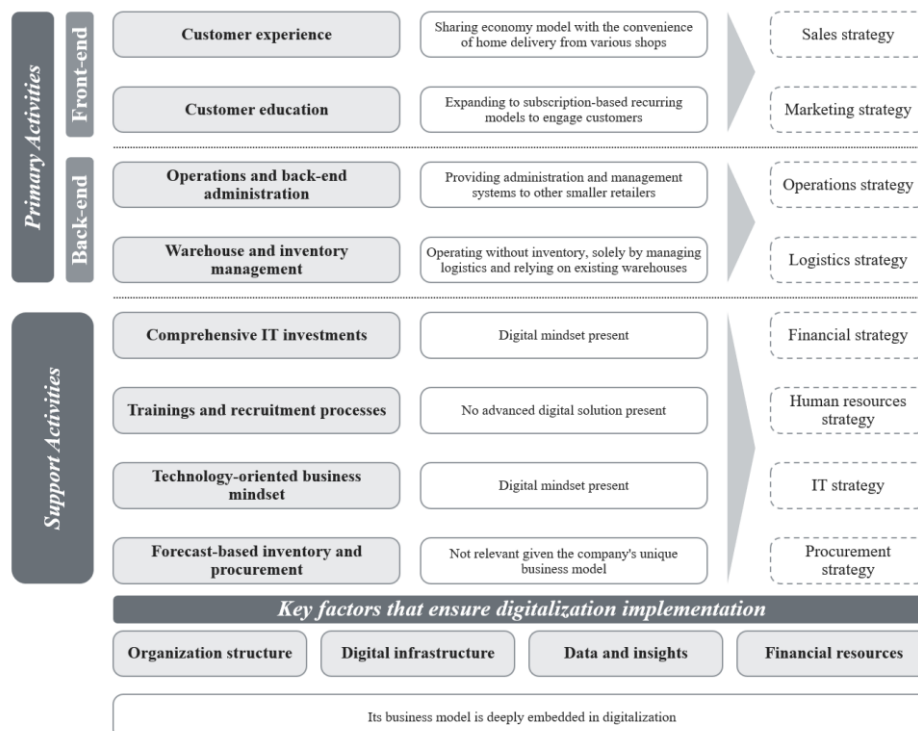


Figure 13: Key digital solutions of "Company C" (Source: Own editing based on in-depth expert interview)

IV.2.4 Summary of the key digitalization solutions in the Hungarian food retail sector

Despite operating in three distinct food retail segments, all of the selected companies share a large number of digital solutions. Scan-as-you-go shopping journeys and loyalty card programs dominate in terms of consumer experience. When it comes to marketing and sales strategy, loyalty card schemes and loyalty club memberships give a substantial chance to conduct data analysis and put personalization into practice by offering customers tailored discounts.

Automation is becoming more prevalent in back-end administration and operational procedures. Businesses are evidently advancing toward a paperless strategy. In spite of the fact that digital supply chains and home delivery services are gradually becoming market standards, an analysis of support activities reveals that there has been no significant breakthrough or innovation in this area.

Companies operating in various segments of the food retail industry employ a variety of digital applications to handle warehousing and inventory management correspondingly. This is due to the fact that each company has a distinctive approach for inventory management. As a result of the variances in the sales models employed by the different market segments, there are also contrasts in the manner in which products are displayed on the sales floor and the digital solutions that are used alongside.

Some companies use a digital selection process that relies in part on algorithms to determine who should become future employees. This digitalization solution in recruitment is not yet widespread in the industry as a whole, but it is rapidly gaining traction.

		Company A – Hypermarket	Company B – Discounter	Company C – e-commerce
Primary Activities	Front-end			
	Customer experience	Scan-as-you-go customer journey; discounts are only available through the loyalty scheme	Pilot program scan-as-you-go customer journey; cashback programs	Sharing economy model with the convenience of home delivery from various shops
	Customer education	Personalized loyalty club offers through advanced data analytics	In-store virtual merchandising displays for discount coupons; loyalty card scheme	Expanding to subscription-based recurring models to engage customers
	Back-end			
Support Activities	Operations and back-end administration	Automated pricing decisions allowing for a "low-price guarantee"	Paperless strategy; 95% algorithm-driven and automated scheduling; internal knowledge base	Providing administration and management systems to other smaller retailers
	Warehouse and inventory management	Autonomous, forecast-based supply chain management systems	Home delivery relying on existing logistics, carried out by a third-party provider	Operating without inventory, solely by managing logistics and relying on existing warehouses
	Comprehensive IT investments	Digital mindset present	No advanced digital solution present	Digital mindset present
	Trainings and recruitment processes	Cybersecurity trainings, digital recruitment process	No advanced digital solution present	No advanced digital solution present
	Technology-oriented business mindset	Digital mindset present	No advanced digital solution present	Digital mindset present
	Forecast-based inventory and procurement	Digital mindset present	No advanced digital solution present	Not relevant given the company's unique business model

Figure 14: Comparison of key digital solutions in the food retail sector (Source: Own editing based on in-depth expert interviews)

IV.3. Key digitalization solutions in Hungarian Apparel & Footwear sector

IV.3.1. Fast fashion and footwear retail segment

The retail market for apparel and footwear in Hungary is a significant segment of the country's retail industry. It includes a variety of local and international brands that operate both online and in physical destinations. Despite the impact of the COVID-19 pandemic, which resulted in a decrease in customer traffic and mandatory store closures, retailers have adapted to the digital era by implementing various digitalization solutions.

Establishing online platforms that enable customers to shop online with options for home delivery and in-store pickup is one of the most important solutions. Retailers have also developed mobile apps that enable customers to browse products, make purchases, and track orders, with some apps offering personalized suggestions based on customer preferences.

The top three players of this sectors are H&M, with a turnover of approximately HUF 43.7 bn in the last year, followed by New Yorker and C&A with HUF 24.4 bn and 24 bn respectively.

