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How Can Digitalization Mitigate Pandemic-Induced Demand Shocks? A Case Study from the Apparel Industry

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Abstract: This paper aims to explore how digitalization can be used as a risk mitigation tool against pandemic-induced demand shocks, when customer movements and activities are constrained by government regulations. Due to the disrupting events of the COVID-19 pandemic, we opted for an exploratory study to uncover the risk mitigation capabilities of digitalization under these circumstances, using a fast fashion case company as an empirical example. Several interviews were conducted with middle and top managers at the company. Our empirical insights about the risk mitigation capabilities of digitalization suggest that, as COVID-19-like events may become more frequent in the future, digital tools offering certain mitigations against physical constraints should be valued more highly than they have been previously. We encourage decision makers to look at the risk mitigation capabilities of digital solutions and include those into the cost–benefit discussion when thinking about new investments. In this way, our paper fills a pragmatic gap in this field, and is expected to help companies to identify the key success factors for the successful implementation of a digital transformation. Because of our chosen research approach, the research results may lack generalizability. Further company-wide, industry-wide, and country-wide extension of this research is possible.

Keywords: risk management; retail; digitalization; COVID-19

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1. Introduction

The Global Risks Report 2020, published on 15 January 2020 by the World Economic Forum, did not think much of a possible pandemic. Only the risks posed by weapons of mass destruction, unmanageable inflation, and terrorist attacks were predicted to be less likely, and impact-wise infectious diseases were only ranked at the 10th spot (WEF 2020). Just two weeks later, the World Health Organization (WHO) declared the COVID-19 outbreak in China a public health emergency of international concern (WHO 2020a), and later a pandemic on 11 March (WHO 2020b).

Along with some other industries, retail was hit particularly hard, as many economies faced lockdowns or other restrictions concerning physical encounters between people during the pandemic, and, within retail, the apparel sector was a clear loser. According to Eiffe (2021), only 30% of EU companies had a crisis or business contingency plan in 2020, and 51% of the enterprises operating in the commerce and hospitality sectors reported disrupted business operations due to the COVID-19 outbreak. It is not surprising, then, that the apparel sector was also unprepared for a pandemic-induced shock causing massive physical restrictions, which led to a demand shock from the customer side. This inevitably leads to the following research questions: why did this situation come as a surprise for many companies, and how can companies operating in the apparel industry mitigate this pandemic-induced risk? In our article, we investigate this problem and propose that digitalization is a possible tool to achieve this goal. The COVID-19 pandemic has forced the adoption of more adaptable business management approaches by enterprises (Contreras 2021). Digitalization is changing how businesses handle risk by combining

risk information systems, automating the process of finding risks, and using data science, analytics, prediction modeling, big data, AI, the Internet of Things, and cloud computing. These tools help businesses figure out how their customers act, anticipate what risks they might face, and look at how their competitors are doing. AI and machine learning are also being used to figure out what risks might happen and how to make services better. (Kumar 2022) In this way, our paper fills a pragmatic gap in this field, and it is expected to help companies to identify the key factors for the successful implementation of a digital transformation. The structure of this article is the following:

- In Section 2, we review the literature. We look at risk management in retail first, focusing on environmental risks. Then, we investigate digitalization in retail and the changes it has made to business models by promoting omnichannel transition. Finally, we conclude that risk mitigation capabilities are typically not considered when assessing the benefits and costs of an omnichannel business model;
- In Section 3, we provide a framework for our analysis and a description of our methodology, and we give an overview of the case company;
- The final sections present the analysis (Section 4), discuss the findings (Section 5), and draw conclusions and give some directions for further research (Section 6).

2. Literature Review

2.1. Risk Management in Retail

Companies constantly have to operate under uncertain circumstances, from which countless risks originate. Risk sources can be classified in many ways. One approach is to take an organization's point of view and differentiate between internal or organizational and supply chain risks. Supply chain risks can be (1) network-related, i.e., they are external to the organization, but internal to the supply chain network, or (2) environmental, in that are external to the network (Jüttner et al. 2003; Manners-Bell 2018). Internal risks can be further divided into process and control risks, while network-related risks can be divided into demand and supply risks (Christopher and Peck 2004; Jüttner 2005).

