Surviving digital disruption: identifying the key digital transformation barriers of multi-channel retailers

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Michel Bejta (s2416921)

Abstract

Studies have indicated that multi-channel retailers have suffered losses in market share due to their inability to utilize the opportunities of digital technologies. Therefore, multi-channel retailers must transform digitally to remain competitive in this digital era. Previous studies have indicated however that it is notoriously difficult for organizations that have become successful before the digital era and dominated their industry for a long time to transform digitally. This study therefore investigated the barriers that prevent multi-channel retailers from transforming digitally. In order to do that, barriers have been identified by researching previously published literature and by conducting interviews with industry experts. Thereafter, a well-established decision making technique has been used to rank the barriers in terms of importance to resolve. In total, fifteen barriers have been identified that can be categorized into five barrier categories. The barrier category with the highest overall priority is "organizational barriers", this implies that although technological innovation underpins digital transformation, industry experts think that organizational barriers prevents them from transforming digitally. The subcarrier with the highest priority is 'lack of digital culture' followed by 'Lack of digital leadership and managerial support' and 'lack of organizational agility.' These findings suggest that multi-channel retailers should start with establishing a digital culture, assessing whether the leaders of the organization have digital capabilities and to establish organizational structures that enables them to quickly respond towards the changing digital environment. Furthermore, what also became clear out of this study is that the lack of resources is one of the least important barriers. The literature however puts emphasis on the lack of resources as a key digital transformation barrier. Further research is needed to understand to what extent lack of resources is a key barrier for multi-channel retailers.

1 INTRODUCTION

In this rapidly evolving digital world, organizations are rethinking how they are going to compete in order to stay competitive in this digital landscape. Established organizations are therefore transforming digitally, by realigning their business model and business processes to the increasingly digital landscape (Kreutzer, Neugebauer, Pattloch, 2018). Digital transformation has led to organization-wide changes as it affects strategy, organizational structure, information technology, supply chains and marketing (Verhoef et al., 2019). Companies who fail to adapt to the digital landscape are expected to lose their competitiveness and might even disappear in the future (Ismail, Khater, & Zaki, 2017). It is however notoriously difficult to successfully implement digital transformation initiatives (Baculard et al., 2017).

Therefore, research has been conducted in recent years into the digital transformation barriers of organizations operating in various industries (Heavin, & Power, 2018). For instance, Heavin and Power (2018) focused on the challenges that managers face with regard to digital transformation. Mugge, Abbu, Michaelis, Kwiatkowski and Gudergan (2020) focused on organizations resistance and described how organizations can overcome such resistance when implementing digital transformation initiatives. Thus, many barriers of digital transformation have been proposed by scholars over the past years. Although these recent contributions, Tabrizi, Lam, Girard, and Irvin (2019) argue that the risks involved with digital transformation was the number one concern of higher management in 2019.

One industry in particular that is affected by the emergence of digital technologies is the retail industry. The rise of online channels changed customer behavior and loyalty as customers started to interact with one retailer via multiple channels (Von Briel, 2018). This resulted in the emerge of multi-channel retailers, a practice of selling products via more than one sales channel. In the past decade however, large multi-channel retailers

have suffered substantial losses in market share and in competitiveness because they were not proactive enough with adopting digital technologies (Kretschmer, & Khashabi, 2020). On the contrary, companies found in the digital era have surpassed multi-channel retailers by utilizing such new digital technologies (Sebastian et al., 2017). For instance, through the effective use of digital analytics, organizations such as Amazon and Alibaba managed to overtake multi-channel retailers such as Ikea in terms of market share and growth (Kretschmer, & Khashabi, 2020).

Multi-channel retailers know that they have to transform digitally in order to keep up with digital born organizations such as Amazon. It is difficult however to transform digitally due to the high failure rate of digital transformation initiatives (Lam, Girard, & Irvin, 2019). For such retailers who are currently in the process of transforming digitally, it is crucial to know what the barriers are that hinder the digital transformation process, and which barriers are the most important ones that needs to be resolved first. Previous studies have addressed the importance of certain digital transformation barriers in isolation, but none of them take a holistic approach by focusing on the digital transformation barriers from the perspective of a specific industry. In addition, little research has been conducted into determining the importance of each digital transformation barrier. Therefore, it is from both a practical and a theoretical point of view relevant to study the digital transformation barriers for the retail industry in specific, and to rank those barriers based on their priority to solve. This study will therefore focus on identifying and prioritizing barriers of multi-channel retailers. Based on the findings, conclusions are drawn and a clear answer can be given to the following research question:

"What are the most important digital transformation barriers of multi-channel retailers?"

This study is based on a well-established method in research called Analytical Hierarchy Process (AHP). Therefore, this paper is structured as follows. First, the term digital transformation will be described. Second, digital transformation barriers of organizations in general are formulated based on the literature. Third, the barriers will be assessed on their applicableness in the retail industry by conducting interviews with industry experts. Fourth, the importance of the barriers will be determined by using Analytical Hierarchy Process (AHP). Finally, an answer is given to the research question, followed by a discussion section, where the practical and theoretical implications of this study are discussed.

2 Literature review

2.1 Systematic literature review

The objective of this literature review is to identify barriers that multi-channel retailers face during their digital transformation process. To analyze existing research regarding these barriers of digital transformation, a systematic literature review has been conducted. According to Webster and Watson (2002), a review of prior literature creates a firm foundation for advancing knowledge and it is an essential feature of any research project. Many literature reviews however do not provide clarification as to how and why they obtained their literature sample (Wolfswinkel, Furtmueller, & Wilderom, 2013). In addition, the authors mention that the methods of analysis used are seldom addressed explicitly in the literature review. To ensure the aforementioned points, the grounded theory method of Wolfswinkel et al. (2013) will be used. The grounded theory method exists out of five phases (define, search, select, analyze and present) and it is a step-by-step guide that enables the researcher to present a transparent and thorough literature review.

2.1.1 Search strategy

In the first phase, the criteria for inclusion or exclusion of the articles and the search terms will be defined. In order to obtain a reliable set of articles, all non-peer-reviewed articles will be excluded. In addition, only articles related to the subject area of business, information systems and computer science were selected. Due to the continuous changes in the digital world, papers published before 2015 were considered to be outdated and so irrelevant for this research. The next step is to formulate search terms that are relevant to the research topic. Since the objective of the literature review is to identify barriers of digital transformation for traditional retailers, the main search terms would logically be "digital transformation", "barriers", and "retail". However, since research about the barriers of digital transformation of retailers in specific is scarce, the keywords "digital transformation" and "retail" will be the first search term and the keywords "digital transformation" and "barriers" will be the second search term. Furthermore, to ensure that no relevant articles were excluded in the final literature sample, synonyms of the aforementioned key search terms were also added to the search process (Table 1). Synonyms of the term "digital transformation" have not been included in the search process. The term digital transformation has over 34.500 search results in databank Scopus, making it a well-established term within the literature. The actual search has been carried out in the two commonly used libraries Scopus and Web of Science. It has been checked whether the search term appears in either the title, abstract or the keywords of an article, altogether, a sample of 1669 articles has been collected.

