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Journal of Business Research 136 (2021) 602–611

Contents lists available at ScienceDirect

Journal of Business Research

journal homepage: www.elsevier.com/locate/jbusres

COVID-19 and digitalization: The great acceleration

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ARTICLE INFO

Keywords:
COVID-19
Work and organization
Digitalization
Business model
Business strategies
Emerging technologies

ABSTRACT

Inspired by burgeoning scholarly interest in the role of digitalization in the COVID-19 pandemic, this paper examines how the COVID-19 pandemic is driving or constraining the digitalization of businesses around the globe. We contend that COVID-19 is "*the great accelerator*" in fast-tracking the existing global trend towards embracing modern emerging technologies ushering in transformations in lifestyle, work patterns, and business strategies. Thus, COVID-19 has evolved to be a kind of "*catalyst*" for the adoption and increasing use of digitalization in work organization and the office, alongside presenting foreseen and unforeseen opportunities, challenges, and costs—leading to negative and positive feedback loops. In this article, we develop and advance a conceptual model by linking the different forces for and against digitalization in response to the pandemic. Our analysis indicates that adoption of emerging technologies may be hindered by vested external interests, nostalgia, and employer opportunism, as well as negative effects on employee well-being that undermine productivity, work–life balance, and future of work. Whilst digitalization may bring new opportunities, the process imparts risks that may be hard to mitigate or prepare for. Finally, we draw out the wider theoretical and practical implications of our analysis.

1. Introduction

In recent times, it has become increasingly evident that the COVID-19 pandemic has not only fundamentally altered the modus operandi of many organizations but has also precipitated the failure of many businesses around the globe (see Amankwah-Amoah, Khan, & Wood, 2020). The range of measures including local and national lockdowns, social distancing measures, government-led border closures, and quarantines have forced many firms to adapt their business models at short notice (see Sostero, Milasi, Hurley, Fernández-Macías, & Bisello, 2020). Broadly speaking, this arose on two domains: externally—how firms interface with customers, suppliers, and other stakeholders; and internally—how firms manage employees and the employer–employee relationships (Sostero et al., 2020). COVID-19 has so far resulted in more than 190 million coronavirus cases and more than 4,101,340 fatalities worldwide, with new strains of virus on the rise (World Health Organization, 2020; Worldometers, 2021), thus significantly hampering global economic activities.

Typified by devastating impacts on livelihoods and business performance, the COVID-19 pandemic also highlights the vast digital divide between the poor and rich, between rural and urban areas, and between advanced and developing economies (Beaunoyer, Dupéré, & Guitton, 2020). One likely consequence of COVID-19 is the accelerated trend towards digitalization of business models coupled with the shift of commercial activities from predominantly offline and brick-and-mortar outlets to online outlets. However, with this has come the question as to whether this will benefit many firms or just a few. In other words, whether traditional firms will be able to recover lost ground through infusing greater digitalization into their business models, or whether this will simply extend the role of the existing internet-enabled platform oligopolies. The pandemic has catapulted the need for change across a host of industries, in addition to fundamentally changing consumer behavior, from store visits to buying online; the latter enables much more information to be gathered on consumers, further undermining the

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https://doi.org/10.1016/j.jbusres.2021.08.011
Received 5 April 2021; Received in revised form 31 July 2021; Accepted 5 August 2021
Available online 11 August 2021
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position of vendors lacking such detailed insider information and analytics capabilities. At the same time the process has been contested, as exemplified by the UK government's August 2020 'back to work (i.e., the physical office) or lose your job' campaign (Faragher, 2020), which seemed to imply that working from home did not constitute 'real work' and that job security depended on presenteeism. More conservative employers might continue to view homeworking, from a pre-COVID perspective, as something that is sub-optimal, best suited to only a few elite workers, and hence may desire to turn back the digital clock rapidly (Andersen & Kelliher, 2020).

Furthermore, whilst potentially enhancing flexibility for employers and employees, and reducing wasted time and energy on long commutes, the digitalization of work has raised concerns about trust, new forms of worker electronic surveillance, and the colonization of leisure time (Hodder, 2020). Anchored in the ongoing discourse on COVID-19 in the mass media and the scholarly community is the need for better understanding of firm behaviors about the supposedly "Black swan event" (Sheng et al., 2020; Spicer, 2020)—a global pandemic was widely predicted, but nonetheless organizations were largely ill-prepared to deal with it (Phan & Wood, 2020).

Despite the importance and effects of digitalization, coupled with emergent research on implications of the pandemic (Seetharaman, 2020) and the proliferation of accounts on COVID-19′s likely impact, scholarly work exploring the challenges confronting firms and their workers in transitioning to digital technology in the wake of this new environmental challenge is only just emerging. Psychological barriers to the adoption of emerging technologies are hampering the efforts of firms and their decision-makers to embrace digital platforms. Although the wider forces for and against digitalization in the wake of COVID-19 warrant additional scholarly attention, so far very little attention has been directed towards this subject. With this in mind, the central aim of this paper is to examine how the COVID-19 pandemic is driving or constraining digitalization of businesses. Much of the literature on digitalization can be readily divided into optimistic and pessimistic accounts; this study seeks to take account of a wide range of factors, informed by a cross-section of the existing knowledge base, to more fully explore the interplay between risks and opportunities. As with any new technology, digitalization brings with it foreseen and unforeseen consequences; we can only deal with the former, but the latter are likely to amplify both positive and negative feedback loops. Hence, with digitalization, the stakes are very high; in this study we seek to provide insights as to what is in play for firms and their key stakeholders as the forces for digitalization gather momentum.