Researching internal and network-related risks has been a popular topic in general and in retail management in particular, but there has been less emphasis on environmental risks (Oliveira et al. 2019), though these risks can actually cause further problems through other consequential network-related and internal risks (Jüttner 2005). Based on their comprehensive literature review, Oliveira et al. (2019) categorized environmental risks into two groups, namely (1) endogenous and (2) exogenous environmental risks. Endogenous environmental risks consist of environmental pollution, waste, non-compliance, and environmental accidents, while exogeneous risks are natural and man-made hazards. Natural hazards can be natural disasters (like earthquakes, extreme weather, volcano eruptions), climate change events, or pandemics, while examples of man-made hazards could be terrorist attacks, cyber-threats, piracy, or war (Manners-Bell 2018). In this paper, our focus is on a pandemic event (COVID-19) and its consequences on retail activities. During our search for research, we found that this risk source has not been researched deeply from a management and retail point of view up until the COVID-19 pandemic. Oliveira et al. (2019) identified 28 papers dealing with natural and man-made hazards, but none of those investigated pandemics. In fact, most of them did not even mention diseases as a potential environmental risk source. The retail research also did not investigate pandemics deeply before COVID-19. After the outbreak this situation changed, and a new stream of COVID-19-centered literature appeared (for retail see, e.g., Dannenberg et al. 2020; Hwang et al. 2020; Laato et al. 2020; McNeish 2020; Pantano et al. 2020; Simbolon and Riyanto 2020 as some early examples).

Given the lack of deep research about pandemics before the COVID-19 outbreak, what can we say about mitigating such a risk? As we mentioned in the Introduction, infectious diseases were not seen as major problem. Almost all other risks were deemed to be more likely, and besides their higher likelihood, several risks were assessed to have more severe impacts (like an information infrastructure breakdown, water crises, cyberattacks, human-made environmental disasters, natural disasters, biodiversity loss, extreme weather,

and climate action failure). This was not a unique situation. Since 2007, pandemics and infectious diseases had not made it onto lists of the top five most likely risk events, and they were considered among the most impactful events only three times (in 2007, 2008, and 2015) (WEF 2020). As an unfortunate consequence, most companies probably also had not bothered to think about this kind of risk and how to mitigate it when it emerges. Hence, it is not surprising that companies were not prepared for a pandemic event in general. Just to make things worse, COVID-19 turned out to be very contagious; its spread was reinforced by globalized travel networks and other connections around the world (Sheikh et al. 2020). As the currently available vaccines were not yet invented at that time, and COVID-19 spread through humans with close contacts, these contacts had to be terminated or limited to contain the virus. There were several ways to accomplish this. The bluntest method was for the government to order a mandatory lockdown, in which the physical movement of people is very strictly limited. This naturally caused a huge demand shock for companies trying to sell their products, as the supply and demand sides could not meet physically in stores or other locations of market activities, and for most companies that offer tangible products to their customers the majority of their sales were still happening offline. These lockdowns were the typical initial reactions by governments across the globe, with some variations in their details (like exactly who could move, and when, and where). A more moderate solution emerged after enduring several weeks of lockdowns, partially because of the very severe economic consequences of the lockdowns. Under this solution people were typically allowed to move everywhere if they wore a mask indoors, and the number of people allowed to be present at a certain location might be limited. This still prohibited certain crowd activities from being performed (like attending festivals or sport events), but the usual shopping activities could be carried out. Still, the demand shock remained in existence in a less-severe form as many people did not go outside without a certain goal in mind (e.g., just to spend time in a shopping mall for fun).

To sum up, this was a very complex and hard situation for many companies to be in, and apparel companies were among those hit the hardest. Nonetheless, companies had to continue with their operations under these circumstances. As the restrictions on physical movement and interaction were made by governments, companies had to comply with these regulations and still had to find a way to reach their customers. As Hänninen et al. (2021) proposed, based on the events of the past decade, the COVID-19 pandemic is one of the main change-triggering events (bankruptcies among physical retailers and the rise of the online retail) in recent times. We, furthermore, argue that digitalization is an essential risk mitigation tool in a situation like this. Hence, the following subsection looks at digitalization in the retail setting.

2.2. Digitalization in Retail

The situation for retail has changed rapidly in recent years, mainly due to the widespread use of technologies that have led to the era of digitalization and Industry 4.0. Currently, it is not enough to sell a particular product to consumers. It is becoming increasingly important, in the face of continuously increasing competition, to make consumer shopping the sort of experience that increases their chance of repurchasing, like with the use of digital technologies during different parts of the consumer journey (Willems et al. 2017). New technologies also allow consumers to passively experience products, such as an app that allows the customer to see a dress from home and how it would fit on them, so that they do not have to go to a store to try the product on (Lehdonvirta 2012). However, the availability of digital devices is also widespread within stores, which can influence consumer choices, make the shopping experience easier, more enjoyable, and thus have a major impact on value creation. There are a lot of tools implemented to boost this effect within stores, like digital promotional flyers (Ziliani and Ieva 2015), electronic shelf-labeling (Soutjis et al. 2017), and digital product fitting (Gustafsson et al. 2019). These tools greatly influence both promotional and pricing models, while also addressing the technical conditions required for them (Grewal et al. 2011). Besides these solutions, retail companies rely on mobile