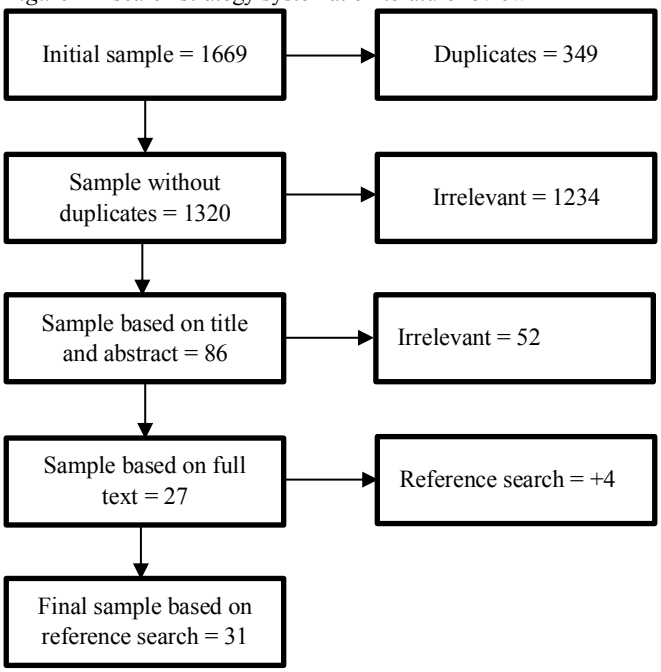
Table 1: Articles per search term

Search term	Scopus	WoS	Total
Digital transformation AND obstacles	35	37	72
Digital transformation AND barriers	72	64	136
Digital transformation AND challenges	675	438	1113
Digital transformation AND store	69	42	111
Digital transformation AND retail	41	51	92
Digital transformation AND commerce	89	56	145

In the third phase, the relevant articles are selected (Wolfswinkel et al. 2013), which is done according to numerous criteria. First, the duplicate articles were removed from the list. Next, the relevance of the articles was assessed by reading the titles and abstracts of the articles. An article is relevant if the research subject of the article corresponds with the research subject of this study. After doing so, a total of 86 articles remained in the sample. Lastly, by scanning the entire text of the articles, another 59 articles were assessed as irrelevant as the subject did not correspond with the research subject of this study. Overall, a total of 27 articles remained in the sample. After studying the references of the

remaining articles, three additional articles were added to the final sample (Figure 1). In the fourth phase, the remaining articles were analyzed. This has been done with ATLAS.ti, a tool for qualitative analysis of textual data such as literature. In ATLAS.ti, codes were assigned to the discovered barriers, obstacles and challenges that organizations in general face when they are transforming digitally.

Figure 2 – search strategy systematic literature review



2.2 Defining digital transformation

Although the term 'digital transformation' is a well-established term, Warner and Wäger (2019) claims that the term is used inconsistently by leaders across different industries. It is therefore important to first clearly define the term digital transformation. Vial (2019) conducted a systematic literature review according the grounded theory principles proposed by Wolfswinkel, Furtmueller and Wilderom (2013). Based on the findings of the literature review, the author developed a Table with 23 unique definitions of digital transformation. The author highlighted that there is no common definition of the term digital transformation. For instance, Heilig, Lalla-Ruis, Voß (2017) define digital transformation as the process of transforming an organization on different levels (e.g. strategy, culture, people) by making use of digital technologies. Furjan, Tomičić-Pupek and Pihir (2020) define digital transformation as either improving organizational processes, products, services or changing the entire work logic and value creation of an organizations by means of using digital technologies. The definition of Warner and Wäger (2019), Hess, Matt, Benlian, and Wiesböck (2016) combines the two aforementioned definitions by stating that digital transformation refers to the changes in organization's business model, organizational structure, and processes through the implementation of digital technologies. Therefore, this study refers to the definition of Warner and Wäger (2019), Hess, Matt, Benlian, and Wiesböck (2016), since it emphasizes the change in value creation of the organization, and organizational structure and processes.

2.3 Digital transformation barriers

As described in the introduction, this research will investigate the key digital transformation barriers specifically for multi-channel retailers. Table 2 provides an overview of the different barriers mentioned in the literature. In total, the authors of the different papers have referred 75 times in total to the 14 different barriers. What is noticeable is the amount of references to non-technological barriers. In terms of digital transformation barriers, the literature particularly puts emphasis on barriers which are not characterized by information technologies (IT). The barrier that is referred to most frequently by the authors of the different papers is the availability of resources (S4), followed by lack of digital leadership and managerial support (L3), employee's resistance to change (O3), lack of digital culture (O4), lack of organizational agility (O1), and lack of digital talent and qualified workforce. The barriers with the fewest references are organizational leaders who make decisions based on past experiences (L2), the presence of legacy IT (T1) and unable to utilize the value of data (T2). An overview and a description of the barriers can be found in the remaining of this chapter.

Table 2 – Overview of digital transformation barriers mentioned per paper

	Strategy				**Leadership**			**Organization**					**IT**	
Papers	**S1**	**S2**	**S3**	**S4**	**L1**	**L2**	**L3**	**O1**	**O2**	**O3**	**O4**	**O5**	**T1**	**T2**
Blitz (2016)			x											
Brunetti et al. (2020)										x				
Chanias, Myers, & Hess (2019)	x	x	x					x						
Cichosz, Wallenburg, & Knemeyer (2020)				x			x	x		x	x	x		
Dolganova, & Deeva (2019)	x	x		x			x			x		x	x	
Fischer et al. (2020)										x			x	
Fur, & Shipilov (2019)								x	x					
Furjan, Tomičić, & Pihir (2020)			x	x			x							
Heavin, & Power (2018)				x				x						x
Hess et al. (2016)				x										
Kane et al. (2018)					x		x		x		x			
Kane (2019)							x			x				
Kretschmer, & Khashabi (2020)		x									x	x		