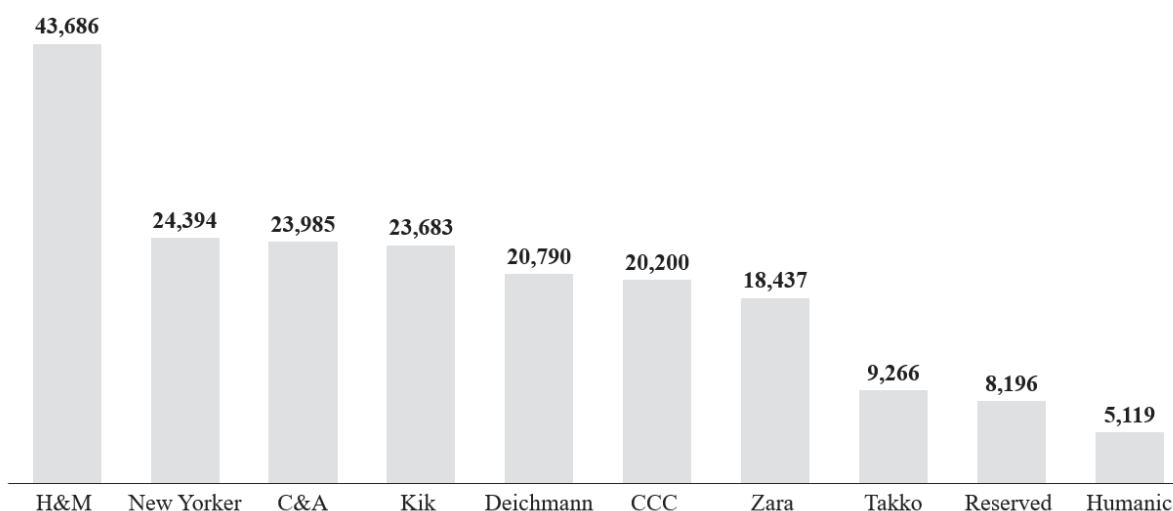


Figure 15: Top 10 players Hungarian Apparel & Footwear sector players by retail value excl. sales tax, 2022 [HUF m] (Source: Own editing based on company data)

These top ten companies account for approximately fifty percent of the total apparel and footwear retail sector in Hungary. C&A, Deichmann, CCC, and Humanic are the four companies that specialize in the sale of footwear. Despite this, all of the companies represented in the graph below also sell shoes, but this is not their primary business.

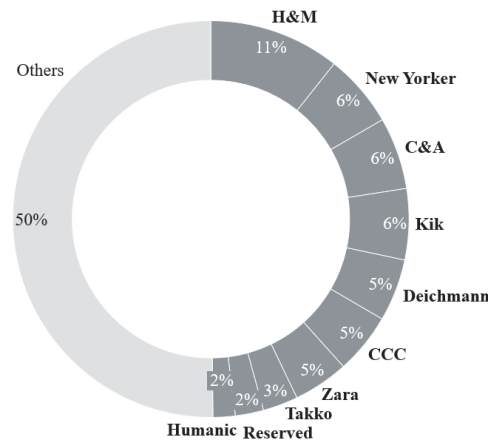


Figure 16: Market share of key players in the Hungarian Apparel & Footwear sector, 2022 (Source: Own editing based on company data)

IV.3.1.1. Fast fashion clothing in-depth interview analysis

I conducted an in-depth expert interview with a multinational retailer that is a key participant in the fast fashion clothing retail segment in Hungary. This organization will be known as "Company D" in the following paragraphs. The corporation is a market leader in casual and business casual clothing and accessories retail. Although they sell footwear, it is not a substantial portion of their operation.

Key factors that ensure digitalization implementation

The analyzed retailer operates globally with highly centralized management and decision-making policies. This is extremely advantageous for the Hungarian subsidiary in terms of digitalization, as there is a central digital expectation for the entire organization. The majority of digital innovations originate from the headquarters to supply each country, business segment, and geographical area.

The organization has an aggregate budget for digitization, but the amount a country can spend depends on its performance. Advanced data analytics are utilized in every aspect of the organization's operations. Targets, daily plans, monthly plans, and annual plans are included in a data-driven central sales plan to attain sales levels across in-store and out-of-store retail channels.

The business utilizes the optimal mix of in-house developments and external providers. Although the company lacks large development teams, maintenance tasks for IT software are performed in-house, whereas development tasks are primarily outsourced.

Key digital solutions for front-end primary activities

Before COVID, the company began implementing its omnichannel program. With the implementation of the omnichannel initiative, consumers can engage in "showrooming" and "webrooming", in which they discover a product in a physical store but decide to purchase it online, or the other way around. Customers can shop for multiple products in many different ways. Obviously, it all begins with traditional in-store purchasing.

"Company D" distinguished the term "quick shopping." This means that store employees can assist consumers with online product orders. This is accomplished using an internal web-based application in which each store has its own account. This ensured that stores did not place orders through the website, but rather through a dedicated application that displayed product suggestions. If a customer asked for a T-shirt in the store, for instance, this app would instantaneously pair it with a complete outfit. In other terms, which trousers and shoes could be recommended to the customer. These digital outfit suggestions are modifiable on the spot by apparel specialists and staff. There is a shared knowledge base between countries, so if one of the altered suggestions is voted up, it is also made available to other app users (store employees in other locations). The company has specific goals and plans regarding the number of these quick purchases that the store should generate. This objective is a 2% increase in revenue, which may seem insignificant but is difficult to attain.

The second method of purchase is via an online store, which is comparable to better-known e-commerce fashion retailers. The customer can request products for in-store pickup or delivery. They have implemented a click-and-collect customer journey for the latter. This is a retail strategy that enables customers to purchase products online and then pick them up in a physical store, as opposed to having them delivered to their doorstep. This provides shoppers with a flexible and convenient purchasing experience while assisting the company in improving inventory management and reducing shipping costs.

Click-and-collect is also a tremendous opportunity for picking up products in a distinct nearby location. For product optimization purposes, the company categorizes stores based on their size and, in some instances, restricts the number of collections. Therefore, if a customer enters a store that does not carry a specific type of clothing, the staff can request the item from a nearby store, and the customer can pick up the clothing on the same day, easing the customer's journey.

The company has combined this omnichannel strategy with loyalty programs, which is beneficial because they can reach loyal consumers digitally and entice them back with promotions and special offers to encourage repeat purchases. The authentication is entirely digital, so consumers do not need a card, paper, or plastic; they can identify themselves digitally by entering their phone number on the website, in the store, or at the checkout.

Exclusive promotions are typical for loyalty club members, who can receive personalized promotional offers based on an analysis of the data collected about them. As a member of the loyalty organization, they are given preference over regular customers for various promotions. Complementing this are birthday promotions and loyalty club anniversary discounts.

Customers can earn digital loyalty points and compensation with their loyalty card. Five percent is always credited back to this account for every purchase, which can be redeemed on the next transaction.

Key digital solutions for back-end primary activities

"Company D" utilizes a centralized, extensive enterprise resource planning (ERP) system that can gather and evaluate data within an hour. They can use it to manage inventory, track sales, and even examine store layouts. This system includes various indicators such as hourly turnover, the number of customers who enter the store, the amount they spent, the items they purchased, etc.

Data analytics influence business decisions by constantly monitoring sales data and making store-by-store, week-by-week data-driven decisions. Every Monday, the national leadership teams gather with store managers to analyze key performance indicators (KPIs) and product sales based on the visualized data and make decisions for the upcoming week. This ERP system also permits the visualization of real-time store sales data. Assigning green, amber, and red colors to key KPIs enables staff to monitor sales goals in real time and make adjustments to operations within a day.