technology more than ever. According to Bellini and Aiolfi (2019), consumers can use mobile technology to check their digital shopping list, to call a family member/friend for information regarding grocery shopping, to check the promotions on the site/banner app, to find product information, to use the retailer's apps, to make calculations, to compare product prices with other retailers, to scan QR codes, to visit the retailer's website, to use digital coupons, and to pay, which can highly improve the impulse shopping behavior of customers. This impulse shopping behavior is also boosted, because digitalization helps in making faster decisions and giving new perspectives (Lidholm et al. 2017). Additionally, these companies can use mobile technology as a data-driven marketing tool to build up a mobile-based market infrastructure and know everything about their customers (Beauvisage and Mellet 2020). We can see that a particular technology, like mobile phones, has been able to reshape the retailscape completely (Fuentes et al. 2017).

The successful implementation of technology can increase the value perceived by the customers, if executed correctly, and the adequate use of technology can ensure a competitive advantage for a physical store against its online competition (Nöjd et al. 2020). Not just the customers need to accept these technologies, however. The attitude of top management towards technology is the most important factor facing the adaptation of customer-facing solutions in an in-store retail environment (Lorente-Martínez et al. 2020).

Decision-makers need to understand how these technologies could be leveraged based on newly developed business models (Grewal et al. 2011; Pantano and Vannucci 2019) and in what combination they need to be used to have a positive impact on the value chain and, consequently, they should also be prepared to develop a strategy to make these changes (Kumar and Kashyap 2018).

The advantage of emerging new business models lies in the proper use and combination of digitalization for commercial companies, making technology a competitive advantage in value creation (Hänninen et al. 2018). Any company that plans to direct its strategy towards digitization must meet certain technological factors and has to invest in them. To maximize synergies, companies need to think about both integrated technologies and processes. This can also help their transformation from multi-channel to omnichannel business models (Hagberg et al. 2016).

In this new era of retail, in which digitalization, social media, big data, and other emerging technologies (including artificial intelligence, virtual reality, blockchain, and so on) are resulting in the transformation of retail business models, omni-channel retailing is becoming a growing trend. (Cai and Lo 2020) The significance of omnichannel retailing and digitalization has experienced an notable increase. Academic research has developed analytical methodologies aimed at examining the specifics and capabilities of omnichannel structures. These methodologies mostly concentrate on the adoption of an omnichannel strategy by traditional brick-and-mortar merchants (Hübner et al. 2021). Omnichannel management is defined by Verhoef et al. (2015) as the number of channels and customer meeting points available to optimize the customer experience and channel efficiency. Berman and Thelen (2018) defined the appearing retailer-based synergies in terms of omnichannel marketing. They differentiated between four issues: (1) access issues like in-store returns after an online purchase or the notification of customers when a new store opens up near them; (2) product information capabilities, which can help suggest to customers the best suitable products; (3) cross-selling opportunities, which can be present as mobile or in-store coupons, targeted emails, etc.; and (4) logistical economies, where faster shipping and reduced warehouse costs are present, which could lower inventory investment and inventory risks as well. It is easier for a company to establish a successful omnichannel transformation if they have a well-established brand which customers can easily recognize; therefore, they can trust that brand. (Hickman et al. 2020) From a business model perspective, omnichannel opportunities were researched by Jocevski et al. (2019). They identified three main dimensions: (1) seamless customer experience, (2) an integrated analytics system and (3) an effective supply chain and logistics, which have a large effect on their corresponding business model elements. These dimensions connect to different

elements of the business model: *seamless customer experience* relates to the value proposition (e.g. offering click and collect services or mobile device experience), the customer relationship (by installing in-store technology that offers synergy across channels), and the key resources (social media engagement, promoting brand ambassadors); *integrated analytics systems* improve the value proposition (by creating personalized offers and direct services), the key activities (by developing data analysis capabilities that enhances customer experience and logistics performance), and the key resources (by internalizing mobile and online resources for a physical store). Retailers must consider all dimensions and business model elements holistically, as customers do, to maximize their perceived value and experience (Savastano et al. 2019). The resulting cost–benefit sides of omnichannel systems are the following. On the *benefit side*, there are incremental sales due to new channels and devices, higher average sales to existing customers, higher proportion of consumers making a purchase, promotional synergies across channels, lower inventory costs, reduced shipping costs due to in-store pickup and lower product returns. On the *cost side*, the major drivers are hardware, software, employee training, additional employee incentives for cross-selling, additional market research expenditures, hiring cross-channel managers and IT personnel (Berman and Thelen 2018). It is worthwhile to note that the risk mitigation of potentially disrupting events between customer and seller was not an issue that arose when thinking about business model activities or the benefits of a digitalized omnichannel solution.