Li (2020)									x		x			
Matt, Hess, & Benlian (2015)	x	x	x											
McGrath, & McManus (2020)									x					
Mithas, Tafti, & Mitchell (2013)	x													
Mugge et al. (2020)				x				x			x	x		
Nair (2019)							x					x		
Oswald & Kleinemeier (2017)			x				x			x				
Paraschiv et al. (2019)				x					x		x	x		x
Sebastian et al. (2017)			x		x									
Stentoft et al. (2020)				x										
Tekic, & Koroteev (2019)	x													
Vial (2019)							x	x			x			
Von Briel (2018)														
Warner, & Wäger (2019)				x	x	x								
Westerman, Soule, & Eswaran (2019)										x				
Wiesböck, & Hess (2020)		x												
Zaki (2019)								x						x
Zangiacomi et al. (2020)					x							x		
Total	**5**	**5**	**4**	**9**	**4**	**1**	**8**	**7**	**5**	**7**	**7**	**7**	**2**	**3**

2.4 Strategic barriers

2.4.1 Lack of digital transformation strategy (S1)

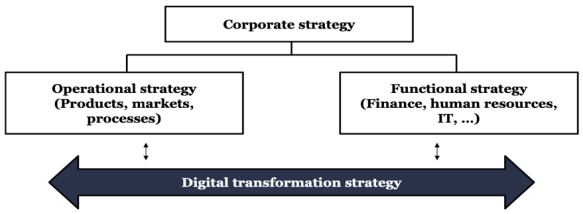
The integration of digital technologies has led to organization-wide changes. Especially for non-digital born organizations, where the integration of digital technologies often leads to a change in their business model and organization processes (Verhoef et al., 2019; Warner, & Wäger, 2019). One key aspect to manage these complex transformations is to design and implement a digital transformation strategy (Matt, Hess, & Benlian, 2015; Chanias, Myers, & Hess, 2019; Kane, 2019). Digital transformation strategies focus on the transformation of products, processes and organizational aspects owing to new technologies (Hess, Benlian, Matt, & Wiesböck, 2016, p125). Such a strategy is supposed to assist organizations during their digital transformation journey by coordinating, prioritizing, and implementing digital transformation initiatives (Chanias et al., 2019). A study conducted by MIT Sloan Management Review discovered that strategy is the main driver to successfully transform digitally (Sánchez, 2017). However, although the importance of formulating a digital transformation strategy is known, organizations still experience difficulty when it comes to actually formulate and implement a digital transformation strategy. It has therefore become one of the biggest challenges that organizations nowadays face (Hess et al., 2016; Chanias et al., 2019).

Organizations often only formulate a digital business strategy or an IT strategy and so they do not formulate a digital transformation strategy**.** However, IT strategies primarily focus on managing the IT infrastructure within an organization, which has a relatively limited impact on driving innovation in business development (Matt, Hess, & Benlian, 2015). Whereas a digital business strategy focuses on the integration of the general business strategy with the IT strategy of the organization (Mithas, Tafti, & Mitchell, 2013). It describes the business opportunities for organizations that are fully or partly based on digital technologies. Thereby not taking into consideration how organizations need to transform and reach these future stages (Matt, Hess, & Benlian, 2015). This implies that the initial goal of both of the aforementioned strategies is not to manage the transformation of organizational structure, processes and business model through the integration of digital technologies. In fact, it is observed that having a digital business strategy nor an IT strategy is not enough to succeed in the transformation of organizations (Tekic, & Koroteev 2019). Dolganova and Deeva (2019) adds to this argument that the biggest barrier of digitally immature organizations is that they do not have a digital transformation strategy in place.

2.4.2 Lack of alignment digital transformation strategy with other organizational strategies (S2)

As previously mentioned, digital transformation affects the organization as a whole. Therefore, digital transformation strategies should be aligned with all other organizational strategies. However, oftentimes organizations have a digital transformation strategy in place, but there is no strategic alignment (Wiesböck, & Hess, 2020). Such misalignments may lead to no common agreement on how to prioritize digital initiatives and it creates silos between different business units (Baculard et al., 2017). Matt, Hess and Benlian (2015) described the relationship between digital transformation strategy and other organizational strategies. As can be seen in Figure 1, the authors mention that digital transformation strategies need to be aligned with all functional and operational strategies of the organization. In practice however, given the recent appearance of digital transformation strategies, there is a lack of understanding about how to actually achieve such strategic alignment (Matt, Hess, & Benlian, 2015).

Figure 3 – relation between digital transformation strategy and other strategies (Hess, Matt, Benlian, & Wiesböck, 2016).



2.4.3 Lack of focus on the customer (S3)

Organizations should rethink the way they are going so serve customer needs. Although the end goal of digital transformation initiatives varies from optimizing organization processes to changing the way organization deliver value to its customers (Furjan, Tomičić, & Pihir, 2020), scholars suggest that there is a lack of focus on the customer when formulating a strategy (Blitz, 2016). This is especially problematic within the retail industry, as previous studies indicated that competition within the retail industry will be based on customer experience across different channels (Von Briel, 2018). According to Blitz (2016), retailers should go back to the basics by understanding who their customers are, determining what their customers need, then offer products and services to the customer that addresses the needs seamlessly in stores and online. Sebastian et al. (2017) adds to this argument by stating that organizations who are founded before the digital era, should either pursue a customer engagement strategy or a digitized solution strategy. Organizations with a customer engagement strategy focus on creating an omnichannel experience that enables customers to seamlessly order and receive products in a consistent way across all channels. Whereas organizations with a digitized solution strategy aim to deliver new value to its customers by rethinking current products and services (Sebastian et al., 2017).

2.4.4 Not enough resources available to finance the strategic roadmap (S4)

In this digital era, the creation of new digital capabilities is vital to remain competitive. According to Paraschiv et al. (2019, organizations that do not allocate enough resources to the creation of new digital capabilities are expected to hinder their own organizational growth in the markets in which they operate in. However, scholars mention that organizations do not allocate enough resources to digital transformation initiatives (Cichosz, Wallenburg, & Knemeyer, 2020; Dolganova, & Deeva 2019; Stentoft et al., 2020; Paraschiv et al., 2019). In practice, namely digital immature organizations struggle with where and how to invest existing resources into the creation of new digital capabilities (Mugge et al., 2020; Cichosz, Wallenburg, & Knemeyer, 2020; Dolganova, & Deeva 2019). According to Dolganova, and Deeva (2019), digital immature organizations do not have one single transformation strategy, therefore, it is difficult to plan the investments for the transformation process because there is no clear strategy. Cichosz, Wallenburg, and Knemeyer (2020) argue that digital transformation initiatives require a large upfront investment, whereby organizations try to calculate the return on investments beforehand. However, if it takes too long to get a return on investment, organizations may postpone implementing the projects (Cichosz, Wallenburg, & Knemeyer, 2020). Thus, scholars state that organizations, especially the digital immature ones, do not allocate enough resources towards digital transformation initiatives.

