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Digital Transformation for Agility and Resilience: An Exploratory Study

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ABSTRACT

In recent times, the concepts of IT-enabled agility and digital resilience have gained increased attention. The COVID-19 pandemic has brought a turbulent environment in its wake, thus providing an opportunity to study organizations' agility and digital resilience. This study examines retailers' strategies and IT's role in facilitating responsiveness to uncertainties in the marketplace. An analysis of the quarterly earnings call transcripts shows the increased reliance of organizations on IT to drive and sustain their strategies. This study supports the oft-made claim that IT capabilities can make an organization more responsive and agile in the face of disruptions.

KEYWORDS

IT capability; agility; resilience; earnings call transcripts; digital transformation

Introduction

The ongoing pandemic has disrupted the usual patterns of organizational functioning in many ways. It has brought to the fore the need for organizations to be agile and resilient to respond to uncertainties that the pandemic has engendered. Furthermore, firms' operations continue to be unsettled by environmental changes induced by the pandemic, as the virus intensifies and flattens or diminishes periodically. Given the continuing and potentially prolonged effects of the pandemic, it is reasonable to investigate whether companies have increased their reliance on IT in the present circumstances to sustain their operations.

Organizations respond to the twin challenges of restoring and continuing their operations through various IT capabilities. Recent articles in leading IS journals have alluded to the use of IT by organizations to transform their operations and become more agile and resilient in the face of emergent pandemic threats.¹⁻⁴ Organizations' initiatives in digitally transforming their businesses have played a significant role in confronting the challenges of the pandemic.¹ There have also been calls to increase digital maturity in organizations through digital transformation to address the unpredictable external environment engendered by the pandemic.² It has been claimed that the pandemic has caused a fundamental transformation of businesses' digital infrastructure and hastened the adoption of digital technologies and cloud applications.³ Likewise, technology and its role in facilitating agility during the

pandemic are also highlighted in current research.⁴ Published industry reports also emphasize IT's increasingly important role in transforming firm operations during this pandemic.⁵

This exploratory study furthers this line of reasoning by empirically examining the role of IT in enabling an agile and resilient organization in the midst of a pandemic. Specifically, it addresses the following research questions.

- (1) *What are the trends in the use of IT to enable organizational agility and resilience in the wake of the pandemic?*
- (2) *What are the types of IT used to provide agility and resilience in dealing with emergent pandemic needs?*

A systematic examination of these research questions will lend greater credence to anecdotal evidence of the transformative role of IT during the pandemic. This study uses a relatively novel source of data, namely, earnings call transcripts, to investigate how IT has helped leading players in the retail industry cope with the pandemic. Specifically, we use text analytics techniques to identify digital transformation-related IT words in earnings call transcripts as a proxy for IT use in these organizations.

This study and its findings contribute in several ways. First, this exploratory study empirically examines the role of IT in facilitating organizational agility and resilience

during a pandemic, thus providing the groundwork for demonstrating IT's value to an organization. Second, this study's findings unravel the types of IT organizations use to sustain their operations while facing the challenges associated with the pandemic. Third, from a methodological perspective, this study demonstrates how earnings call transcripts can be analyzed to draw insights into how organizations use IT to adapt and respond when faced with unexpected events.

The remainder of the paper is structured as follows. The next section discusses digital transformation, organizational agility, and resilience, followed by a discussion of the research methodology and the study context. Subsequently, we present our analysis and results of the study. The penultimate section discusses the study's findings on resilience and agility and their implications. The concluding section summarizes the paper and its value to the extant body of literature on organizational agility and resilience.

Digital transformation induced organizational agility and resilience

Digital transformation is defined as a company-wide phenomenon – with broad organizational ramifications – in which the firm's core business model is reimagined using digital technologies.⁶ It leverages new-age technologies, such as Artificial Intelligence (AI), Machine Learning (ML), the Internet of Things (IoTs), and blockchain to redefine the value proposition and change the firm's identity.^{7,8} Digital Transformation often entails changes to business processes and routines as well as a reconfiguration of resources to help an organization achieve operational excellence and become more responsive to market needs.⁹

At the heart of a successful Digital Transformation is an innovative business model that leverages digital technologies to deliver greater value and make the organization more adaptive to a changing competitive landscape.¹⁰ Hence, digital transformation has been examined through various perspectives, including technology's impact on the transformation efforts.¹¹ This study adopts the technology impact perspective and examines the role of technologies in enabling digital resilience and organizational agility.

Resilience provides the capability to take transformative actions when faced with unexpected events that threaten the organization's survival.¹² Enterprise agility offers the capability to sense change and be responsive to market demands to ensure organizational success.¹³ These capabilities are complementary, as resilience pertains to drastic and unexpected change, while agility deals with continuous and inexorable change.¹² Agility

and resilience, however, have some common characteristics, such as the ability to expedite operations, scan and monitor the environment, and make the necessary adjustments to be effective.¹⁴

Digital transformative efforts promote organizational agility, thereby facilitating strategic resilience.¹⁵ Organizations planning to digitally transform need to have digital assets and capabilities related to agility, such as agile structures with low levels of hierarchy.⁶ IT's role in providing organizational agility has been the focus of many studies. For example, digital technologies capabilities are an antecedent of organizational agility that enables better adaptation to changing external conditions.⁷ Likewise, IT can enable agility through digitalization both within organizational boundaries and across inter-organizational networks.¹⁶

Research on digital transformation has shown positive impacts on organizational resilience by improving the organization's ability to perceive, integrate, coordinate, and rebuild itself during a crisis.¹⁷ Research on digital transformation has also shown that it can provide resilience in supply chains.¹⁸ Likewise, researchers have not only explicated how information systems can provide resilience but have also clarified the role of digital transformation in furthering resilience during this pandemic.¹⁹ The pandemic's current challenges provide a unique opportunity to study whether information technologies can provide the digital resilience and agility that organizations require to perform well in these difficult times. [Figure 1](#) presents the various steps involved in this study and elaborates the activities performed in this research.