As a result of these business model changes, many large retail chains use more and more digital devices in their processes, and in their physical stores as well, supported by technologies such as artificial intelligence or robotics (Hagberg et al. 2016). Still, there are a lot of barriers which can hold back this transition to digitalization (especially for smaller companies), like a lack of proper resources, a low perception of external pressures for the transition, and a low intention level to use digital services, channels, and marketing. A positive attitude towards digitalization can act as a driver, though (Bollweg et al. 2020), as a company should support new technology efforts and its employees should see the positive side of this technology and not view it as something that could do their job instead of them (Bagdasarov et al. 2018; Priporas et al. 2017).

The aforementioned changes are particularly strong and advantageous in the apparel industry, where new types of shoppers have emerged and product recommendations are tailor-made to their personal preferences (Sebald and Jacob 2020). Silva et al. (2020) analyzed multi-channel and omnichannel strategies through nine fashion retail companies, and examined the channels used, especially company websites, social networks, Instagram, Youtube, mobile applications, and the integration of their websites and mobile applications. They concluded that the brands studied had good channel integration, order tracking, online communication, and social media, and that they acted almost in the same way, presenting only slight differences in their practices, regardless of the area they were focusing on. Another study by Macchion et al. (2017) concluded that customers were willing to buy only from well-known brands online, which had had brick-and mortar stores at the past.

To summarize our literature review, we can see that the investigation of environmental risks was never in focus, and research about potential pandemic effects was extremely rare until the COVID-19 pandemic. Also, the potential risk-mitigating capabilities of digital solutions were not a factor when assessing the benefits of an omnichannel business model. These also explained our first research question, namely how did this situation come as a surprise for many companies? In the empirical part of our study we look at the second research question in detail: how can companies operating in the apparel industry mitigate this pandemic-induced risk through digitalization efforts?

3. Framework and Methodology

Wenzel et al. (2020) investigated the possible strategic responses from firms for a crisis situation (like the COVID-19 pandemic). Building on these responses, Kraus et al. (2020) examined how family businesses can react to situations arising from COVID-19, but we think that the model is general enough in nature to also be used for the analysis of any

kind of companies. Figure 1 visualizes the model along two axes: the first one shows the short-term and long-term solutions, while the second one consists of retrenchment, persevering, and innovation, the three possible options for a firm reacting to a crisis. Based on this model, a firm has six approaches:

1. Controlled shutdown: companies build up contingency reserves and reduce their fixed costs. Short-term work, cost-cutting and safeguarding liquidity are examples of this approach.
2. Operative crisis management: companies directly set up teams and make management decisions to deal with a crisis.
3. Temporary business model adjustment: only minor changes are made to the business model, with the aim of improving efficiency and adapting to the current situation. Alternative usage of resources can happen.
4. Process streamlining: simplification of processes due to optimal operation and the identification of inefficiencies.
5. Reflection: following the management of the crisis, employees will be brought up to speed on the changed processes and any necessary training will be provided for them.
6. Business model innovation: in this case, major changes take place, even completely new sources of income may be introduced in order to adapt to the situation, and to create a sustainable business model. Digitalization of workflows can also happen.

INNOVATION	Temporary business model adjustment (3)	Business model innovation (6)
PERSEVERING	Operative crisis management (2)	Reflection (5)
RETRENCHMENT	Controlled shutdown (1)	Process streamlining (4)
	SHORT-TERM AD HOC	**LONG-TERM STRATEGIC**

Figure 1. Model of short-term and long-term interventions with specific measures (based on Kraus et al. 2020).

In our research we would like to highlight these options from a digitalization point of view, and we looked at possible methods to carry out our research. Based on Yin (2018), three conditions that help to establish the relationship of the research questions to research methods are (1) the form of research question posed; (2) the control a researcher has over actual behavioral events; and (3) the degree of focus on contemporary, as opposed to entirely historical, events. Yin (2018) differentiates between experiment, survey, archival analysis, history, and case study. We are looking for answers to the how and why questions, and the boundaries of the investigated phenomenon and the context cannot be completely separated from each other either (Condition #1). It is important that we, as the researchers, cannot influence the outcome of the study; that the events took place independently of us (Condition #2). We also focused on contemporary events (Condition #3) (Starman 2013; Yin 2018). Based on these conditions, the case study approach was the right one for this research (Yin 2018). According to Harling (2012), "a case study is a holistic investigation that examines a contemporary phenomenon in its natural environment". A phenomenon can be any problem, event, action, or even individuals. The natural environment means the context of the event, the conditions under which the phenomenon takes place. This is important during the investigation of the phenomenon, because either the environment affects it, or the two cannot be clearly separated from each other, which is extremely relevant to the researcher. The versatility and detail of the data are ensured by holistic examination. During data collection, researchers can rely on several, rather than just a single, method, like observation, interviews, document analysis, and audiovisual materials (Starman 2013; Simons 2014). Also, using case studies is accepted and widespread in business and international business, as Yin (2018) sampled it. The case itself can be about several issues, like individuals, groups of people, organizations, projects, decisions, processes, and so