Accordingly, we provide insights into the challenges and opportunities of the pandemic for firms. First, although digitalization per se is not new to scholars and practicing managers (Ritter & Pedersen, 2020), the potential effects of the pandemic in halting or accelerating the process of adoption of emerging technologies remains underexplored. Our contention is that the COVID-19 pandemic can be viewed as the great acceleration (Bradley, Hirt, Hudson, Northcote, & Smit, 2020; Lozada, 2020) in a sense of accelerating the existing global trend towards embracing new technologies and digital platforms to facilitate remote working and online shopping. In this vein, we develop a conceptual model in order to enhance our understanding of COVID-19′s effects on digitalization, focusing on the intra-organizational and human dimensions. By examining key factors, this study aims to advance the literature on the COVID-19 pandemic discourse in management and information systems (Sostero et al., 2020; Verma & Gustafsson, 2020; Zheng & Walsham, 2021) by shedding light on the drivers for change and resistance towards change for digitalization. Second, we contribute to the growing literature on digitalization (Saarikko, Westergren, & Blomquist, 2020) by providing insights into how digitalization can expose organizations to new forms of business risks including hacking and cyberattack. In addition, by examining digitalization in the wake of the COVID-19 pandemic, our study provides a more nuanced understanding of key barriers to digitalization of businesses. Thus, we illuminate understanding of the digitalization forces and processes, which can have far reaching implications for small and large businesses. Finally, we draw out the policy implications; the latter takes account of the dynamic tensions embodied in the digitalization process, and the limits and risks of state-led digital industrial policies. In so doing, the paper offers a more balanced perspective by highlighting both the forces for and against digitalization in the wake of COVID-19.

The rest of the article is organized as follows. After presenting a review on digitalization, business environment and innovation, we then present our conceptualization and analysis. We shed light on the linkages between COVID-19 and digitalization before outlining the implications of the analysis.

2. Digitalization, business environment and innovation: An overview

Digitization refers to the technical process of converting analog or traditional paper-based tasks or processes to digital form so that computers can help in accessing, storing, and transmitting information (Bloomberg, 2018; Brennen & Kreiss, 2016). By contrast, digitalization refers to "the sociotechnical process of leveraging digitized products or systems to develop new organizational procedures, business models, or commercial offerings" (Saarikko, Westergren, & Blomquist, 2020, p. 4). Thus, digitalization denotes partially or fully converting elements of firm value-chain activities and business models to digital platforms via emergent digital technologies such as the mobile and visual connectivity, cloud computing, robotics, smart phones, artificial intelligence (AI), blockchain, additive manufacturing, 3-D printing, and Internet of Things (IoT) (Soto-Acosta, 2020). Such transformation can arise as part of integrated digital platforms, as innovative ways of doing business. Digital technologies such as websites, social media, smartphones, content-sharing platforms, e-procurement systems, blockchain, automation technology, robotics, and wearable devices have helped pave the way for businesses to engage effectively with innovation and R&D activities and exploit new market opportunities (Lupton, 2020; Vural et al., 2020). However, firms have not yet realized the full potential of digitalization, and the COVID-19 pandemic is driving the adoption of emergent technologies.

Previous research has shown that improved business process competence, new forms of cooperation and customer engagement, and a faster pace of innovation are factors driving digitalization (Adomako, Amankwah-Amoah, Tarba, & Khan, 2021; Rachinger, Rauter, Müller, Vorraber, & Schirgi, 2019). Seizing opportunities in the marketplace entails initiating and incorporating greater use of digital technology in the ways that firms undertake value-adding activities. Business-model innovation refers to "the search for new logics of the firm and new ways to create and capture value for its stakeholders; it focuses primarily on finding new ways to generate revenues and define value propositions for customers, suppliers, and partners" (Casadesus-Masanell & Zhu, 2013, p. 464; Baldassarre, Calabretta, Bocken, & Jaskiewicz, 2017). Digitalization also facilitates greater ease of doing business in firms' external activities and may equip organizations to improve and enhance overall competitiveness (Ritter & Pedersen, 2020). Less critical accounts have suggested that digitalization somehow makes businesses more 'excellent' (Ross, 2017), typifying the view that it represents an unabashed good, yet, like all new technologies, it may present both foreseen (e.g., digital surveillance) and unforeseen consequences down the line. Prior scholarly work on digitalization focused largely on altering organizational processes and developing effective links between the organization and its stakeholders (Nambisan, Lyytinen, Majchrzak, & Song, 2017); this conceptual paper explores further how exogenous (or semi-exogenous) events might drive further digitalization, with particular focus on the internal human dimensions.