2.5 Leadership barriers

Effective leadership has become a key aspect that needs to ensure that digital transformation is managed correctly within organizations. As stated by Vial (2019), "leaders within organizations must ensure that the organization creates a digital mindset while being capable of responding to the disruption associated with the use of digital technologies" (p. 129). Several authors mention that digital leaders with a vision about the future of the company, that are supportive towards digital transformation initiatives (L1) is a critical success factor (Cichosz, Wallenburg & Knemeyer, 2020; Oswald & Kleinemeier, 2017). This had led to the emergence of new leadership roles, such as the Chief Digital Officer, within organizations (Vial, 2019; Li, 2020). The primary role of such leaders is to ensure that digital strategy is implemented correctly within the organization (Vial, 2019). In practice however, digital leadership remains a key barrier that prevents organizations to successfully transform digitally. For instance, managers tend to make decisions based on previous experience (L2). By doing so, they prefer to do things based on what has worked in the past or with which they are familiar with (Warner, & Wäger, 2019). In addition, according to Warner and Wäger (2019), there is a lack of understanding of digital technologies among senior management (L3). Organizations therefore struggle with the identification of the right technology to focus on that is in line with specific business needs (Zangiacomi et al., 2020; Paraschiv et al., 2019; Kane et al., 2018). A study conducted by Kane et al. (2018), revealed that both digitally immature as digitally mature organizations experience difficulty with deciding which technology to acquire and implement in their organization. Furthermore, Kane (2019) studied how organizations transform during the digital era. The author mentions that having digital leadership in place is the second most important success factor of digital transformation of organizations. According to the author, the most important skills of digital leaders are respectively having a transformative vision, forward-looking, being change-oriented and digital literacy.

2.6 Organizational barriers

2.6.1 Lack of organizatinal agility (O1)

The first organizational barrier is organizational agility. Organizations need to establish organizational structures that enables a quick response towards the changing digital environment. Scholars suggest that cross-functional collaboration is an important factor in order to react with the required speed and flexibility to keep up with the quickly changing digital environment (Vial, 2019; Zaki, 2019; Heavin, & Power, 2018; Mugge et al., 2020). This implies that in practice, organizations should create multi-disciplinary teams that have the capabilities and decision-making power to operate autonomously within the organizations (Fur, & Shipilov, 2019).

In practice however, organizations are concerned that they will not retain their competitiveness because their organization is not agile enough to keep with the rapid development of digital technologies (Mugge et al., 2020). Heavin and Power (2018) and Mugge et al (2020) both mention that organizations should work according agile methodologies if they want to achieve digital transformation maturity. Despite the fact that agility and cross-function collaboration is not new within information system research, organizations still experience difficulty with achieving agility within the organization (Vial, 2019).

2.6.2 Lack of incremental approach towards digital transformation (O2)

Another key organizational barrier of digital transformation is the lack of incremental approach towards digital transformation initiatives (McGrath, & McManus, 2020; Li, 2020; Paraschiv et al., 2019; Fur, & Shipilov, 2019; kane et al., 2018). This means that digital transformation initiatives are broken down into smaller and better measurable projects. One advantage of an incremental

approach is that unlike start-ups, organizations have the resources to experiment with multiple ideas at the same time (McGrath, & McManus 2020; Li, 2020). Allowing them to quickly collect information about which project is successful and which one not. This makes it more likely that organizations find a new dominant business model. In addition, McGrath and McManus (2020) argue that due to the complexity of digital transformation, organizations who start big and assume that they have all the information at its disposal, will likely have to deal with resistance to change from all levels of the organization. According to the authors, an incremental approach towards digital transformation will help organization with overcoming common barriers such as resistance to change.

2.6.3 Lack of digital culture (O3)

The third organizational barrier is the lack of digital culture. As stated by several scholars, it has been perceived by organizations in different industries as a key barrier that prevents them to transform digitally (Kane, 2019; Brunetti et al., 2020; Fischer et al., 2020). Several scholars even argue that it is important to develop a digital-ready culture first, before investing in the integration of digital technologies (Brunetti et al., 2020; Westerman, Soule, & Eswaran, 2019). A digital culture determines how employees react to organizational changes caused by digital technologies and how innovation teams within organizations continue with the development of digital technologies (Wiesböck, & Hess, 2019; Brunetti et al., 2020). It is a culture that encourages characteristics such as continuous learning, cross-functional collaboration, risk-taking and experimenting within organizations (Kane, 2019; Fischer et al., 2020). According to Oswald and Kleinemeier (2017), even the best digital strategies may fail if the organizational culture does not embrace the digital changes. In addition, Kane (2019) stated that digitally mature organizations spend more time on developing those characteristics than digitally immature organizations. However, it is extremely difficult to change culture since it is deeply embedded in an organization and much of it happened subconsciously (Kane, 2019; Westerman, Soule, & Eswaran, 2019).

2.6.4 Resistance to change (O4)

Employees have been identified as either a success factor or as a major barrier of a successful digital transformation. As stated by Kane (2019), technology implementation is not the difficult part, the ability for an organization to adapt to the ideal future digital state, and change the way employees work is extremely difficult. Prior studies have therefore identified that employees are the main barrier or the critical success factor of a successful digital transformation (Cichosz, Wallenburg, & Knemeyer, 2020). One major workforce related barrier is resistance to change (Vial, 2019; Li, 2020; Cichosz, Wallenburg, & Knemeyer, 2020; Paraschiv et al., 2019). This implies that employees are unwilling to adapt to new circumstances. According to Mugge et al. (2020), organizations are increasingly worried about the unwillingness to change and that is why it has been identified as one of the major barriers of digital transformation.

2.6.5 Lack of digital talent and qualified workforce (O5)

The next barrier concerns the digital talent gap that organizations are facing (Oswald & Kleinemeier, 2017). Nair (2019) defines digital talent as a combination of hard digital skills such as data analytics and programming. And soft digital skills such as learning ability, customer-centricity and collaboration. In addition, the literature reveals that employees increasingly become responsible for roles outside their traditional function (Vial, 2019). For instance, employees who are not part of the IT department, take the lead in technology-oriented projects. Whereas IT personnel get more and more involved with the business environment to ensure successful execution of technology-oriented projects. Overall, there is a lack of qualified employees with the right combination of soft and hard skills. Over half of the organizations experience difficulty to transform digitally due to a lack of digital talent (Nair, 2019; Paraschiv et al., 2019). For this reason, organizations should develop training activities so that employees can develop the necessary skills needed (Stentoft et al., 2020; Zangiacomi et al., 2020; Mugge et al., 2020). However, Kane et al (2018) suggest that only 34% of the employees in their study were satisfied with the level of support their organizations provide when it comes to skill development.