The use of personal digital assistants (PDAs) in-store is a company-wide digital initiative. It is a compact, portable terminal that combines the capabilities of a computer and a smartphone and aids in automating processes in an agile and productive manner. Barcodes are placed on items leaving the warehouse, and the PDA is used to scan these barcodes. This automatically links the system to the back-end administration and enables employees to view what products of specific types and sizes have arrived. So the system will display everything, including an image of what is on the PDAs. The PDAs are also utilized for pricing, as they are connected to a small

digital printer that the employee can use to capture and print the product's price. It is completely interoperable, so if they have a cartridge number or a product ID, they can view the price or view a picture.

The centralized logistics system is located in an additional European nation, and this warehouse is nearly completely automated. If a product runs out of a size in Hungary, the system promptly sends a message and restocks it until it finds a replacement on the shelf, and does so simultaneously everywhere else in the world. Due to the company's widespread presence, whenever a product is sold out, the store that just sold it is the first to receive the replenishment, so that when the best-selling products and sizes run out, there is no need to ship large quantities to the stores.

As a consequence of the omnichannel initiative, the company launched a "dark store" in Hungary. This is a central warehouse in Hungary, from which they can fulfill online orders in a very brief amount of time and at a significantly lower price than if they ordered directly from the central warehouse. "Company D" also introduced the concept of "HUB stores" in Hungary. These are designated stores with larger inventories so that the company can deliver from both the central facility and the store. If a customer places an order and the system first checks the HUB stores for availability, and if the HUB stores are out of stock, the system then proceeds to the warehouse in Hungary, which is the final destination. However, if there is a HUB that has the product in stock and the customer wants to pick it up, the store simply removes it from the warehouse, packs it, and applies a barcode, and it can be available for pickup within an hour. Additionally, these HUB locations prepare orders for delivery.

Key digital solutions for support activities

The digitalization budget is the responsibility of the corporation's headquarters, so the Hungarian company has no influence. Clearly, the better the country performs and the greater its influence on the European market as a whole, the more products become available and the more money the Hungarian subsidiary receives.

"Company D" uses an application to digitize the onboarding procedure, which includes assessments and training videos. The HR department utilizes an app for employee training. These are digitally augmented training materials, imaginative tests, or brief videos that correspond to test queries. In addition, a gamified staff learning instrument is utilized to increase employee engagement and add more value.

This is essentially an app that staff members install on their mobile devices. Everyone logs in with their employee code and sees the same interface. When the company declares a competition, which typically lasts 4-5 days, employees can download training materials from the site. It is based on either a brief film or a text that they have read, and there are test questions about it, as well as how much they enjoyed it. They are then assigned a score based on this, and the company developed a competition where they can challenge each other. They are told how many of these battles they can initiate per day and which one of them will receive five questions. The winner is the player with the fastest and most accurate responses. In addition, it is a learning stimulus for them because, for instance, they are discussing a collection of that magnitude, and they are learning by playing.

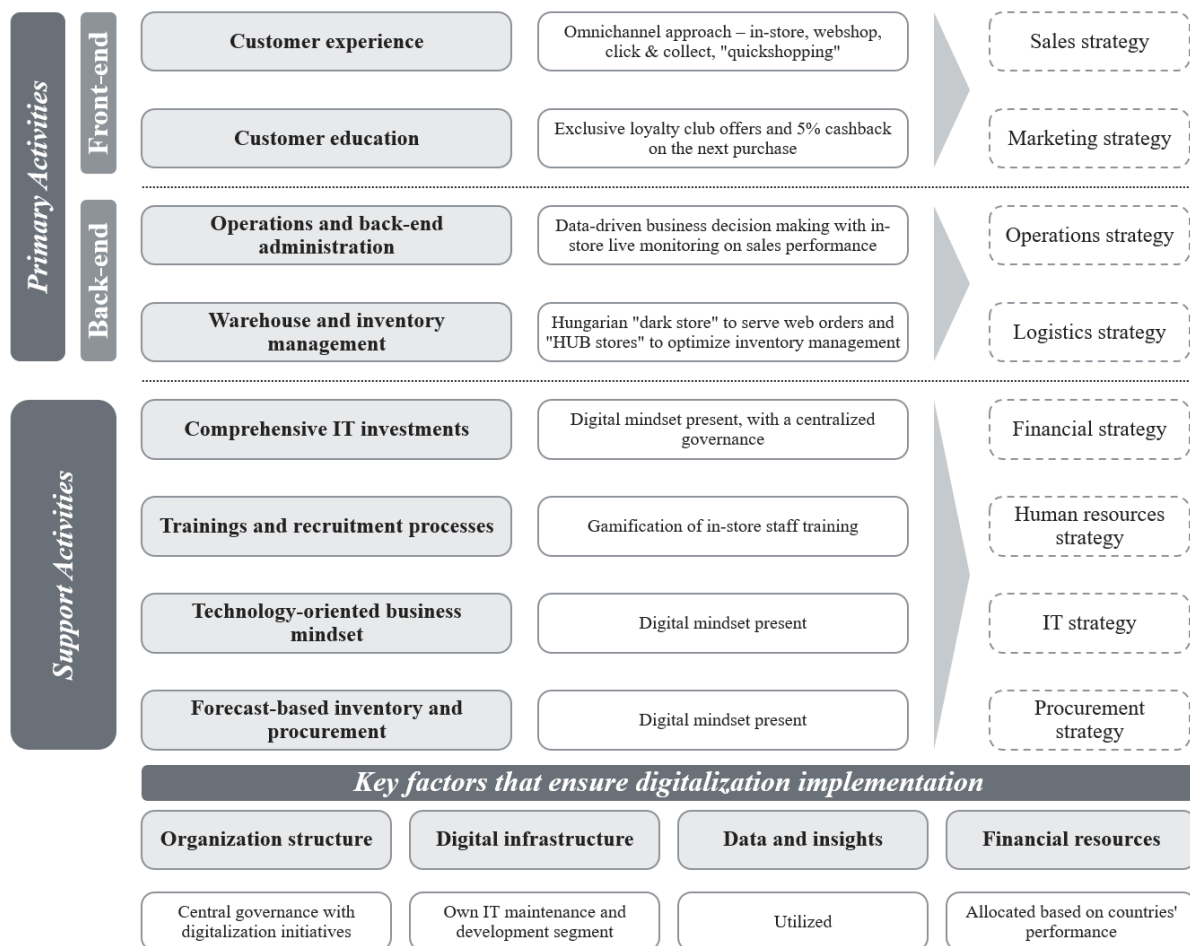


Figure 17: Key digital solutions of "Company D" (Source: Own editing based on in-depth expert interview)

IV.3.1.2. Footwear retailer in-depth interview analysis

I conducted an in-depth expert interview with a multinational retailer that is a key participant in the footwear retail segment in Hungary. This organization will be known as "Company E" in the following paragraphs. The corporation is amongst leading footwear and clothing. Despite the fact that they have become an increasingly significant component of apparel sales in recent years, shoe sales continue to dominate. The company also distributes well-known brands like Nike, Adidas, and Jordan, but it also has a brand of its own.