on (Hays 2004; Yin 2018). In our study we chose business organizations, and hence our unit of analysis was a company operating in the apparel industry. This company (which is presented below in more detail) already participated in a different, broader research project about Industry 4.0, where we explored its initial efforts to make a transition to omnichannel operations. The COVID-19 pandemic arrived during this transition process and the company allowed us to continue to follow their journey through the pandemic crisis. As single case studies are also an accepted design choice (Yin 2018), we made this company our case company for this research. As we had deeper access to our case company, we were able to use multiple sources of data. Several interviews were conducted with the top and middle management of the Hungarian subsidiary, namely the country manager, the HR manager, and two area managers, in 2018. These interviews first focused on the omnichannel transition of the company, and then on the COVID-19 pandemic in relation to this transition. We also had the opportunity to review related company documents and directly observe front-office and back-office store operations that gave additional context to the interviews.

According to Yin (2018), one needs to look beyond the mere application of analytical tools and techniques and also think about an analytic strategy, but there are few instructions that function as guides, and much more depends on the style of the researcher's thinking. Also, the four strategies and five techniques recommended by Yin (2018) are not mutually exclusive, and hence can be used in any combination.

The analytical strategy of our research is the one relying on theoretical propositions. We already had adequate data about the digital landscape of the case company due to our earlier research about Industry 4.0. During the COVID-19 pandemic we realized that contemporary research in retail did not have an adequate coverage or explanations of pandemic-related risks and their mitigation, so we were looking for a theoretical framework that is applicable to this situation, and we chose the model of Kraus et al. (2020) introduced earlier. This model helped us in shaping our data collection plan through interviews, company documents, and direct observations. Following primary data collection, we coded and organized the acquired data, and we used an analytic technique called pattern matching, described by Yin (2018). With pattern matching we compared our empirical pattern, based on the collected data, with the predicted one—namely the model of Kraus et al. (2020). The results of this pattern matching are detailed in Section 4, but before that we will introduce the case company to give the context for the analysis.

Company Overview

Our case company is the Hungarian subsidiary of a global apparel company headquartered in Spain. The company has many brands that are brought together by central management and are present in dozens of countries, with thousands of stores across the world. Currently, the company is transitioning from a multi-channel business model to an omnichannel one. Digitalization plays an important role in the company. Some brands already have e-commerce solutions. However, organizational culture does not necessarily support the rapid spread of these solutions. The company has very strong central management in every aspect. Digitalization developments are implemented as a combination of in-house and outsourced solutions. The development of digitalization solutions is considered primarily a matter of money; the know-how required for this is available (either in-house or from external service providers), so it is up to the headquarters to decide where to allocate the resources needed for investment.

In the development process, the priority of the Spanish and Portuguese markets prevails. All innovations are tested there, and during the implementation phase they are gradually expanded to international markets in several steps. Each subsidiary in other countries is managed by country managers, but decision-making is completely centralized, with subsidiaries having virtually no opportunity to make proposals. The self-driven development of subsidiaries tends to be minimal, but some level of adjustment is possible due to cultural differences across countries. Development projects are usually

only communicated by the headquarters during the implementation phase, and it is not always possible to know why a potential project is not progressing.

Digitalization solutions were initially used to make internal processes more efficient. Customer-oriented digital solutions are not spreading so quickly in the industry, but initiatives have already emerged. Although the online segment is evolving more and more, the Hungarian country manager expects physical consumption and physical stores to remain relevant in the Hungarian market in the long run as shopping malls are also a place for entertainment, not just a place for shopping, and they also appeal as a kind of lifestyle for the younger generations.

By the time the COVID-19 pandemic reached Hungary, the company already had certain digital solutions up and running. The most important ones were the following:

- An externally developed, real-time IT system used by the whole, global company to monitor traffic, inventory, and KPIs;
- An online sales channel through the central website and a mobile app. Since August 2019 it has been possible to order directly to the stores and customers could exchange the unsatisfactory products they ordered online in the stores as well.
- Ordering via tablets (OVT), where a tablet was placed in the store that allowed the customer to access the company's website and order a product to the store through it. In addition to this basic function, it could be expanded with several additional functions, e.g., to measure customer satisfaction, which could replace mystery shopping. The customer could also look at the inventory of another store. The tablets were installed in Hungarian stores in February 2020.