2.7 IT barriers

The last identified barrier category are the IT related barriers. According to Kane (2019), when it comes to digital transformation, technological changes should have the lowest priority. According to the author, starting with technology often times leads to investments that do not achieve the intendent results. However, the literature put emphasis on two IT related barriers that slow down the digital transformation process. First, Dolganova and Deeva (2019) mention that outdated technologies and the lack of integration of new and outdated technologies are a barrier that hinders the digital transformation process (T1). According to the authors, the implementation success of digital technologies is dependent on the flexibility of the current IT architecture of an organization. The second barrier is the ability to utilize the value of data (T2). Organizations struggle with capturing meaningful data that can be used for further analysis (Paraschiv et al., 2019). As stated by the author, identifying data sources, assessing data quality, and combining different data sources is a problem which many organizations run into. It is however extremely important to work according to data-driven practices since non-data-driven organizations risk losing their competitive advantages (Zaki, 2019).

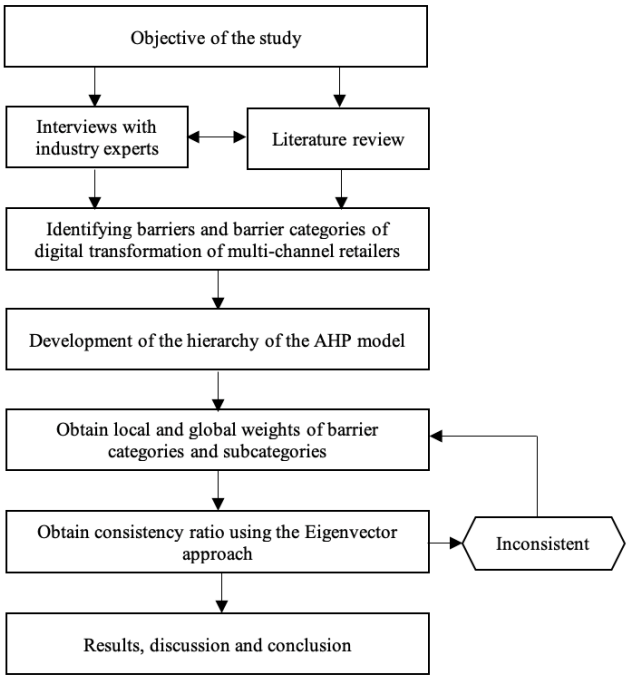
3 Methodology

Multi-criteria decision making (MCDM) is a powerful technique to prioritize barriers based on their importance. One MCDM technique called Analytical Hierarchy Process (AHP) has been widely used to determine the importance or the weight of the factor, which is in this case the barrier (Shi, Peng, Liu, & Zhong, 2008). By using pairwise comparisons, a more accurate ordering of priorities can be obtained (Saaty, 1990). AHP is a mathematical technique that has been originally developed by Saaty in 1980. Due to its mathematical simplicity and its flexibility to handle large number of criteria and sub-criteria, AHP has been used by scholars to study and prioritize barriers within various industries (Vaidya, & Kumar, 2006). With complex decision making, key factors have to be taken into consideration. AHP takes those factors into consideration by organizing them into levels using a hierarchical structure which is called the hierarchy of the AHP model (Delmonico et al., 2018). The hierarchy of the model consists of an overall objective, criteria and sub-criteria (Singh, 2013). The respondents analyze the hierarchy through a series of pairwise

comparisons, which eventually leads to a ranking of factors based on their importance (Brunelli, 2015).

According to Delmonico et al. (2018), the process of AHP can be divided into four steps. First, the identification and validation of barriers through a literature review and consulting the opinion of industry experts. To determine the applicableness of the identified barriers for a specific context or industry, the researcher can develop a qualitative data collection procedure in order to validate the identified barriers. For instance, both Sindhu, Nehra and Luthra (2016) and Kumar, Luthra, and Haleem (2015) validated the barriers by asking the opinion of industry experts about the applicableness of the identified barriers. The second step concerns the development of the hierarchy of the AHP model (Figure 5) which consist of the objective of the study, barrier categories and subcategories (Delmonico et al., 2018). Thirdly, after finalizing the AHP model, a paired questionnaire can be developed so that data can be collected from industry experts. Lastly, before the final weights of the barrier categories and each specific barrier can be specified, the consistency ratio (CR) of each pair-wise comparison must be calculated. The consistency ratio (CR) indicates to what extent the pair-wise judgement of the respondent is a random set of pair-wise comparisons (Hummel, Bridges, & IJzerman, 2014). The research framework of the aforementioned steps is represented in Figure 4. See Appendix A for the stepwise explanation of the AHP process.

Figure 5 – Flowchart of the research methodology



3.1 Data collection

3.1.1 Qualitative: online interviews

In order to complete the second step of the AHP process, the identified barriers of digital transformation from the literature have to be validated for the retail industry. According to of Hummel, Bridges, and IJzerman (2014), who illustrates the procedural steps of AHP, if most of the relevant criteria (in this case barriers) are known from literature, a final list of criteria and sub-criteria (in this case barriers and barrier categories) can be developed by collecting data from industry experts. Based on the latest insights of industry experts, criteria's can be added if they are not described in the literature and removed if they are not applicable.

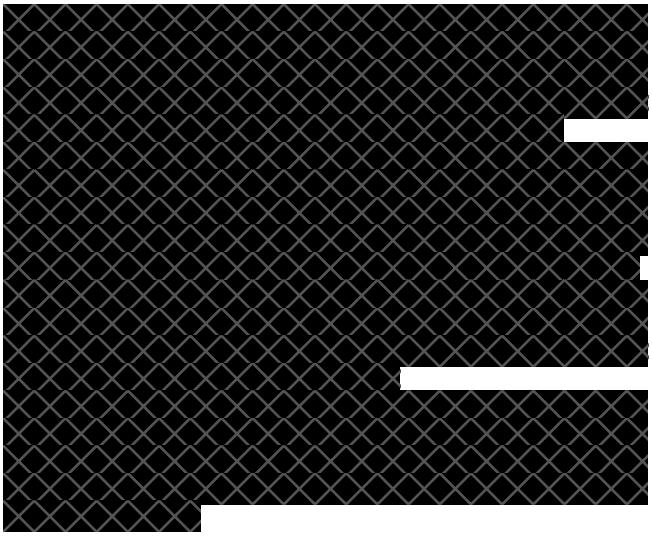
When gathering data from the participants, the possible spread of the COVID-19 virus has been taken into consideration. Therefore, it has been decided to gather data without physically interacting with participants. The drawback of such data collection method is that it is difficult to observe the participants behavior or body language (Janghorban, Roudsari, & Taghipour, 2014). For that reason, data has been collected by conducting interviews via video conferencing since this method does not rely on observing the participant. In order to validate the barriers, a data collection procedure has been developed that aims to gather data about the applicableness of the identified barriers for the retail industry. This is done by asking questions to the industry experts, with extensive knowledge about digital transformation, about whether they recognize the identified barriers of digital transformation in the retail industry.