Research methodology and study context

The pandemic has shown the importance of digital transformation. According to a survey by McKinsey, organizations accelerated the digitalization of the customer and supply-chain interactions and their internal operations by three to four years.⁵ These technology-driven changes have allowed organizations to be agile and resilient in overcoming the challenges wrought by the pandemic. Hence, this study's research questions examine the trends in IT use and the type of IT in enabling an agile and resilient organization.

Earnings call transcripts for research

This exploratory study uses a novel approach to examine IT's role in organizations through publicly available earnings call transcripts. Earnings conference calls, in which the top management and investment analysts participate, are held along with the

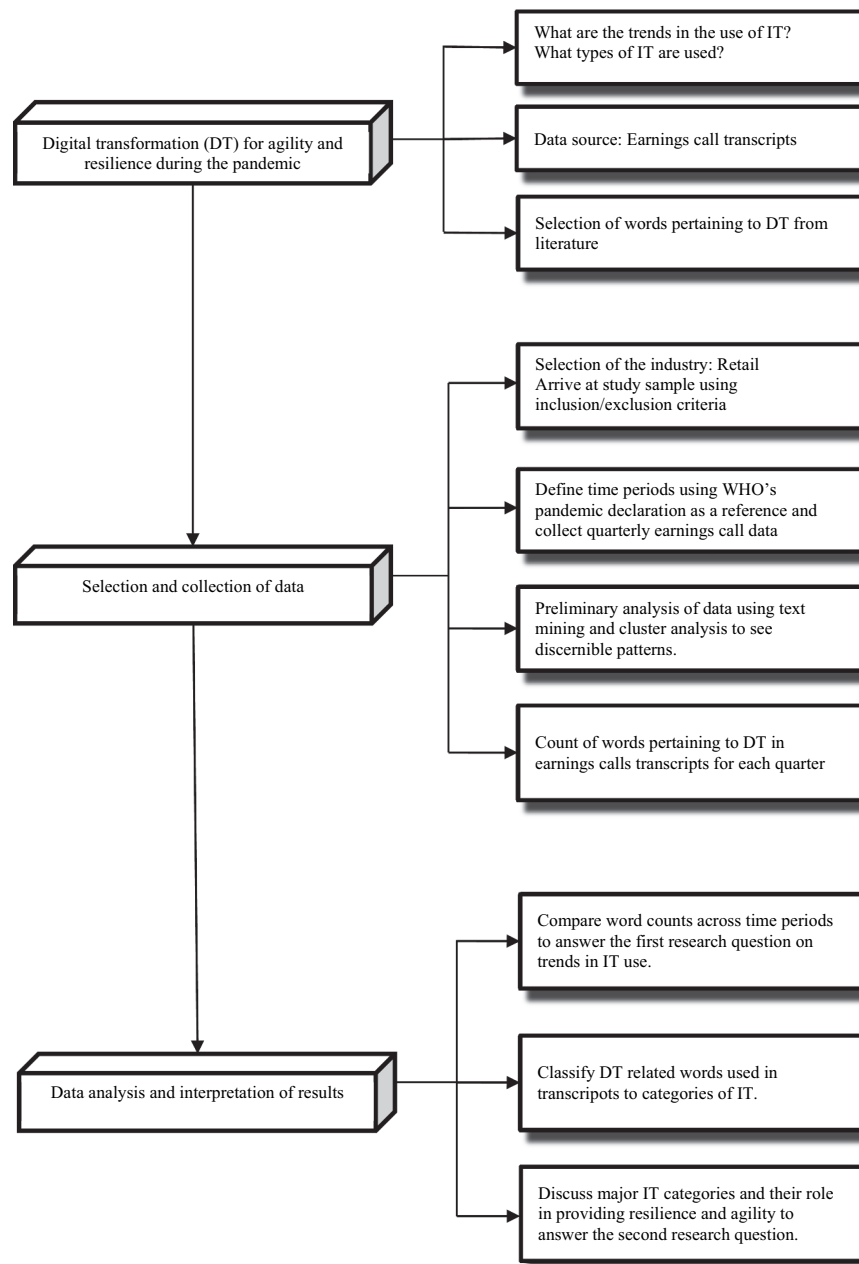


Figure 1. Steps in this research study.

quarterly earnings reporting of public companies. The Securities and Exchange Commission's Regulation Fair Disclosure requires the conference calls to be open (e.g., ref.²⁰) and provides an opportunity for other participants to corroborate or dispute statements made in the call.²¹ The use of earnings calls for research has been growing in disciplines such as finance and accounting,²² but largely unexplored in information systems. In this study context, the earnings calls provide a contemporaneous first-

hand account of top management on various aspects, including IT's role in dealing with uncertainties brought about by the pandemic.