The environment in which businesses operate may be located on a scale between benign and hostile (Kreiser et al., 2020). Non-hostile or benign environments are environmental conditions that "provide a safe

setting for business operations due to their overall level of munificence and richness in investment and marketing opportunities" (Covin & Slevin, 1989, p. 75). Hostile environments reflect "precarious industry settings, intense competition, harsh, overwhelming business climates, and the relative lack of exploitable opportunities" (Covin & Slevin, 1989, p. 75), which can alter the life chances of the organization. In benign environments, firms' activities are typified by opportunities for company growth (Covin & Slevin, 1989) and growing complacency. Indeed, abundant environmental opportunities can undermine the erstwhile drive for innovation and any desire to embrace digitalization. Hostile environments, by contrast, are characterized by rapidly changing events and substantial competitive rivalry among firms, which typically are unfavorable to business operations. Firms may experience a limited capacity to predict and manage "Black swan" events (Higgins, 2013), whether due to limited resources or capabilities (Phan & Wood, 2020). As environments become more hostile, firms may become more entrepreneurial, but only to a point after which the severity of challenges forces them to retreat into a largely defensive mode (Kreiser et al., 2020). Recent research has shown such unfavorable environmental factors might include natural disasters, pandemics, price wars, fluctuations in commodity prices, depression or recessions, or radical departures in politics and government policy (Phan & Wood, 2020). The two poles of extremely low business risks (benign environment) and extremely high business risks (volatile environment) are depicted in Fig. 1. The volatile period ushered in by COVID-19 denotes a shift to a more hostile environment in which businesses are operating.

To illuminate the potential effects of business risk on the race towards digitalization, we contend that, as risk rises, firms will tend to embrace greater digitalization. This will be true especially when failure is imminent, or to avert closure either in response to government restrictions or in direct reaction to the effects of the pandemic. Firms might also imitate their competitors and embrace emerging technologies. During more tranquil times organizations will face relatively little pressure to embrace digitalization, unless enticed by the exigencies of competition. As a world historic event, COVID-19 is particularly likely to accelerate the digitalization process as depicted in Fig. 1; this reflects its highly contagious nature, and the extent to which organizations can safely carry out their activities depends, in most instances, on effective usage of digital technologies.

3. Opportunities and challenges of digitalization

Digitalizing at least part of the organizational and business model is increasingly ubiquitous and holds the prospect that firms can accrue efficiency gains through even modest changes (Björkdahl, 2020). An early advance was basic automated document management systems, which paved the way for many organizations and individuals to search for and find documents with speed and greater accuracy, thereby eliminating various laborious tasks associated with finding documents (Smith, 2019). More advanced emerging technologies offered an effective mechanism for organizations to link teams and foster closer working relationships between headquarters and subsidiaries (Autio et al., 2021). Firms have gained new opportunities for digitalization as the cost of communications, storing information, and computers/devices has shrunk, whilst the capabilities of the latter have exponentially increased.

3.1. Drivers of digitalization

3.1.1. Shift to remote working and remote operations

Remote working denotes performing the activities of the employing organization from outside the office at a remote virtual location (Wang et al., 2021). Although many of the technologies for enabling remote working have existed for at least a decade, most firms choose not to adopt them (Rosalsky, 2020a), or focus on a few favored workers (Andersen & Kelliher, 2020). The latter would reflect concerns regarding a possible loss of control, not trusting workers to exercise their autonomy responsibly (Miele & Tirabeni, 2020), or a reluctance to cast aside proven solutions of the past. Yet whatever the level of managerial reluctance, the pandemic has forced large numbers of firms to embrace emergent technologies to shift to remote working and remote skills formation activities. In responding to travel restrictions and quarantine measures around the globe, remote working has become acceptable to multinationals that previously had been wedded to industrial-scale business travel (Wilson & Chen, 2020). Following the global crisis