The respondents were selected based on several criteria. In the first place, only experts that work on a senior lever or higher were asked to participate in this study. Using the opinion of industry experts, challenges of collecting the right qualitative data can be mitigated (Eisenhardt, & Graebner, 2007). In the second place, the participants must work on digital transformation initiatives within the retail industry. Lastly, due to the focus of this study on multi-channel retailers, only experts that work for multi-channel retailers that are active in western markets were asked to participate.

3.1.2 Quantitative: pairwise questionnaire

In order to prioritize the barriers of digital transformation of multi-channel retailers, a pairwise questionnaire has been developed to collect data from practitioners who are in the middle of the process of transforming digitally. The pairwise questionnaire was distributed online to the respondents. Similar to respondents who were interviewed, only industry experts that work on a senior level

were asked to fill in the questionnaire. There are no specific rules nor guidelines to determine the minimum sample size (Waris et al., 2019). To the best of our understanding, most papers using AHP do not elaborate on the reasoning behind determining their sample size. According to Waris et al. (2019), a survey based on the AHP technique does not require a large sample, as a higher degree of inconsistency is associated with larger sample sizes. The sample sizes of the relevant literature that uses AHP as their research approach, consisted of a low sample size as it is more reliable (Waris et al., 2019). In this case, the respondents were selected based on the same criteria mentioned in subchapter 3.1.1. In addition, the respondents that were interviewed also filled in the pairwise questionnaire.



4 Results

Following the steps of the AHP process, the first step is to identify the objective of the study. In this case, the objective of this study is to identify and prioritize digital transformation barriers of multi-channel retailers. By doing so, there is a better understanding among decision makers about barriers that hinder the process of transforming digitally. The second step is to construct the hierarchy of the AHP model which consist out of the objective of the study, barrier categories and subcategories. Based on the opinion of industry experts and the literature review, the barrier categories and subcategories have been identified. In total, four barrier categories have been identified, which are strategic barriers, organizational barriers, leadership barriers and IT barriers. In total 15 unique barriers have been identified. Thereafter, the hierarchy of the AHP model can be formulated according Saaty's (1990) principals. As shown in Figure 5, the objective of this study is the identification and prioritization of digital transformation barriers for multi-channel retailers, the criteria are the barrier categories and the subcategories are the specific barriers stemming from the barrier categories.

During the next step, the obtained pairwise comparisons were analyzed using Saaty 's (1990) principal eigenvector approach. Thereafter, the consistency ratio (CR) of each matrix was calculated in order to check to what extent the pairwise comparison matrix is random (step four). According to Hummel, Bridges, and IJzerman (2014), a CR lower than 0.1 is considered to be good and a CR between 0.1 and 0.2 is considered to be reasonable. If the CR is higher than 0.2, the pairwise comparison matrix should be either revised by the respondent or it should be omitted. In this case, the CR of all pairwise comparison matrices are below the threshold value of 0.1, and therefore consistent (Appendix B). Since there are no consistency issues, weights were assigned to the different barrier categories and barriers stemming from that category. Overall priority ranking is obtained by multiplying the local weight of the barriers with the global weight of the overarching barrier category (Table 5). See Appendix B for the calculations and results of all pairwise comparison matrices.

Figure 5 – Hierarchy of the AHP model

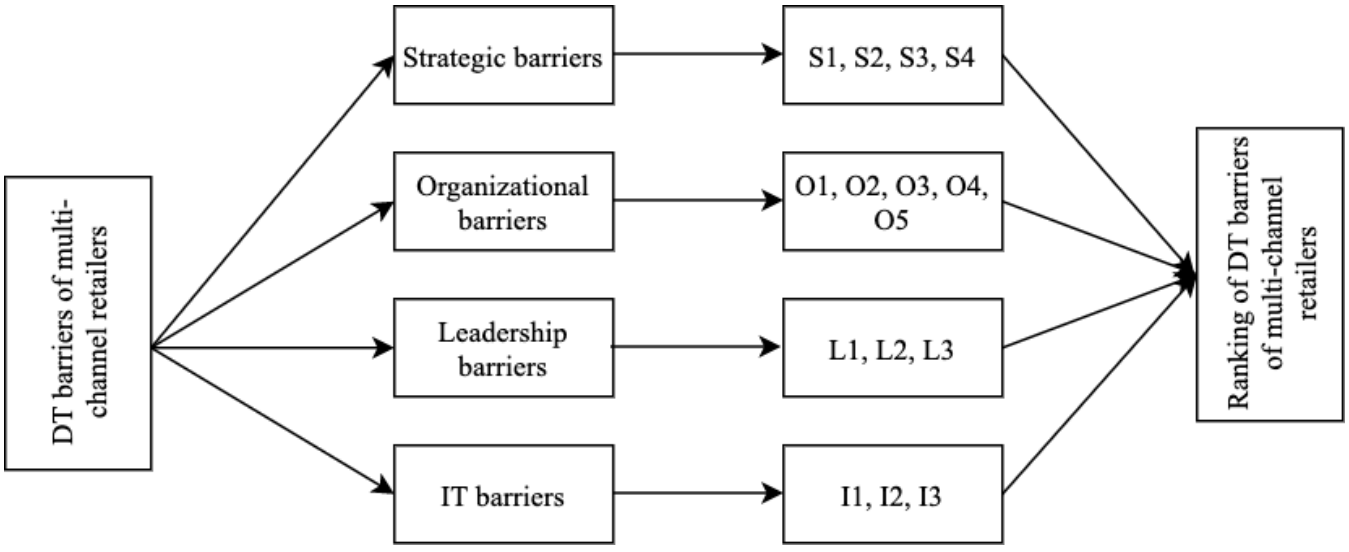


Table 5 – Priority ranking per barrier

Category	Global weight	Category Ranking	Barrier	Local Weight	Global weight	Overall Ranking
Organization	0,445	1st	Lack of organizational agility (O1)	0,282	0,126	3
			No incremental approach towards implementation of DT initiatives (O2)	0,125	0,055	9
			Lack of digital culture (O3)	0,382	0,170	1
			Resistance to change among employees (O4)	0,159	0,071	5
			Lack of digital talent and qualified workforce (O5)	0,052	0,023	15
Leadership	0,280	2nd	Lack of digital literacy among organizational leaders (L1)	0,311	0,087	4
			Lack of digital leadership and managerial support (L2)	0,469	0,131	2
			Organizational leaders tend to make decisions based on past experiences (L3)	0,221	0,062	8
Strategic	0,208	3rd	Lack of digital transformation strategy (S1)	0,338	0,070	6
			Lack of focus on the customer (S2)	0,221	0,460	10
			Not enough resources available in order to finance the stratigic roadmap (S3)	0,126	0,026	12
			Lack of strategic alignment (S4)	31,42	0,065	7
IT	0,067	4th	Legacy IT (T1)	0,363	0,024	13
			Unable to utilize the value of data (T2)	0,525	0,035	11
			Agile IT landscape (T3)	0,113	0,008	14

4.2 Barrier discussion

A complete comparison between the empirical findings and the literature of all the barriers can be found in Appendix C. In the proceedings of this subchapter, the barriers with the highest priority and noticeable differences between the literature findings and the empirical findings will be discussed.