Key factors that ensure digitalization implementation

The company has no budget, proposals for digitalization must be presented to the board, and resources must be allocated for these projects individually. Depending on the specific business field the management board must discuss every significant digitalization development. This is due to a limited R&D budget, as well as the company's belief that they cannot develop a warehouse, a webshop, and a store at the same time, as they would become confused.

Key digital solutions for front-end primary activities

“Company E” began its omnichannel initiative prior to the pandemic. The offline retail channel continues to account for more than 90 percent of total sales, but the webshop continues to grow in influence. Due to staff underutilization and high salaries, many stores were forced to close as a result of restrictions imposed during the pandemic. This has encouraged the “Company E” to attract consumers to the online world even further.

Meanwhile, the company has established a customer loyalty card program with multiple benefits. One is that only members of the loyalty organization are eligible for discounts. Complementing this are anniversary and birthday discounts for loyalty club members. In addition, there are frequently limited-time promotions that are exclusively offered through the online store and typically do not last longer than a few of days.

Signing up for the loyalty club in-store via a tablet with the assistance of a member of staff enables customers to receive immediate rewards. By providing feedback in-store, customers can receive additional discounts and rewards. This feedback is handled similarly to loyalty card registration.

After-sales activities include in-store and email-delivered consumer feedback forms. Each store location has a monthly feedback questionnaire objective number. This information is then analyzed to enhance the consumer experience at the designated location.

Adaptive screens are one of the main initiatives of digitalization in the field of in-store visual merchandising. These are displays positioned in busy stores that the store manager can update and modify. This enables promotions to be quickly adapted. When a new batch of shoes arrives at a store, for instance, employees can rapidly display the item or the associated promotion by selecting the appropriate shoes from a virtual database.

Key digital solutions for back-end primary activities

“Company E” not only sells its own products, but it is also a distributor for a number of major international brands. As a result, the company places a significant emphasis on logistics and operations related to in-store logistics. The business utilizes a completely automated warehouse that can analyze the sold items and autonomously place orders from the main warehouse to the store. Aside from this, the entire inventory in stores and warehouses is digital. Employees can monitor the store's inventory and newly received items with PDAs to increase their efficiency. This digitalization solution enables the opportunity to optimize delivery as well.

Additionally, the company utilizes a "dark store" to fulfill web orders, which is specifically intended for so-called fast-moving products and can be moved continuously from the warehouse. In addition to this, orders can be managed from the stores as well. If the "dark store" does not have the requested items in stock, an automated system is implemented. There is an optimization system that considers the quickest time to select from the store closest to each other and, if multiple stores are involved, the fewest number of stores to place the order. The web sales are then dispatched from the stores, after which the delivery company delivers the packages to the specified addresses.

The design process for the company's products has been completely digitized, which enables the business's designers to pull creativity from a wide variety of outside sources and quickly incorporate it into the design process.

Key digital solutions for support activities

In support activities, the company does not prioritize the development of cutting-edge digital solutions. Despite the fact that the majority of the procurement procedures have been digitized, individuals are still responsible for making decisions.

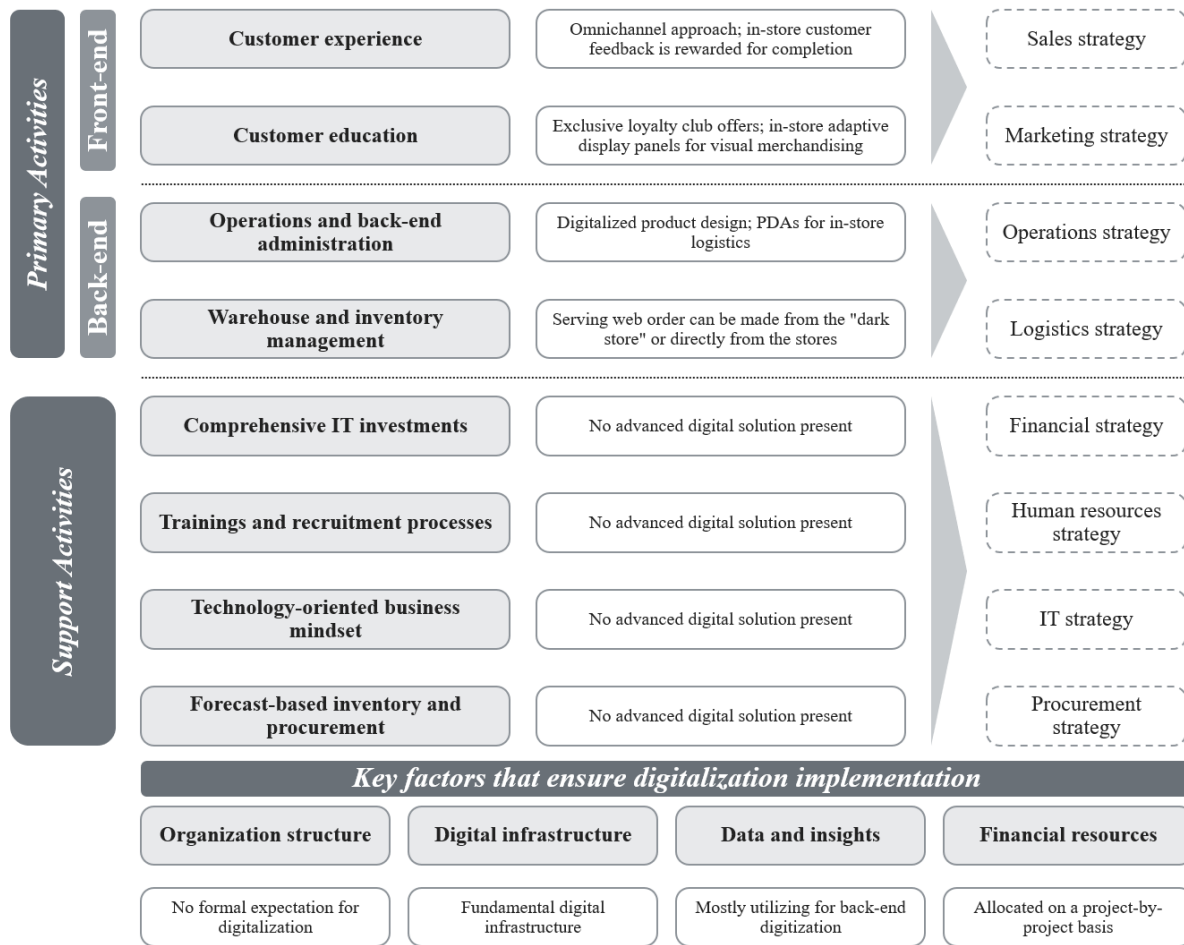


Figure 18: Key digital solutions of "Company E" (Source: Own editing based on in-depth expert interview)