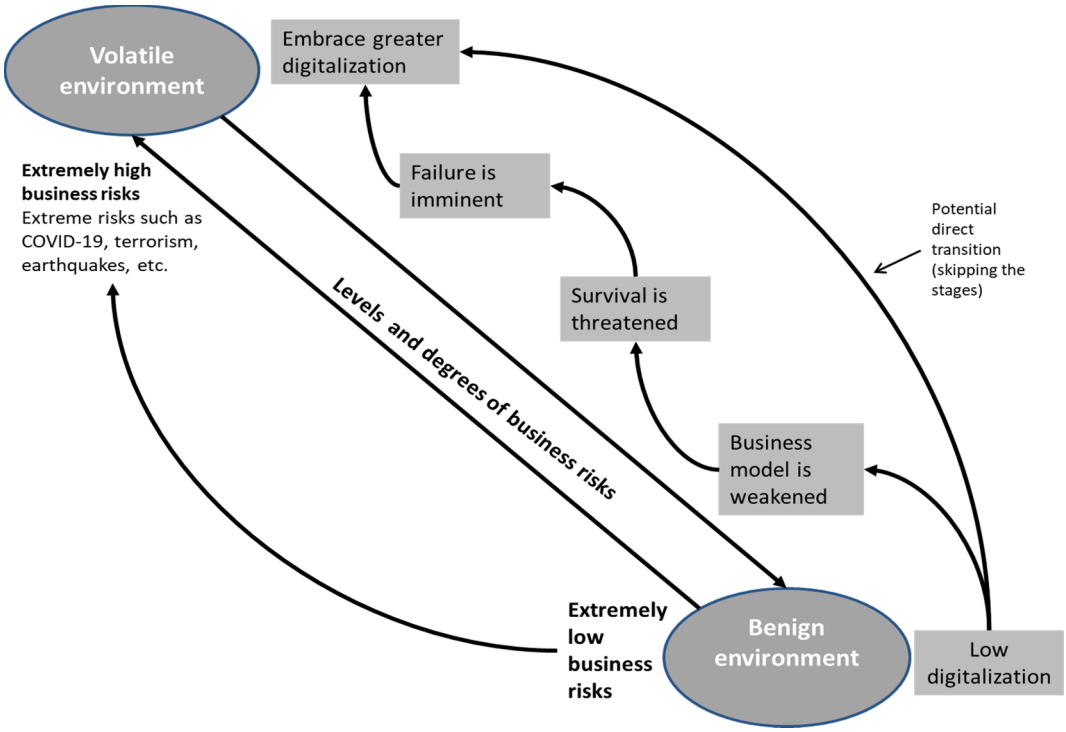

Fig. 1. Levels of risk in the environment and digitalization.

caused by the current pandemic, many businesses transitioned to remote working. For instance, during the pandemic, around 90% of Morgan Stanley's 60,000 employees worked remotely from home, in sharp contrast to previous norms (Morgan Stanley, 2020). Indeed, *"many organizations have shifted to remote working models almost overnight. A remote-first setup allows companies to mobilize global expertise instantly … and respond to customer inquiries more rapidly by providing everything from product information to sales and after-sales support digitally"* (Baig et al., 2020, p. 2).

As virtual offices are not limited by space, firms have access to unlimited new labor pools across the globe to recruit talent (Rosalsky, 2020a), and can bypass onerous national visa regimes. Twitter, Facebook, and other firms that extensively leverage digital technologies now allow workers to "become roving nomads forever", thereby creating a platform to recruit top talent and assess employees on performance rather than mere "clocking hours" (Rosalsky, 2020a, p. nd; Hodder, 2020). Work that requires frequent video meetings and/or large-scale data transmission relies on access to high-speed internet connections at home, which is often lacking in developing economies.

According to Dingel and Neiman (2020), around 37% of jobs in the United States (US) can be performed full time from home. Indeed, around 4% of all American employees worked "at least half the time" from home, suggesting the potential to expand remote working not just in the US but in other countries as well (Dingel & Neiman, 2020; Rosalsky, 2020b). Another driver for remote work is commuting to work, which is time consuming, physically tiring, and costly, with consequences for the natural environment. Commuting could be greatly reduced if working in the physical office were limited to essential activities (Rosalsky, 2020a). Relatedly, the magnitude of office space used by businesses could be reduced, cutting costs associated with commercial real estate, especially if offices are located in major and expensive cities (Rosalsky, 2020a, 2020b). Firms are increasingly developing and utilizing videoconferencing facilities and remote collaboration enabling tools to continuously improve remote-working processes (Cortez, 2020). Broadly, leveraging digital platforms can reduce operational costs, bureaucracy, and costs associated with commuting and business travel, resulting in substantial savings for employees (Hensher et al., 2021). Finally, digitalization has implications for reducing firms' environmental footprints (Elliott et al., 2020).

At the same time, whilst the gains may be immediate and visible, there may be costs on organizations, employees, and other actors. From an organizational perspective, it is not clear as to whether the loss of subtle nonverbal means of communication may diminish internal efficiency, result in more misunderstandings, and reduce empathy (Kniffin et al., 2021). Employees may open themselves to new forms of intrusive digital surveillance, which, even if not widely deployed, can lead to increased suspicion as to employer motives and behavior (Charbonneau & Doberstein, 2020). A reduced ability to monitor worker productivity arising from the digitalization of work directly might drive firms to demand greater output from employees (Hodder, 2020). Digitalization can disrupt the work–life balance, whilst the long-term health effects of ever greater screen time remain unknown (Hjálmsdóttir & Bjarnadóttir, 2020; Conroy et al., 2020). There is also the gender dimension – women, especially of childbearing age, often must balance the demands of full-time work and managing the home, placing them under greater stress than, say, middle-aged men with grown children (Hjálmsdóttir & Bjarnadóttir, 2020; Yerkes et al., 2020). In general, unintended consequences of digitalizing work may pose long-term costs for organizations in terms of diminished productivity and health-related absenteeism. Finally, satellite industries that support traditional office work, ranging from transport to catering to office property leasing, will likely decline in the wake of rising remote work and accompanying benefits of work–life balance.

3.1.2. Paperless offices and paperless organizations

For decades, businesses large and small grew and became accustomed to paperwork and physical workspace. Today, however, businesses increasingly adopt new and emerging digital technologies to enhance operational efficiency and effectiveness. Digitally oriented value-chain activities have become essential for many businesses seeking not only to minimize negative effects of COVID-19 but also to enhance competitive advantages and long-term sustainability. Although the notion of the paperless office has gained traction since the late 1960s (The Economist, 2002), the pandemic has increased the urgency of digitalization, appealing to a wide range of organizations. Tools for digitalization and paperless organization such as laptops, high-capacity storage devices, tablets, smartphones, and high-speed wireless broadband are increasingly available to businesses (Hudson, 2012). By going digital, firms reduce dependence on paper documents and provide greater opportunities for all employees to access information without incurring costs associated with printing or managing physical paper flows.