4.2.1 Similarities

In the first place, as can be seen in Table 5, the barrier with the highest overall priority score is a *lack of digital culture* (0,170). Comparing the AHP score with the literature findings, with seven references, lack of digital culture has the third overall ranking in terms of the number of references from the literature, together with three other barriers (Table 2). Although culture does not have the most references from the literature, scholars do suggest that organizations should first develop a digital ready culture, before investing in other digital transformation initiatives (Brunetti et al., 2020; Kane, 2019; Westerman, Soule, & Eswaran, 2019). In line with theory, all interviewees agree that developing a digital culture should be the first priority for multi-channel retailers. Interviewee 2 stated that stimulating a culture of risk-taking and collaboration is a success factor for innovation and transformation. Interviewee 3 adds to this argument by stating that a lack of digital culture can be detrimental to the existence of the organization. So, both the literature and the empirical findings suggest that multi-channel retailers should start with changing the culture, before investing in other digital transformation initiatives.

The barrier with the second overall priority is the *lack of digital leadership and managerial support* (0,131). In total, with eight references from the literature, digital leadership and managerial support have the second overall ranking in terms of the number of references from the literature (Table 2). In addition, according to Kane (2019), digital leadership is the second most important success factor of digital transformation. Thereby making it the second most important barrier based on the empirical findings of this study and based on the literature. On top of that, all interviewees acknowledge the importance of having digital leaders within the organization that are supportive of digital transformation initiatives. For instance, Interviewee 6 explains:

"Having a plan is not enough, you need to have leaders within the organization that are supportive towards change by setting the right culture and by creating a safe environment for change. And that starts at the top of the organization with the leaders"

Overall, there are many digital transformation barriers. But according to both the literature and the findings of this study, digital transformation starts with a shift of the organizational culture, which needs to be supported by top management of the organization. Multi-channel retailers that fail to pay attention to these two barriers are unlikely to achieve the predefined results of digital transformation initiatives.

Furthermore, the barrier with the third overall priority score is the *lack of organizational agility* (0,126). This is in line with the literature, as organizational agility, together with three other barriers, has the third highest number of references from the literature. In practice, all interviewees indicated the importance of adopting agile methodologies. Retailers experience difficulties however with adopting agile methodologies. According to interviewee 2, people are only engaged with their own departments and activities. Consequently, they have no interest in collaborating with other departments. Interviewee 4 stated that they have overcome this barrier by achieved agility by creating new departments outside the existing organization. As stated by interviewee 4:

"To build technology at a certain speed, you cannot do that within the existing organization. I have started a new department, in a new building, in order to transform and built technology at a certain speed. That is another potential barrier, if you do that within the organization, you need to get the whole organization behind the idea and that is very difficult"

So, the newly created departments are small teams with newly hired employees who have experience with working according to agile methodologies. However, this does not solve the problem of achieving organizational agility because only specific departments work according to agile methodologies and so not the whole organization.

The barrier with the fourth overall priority score is the *lack of digital literacy among organizational leaders* (0,087). As can be seen in Table 2, the literature has paid little attention to the lack of digital literacy among organizational leaders (four references in total, overall tenth ranking). The interviewees all agree with each other on the need to have leaders with digital literacy:

"This can be a big problem, especially when dealing with older generation management. It can be very difficult to get them on board with certain initiatives" (Interviewee 6).

"Yes, that is a problem. Or for instance leaders who think that they have the knowledge about digital technologies, but they do not" (Interviewee 3).

In addition, the interviewees stated that retailers who started before the digital era, have to educate their leaders about digital transformation and the future of retailing. Some even argue that it is necessary to replace certain leaders for leaders with a technological background (Interviewee 1). So, in terms of the empirical findings, the lack of digital literacy among organizational leaders is one of the most important digital transformation barriers. It remains unclear however why the literature did not emphasize the importance of digital literacy among organizational leaders. One explanation could be that scholars do not make a clear distinction between lack of digital literacy and lack of digital leadership & support (second highest priority). So, leaders are not supportive towards change because they do not have a sufficient understanding of digital technologies. Thus, one could argue that lack of digital literacy among organizational leaders in combination with the lack of digital leadership & support (second overall highest priority) can be perceived as the biggest overall digital transformation barrier. This implies that leaders with digital know-how and who are supportive towards organizational change are crucial for the digital transformation process of multi-channel retailers.

The barrier with the fifth overall priority rank *is resistance to change among the employees* (0,71). In line with the empirical findings, the literature specifies resistance to change as one of the most important digital transformation barriers (seven references, shared third overall ranking with three other barriers). The unwillingness for employees to adapt to new circumstances is perceived by different scholars as a key digital transformation barrier (Vial, 2019; Li, 2020; Cichosz, Wallenburg, & Knemeyer, 2020; Paraschiv et al., 2019). The same applies for multi-channel retailers, as it is perceived as difficult to get employees on board with digital transformation projects. For instance, Interviewee 6 explains:

"*Yes, definitely. It has much to do with old habits, ways of thinking and doing things. It takes a while for people to change those old habits and how they are used to work*"

Lastly, this study indicates that multi-channel retailers consider IT as the least problematic barrier category with a priority score of 0.067. In line with the literature, digital transformation starts with a shift in culture at the employees, leadership, and organizational levels (Kane, 2019). Whereas starting with technology oftentimes leads to investments that do not achieve the intended results. According to the interviewees, IT remains difficult, but retailers know what to do and therefore it is not a key digital transformation barrier. According to interviewee 3: *"we know what to do, that is not the problem. But yes, it remains difficult but it has always been difficult."* Thus, both the literature findings and the empirical findings indicate that transforming digitally is less about technology, but more about people.