Digital transformation-related terms

This study examines the earnings calls to find various digital transformation-related words that imply the use of associated technologies. Terms such as big data, analytics, blockchain, cloud computing, e-commerce, AI,

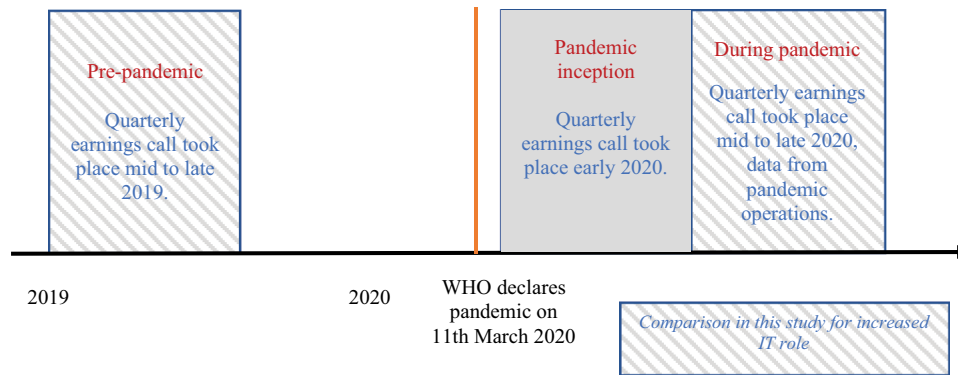


Figure 2. Quarterly time periods included in the study.

mobile computing, IoT, and digital platforms are associated with digital transformation.⁷ Likewise, digitally empowered firms provide better customer experience through an intimate understanding of customer needs as well as by creating large business ecosystems through multi-channel or even omnichannel offerings on flexible platforms integrated with partner companies.²³ This study will, therefore, use the prominent technologies mentioned in digital transformation research to understand their role during the current pandemic.

Selection of industry and the study sample

Instead of examining a broad random selection of organizations, this study focuses on a particular industry to better understand IT's role (e.g., ref.²⁴) in meeting the unique challenges presented by the pandemic. We focus on the retail industry, which, along with serving customers' essential needs, has functioned with restrictions to safeguard the well-being of all stakeholders. According to the Organization for Economic Co-operation and Development (OECD), the retail sector is an economic heavyweight accounting for almost 5% of GDP in the OECD countries. Further, it occupies an important position in the value chain as an outlet for upstream sectors and was dramatically impacted by the pandemic.²⁵ Moreover, industry analysts consider retail to be among the most vulnerable to changing economic conditions engendered by the pandemic.²⁶

The pandemic has disrupted the retail industry in several ways.²⁷ First, demand patterns have changed considerably because of altered consumer behaviour (e.g., hoarding of products) precipitated by the virus. Second, retail stores rely on global supply chains and production cycles which were disrupted by the pandemic. Third, social distancing and other safety measures imposed restrictions such as reduction in operating hours, store capacity, and enhanced cleaning.

The magnitude of these disruptive events requires retailers to be highly resilient and agile in responding to changing customers' needs. Hence retail industry's disruptions caused by the pandemic provide an excellent opportunity to examine IT's role in providing agile and resilient operations across firms.

To identify retailers to be included in this study, we relied on the National Retail Federation's listing of top retailers for 2020.²⁸ Since the earnings call transcripts are available only for public companies, private companies are excluded. Furthermore, we excluded companies with other business lines (e.g., Amazon, Apple). We also excluded subsidiaries of overseas corporations (e.g., Ahold Delhaize), as they were listed in overseas stock exchanges with differing public reporting requirements. To keep our sample homogeneous, we excluded fast-food outlets which had dining restrictions and apparel/department stores that had in-store sales restrictions during the pandemic.²⁹ These inclusion/exclusion criteria resulted in 16 retailers from the top 50 retailers in the United States of America. We collected earnings call transcripts from various public sources such as MotleyFool and SeekingAlpha.

The organizations included in our sample used differing quarterly reporting periods and financial years. Hence, we categorized the earnings call transcripts into three time periods: *pre-pandemic*, *pandemic inception*, and *during pandemic*. Figure 2 illustrates this categorization. Researchers examining the pandemic have used similar periods to discuss the differences in the digital transformations efforts in organizations.³⁰

The *pandemic inception* quarter earnings calls took place after the World Health Organization (WHO) declared the pandemic.³¹ The *during pandemic* quarter's earnings call corresponds to organizations participating in earning calls after the pandemic was declared and encompassed a quarter of operations during the

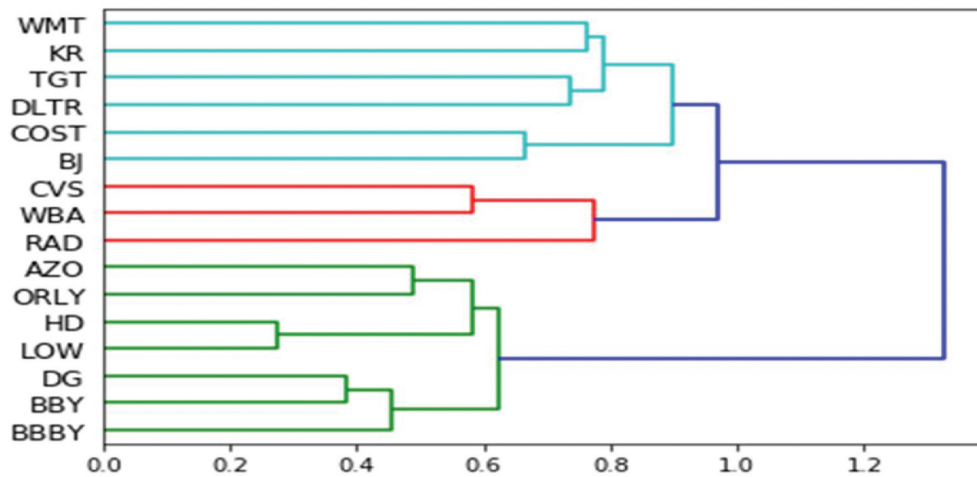


Figure 3. Dendrogram based on the earnings call transcripts (companies represented by their ticker symbols).

pandemic. The *pre-pandemic* quarter corresponds to the previous year's *during pandemic* quarter that allowed us to compare (e.g., Q2 2019 vs. Q2 2020) effects of pandemic for an organization.