Although paper-based work is a feature of traditional offices, this has been altered by the availability of alternatives (Hudson, 2012). Technological advances have facilitated increased reliance on digital methods, such as electronic scanning of documents and maintaining digital records through storing of images on the cloud. Accompanying digitalization is reduced usage of copiers and printers, as well as less need for repair and maintenance of such equipment, and of papers and related supplies. In addition, "the time required by employees to complete tasks will decrease with automation, which in turn means you need to allocate less hours to the tasks you have automated" (Smith, 2019, p. nd). Partial or full digitalization of business operations has become a necessity for many businesses in the new digital economy. By shifting from the physical paper to a digitally-oriented approach for storing, disseminating, and processing information, firms can improve processes, and reduce the costs associated with administration and processing (Smith, 2019). Indeed, "*paper and paper-based processes are also slow and inefficient compared to automated digital systems, it's more difficult to capture data from physical documents and reports on paper-based processes are manual and slow to generate … office workers spend an hour every day searching for documents, which wastes time and money, and reduces productivity*" (Smith, 2019, p. nd). It also has the potential to eliminate bottlenecks in routines and processes in paper offices that often curtail innovation.

Besides the cost savings, digitalization also has the potential to reduce human errors linked to multiple administrative and manual routines and tasks (Smith, 2019). Buoyed by technological improvements, there are now opportunities for organizations to not only have paperless offices but also become paperless organizations as a means of saving costs and reducing the cumbersome processes that often stifle innovation activities. Table 1 summarizes the COVID effects as drivers of digitalization. Motivated by growing opportunities inherent in digitalization in terms of the elimination of paper-based bureaucratic processes and associated costs, many small and medium enterprises (SMEs) employed digital devices to man aspects of their business. Some of the drivers for the adoption of new technology encompass the relative advantages of the technology relative to the alternatives such as quality and cost, as well as compatibility with existing products and processes of the focal organization (Lanzolla & Suarez, 2012). As the pressure to shift towards digitalization intensifies, there are also constraints in curtailing the shift. Indeed, adopting electronic reporting procedures might be a modest shift for businesses towards digitalization but could have an impact on improving existing processes.

3.2. Barriers to digitalization

Our analysis thus far highlights that the pandemic can be construed as an opportunity for organizations to improve manual workflows and adopt digitalization. Table 2 summarizes the different factors related to technology infrastructure, institutional constraints, security and privacy concerns, and organizational-level constraints. While firms may identify

Table 1
COVID-19: A driver of digitalization.

Pre-COVID 19 forces	COVID-19-effects as drivers	New realities of the global economy
● Financial and cost pressures to shift to remote working and "paperless organization". ● Wider embrace of paper-based to electronic-based processes, procedures and routines in both public and private organizations. ● Embrace of video conferencing and online meeting platforms.	● Forced many organizations to shift to remote working and becoming increasingly a "paperless organization". ● Accelerated shift from paper-based to electronic-based processes, procedures and routines. ● Domestic and internal travel and social distancing restrictions forced firms to operate online rather than face-to-face. Nevertheless, quarantine restrictions and effects have been mitigated or at least partially overcome by video conferencing and online meeting platforms.	Digitalization is seen as essential. Driving further development of infrastructure and conditions for digitalization and electronic transactions.

Data sources: synthesized by the authors from: Rachinger et al., 2019; Appiah et al., 2020; JoyBusiness, 2020.

various functions and processes that can be performed electronically, digitalization may be limited due to resource constraints, bureaucratic processes, and insufficient commitment from senior management. Administrative heritage is a feature of long-established businesses (Miller & Friesen, 1984; Collis, 1991). Well-established firms must abandon long-standing procedures and routines before new, innovative routines can be adopted. Abandoning embedded routines and established practices can be relatively challenging, especially in older, established firms, because new knowledge that leads to novel routines tends to conflict with existing operations and tried-and-true models (Barkema & Vermeulen, 1998; Autio, Sapienza, & Almeida, 2000). Complex or systematized routines can be costly to modify and limit firms' ability to innovate (Utterback & Abernathy, 1975). Previous investments and organizational routines can hinder future behavior and the capacity to adopt new methods (see Leonard-Barton, 1992; Pisano, & Teece, 1994). Bounded rationality and embedded "hierarchies" (Grant, 1991) of routines may restrict the ability to adopt new technological solutions. Firms will tend to emphasize incremental, rather than disruptive innovations, resulting in the development of capabilities and routines more closely related to existing knowledge and routines. Key pathways are described in Fig. 2.

In recent years, many organizations have sought to move the basic information technology infrastructure from the "traditional on-premises deployment to the cloud", thereby ushering in a new era of taking advantage of technological advancements (Retana et al., 2018, p. 961). Nevertheless, old and large organizations might be underpinned by old routines, values, processes, and routines that might have taken years to take hold, develop, and be locked in (Christensen, Anthony, & Roth, 2004).