IV.3.2. Apparel & Footwear e-commerce retail segment

The apparel and footwear e-commerce retail market segment in Hungary is a quickly expanding segment of the clothing retail industry. Many traditional retailers have invested in e-commerce platforms and digitalization solutions to remain competitive as online purchasing becomes increasingly popular. One of the primary benefits of e-commerce platforms is that they enable retailers to expand their reach beyond the local market. This has allowed numerous apparel and footwear retailers to expand internationally and get into new markets. (André et al., 2022)

The Hungarian apparel and footwear e-commerce retail market segment is anticipated to continue its growth trajectory after the pandemic-induced surge in sales. Recent reports indicate that the e-commerce segment of the Hungarian apparel and footwear market is expected to grow at a compound annual growth rate of approximately 9% between 2021 and 2026 (Euromonitor, 2022). This growth is fueled by the convenience of online purchasing, the availability of a vast selection of products, and the ability to compare prices and locate discounts. As more

consumers adopt online shopping, retailers will continue innovating and investing in digitalization solutions to satisfy their needs and maintain market competitiveness.

Traditional clothing retailers dominate the market since they were the first businesses to enter it and were able to thrive on it by utilizing their already established brand and supply. Despite this, two of the top 10 players, particularly Ecipo and Fashiondays, do not operate with an offline presence and instead conduct operations entirely online.

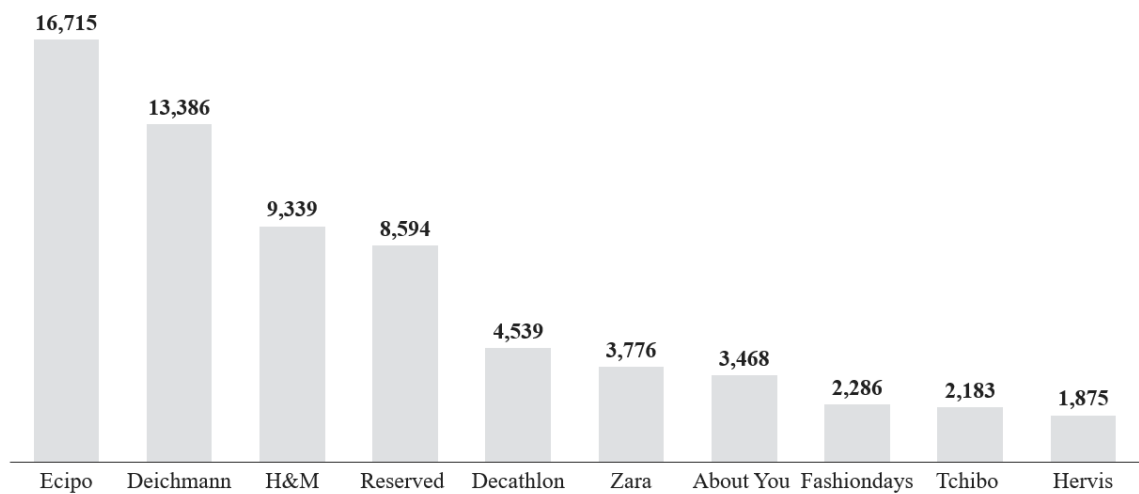


Figure 19: Top 10 players Hungarian Apparel & Footwear e-commerce segment players by retail value excl. sales tax, 2022 [HUF m] (Source: Own editing based on company data)

The top five competitors currently hold a combined market share of almost 62%, indicating that this is a fairly consolidated market. The largest of them is Ecipo, which controls a fifth of the whole market in terms of sales revenue. Following Ecipo on the list are Deichmann, H&M, Reserved, and Decathlon.

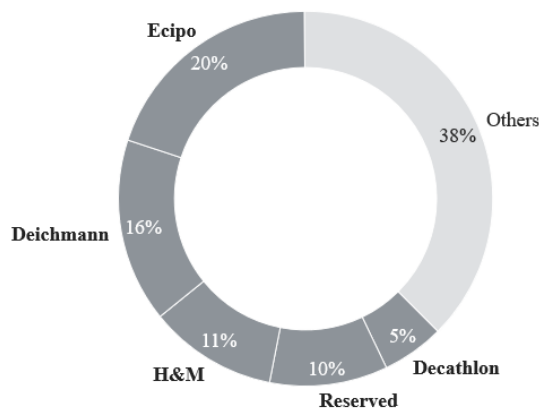


Figure 20: Market share of key players in the Hungarian Apparel & Footwear e-commerce segment, 2022 (Source: Own editing based on company data)

IV.3.2.1. Digital second-hand and outlet retailer in-depth interview analysis

I conducted an in-depth expert interview with a multinational retailer that is a key participant in the second-hand and outlet clothing retail in Hungary. This organization will be known as "Company F" in the following paragraphs.

"Company F" was founded to offer consumers a more sustainable and cost-effective way to purchase high-quality apparel, footwear, and accessories. It is a market leader in Europe for online second-hand fashion sales. The business model of the company places a significant emphasis on promoting sustainability in fashion. On one hand, it purchases used apparel and footwear from users, digitizes it, and lists it for resale on its website. On the other hand, the company sells outlet clothing and authentic designer items at a discount. As part of a clearance procedure for excess inventory, these products are typically obtained directly from the individual brands. This indicates that the items have never been worn or used before. This enables the company to sell luxury brands like Gucci and Prada on its website. The firm is attempting to balance its inventory between the two types of apparel and footwear in order to satisfy consumers equally and maintain a stable business operation.

Key factors that ensure digitalization implementation

As "Company F" is an e-commerce service provider that digitizes used apparel products, digitalization-supporting features are inherent to its design. The corporation offers its services via its website and additionally through a mobile application. The key factors that assure digitalization adoption are always present given the business model.

Key digital solutions for front-end primary activities

The intuitive website is one of the most important digitalization solutions that the organization offers. The website is designed to be easy to navigate, with a clean and contemporary interface that makes it effortless for customers to locate the desired products. The platform also includes sophisticated search and filtering tools, enabling customers to quickly find the products they want based on size, brand, color, and other criteria. Users have the option of browsing for either pre-owned or brand-new (outlet) apparel. To further enhance the online purchasing experience, "Company F" has created a mobile application that enables customers to browse products directly from their mobile devices.