Analysis and results

To examine the validity of earnings calls data for our research, we first analyzed the entire corpus to see whether there are discernible patterns in the data. Specifically, we pre-processed the text in the transcripts for each company and then obtained a document-term matrix (rows with words in the vocabulary and columns with each of the earnings call transcripts), using a term-frequency inverse-document frequency (TF-IDF) vectorizer implemented in Python. The document-term matrix was then used to compute cosine similarities between the company's earnings call transcripts irrespective of the size of the document. These similarities were converted to distances and input to Ward's method, a popular hierarchical clustering algorithm that produces a dendrogram (see Figure 3). As we can see, there are three distinct groups of retailers dealing with differing product assortments.

These three groups of retailers are classified in this study as general retailers, pharmacy retailers, and specialty retailers. General retailers include grocery stores such as Walmart, Kroger, and warehouse stores like BJ's and Costco. During this pandemic, they catered to the daily needs of the customers. The second cluster – labeled pharmacy retailers – includes all three pharmacies (CVS, Walgreens, and RiteAid). Specialty retailers refer to various retailers who deal with a particular segment of goods, such as home improvement stores (Lowe's, HomeDepot), auto parts stores (Autozone, O'Reilly), and electronic stores (BestBuy). The cluster

compositions were as anticipated, thus confirming that the transcripts' words can be meaningful for further analysis of IT word usage.

Next, we examined each organization's earnings call transcripts to capture IT-specific words that are typical in digital transformative efforts (e.g., big data, data analytics, mobile, etc.). In this study, IT words were used as a proxy for the use of IT by the organizations. Earnings call transcripts were examined using KH Coder,¹ an open-source text mining software – with lemmatization and stemming capabilities. While examining IT-related words in the corpus, few other IT-related words such as technology and systems were also found to be prominently used by the top management. Hence, these additional words were also included in the study sample.

In total, 1,873 counts of IT-related words were identified from the earnings calls transcripts. It must be noted that the counts are based only on the top management's use of these IT-related words. We also examined the context in which the IT word was used to see whether it was relevant or not. For example, if there is a mention of the word "website" in the transcript, looking at the context – such as "investor relations website" or "shopping website" – allowed us to determine that the latter was relevant to our study while the former was not. Likewise, terms such as data were used in different ways to discuss financial data (excluded in the study) or data as a decision-aid (included in the study).

Differences in IT-related words across time periods

The first research question is answered by examining the differences in the number of IT words used across the three time-periods. To make a meaningful comparison

¹<http://kncoder.net/en/>

of the frequency of IT-related words across different periods (*pre-pandemic*, *pandemic inception*, and *during pandemic*), we normalized the occurrence of IT-related words per 1,000 words in the transcript to control for the effects of the number of words in a transcript. Table 1 presents word counts in the earnings call.

Since the sample contained only 16 of the largest retailers, a non-parametric statistical technique, the Wilcoxon Signed-Rank test, was used. The Wilcoxon Signed-Rank test using the normalized word counts showed that use of IT-related terms was significantly higher ($p < .05$) for the *during pandemic* period compared to *pre-pandemic* period. This suggests that these retailers have increasingly relied on information technologies to sustain their operations and to respond to challenges engendered by the pandemic. However, there was no significant difference between the number of IT-related words in the *pre-pandemic* and *pandemic inception* periods. Hence, IT words usage was pronounced in the subsequent quarter after the onset of the pandemic. Table 2 compares the data across the periods and results of the Wilcoxon Signed-Rank test.

This study relied on the IT-related words expressed by the top management as a proxy for the use of IT and found support for the increased use of IT words. In order to further ascertain whether there is indeed greater use of IT, we also looked at IT spending of these retailers. We analyzed the annual reports of the 16 retailers in the study to see whether IT-related capital expenditure or operating expenses had increased during the pandemic year. Eleven organizations indicated an increase in IT spending on their annual reports, either through quantitative data (e.g., WBA, WMT) or

qualitative statements (e.g., TGT, BBBY). Three of the organizations (AZO, COST, ORLY) did not mention IT spending in their annual reports. Two of the organizations (RAD, and DG) saw a reduction in the IT capital expenditure from their previous year. However, these two organizations did not mention their IT operating expenses and had greater IT capital investments in the year preceding the pandemic. These findings suggest that the increased use of IT-related words in the earning calls is associated with increased IT spending.

Incidentally, we examine whether there is evidence of improved organizational performance during the pandemic by comparing the *pre-pandemic* revenues of these organizations with the revenues earned *during pandemic*. The Wilcoxon Signed-Rank test indicated a significant positive improvement ($p < .001$) in the revenues between the *pre-pandemic* quarter and its corresponding *during pandemic* quarter. However, there was no significant difference between *pre-pandemic* revenues and those earned at the *pandemic inception*,

Table 2. Wilcoxon signed-rank test results.

	Time Periods	Mean	Median	Z-value	W-value
IT-words usage per 1000 words in the earnings call transcripts	TP # 1	3.72	3.77	-1.09	47
	TP # 2	4.08	3.95	(p -value = 0.276)	
	TP # 3	5.29	4.57	(p -value = 0.039)	28*
Revenues in Billions of \$	TP # 1	25.91	13.98	-0.47	59
	TP # 2	26.44	14.09	(p -value = 0.638)	
	TP # 3	28.44	16.45	(p -value < 0.001)	1**

Time Periods – TP # 1: Pre-pandemic (Mid to late 2019); TP # 2: Inception (Early 2020); and TP # 3: During (Mid to late 2020)

* $p < 0.05$; ** $p < 0.001$; The critical value for W at $N = 16$ ($p < .05$) is 29.