Another major barrier to digitalization concerns the long-held notion by some that digital and video platforms are suboptimal relative to the physical office for facilitating the social bonding, managerial involvement, mentoring, and chance encounters among colleagues that lead to novel, innovative interpretations, and solutions (Rosalsky, 2020a). On its own, the physical office environment is very useful and provides a fertile ground for organizational innovation and development. Despite the proliferation of high-speed internet and apps such as Skype, Zoom, Slack, and Dropbox, the percentage of people regularly working

Table 2
Classification of post-COVID 19 barriers to digitalization.

Barriers	Barriers/impediments in the adoption of digital technologies	Breaking down the barriers and meeting new challenges
Technology infrastructure	● Technology and digital divides between cities and rural areas and developed and developing nations limit scaling-up of digitalization.	Investment in digital infrastructure to support digitalization.
Institutional constraints	● Formal institutions (e.g., national laws and regulations) can create hostile conditions for new technologies adoption. ● Institutional impediments such as lack of government support for digitalization, underdeveloped education system or poorly designed education system towards digitalization and limited government skill formation initiative on digitalization. ● Lack of access to stable Internet connection and limited or lack of access to remote banking for businesses. ● Lack of government investment in infrastructure. ● Policy incoherence and churn. ● Desire for a return to the familiarity of a past.	Investment in human capital at the national level. Creating an online payment culture.
Security and privacy concerns	● Privacy concerns of workers and other stakeholders ● Uncertainties about the security risks and unsecured virtual facilities. ● Lack of businesses' confidence in their ability to withstand the threat from cyberattacks and hackers. ● Risk of general or localized internet outages.	National investment to provide training, support and assurances to small businesses on security measures. Contingency planning; greater awareness of paradigm threatening risks.
Organizational level constraints	● Lack of financial resources for the upfront cost of investments in new technologies. ● Lack of technical expertise to facilitate digitalization. ● Organizational inflexibility/ unwillingness to change (typified by hard-to-change organizational routines, process and traditional ethos of the organization). ● Lack of firms' awareness of latest technologies and potential gains from digitalization. ● Lack of deep knowledge of security and safety measures inherent in digitalizing the business processes. ● The business model of the firm is perceived underpinned by face-to-face interactions. ● Nostalgia. ● Employee resistance. ● Productivity being undermined by employee stress brought about by the intensification of work.	Creating a network of support for businesses to support transition. Recognition that the benefits and costs of digitalization are unevenly spread. Need for concrete interventions to mitigate this. Organizational 'good faith'; recognizing that digitalization may be undermined by violating past rules of fair play.

Data sources: synthesized by the authors from: Appiah et al., 2020; Amankwah-Amoah et al., 2021; Vural et al., 2020; Ebrahim & Irani, 2005; Effah, 2016; Effah & Nuhu, 2017; Rachinger et al., 2019; Peachey, 2019; 2020; Lokuge, Sedera, Grover & Dongming, 2019.

remotely increased very little in the decade from 2005 (Rosalsky, 2020b). Historical evidence of past pandemics, dating back to the waves of black plague in the Middle Ages, suggests that there was much hope of better futures in their aftermath, but owing to a range of vested interests – and the desire for the comfort of familiarity – there was a drive to return to "life as normal" (Varlık, 2020)), even if there were structural effects on wages and the relative power of labour. There is a very wide body of literature that confirms that 'nostalgia' and the desire for the comforts of an even partially imagined past can wield powerful effects on present-day choices (Atia & Davies, 2010).

s noted above, digital working can raise concerns as to greater surveillance, insecurity, and challenges to work–life balance; in turn, concerns as to the long-term wellbeing and associated productivity effects may deter its adoption, as might hidden forms of employee resistance. There is also a wider security dimension. All electronic communication is open to hacking and there have been numerous high-profile security breaches, even among those practicing high levels of security. An even greater threat is that of internet outages; the latter are inevitable, and often due to opaque causes (Aceto et al., 2018). In other words, digitalization imparts high-probability risks of uncertain scope and scale, the latter with consequences potentially beyond the realm of human past experience.

Finally, the erratic and, indeed, chaotic decision-making and frequent policy shifts that characterized the Johnson and Trump governments' response to COVID-19, in the UK and the US respectively, may do little to encourage substantial innovation and adoption of new technologies following resolution of the pandemic (Asimakopoulou et al., 2021). There are also more structural measures at play. For example, in the UK, national institutions have driven a specific pattern of economic activity that is particularly supportive of rentier interests (Standing, 2016). Central to the latter has been high levels of speculation on property, both commercial and residential (ibid.); homeworking challenges the rental market in large cities, and there is little doubt that the abovementioned UK government's back-to-work campaign of August 2020 was motivated by concern for the wellbeing of such interests. There is little doubt that as the pandemic diminishes there will be a wide range of institutional pressures brought to bear to support a return to the status quo ante of resuming office-based work. In the following sections we outline other barriers to digitalization.