In addition, the company offers a loyalty card program that provides consumers with exclusive promotions and discounts. Furthermore, promotional coupon codes are frequently highlighted

on the landing page of the website. Most of the time, there are at least two or three promotions running concurrently to convince consumers that they must purchase immediately in order to take advantage of these exceptional deals. Typically, the second-hand clothing and outlet clothing sections of the webshop are discounted separately, but "Company F" places a strong emphasis on ensuring that there is always a discount for purchases made through both interfaces simultaneously. This is an attempt to channel one consumer segment into another, converting those who visit the website solely to sell their own clothing into customers.

Key digital solutions for back-end primary activities

"Company F" also leverages digital technologies to optimize its supply chain and logistics operations. The firm uses advanced inventory management systems to track and manage its inventory of second-hand items, ensuring that the right products are available at the right time. Additionally, the company uses data analytics and machine learning to predict customer demand and optimize its pricing and promotions.

If a user intends to sell their old clothing or footwear via the platform, a pricing strategy based on data analytics is put into effect. The website displays price guides for all apparel items, including blouses, dresses, trousers, skirts, shirts, and shoes, in three categories: budget, mid-range, and luxury. In addition, the user can receive a personalized price proposal by specifying the precise brand and type of garment for sale on the platform. Even within a single day, the consumer's purchase prices may vary based on the company's inventory levels.

The digitization process commences once the products have arrived from each user and from the outlets' procurement sources. Initially, the inventory is sorted using a conveyor belt system that is mostly automated. Due to the large number of unique products that appear individually, they must be digitized. Workers take photographs of the products from multiple angles and with perfect lighting, and then create digital records for each item in a central system. The products are subsequently sorted in the central warehouse, where they await shipment and the online inventory is updated daily.

The pricing of the products and garments offered for sale is also highly digitized and even employs advanced data analytics. The webshop displays the original price of the product when it was first added to the platform's inventory. In contrast, the final price can vary based on seasonality, how long the product has been in stock, and the category and brand popularity of the product. In addition, an algorithm has been used to display the estimated market price for the majority of products in order to provide the consumer with a benchmark. This price

represents the anticipated market price of products of the same category, brand, quality, and material offered by other retailers at the time the product was introduced to the market in new condition.

Key digital solutions for support activities

Because of the nature of the organization and the way it does business, the majority of the supporting operations have been automated or at least have been digitized. Comprehensive investments in technological innovation are at the core of business operations and the technology-driven business thinking that underpins both. Forecast-based inventory management systems are not necessary for the organization because it relies in part on its customers to acquire the items.

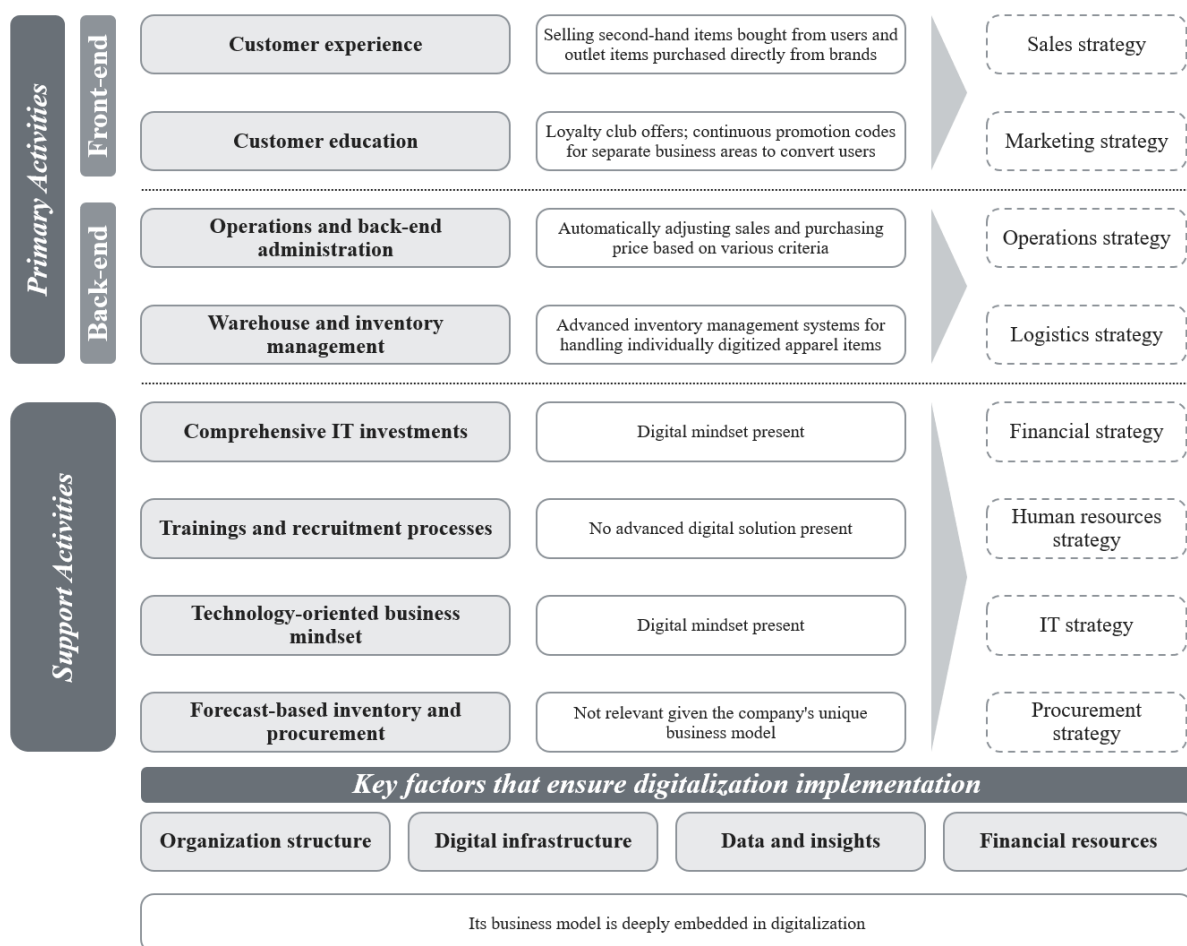


Figure 21: Key digital solutions of "Company F" (Source: Own editing based on in-depth expert interview)

IV.3.3. Summary of the key digitalization solutions in the Hungarian Apparel & Footwear retail sector

Despite the fact that the companies operate in various markets, the concept of omnichannel activities stands out among the companies whose main operations have been examined. Almost all businesses have established a foothold in the digital space as a result of shifting consumer preferences, and they also operate an online store. Additionally, there is a distinct trend toward loyalty card programs and personalized discounts. In order to reach consumers and maintain their interest, fashion companies often provide discounts that are oftentimes exclusive to online purchasing.