Table 1. IT-related word counts and revenues in the three time-periods of the pandemic.

Company	Ticker Symbol	Raw IT Word Count			IT Words per 1000 Words in the Earnings Call Transcripts			Revenues in Billions of \$		
		TP # 1	TP # 2	TP # 3	TP # 1	TP # 2	TP # 3	TP # 1	TP # 2	TP # 3
AutoZone	AZO	37	14	12	4.72	1.74	1.40	3.99	2.78	4.55
Bed Bath and Beyond	BBBY	25	76	148	3.69	6.65	13.39	2.72	1.31	2.69
Best Buy	BBY	42	64	87	4.70	6.88	10.11	9.54	8.56	9.91
BJ's	BJ	33	44	32	3.86	5.40	3.94	3.35	3.8	3.95
Costco	COST	21	24	19	2.42	2.82	1.80	47.5	37.27	53.38
CVS Pharmacy	CVS	15	18	23	1.73	2.49	3.16	63.43	66.79	65.29
Dollar General	DG	23	16	16	2.42	1.81	1.80	6.98	8.45	8.68
Dollar Tree	DLTR	3	2	3	0.38	0.25	0.42	5.74	6.29	6.28
Home Depot	HD	27	19	35	3.40	2.75	5.20	30.84	28.26	38.05
Kroger	KR	37	69	60	4.66	6.54	6.76	28.17	41.55	30.49
Lowe's	LOW	80	32	88	8.32	3.80	10.63	20.99	19.68	27.3
O'Reilly Automotive	ORLY	3	14	9	0.45	1.99	1.16	2.59	2.48	3.09
Rite Aid	RAD	27	44	26	4.37	4.59	2.73	5.37	5.73	6.03
Target	TGT	68	82	79	6.30	7.18	7.42	18.42	19.62	22.98
Walgreens Boots Alliance	WBA	36	39	76	4.74	4.09	8.19	34.59	35.82	34.63
Walmart	WMT	11*	57	58	3.38	6.24	6.60	130.38	134.62	137.74
Total		488	614	771						

TP # 1: Pre-pandemic (Mid to late 2019); TP # 2: Inception (Early 2020); and TP # 3: During (Mid to late 2020)

Note: * Earnings call for media

IT Categories and IT-related Word Counts in the Three Time-periods of the Pandemic.

suggesting that organizations initially had significant challenges in growing their revenues and sustaining their operations. The revenue growth cannot be solely attributed to IT's transformational role as there may have been other factors (e.g., customer hoarding, supplies of masks, handwash, etc.). However, it is interesting to note that retailers have still managed to increase their revenues despite the widespread disruptions and the consequent impact on the retail industry.

To answer the second question on the types of IT and their role, we closely examined the IT-related words for similarities and dissimilarities among them. In total, there were 1,873 IT-related word counts with 60 unique words. A closer examination of the IT-related words revealed that their usage varies based on the organization and context. For example, IT-related word usage differed in some cases for similar concepts (e.g., online, e-commerce, web), similar types of technology (e.g., CRM, systems price management system), or similar types of techniques (e.g., data analytics, AI). Hence, two authors independently coded the identified 1,873 words into seven IT categories for further analysis. In order to ascertain the inter-rater reliability, the Cohen's Kappa coefficient was computed and found to be 0.92, which was well above the recommended 0.70.³² Subsequently, the two coders discussed and resolved the disagreements. Table 3 presents the IT categories and their counts.

Some of the IT categories, such as e-commerce and omnichannel's raw usage counts, more than doubled while digital initiatives increased by more than 75%. Rest of the categories – except IT infrastructure – had a positive increase in usage during the earning calls, indicating consistent usage across periods. Results of this analysis allow us to conjecture that some of the technologies (e-commerce and omnichannel) provided resilience to the organizations to meet the emergent needs of the market, as these technologies were discussed more frequently in the earnings calls that occurred in the aftermath of the pandemic. We further speculate that few other IT categories (e.g., systems, data analytics) may have provided agility, as their usage in the earning calls increased over the year but not at the pandemic's inception. This may indicate that these IT categories were important for the organizations to be agile in dealing with the prolonged uncertainties of the pandemic. The category pertaining to IT infrastructure declined over the period, indicating top management's higher emphasis on the applications of technologies in the earnings calls post-pandemic rather than on the underlying technological infrastructure. Moreover, the IT infrastructure (supposedly already well-established for the large retailers) provides the foundation for the

applications that provide resilience and agility in the organization's responses, and may not change significantly between quarters.

Discussion

To better understand how IT helped the retailers during this pandemic, we examined the transcripts using the study's seven broadly identified IT categories. The following sub-sections highlight retailers' use of IT to digitally transform their organizations to achieve agility and resilience.

Digital initiatives

During the pandemic, retailers faced uncertainties in various operations, thereby compelling them to rely on digital initiatives to operate. In the aftermath of the pandemic, it appears that organizations have accelerated their digital transformation efforts to improve their operational performance and to address changing customer behaviors.¹

Digital initiatives helped retailers in various ways. For example, the pandemic forced them to rapidly change their fulfillment of orders to satisfy customers' preference for pickup, delivery, or contactless shipping. These changes in the shopping patterns were supported through various digital initiatives that were expedited in these organizations. Here are sample quotes from the earnings calls showing the reliance of retailers on digital initiatives to transform their operations.