3.2.1. *The digital divide*

A major challenge pertains to access to digital technologies. Even in the wake of the COVID pressure to embrace digital technologies (Amankwah-Amoah, 2020a; 2020b; 2021), many entrepreneurs generally face human resource and capability impediments encompassing technical skills and digital literacy, which can curtail the digitalization (see also Effah & Nuhu, 2017). It has been suggested that COVID-19 revealed the consequences of rising inequality in many developed nations (MacLeavy, 2020), as well as the real digital divide within and between developed and developing economies (African Business Magazine, 2020). Indeed, quarantine measures, social distancing laws, and stay-at-home restrictions adopted by governments in response to the pandemic were implemented in the absence of robust internet infrastructure in many developing economic and rural areas, and resulted in business failure, financial hardship, and other calamities (African Business Magazine, 2020). Many developing economies lack the institutions and infrastructure necessary to support digitalization, teleworking, and e-commerce.

One of the outcomes of the pandemic is the exposure of the digital divide in countries and its effects in exacerbating the inequalities between both the poor and rich, and urban and rural areas (see Yang, 2020). In many areas around the globe, small businesses often lack access to reliable wireless broadband or high-speed internet service to manage aspects of their operations. It is worth noting that many small-business owners in the developing world have opted to operate from their phones with internet services. Although access to new technologies and the internet continue to improve across the globe, all this limits the opportunities available to many businesses. Coupled with an underserved market for high-speed technologies, poverty also curtails access to opportunities for digital working. Even within developed economies, there are digital divides between major cities and rural areas where

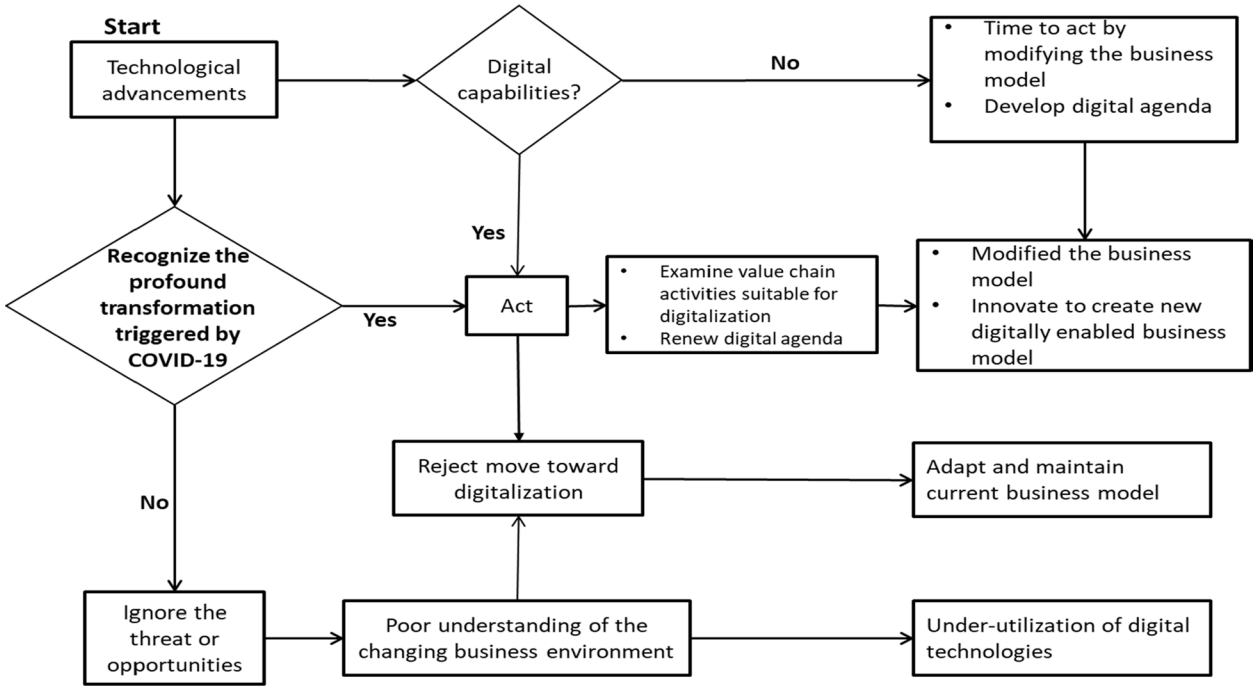

Fig. 2. A paradigm for COVID-19 and digitalization.

access and internet infrastructure development differ, thereby shaping new-business formation opportunities (Haight et al., 2014). Accompanying the pandemic is also the shift away from brick-and-mortar stores to online stores leading to underutilization of physical office spaces. Indeed, "the shift to remote work over the past few months—in some cases marking a permanent change—has refocused the sights of many corporate and private-equity buyers to acquisitions that help build capabilities in digital communications and e-commerce" (Cortez, 2020, p. nd).

4. Discussion and implications

Although the COVID-19 pandemic offers copious opportunities for firms to embrace digitalization, most have responded unevenly and in a manner that brings with it paradoxes and contradictions. Inspired by the scholarly interest in digitalization, the purpose of this paper was to examine how the COVID-19 pandemic is driving or constraining digitalization of businesses. In examining the issue, a conceptual model was advanced, linking the different forces for and against digitalization in the face of the pandemic, as depicted in Fig. 3. We contended that COVID-19 is "the great accelerator" in fast-tracking the existing global trend towards embracing modern technologies. Hence, COVID-19 may well have served as a "catalyst" in advancing the adoption and increasing use of various technologies such as video telephony, 5G digital networks, Internet of Things, cloud computing, machine learning, and artificial intelligence, but this process has been contested and the outcomes remain uncertain.