In terms of back-end operations, the digitization of inventory and stock administration plays an important role. In the clothing industry there are "dark shops" that only serve online orders. Additionally, the store frequently serves online customers directly. There are also disparities between companies regarding their use of sales data analysis and the online sales goals they establish. My research indicates that the more data a business accumulates, the more effectively it can analyze it to optimize sales.

Different companies have vastly diverse digitalization strategies for their support operations. The most prominent of these solutions are digital employee training and the use of gamification to further educate employees.

Digitization initiatives and policies can vary from company to company. In some instances, the company applies a centralized cost allocation framework to digitization enhancements, while in others, costs are only accepted and allocated on a project-by-project basis.

		Company D – Fast fashion	Company E – Footwear	Company F – e-commerce	
Primary Activities	Front-end	Customer experience	Omnichannel approach – in-store, webshop, click & collect, "quickshopping"	Omnichannel approach; in-store customer feedback is rewarded for completion	Selling second-hand items bought from users and outlet items purchased directly from brands
		Customer education	Exclusive loyalty club offers and 5% cashback on the next purchase	Exclusive loyalty club offers; in-store adaptive display panels for visual merchandising	Loyalty club offers; continuous promotion codes for separate business areas to convert users
	Back-end	Operations and back-end administration	Data-driven business decision making with in-store live monitoring on sales performance	Digitalized product design; PDAs for in-store logistics	Automatically adjusting sales and purchasing price based on various criteria
		Warehouse and inventory management	Hungarian "dark store" to serve web orders and "HUB stores" to optimize inventory management	Serving web order can be made from the "dark store" or directly from the stores	Advanced inventory management systems for handling individually digitized apparel items
Support Activities		Comprehensive IT investments	Digital mindset present, with a centralized governance	No advanced digital solution present	Digital mindset present
		Trainings and recruitment processes	Gamification of in-store staff training	No advanced digital solution present	No advanced digital solution present
		Technology-oriented business mindset	Digital mindset present	No advanced digital solution present	Digital mindset present
		Forecast-based inventory and procurement	Digital mindset present	No advanced digital solution present	Not relevant given the company's unique business model

Figure 22: Comparison of key digital solutions in the Apparel & Footwear retail sector (Source: Own editing based on in-depth expert interviews)

V. Summary

V.1. Summary of findings

This study was conducted with the intention of attempting to provide insights into the key digital solutions in the Hungarian food and clothing retail sector as well as identify best practices by studying the experiences and opinions of industry professionals within a unified framework.

To investigate this topic, the following research question was developed:

“How does digitalization affect companies' front- and back-end activities in the Hungarian food and apparel retail sectors?”

To support the research question and to comprehend the digitalization of the apparel and food retail sectors in Hungary, the following sub-question was formulated:

“What are the similarities and differences between the Hungarian food and apparel retail sectors in terms of digitalization?”

On the basis of the findings of the research, it is possible to say that generalizations may be derived across different industries, despite the fact that several retail organizations use a variety of different digitalization solutions. The primary digitalization solutions in the food and apparel & footwear retail sector are highly similar, but there are some major distinctions between them as well.

Similarities in digitalization solutions

The omnichannel approach to improve the customer experience is the common digitalization answer for both of these industries. With this strategy, businesses are able to offer their customers a variety of different ways to interact with them. There is a growing trend in both sectors to shift customer education activities, such as promotions and markdowns, to digital media. In addition, there is a development of loyalty card programs, and the analysis of the data collected through these programs may be used to develop consumer promotions and offers that are specifically tailored to the consumer, which further increases customer engagement and value. Instead of mass media, businesses prefer to communicate with their customers through this individualized digital approach.

Automation and data-driven decision making processes are both making their way into the operations and back-end procedures of businesses in the analyzed sectors. In order to maximize

profits and minimize expenses, warehousing and inventory management systems have both become highly automated. In addition, supply chains are being partially or fully digitized to improve efficiency and resilience.

In conclusion, both of these retail subsegments are dominated by consumer-perceived digitalization solutions, and these innovations are converging.

Differences in digitalization solutions

In spite of the fact that the two industries share a common goal of engaging customers in the shopping experience, the digitalization solutions that they each provide are distinct. A digital milestone was reached in the grocery retail industry with the introduction of scan-as-you-go solutions. These approaches allow customers to streamline the shopping process and become more engaged with the firm as a result.

In opposition, the retail industry for clothing has a goal of increasing the amount of orders placed through the so-called "quick shopping." This indicates that staff in the store utilize a tablet to place orders for particular pieces of apparel to be shipped to another store location or even to their homes. Digital solutions in the apparel and footwear sector also aid in the process of recommending a garment for purchase. Systems and algorithms are often used to advise an entire ensemble of matching clothes, so digital tools are helpful in this regard as well. This option is also available in online spaces, where customers can obtain recommendations that are even more tailored to their preferences by virtue of an analysis of their purchase history.

The two industries are also distinct in terms of the warehousing and inventory management solutions that are utilized. Clothing retailers frequently set up specialized locations known as "dark shops" only for the purpose of fulfilling online orders. An additional advantage of using digital technology is the ability to have the products that a customer has ordered delivered not just from the online warehouse but also from the physical location of the store itself.

The degree to which training and recruitment procedures are being digitalized also differs greatly between sectors. There is a significant emphasis placed on trainings for people who work on sales floors in the retail clothes industry. When integrated with digital technologies and gamification, this form of employee training enables the organization to help its staff learn more effectively about both the existing stock and the new collections. Such training and recruitment activities contribute very little, if at all, to outstanding digital solutions for food retail.

		Food retail sector (Company A-C)	Apparel & Footwear retail sector (Company D-F)
Primary Activities	Front-end		
	Customer experience	Omnichannel approach; digitally involving customers in the purchasing process through scan-as-you-go solutions and self-assisted checkouts	Omnichannel approach enabling webrooming and showrooming; rewarding in-store customer feedback
	Customer education	Shifting of promotions on digital platforms; exclusive digital coupons; loyalty club program – personalized promotions through data analysis	Adaptive digital in-store display panels; continuous online promotions; exclusive coupons and cashbacks via loyalty club program
	Back-end		
Support Activities	Operations and back-end administration	Automated pricing decisions; algorithm-driven staff scheduling and store layout optimization; committing to paperless strategies	Data-driven business decision making with in-store live monitoring on sales performance; PDAs for in-store logistics
	Warehouse and inventory management	Autonomous, forecast-based supply chain management systems; home delivery either from the warehouse or from the shop's existing stock	Automated inventory management systems; "dark stores" for serving only web orders combined with delivering from store inventory
	Comprehensive IT investments	No major innovations linked to digitalization, but a digital mindset is present	No major innovations linked to digitalization, but the digital mindset is present
	Trainings and recruitment processes	Cybersecurity trainings, digital recruitment process	Gamification of store employee training with in-house quizzes and questionnaires
	Technology-oriented business mindset	No major innovations linked to digitalization, but the digital mindset is present	No major innovations linked to digitalization, but the digital mindset is present
	Forecast-based inventory and procurement	No major innovations linked to digitalization, but the digital mindset is present	No major innovations linked to digitalization, but the digital mindset is present