“Another core strategic priority is the digitalization of our business, where we've taken significant steps in the quarter. We are now accelerating our plans and will be further increasing our investment in digital initiatives in the coming months.” Alex Gourlay – Co-COO for Walgreens Boots Alliance, Inc.²

“Among our store-enabled digital fulfillment options, we continue to see the most rapid growth in our same-day offerings in store pickup, Drive Up and Shipt. . . . They are digital capabilities enhanced by human interaction . . . ” Brian Cornell – Chairman and CEO, Target³

E-commerce

Many enterprises that we examined (e.g., Walmart, BestBuy) substantially increased their online sales during the pandemic, and the top management alluded to this growth in their discussions. The pandemic has

²<https://www.fool.com/earnings/call-transcripts/2020/04/02/walgreens-boots-alliance-inc-wba-q2-2020-earnings.aspx>

³<https://www.fool.com/earnings/call-transcripts/2020/08/19/target-tgt-q2-2020-earnings-call-transcript/>

Table 3. IT categories and IT-related word counts in the three time-periods of the pandemic.

IT Category	Prominent IT-words	TP	TP	TP	Grand Total	% change from TP#1 to TP#3
		# 1	# 2	# 3		
Digital initiatives	digital-first, digitalization, digitalize, digitally, digital-only, and digital	123	186	218	527	77%
E-commerce	online, web, e-commerce, web, website, and dot.com	97	185	210	492	116%
Omnichannel	omnichannel, omni-always, omni, and (technology supported) channel	42	77	110	229	162%
Systems	systems, platform, ecosystem, CRM, and (technology supported) relationships	71	48	90	209	27%
IT infrastructure	Technology, technology-related and cloud	85	54	51	190	-40%
Data Analytics	Analytics, Artificial intelligence, machine learning, and (insights from) data	39	31	55	125	41%
Mobile	mobile, app, and application	31	33	37	101	19%
	Grand Total	488	614	771	1873	58%

Time Periods – TP # 1: Pre-pandemic (Mid to late 2019); TP # 2: Inception (Early 2020); and TP # 3: During (Mid to late 2020)

spurred customers to switch to e-commerce for their needs. According to the US Census Bureau News, retail e-commerce sales rose by 37% during the second quarter of 2020 compared to the first quarter.³³ For the whole year, e-marketer estimates that e-commerce sales will grow from 11% to 14.5%, the largest annual growth since this data has been tracked.³⁴

E-commerce thus played a significant role in meeting the demands of retail customers. It is important to note that this explosive growth in e-commerce sales is supported by an IT-enabled e-commerce platform with its underlying technologies and operations. Here are some snippets from the earnings call transcripts that assert the growth of e-commerce during this pandemic, providing the resilience needed to continue the firm's operations.

“Net sales from our digital channels grew 82% in the first quarter and therefore, represented nearly two-thirds of total net sales. Digital growth was also favorably impacted by the way we pivoted our merchandising and

marketing plans and how we engage with our customers . . .” Mark Tritton, President and CEO, Bed Bath & Beyond⁴

“At sales our e-commerce channel was up double-digits versus last year as business customers and consumers recognized the convenience of our online presence . . .” Gerry Smith, CEO, Office Depot Inc⁵

Omnichannel

Another aspect is the changes in the operating models for many retailers, with the emphasis now being on the omnichannel model. According to Goldberg,³⁵ omnichannel integrates data, customer policies/experience, and systems across customer interaction modes. Omnichannel in retailing was popular even before the pandemic. For example, 73% of a particular retailer's shoppers used omnichannel engagement (e.g., mobile app, buy online and pick up in-store, and buy in-store for delivery) through various touchpoints.³⁶

The ability to buy online or through mobile and pick up in-store or at curbside provided excellent opportunities for customers to transact business safely. Many retailers in this study have experienced increased use of such options by their customers. Omnichannel capabilities provided resilience to the organizations in meeting the demands of customers. Here are some excerpts from the earnings call transcripts that show how some retailers have already reaped the benefits of the omnichannel approach, while others are ramping up their investments in this technology-driven approach in anticipation of the benefits that accrue.

“We haven't talked a lot about our omnichannel offerings, but these become pretty important in this realm as well, where our investments in same-day delivery, buy online, pickup in club have really helped us grow.” Lee Delaney, President & CEO of BJ's⁶

“. . ., because we have a very aggressive strategy in mind, really build a strong omnichannel presence in the US we do recognize we're behind the market and we're scaling up the investments as we speak.” James Kehoe, EVP and Global CFO, Walgreens Boots Alliance⁷

⁴<https://www.fool.com/earnings/call-transcripts/2020/07/09/bed-bath-beyond-bbby-q1-2020-earnings-call-transcr.aspx>

⁵<https://www.fool.com/earnings/call-transcripts/2020/08/05/office-depot-inc-odp-q2-2020-earnings-call-transcr.aspx>

⁶<https://www.fool.com/earnings/call-transcripts/2020/08/20/bjs-wholesale-club-holdings-inc-bj-q2-2020-earning/>

⁷<https://www.fool.com/earnings/call-transcripts/2020/04/02/walgreens-boots-alliance-inc-wba-q2-2020-earnings.aspx>

Systems

Senior executives of organizations also discussed various information systems they introduced during the pandemic to respond to changing needs. These systems helped organizations to manage their operations better. Organizations become agile by digitalizing the sensing and responding processes through enterprise systems, thus enabling them to operate in a turbulent environment.³⁷

Retail stores used these systems to better manage their staffing needs despite constrained store hours and changing employee needs. Likewise, supply chain and customer relationship management solutions that could satisfy the soaring demand while addressing the reduced supply helped retailers meet customers' needs. Moreover, with the increased demand for pickup and delivery, organizations invested in order fulfillment and delivery systems. Some excerpts from the earnings call transcripts show how these organizations used systems to meet customer demand, derive new capabilities, and carry out operations successfully.