4.2.2 Differences

In terms of the differences between the literature and the empirical findings of this study, the barrier that is referred to most frequently by the authors of the different papers is the *lack of resources to finance the strategic roadmap* (9). Based on the AHP analysis however, lack of resources received the twelfth overall priority (0.026). So, there is a difference between the empirical findings of this study and the literature. Although the number of references, the authors of the different papers from the literature sample did not indicate the lack of resources as the most important digital transformation barrier. Rather, the literature refers to organizational factors such as culture, leadership, and organizational structure as the most important barriers. In addition, scholars indicate that especially digitally immature organizations struggle with allocating a big enough budget. In terms of the interview findings, the interviewees acknowledge the importance of resource allocation towards digital transformation initiatives. But, they do not agree that it is a key digital transformation barrier:

"The lack of resources can be problem, but it is not the case at our organization because we believe that the future of retail is digital" (Interviewee 2).

"Budget has always been an issue for the technology department of retailers. And so, the lack of resources remains a barrier, but it is not something new" (Interviewee 3).

"The lack of resources is not necessary the problem, but rather a struggle. Knowing to which projects the resources should be allocated to is difficult due to many different projects and competing priorities. This leads to a constant reprioritization of resources due to these conflicting priorities" (Interviewee 1).

Overall, both the literature and the empirical findings of this study acknowledge the importance of resource allocation, but there is no explicit indication that the lack of resources is the most important digital transformation barrier other than the number of references from the literature.

Another noticeable difference between the literature and the empirical findings of this study is that the literature emphasis *the lack of digital talent & qualified workforce* (seven references, shared third overall ranking with three other barriers). The results of this study however, reveal that multi-channel retailers do not perceive the lack of digital talent and qualified workforce as a key digital transformation barrier (ranked fifteenth). For instance, interviewee 1 stated that:

"It was quite a journey, what makes for a great category manager, product line manager or a good merchandise planner? We have refined as we are hiring and search for talent, someone that is more technologically advanced. And the existing employees, they have been on a journey to develop new digital capabilities and they are evolving and adapting quite well. So not really a problem for us"

So, overall, the literature indicates that the lack of digital talent & qualified workforce is one of the biggest digital transformation barriers. The interviewees acknowledge the importance of digital talent, but they do not experience difficulty with hiring such talent nor with retraining the current workforce. Thus, there is a difference between the empirical findings of this study and the literature.

5 Conclusion

The aim of this study was to provide an overview of the key digital transformation barriers of multi-channel retailers. Therefore, the following research question was formulated:

"What are the most important digital transformation barriers of multi-channel retailers?"

In the first place, the organizational barrier category has the highest priority among all barrier categories. It concludes that the organizational barriers are the main concern for multi-channel retailers who are currently in the process of transforming digitally. The barrier categories with the next highest priority weight is the leadership barrier category, followed by the strategic barrier category, and the IT barrier category. Although technological innovations underpin digital transformation, multi-channel retailers do not think that technological barriers prevent them from transforming digitally.

Furthermore, in terms of the sub barriers, the literature and empirical findings of this study are in line with each other. In the first place, the digital transformation barrier with the highest overall priority is the lack of digital culture. This implies that multi-channel retailers find it the most difficult to change the existing culture of the organization to a culture that embraces risk-taking, continuous learning, and cross-functional collaboration.

Thereafter, lack of digital leadership & support received the second highest priority. On top of that, lack of digital literacy among organization leaders received the fourth highest priority ranking. This concludes that leaders with digital capabilities and that are supportive towards organizational change are crucial for the digital transformation process of multi-channel retailers. Although culture received the highest overall priority ranking, the leaders of the organization are responsible for changing the culture. Thus, multi-channel retailers should start with addressing the aforementioned leadership barriers first.

The barrier with the third highest priority is the lack of organizational agility, concluding that multi-channel retailers struggle with being agile enough to respond to changes in the digital environment.

Lastly, the findings of this study suggest that multi-channel retailers do not perceive the lack of financial resources and the availability of qualified workforce as key digital transformation barriers. In terms of resource allocation, this may be related to the digital maturity of the organization, as digital immature ones find it difficult to allocate enough resources to the digital transformation of the organization. However, resource allocation and qualified workforce are key digital transformation barriers according to the literature. It remains unclear why there is such a difference between the literature and the findings of this study.

6 Discussion and further research

This research is based on a well-established research method called AHP. In addition, interviews were conducted in order to further validate the findings of the AHP analysis. However, there are certain limitations of this study. First, although the effectiveness of Saaty's nine-point rating scale has been validated through theoretical comparison with other scales and in practice, some researches recommend the use of Fuzzy numbers as it better reflects the style of human thinking (Gazerani, Bahadori, Amiri & Ravangard, 2019). Fuzzy AHP uses a fuzzy scale covering multiple numbers, instead of judging the pairwise comparison in one deterministic number (Hummel, Bridges, & IJzerman, 2014).

In the second place, since the literature used in this study is not industry specific, the identified barriers from the literature are applicable for other industries as well. In addition, the similarities between previously published literature on digital transformation barriers and the findings of this research are evident. In terms of digital transformation barriers, the literature puts emphasis on addressing non-technological barriers first, which is in line with the findings of the AHP analysis and the opinion of industry experts. The same applies for the sub barriers, in which both the literature and the results of this study put emphasis on the same sub barriers. Thus, one could argue that the findings of this study might be applicable for other industries as well. However, the AHP model has only been tested in the retail sector, with a special focus on multi-channel retailers. Hence, other industries are not taken into considered, which makes the generalizability of this study questionable.

Thirdly, further research is needed in order to validate the results of this study. For instance, the results of this study can be verified by applying the same AHP model in various other industries (e.g. banking and manufacturing). Besides that, different statistical tests such as exploratory factor analysis, confirmatory factor analysis and structural equation modeling can be used to verify the results of this study and to obtain more consistent results.

Fourth, according to the literature, the lack of financial resources and the availability of qualified workforce are important digital transformation barriers. It appeared from this study however that multi-channel retailers do not perceive the two aforementioned barriers as key digital transformation barriers. One explanation for the differences between the empirical findings of this study and the literature could be related to the digital maturity of the organizations. Thus, digital mature organizations do not experience difficulties with resource allocation and the availability of qualified workforce. Further research is needed however to better understand the differences between the findings of this study and previously published literature in order to verify the aforementioned statement.

Lastly, this study concluded that culture, leadership & managerial support, and organizational agility are the most important digital transformation barriers for multi-channel retailers. It would be interesting to further investigate the three aforementioned barriers to develop certain practices that can be used by multi-channel retailers in order to mitigate the most important digital transformation barriers.

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Access to appendix upon request
Appendix A: Stepwise explanation of the AHP process
Appendix B: Tables and calculations of the AHP analysis
Appendix C: Barrier discussion for each barrier
Appendix D: Coding interview sessions

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