Figure 23: Comparison of key digital solutions in the Food and Apparel & Footwear retail sector in Hungary (Source: Own editing based on in-depth expert interviews)

Implications for food and fashion retailers at the start of their digital journey

The findings of the study make it abundantly clear that those clothing and food retailers who have, up until now, placed less emphasis on improving their processes through digitalization have no excuse to delay if they wish to continue competing successfully in their respective markets. The implementation of key digital solutions that contributes to consumer experience and education are the most important steps in the transformation process.

To remain competitive, businesses must embrace online channels and progressively adopt an omnichannel model. In terms of consumer education and marketing opportunities, loyalty programs can help them generate additional revenue by increasing the number of returning customers and the frequency of their purchases via personalized discounts.

Using digitalization tools such as automated inventory and supply chain management or data-driven decision making, it is certainly possible to reduce the cost of back-end operations. By automating manual processes, retailers can streamline their operations and reduce the cost and time required to complete routine tasks, resulting in consumers having access to products and services that are superior and less expensive.

The world is becoming increasingly digital, and retailers who fail to adapt run the risk of falling behind. By adopting digital technologies, retailers can assure their continued relevance and competitiveness in the future.

V.2. Research limitations and future research proposals

When conducting in-depth interviews with experts, it is challenging to locate and recruit participants. This may be due to the experts' hectic schedules and the competitive nature of research, which may make them hesitant to share their knowledge and insights.

Regarding further constraints of the study, a limited sample size of expert interviews may reduce the generalizability of the results, as different experts may have varying perspectives and experiences. Future research could consider conducting a larger survey or utilizing various sampling techniques to ensure a more diverse and representative sample of experts in order to overcome this limitation. In addition, the study's concentration on the Hungarian food and apparel retail sectors may limit the findings' applicability to other retail sectors or countries with distinct cultural and economic contexts. To enhance the universality of the results, future research could include a wider variety of retail sectors and countries.

In terms of future research proposals, investigating the effect of digital solutions on customer behavior and satisfaction could provide valuable insights into how these solutions can be optimized to improve the customer experience. In addition, studying the potential disadvantages and difficulties of implementing digital solutions from the customer's perspective could aid in identifying strategies for mitigating these problems. Exploring the role of government policies and regulations in promoting or inhibiting digitalization in the retail sector could also help identify areas where policy interventions may be required to facilitate the adoption of digitalization solutions.

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Annexes

Appendix 1: Key retail digitalization solutions (Source: Own editing based on Matyusz & Pistrui, 2020 and Deloitte, 2017)

Implement- ation areas	Subsegment	Key digital solutions	Illustrative example
Strategy	Segmentation	- Using data analytics for micro-segmentation - providing personalized offerings & targeted communication	Advanced AI based analytics to create consumer microsegments
	Positioning	- Offering additional services and facilities - Leisure provisions and shopping environment	Theme-based digitally-enhanced experimental stores
	Operating Formats	Disruptive & innovative formats aided by digital initiatives to expand reach (Omnichannel approach)	On-demand grocery delivery
	Business Models	Disruptive business models using digital enablers	Subscription model
Front-end	Customer Experience	Providing holistic physical and digital experience across the entire customer journey	Smart mirrors for providing virtual trials to shoppers
	Merchandizing	Using digital merchandising (e.g., virtual fitting rooms, digital kiosks, AR)	Virtual trial rooms and 3D try-on facility
	Loyalty Programs	- Shifting towards mobile app based programs - Blockchain based loyalty programs	Block-chain based loyalty programs
	Pricing and POS solutions	Applying advanced dynamic pricing strategies	Use of electronic shelf-edge technology

		• Customized engagement and personalized deals for customers	
Back-end	Supply Chain	• Shifting towards a dynamic, integrated supply network • Digital Supply Networks	“Always-on” agile supply chain
	Logistics & Warehousing	• Shifting to shared logistics capabilities and digitally enabled logistics services • Continuous automated monitoring	Drone based deliveries
	Finance	• Use of RPA to automate financial functions • IOT-enabled processes	Crypto currencies
	Procurement and Vendor Management	• Shifting to digital collaboration with vendors	Blockchain technology for contract management & supplier payments
	Assorted-mix & Planning	• Applying data-driven algorithms for store’s assortment planning • Adopting predictive models & real-time forecasting • Using dark analytics	RFID chips to make supply chain more responsive
	People & Organization Structure	• Simplifying employee processes through automation • Digital retail transforming KPIs to measure and reward employees	Adoption of smart systems to manage staff shifts and checkout procedures

Appendix 2: In-depth interview guideline

1. Describe your company in a few sentences.
2. How does digitalization manifest itself in your company?
 - a. Is there a formal expectation from any level, center or owner to use digital tools?
 - b. Where did the inspiration come from to use digitalization tools (internal or external pressure, constraints or opportunities, lack of workforce, profitable automation, etc.) - at company level, at local level
 - i. Was the use of robots and the drive for automation in the company a feature of the past? Since when? Why?
 - c. What areas of the company are affected by the introduction of digitalization solutions (e.g.: marketing, promotion, production, logistics, purchasing, warehouse, quality, operations)?
 - d. What projects have been implemented in relation to digitization?
 - e. What solutions (tools) do you have experience with? What tools are you thinking about in the short and medium term?
 - f. Tell us about one or two previous digitization projects in particular.
 - i. Who decides on the project, what is the purpose of the project and on what basis?
 - ii. Why these projects were highlighted?
 - iii. Who is involved in the project (internal vs. external: whether it is open to business partners, whether it was expected by customers, who is involved internally)?
 - iv. Adapted digitization tools (ready-to-made solutions, in-house development, combination)?
 - v. What is the investment, how is the return expected; is the expectation of return on these digitization projects generally different from other projects?
 - vi. What are the steps involved in such a project?
 - vii. Results achieved, sustainability of results (did the results matter or were they driven by other considerations)?
 - viii. General experiences, success criteria, failure factors of the project - participants, leaders, areas concerned, organizational gaps
 - g. Are there any companies that are being watched, benchmarked against? Is there a business-to-business forum that you would like to participate in?

- h. How can you help the company with the digitization of the university?
- 3. Do you think there are any important issues that we have not touched on in relation to digitalization?