"... a customer-centric labor scheduling system that gave stores the flexibility to align payroll with the unique needs of the customer and the associate; ..." Marvin Ellison, President and CEO, Lowe's Companies⁸

"... we track very closely how a power customer behaves and when they engage digitally, and we see a significant level of incremental sales overall in the customer relationship ..." Gary Millerchip – SVP and Chief People Officer, Kroger⁹

IT infrastructure

The IT infrastructure provided the basis for various technology initiatives in these organizations, as evident from the earnings calls transcripts. According to Weill and Subramani,³⁸ investments in appropriate IT infrastructure will allow organizations to gain strategic agility, as IT can be used to reduce not only costs of current business processes but also to rapidly implement future digital business initiatives. Likewise, agile approaches to software development may enable organizations to be more responsive and agile during the pandemic.⁴

Retail organizations leveraged their IT infrastructure in different ways. For example, the shift to online sales required organizations to meet the increased web traffic and serve the customers' needs. These infrastructural investments helped in the Business-to-Business

segment, such as procuring the products for sales. Interestingly, the top management even highlighted the move to the cloud for their IT infrastructure. Here are some sample quotes to support this contention and show how these IT investments enable organizations to adapt to the changes.

"Our interconnected retail strategy and underlying technology infrastructures have supported record web traffic on a consistent basis for the past several months." Craig Menear, Chairman and CEO, and President of HomeDepot¹⁰

"... replatforming Lowes.com from a decade-old infrastructure to the cloud and developing a top-rated mobile app that's allowed us to grow online sales triple digits ..." Marvin Ellison, President and CEO, Lowe's Companies¹¹

Data analytics

The pandemic has brought to the forefront the use of data for decision-making by organizations, and retailers are no exception. Retailers have relied on data to make informed decisions on various fronts (e.g., safe store operations, forecasting, customer insights, etc.), and the earnings call highlights this.

Interestingly the top management also discussed how data insights helped them with their operations. Some of the earnings calls even discussed analytics capabilities, including specific tools such as SAP's HANA or techniques such as artificial intelligence. This illustrates the extent to which data analytics helped retailers in their operations during this pandemic. Following are some sample quotes from the earnings calls highlighting the role of data analytics' and the value these organizations have placed on data-driven decision-making to sense and respond appropriately amidst the pandemic uncertainties.

"... we remain laser focused on supporting a safe store environment through a data-driven approach based on an analysis of store traffic trends across our portfolio." Joseph M. McFarland III – EVP, Lowe's Companies¹²

"... personalization and data remains one of Kroger's key and core competitive moats. We use our data to understand what is most important to our customers and ..." Rodney McMullen – CEO, Kroger¹³

⁸<https://news.alphastreet.com/lowes-companies-inc-low-q2-2020-earnings-call-transcript/>

⁹<https://www.fool.com/earnings/call-transcripts/2020/09/11/kroger-kr-q2-2020-earnings-call-transcript/>

¹⁰<https://www.fool.com/earnings/call-transcripts/2020/08/18/home-depot-hd-q2-2020-earnings-call-transcript/>

¹¹<https://news.alphastreet.com/lowes-companies-inc-low-q2-2020-earnings-call-transcript/>

¹²<https://news.alphastreet.com/lowes-companies-inc-low-q2-2020-earnings-call-transcript/>

¹³<https://www.fool.com/earnings/call-transcripts/2020/09/11/kroger-kr-q2-2020-earnings-call-transcript/>

Mobile

During the pandemic, mobile phones and mobile apps helped organizations in different ways. Public health officials used mobile phones to understand the pandemic's spread.³⁹ Likewise, mobile phones are also used to study the effectiveness of stay-at-home orders and people's mobility.⁴⁰

As explicitly discussed in some of the earnings call transcripts, retailers also relied on mobile phones and mobile apps to carry out their business operations during the pandemic. For example, mobile phones enabled customers to buy products and services and employees to perform specific tasks. Interestingly, top management's discussion of mobile app store ratings shows how vital these mobile applications are. Below are some quotes from the earnings calls that reiterate mobile applications' role for both the customer as well as employees.

"... in our Aetna Health app, we engaged more households in Q1 than we did in the first three quarters of 2019." Larry J. Merlo – President and CEO, CVS Health¹⁴

"... a significant increase in downloads of our mobile app, as well as improved customer ratings. ... And we added an internal order picking app to improve our associates' speed and accuracy in fulfilling these orders." William P. (Bill) Boltz — EVP, Lowe's Companies¹⁵

Information technology's role in digital resilience and agility

Our quantitative and qualitative analyses of retailer's earnings call transcripts suggest that IT plays a critical role in making organizations more resilient and responsive. Our analyses further show that the upper echelons of organizations recognize the pervasive influence of IT, particularly in its ability to deal with the unexpected. IT has provided various capabilities that helped these retailers better cope with an environment drastically changed by the pandemic. As discussed, organizations have embarked on digital initiatives and transformations to meet the emergent needs of the pandemic.

Moreover, these retailers could shift their sales operations online and seamlessly integrate sales across multiple channels, thus allowing customers to buy online storefronts for delivery or pickup. In response to changing buying habits and behaviors, retailers have rolled out new applications to meet the emergent needs in

managing store operations and supply chains. These systems have helped retail organizations to lessen the impact of pandemic-related disruptions. Organizations have also relied on data and analytics to make decisions and guide their operations. Finally, organizations also relied on a scalable IT infrastructure to respond to the growing needs of IT to support their operations during this time. One-off events, such as the pandemic, have shown the extent to which IT can support organizations and make them resilient to changing environmental conditions.