Though this level of digitalization was far from the desired target laid out in the company's long-term strategic initiatives, in the Hungarian context it was still quite advanced, as the application of digital technologies and their integration into corporate practice left much to be desired, not only in retail but throughout the whole Hungarian economy. According to the DESI (2020) report, Hungary ranked 24th out of the 28 EU members on the integration of digital technology, and only 12% of SMEs sold goods online in 2019 (compared to 18% in the EU).

4. Analysis

The first COVID-19 infection was reported at the beginning of March 2020 in Hungary. Soon after this a state of emergency was declared. From mid-March certain activities were limited and most stores were allowed to be open only until 3:00 p.m. At the end of March 2020, the government introduced a more serious lockdown, where people were allowed to leave their home only with a proper reason (e.g., going to work or buying necessary products like food, fuel, or medicine). Apparel products were not ruled necessary, so although apparel stores were not forced to close, people were effectively banned from visiting them, causing a demand shock for the companies. This lockdown was lifted during May 2020, but a partial one was reintroduced in November 2020 that lasted until May 2021.

What was the company response, under these circumstances, from a digitalization point of view? We use the framework of Kraus et al. (2020), introduced in Section 3, to assess the implemented actions.

In order to make the temporal dimension explicit, by short-term ad hoc actions we mean actions taken as a response to the first-wave lockdown (March–May 2020), and by long-term strategic actions we mean actions taken with the future in sight, and those that were continued after the reopening of May 2021.

4.1. Retrenchment

4.1.1. Controlled Shutdown

Certain projects were suspended because of their lesser strategic importance and their cost implications. One example of this is the recommendation service that was launched in February 2020, and worked like this: if a customer looked for a certain product, the sales assistant could show it on the tablet and could also recommend a full outfit/set of

other products that would go well with the desired product. These outfits were created by sales assistants from stock photos and they helped the customer visualize their overall appearance in those products. If there were missing garments from the desired outfit in the store, the customer could order those items online either into the store or to their home address. The tablet could also provide real-time data about the inventory located in Hungary in terms of size, color, or availability. As the declining visitor numbers were not able to make up for the associated costs, the project was suspended in March 2020 until September 2020, when it became greenlit again.

Another suspended project was a club service for loyal customers. Through this project, the company would be able to monitor loyal customer sales and give personalized recommendations for additional purchases. As there were a lot of associated costs with this initiative (e.g., producing and distributing physical club cards, installing terminals to handle the cards, improving the IT system to manage the cards, analyzing big data, and generating automatic personalized recommendations), it was put on hold.

The introduction of a gamification-based mobile training app for sales assistants was also postponed.

4.1.2. Process Streamlining

As the basic underlying physical processes remained the same, the company's streamlining had two focus points in order to identify and improve upon inefficiencies. First was the merging of the physical and the new online processes to create a flawless experience. This is something that is still going on, as the company continuously encounters new problems and gains new insights.

Second, certain previously suspended or postponed digitalization solutions were reevaluated. While the club service became an important driver of the business model's transformation, others were used only to a limited extent, e.g., the recommendation service is currently not available in every store because of the cost implications, as the underlying software is licensed from an external party. In addition to this, sales assistants are also not too keen on using the service when it is available to them. The original version of the gamification-based mobile training app for sales assistants had to be changed, because the original external developer company went bankrupt. There is a new one, but it is not used currently as company headquarters does not provide the necessary resources (content manager and know-how) to make it work.

4.2. Persevering

4.2.1. Operative Crisis Management

HR-related processes were immediately transferred online, to digital forms (meetings, essential trainings, motivational tools), as these were deemed to be of strategic importance. The company adopted MS Office 365 Suite solutions. Two important aspects were the overall crisis communication and the creation of online training about the health and safety requirements that could be implemented after the lockdown. Work from home was introduced for administrative tasks.

4.2.2. Reflection

After lifting the complete lockdown, many in-store processes were slowed down because of the health and safety regulations and initiatives in place (e.g., wearing masks were obligatory in stores for both customers and employees; the stores had to be disinfected regularly; the number of opened fitting rooms was limited, all clothes were steamed where possible; stickers were put in the stores about keeping the necessary physical distance; the overall situation had to be monitored; and health and safety equipment had to be sourced continuously). Employees had to be trained for this situation. An online health and safety training course was devised for store managers, who were responsible for teaching their employees the necessary knowledge.