Implications for research and practice

Organizations have ramped up their digital transformation efforts by accelerating IT initiatives during the pandemic. This is evident from this study and is consistent with published surveys (e.g., ref.⁵) This study, set in the retail industry, shows how the digital transformation efforts through IT allowed these organizations to provide service amidst disruptions seamlessly. The operating models (e.g., buy online curbside pickup, contactless delivery, omnichannel experiences) furthered by these transformative efforts have far-reaching impacts on the future of retailing. Moreover, digital transformations entail not only the use of digital resources but also organizational structure and strategies.⁶ With the accelerated digital transformation seen in the retail industry, it appears the organizational structure and growth strategies co-evolved in tandem at a rapid phase.

This study's findings show that IT capabilities have helped many organizations to address emergent needs. In this regard, existing IT capabilities allow organizations to exploit available digital options,⁴¹ addressing business opportunities that were not recognized before the pandemic. Some examples of firms realizing these digital options include a) organizations transitioning from or supplementing their buy online and pick up in-store to buy online and curbside pickup; b) provisioning scanning and checking out for contactless shopping through existing mobile apps; and c) realizing newer revenue stream through subscriptions for added services (e.g., Walmart+).

Though the pandemic necessitated many mandatory uses of IT, IT adoption research shows that the continued use of information technologies may depend on user expectations and satisfaction.⁴² Unless users see a value in these altered mechanisms, they are likely to abandon the pandemic-induced behaviors, as this has implications for the usage of various IT systems. Hence, organizations should be

¹⁴<https://www.fool.com/earnings/call-transcripts/2020/05/06/cvs-health-corp-cvs-q1-2020-earnings-call-transcri.aspx>

¹⁵<https://news.alphastreet.com/lowes-companies-inc-low-q2-2020-earnings-call-transcript/>

mindful of changes in the post-pandemic usage behavior of users and provide appropriate reinforcement where necessary to further the usage.

This study considered IT's digital resilience and agility capabilities during the pandemic-induced disruptions that were sudden and widespread. The IT strategies used by organizations during the pandemic can help in future emergent shocks (e.g., climate change, cyber-attacks, natural disasters) and disruptions in a firm's operations locally or globally. Organizations rely on business continuity and disaster recovery planning for organizational resilience,⁴³ and digital resilience and IT agility can play a significant role in such planning beyond the pandemic.

Our study shows that organizations facing disruptions with the pandemic relied on IT to sustain their operations. However, organizations should be cognizant of the inherent IT-related risks, such as remote access to systems, security, and IT skills shortages during pandemic times.⁴⁴ Strategies for recognizing and minimizing these risks are essential for the long-term sustainability of these modes of IT usage. Moreover, organizations relying more and more on technologies need to take sufficient safeguards in creating redundant systems to weather any untoward IT failures.

There is a nascent discussion on the digital pivot and IT capability that enables a firm to shift its operation mode.⁴⁵ This research shows that organizations' investments in IT can help them pivot their operations based on emerging needs. In the case of retailers, they could change their operations from one mode (offline storefront) to another mode (e-commerce/buy online pickup in-store) to survive the disruptions engendered by the pandemic. It is apparent from the responses to the pandemic that digital pivotability complements other IT capabilities of an organization and gives organizations the agility to survive in difficult times.

Limitations and future research directions

Analysis of the earnings calls transcripts of retailers showed a significant increase in IT-related words implying more IT use during the pandemic to address the emergent uncertainties with the pandemic. With the retail industry facing one of the worst risks during the pandemic,²⁶ this study's findings bolster the assertions of IT in providing resilience and agility. However, future studies with a broader sample across industries can shed more

light on IT's role in providing agile and resilient responses in light of sudden and prolonged disruptions.

This study did not distinguish among the use of various digital transformative technologies and considered them uniformly in their use/impact. However, digital changes occur in multiple phases ranging from simple to more pervasive changes with technologies.⁶ The study's findings provide credence to the transformative effects of these technologies in furthering the agility and resilience of organizations. Hence, future research can investigate the differential impact of these transformative technologies on agility and resilience.

This study extracts and analyses IT words based on the spoken words of the top management during earnings calls. Though there are many commonly occurring IT-specific words in the transcripts, their usage context may vary from one retailer to another. Hence, the results of the study should be interpreted carefully. However, the categorization of the IT words mitigates this concern and to an extent accounts for variations in the use of words. Future research can adopt a nuanced approach to finding the differences in the usage of different types of IT across periods and their role in providing agility and resilience.

Conclusion

It is widely acknowledged that IT is the lifeblood of organizations, and IT systems have traditionally worked in the background to improve efficiencies, increase coordination and communication, and enable strategies. The changes that organizations have had to make in the aftermath of the pandemic have now thrust IT into the limelight. The acceleration in the development/deployment of systems and technologies was precipitated in no small measure by the crisis. These developments will not only sustain a firm's operations but will also have a lasting impact on the industry for years to come, as customers and organizations realize their benefits. Our analysis of earnings calls transcripts suggests that organizations use various digital transformation initiatives to thrive during challenges arising due to the pandemic successfully. This study adds to the IT value-related research in providing a new perspective on IT's role in providing a digital pivot for organizations to rethink their strategies and/or re-orient their operations. This pivoting is instrumental in facilitating IT-enabled resilience and agility that enable organizations to deal with the unexpected.

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