The HR-related processes that were transferred online as an emergency step remained online in the long term as well, thus saving a lot of travelling and time. Work from home solutions also remained available.

4.3. Innovation

4.3.1. Temporary Business Model Adjustment

After the lockdown was introduced, the primary issue was the redirection of those customers whose contact information was available in the company database to online channels. These customers received newsletters about products that were stuck in the stores, and the company offered discounts on the products and on the delivery. A big advantage of online purchases was, as it turned out, that the products were shipped in their original packaging, so no other customers had touched the clothes previously, as they would have in a store. The existing IT infrastructure of the company was capable of handling the online transition, but the delivery process faced serious difficulties, because at that time the company had a central warehouse for online purchases in Spain that served every country globally, and the product picking process became significantly slower as the volume increased and safety regulations had to be followed. A regional Eastern European warehouse would have been better from this viewpoint, but the company did not have one, as it only had a limited presence in the region and the overall costs would have been too high. To sum up, the company diverted everything that it was possible to online, but it clearly lacked the necessary experience and know-how to implement omnichannel solutions on a large scale.

4.3.2. Business Model Innovation

Certain projects continued because of their strategic significance. An example of this is that the company started to integrate its current ERP system into the real-time IT system mentioned previously before the pandemic, and it continued to do so.

To tackle the issues of the slow delivery process mentioned earlier, the company decided to establish a dark store in Budapest, the capital city of Hungary, that opened at the end of 2021. This solution was used very rarely by the company, but the Hungarian online results convinced central management to install it. This gave a huge boost to the online leg of the business, because the delivery time was cut drastically, and it was seamlessly merged into the omnichannel solution: the customers were able to order from home to their home or to a store, and they could send back products to any store or the dark store itself. Another plus is that other competitors did not have dark stores within Hungary, only in the Eastern European region.

The club service loyalty program was finally introduced in December 2021. It was also immediately merged with the online leg, though there are still certain overlaps with the website's functions. In just one year the company managed to recruit 60–70% of the store visitors into the club service.

The ordering-via-tablets (OVT) solution became really popular among customers after the lockdown. As the inventory variety and size of the stores were inherently limited (basic products were typically on hand, but fashion products were not), customers could use the tablets to reach the whole product range of the company and order products to the stores. As sales assistants received a commission on all tablet sales, they also pushed the use of this solution. The OVT solution was further improved in 2022 with the arrival of Samsung Xcover phones that aimed to replace the tablets in the near future. The phones are smaller, lighter, and are able to provide more functionality in terms of back-office processes as well (like inventory taking or receiving and sending products).

5. Discussion

As a result of a strict government lockdowns during the first two waves of COVID-19 in 2020–2021, the Hungarian apparel industry suffered severely. Many of its companies that did not have an online presence during the first wave went out of business. In line

with Bollweg et al. (2020), these were SMEs, who were among the least digitalized in the Hungarian economy (DESI 2020), while large companies were able to optimize their resources across their business network. Hence, the first, and maybe most important managerial implication is to invest to the online presence of the company, if this has not been done properly so far, otherwise the company will be much more vulnerable to similar events than its competitors. This is even more pressing as the digital adoption rate has skyrocketed among Hungarian consumers: the pre-COVID-19 rate of 79% increased to 95% (Fernandez et al. 2020).

Our case company had already started its omnichannel transformation journey before the COVID-19 pandemic, but the lockdown gave a huge push and acceleration to its efforts. Obviously, it is facing a lot of new problems to be solved, but, as a result, the company believes itself to be much better prepared for a future pandemic lockdown situation. A lot of experience was accumulated during the last years that could help in handling a similar situation, while the trio of the real-time IT system, the dark store, and the club service provides the necessary ability to reach and serve customers even without a physical connection in stores. As we mentioned, the club service is already a huge success, and the company is able to reach most of its target customer group online on a regular basis. Another step in this direction would be the development of a mobile app for the customers, but this solution currently does not exist.

Therefore, when thinking about investment decisions for digitalization tools, we argue that the dimensions and benefits described in Section 2.2 should be expanded with the risk mitigation capabilities of the digital solutions compared against physical constraints. For example, our case company's recommendation service initially was aimed at providing seamless customer experience with the help of an integrated analytics system and logistics support when they introduced it in February 2020. But there were additional beneficial effects of this solution risk-mitigation-wise: as customers could order missing garments from the desired outfit to their home, they could avoid unnecessary travel between stores and thus limit excess physical encounters, and this feature could increase the value of the service in the eyes of the customers. Another example could be the ordering-via-tablets (OVT) solution, which turned out to be extremely helpful for older customers. These people typically do not order online or via mobile apps, so the tablet could replace this channel for them with the help of a sales assistant, and, combined with home delivery services, could also limit their physical exposure, mitigating the risk of infection for these more vulnerable age groups. The club service solution enabled the company to build up a huge and relevant customer base that can be reached anytime via online means and can be used to channel the customers to the online platforms, which were, in turn, improved by introducing the dark store concept. So, we argue that the benefit and cost dimensions of Berman and Thelen (2018) should be extended with another component related to the demand shock mitigation effect of a digital solution.

As our case study is an explanatory one, the patterns may be related to the "how's" and "why's" of the case study, and if the empirical and predicted patterns appear to be similar, these results can help to strengthen the internal validity of the case study. Also, the actual pattern-matching procedure does not need to involve any statistical comparisons or tests. (Yin 2018) In our analysis, we showed how the actions taken by the case company can be fitted naturally into the model of Kraus et al. (2020), thus achieving pattern matching and increasing the validity of our work. We also think that our results and conclusions are significant, which is a characteristic of a good case study according to Yin (2018). To support our argument, we refer to CBInsights (2023), which has listed 154 US retail bankruptcies since 2015. Fifty-two of the bankruptcies (33.7%) happened in 2020, the majority either directly due to the pandemic, or because the pandemic gave the final push to companies already struggling. The pandemic and its aftershocks also played a vital role in many of the 32 bankruptcies between 2021 and 2023. We argue that several of these occurrences could have been avoided or at least eased if the affected companies were aware of the potential risk mitigation capabilities of digital solutions as well. Our case study shows an

empirical example of how a company operating in a badly affected industry can overcome the industry's challenges by realizing the potential fallouts and adjusting its digitalization efforts accordingly. However, our case study, naturally, has its constraints, which we discuss in more detail along with the further research opportunities below.

6. Conclusions and Further Research

Though global pandemics, so far, have been rare in human history, they are not zero-probability-risk events. Today's more globalized world can help spread a local outbreak around the globe quickly, if the pathogen is contagious enough. Also, more frequent encounters between humans and the natural environment can increase the chance of another zoonotic disease appearing, like the current COVID-19 strain. Taylor et al. (2001) have already estimated that out of 1415 organisms known to be pathogenic to humans, 61% are zoonotic, meaning that they can be transmitted between animals and humans. A global pandemic, as we have seen, is able to shut down or constrain society and the economy significantly, so companies need to be prepared to mitigate the associated risks as much as possible. Based on our current experience, digitalization can play a role in this effort. In a lockdown period, when physical movements and activities are severely limited, online sales channels seem to be the only viable way to continue business, though at a reduced scale. Hence, it is imperative that more businesses create an online presence if they do not want to lose their customers in a pandemic-induced demand shock. This requires well-established back-end digital solutions and a reliable logistics system for their delivery. Digitalization can also be helpful in the reopening phase, as certain in-store solutions can improve business results. Future decisions about investments into digitalization projects either in a multi-channel or omnichannel setting should take their different risk mitigation capabilities for easing the physical constraints of individual digitalization tools into account as well, when thinking about the potential costs and benefits.

There is a plethora of possibilities for future research. The full impact of COVID-19 on society and economy is not yet known, as the pandemic is still considered global and ongoing by the WHO (WHO 2022). We also have to add that this kind of intensive digital transformation brings its own additional risks into play, whose costs were also not assessed by Berman and Thelen (2018). The most notable of these might be the increased exposure to cybercrime, and the higher risks associated with information security and the protection of the personal data of buyers. (Toleuuly et al. 2020) There are opportunities as well, though. Information security issues might be mitigated by the efficient deployment of blockchain technologies (Azimov and Petrova 2022). Also, if we look at the broader environment of companies, the emerging smart city concept and its technologies might provide a strong tool to ease environmental risks in times of pandemic crises, as it can help in absorbing pandemic risk by focusing on preventive measures (Petrova and Tairov 2022). Furthermore, a stronger relationship with customers in the online space will have significant implications for how social media is used. Werke and Agazu (2023) give a thorough overview of the COVID-19-induced changes so far.

Besides the limitations in scope of our study, we were also constrained to a single country and the apparel sector of the retail industry through our case company, and, because of this chosen research approach, the results may lack generalizability. There is a lot of potential in investigating the pandemic's effects within the whole global company network and the company-wide efforts to mitigate it. Also, a more thorough examination of the whole apparel industry would be interesting, not just in Hungary, but in other countries as well. Comparing different retail subsegments with different levels of digitization would be worthwhile. These extensions would also indicate a shift in research methodologies to include more quantitative, survey-based data collections.

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