Moreover, we contended that some kind of "psychological dividend" of COVID-19 in precipitating the adoption of a host of new technologies influencing works and distribution of work, at the same time as nostalgia, represents a powerful barrier. Specifically, managers in a host of organizations which were previously fearful or hesitant about adopting new technologies, have been forced to alter their behaviors, even as others hanker for the opportunity to reset matters to the status quo ante. The analysis shed light on digitizing business-model practices ushered in by the pandemic including the shift to remote working and remote operations, and paperless offices and paperless organizations.

However, the opportunities offered by digital technologies and the pandemic for organizations to re-invent their business models have been curtailed by impeding forces such as organizational inflexibility, the digital divide, and the uneven effects on employee wellbeing. The crucial forces driving towards digitalization include availability of user-friendly digital technologies, lower digital-data storage cost and the potential efficiency gains that might come with this, as well as the savings and more efficient usage of time, and potentially flexibility, that come with homeworking; these benefits may be self-reinforcing in a positive feedback loop. However, there may be immediate costs to specific categories of employee, which are likely to be particularly concentrated within specific types of organization. In turn, this might lead to negative effects on wellbeing and productivity, raising the potential for resistance. Again, contextual circumstances, ranging from the physical infrastructural provision through to the configuration of supportive institutions to political pressures at the behest of vested interests, may all disrupt matters, and, indeed, coalesce in negative feedback loops. Moreover, digitalization brings with it many unknowns, which in turn, may drive the kind of nostalgia and an urge to return to the status quo ante that characterized past pandemics. Nor is such nostalgia solely driven by fear and superstition: digitalization brings with it a range of high-probability risks that are challenging to mitigate or prepare for, from quotidian security breaches to internet outages; knowledge as to the range of causes of the latter remains incomplete (Aceto et al., 2018). The analysis also focuses on the shift to remote working and remote operations, as well as paperless offices and paperless organizations, in other words, the digitalization of office work, supplementing accounts of the digitalization of marketing, logistics, supply chains, and retail. Simultaneously, shifts toward the digital office face countervailing pressures such as organizational inflexibility, ideology, and, in the case of smaller firms, traditions of cash-based businesses and the digital divide of haves and have nots.

From a theoretical standpoint, this paper contributes to the current discourse on COVID-19 (Spicer, 2020) by examining the shift and processes towards digitalization by businesses, focusing on the internal dimensions, people, and work, and locating this in a wider comparative context. We map out the mechanisms through which COVID-19 can drive digitalization in these domains, as a dynamic process, characterized by positive and negative feedback loops, moulded by internal and external contextual features. Other high-probability yet poorly prepared events are likely to result in similar dynamic processes of adjustment, characterized by foreseen and unforeseen consequences, and with associated patterns of reinforcement and disaggregation.

From a practical standpoint, our analysis buttressed the argument that the crisis presents opportunities for businesses to embrace at least some aspects of digitalization. This could be an effective strategy to weather the storm and help firms emerge from the crisis more resilient.

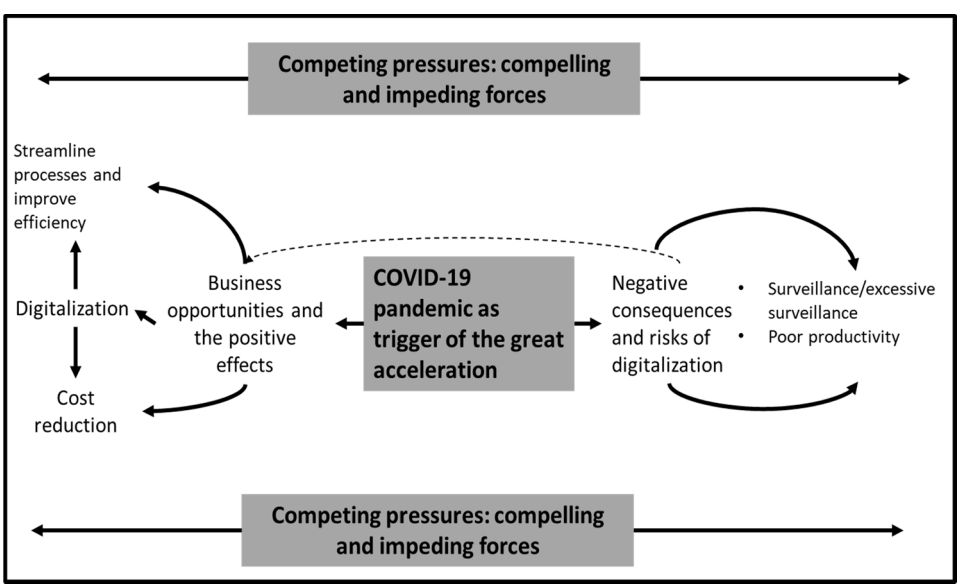

Fig. 3. A "unified" framework of competing forces from COVID-19.

Our analysis also buttresses the need for organizations to reinvent themselves or risk becoming the casualty of market competition. This is crucial given the empirical evidence from business failure research that has demonstrated that one of the major causes of business failure is the inability to adapt the business model and firms' offering as the external environment changes (Zhang et al., 2019). Our study speaks to the ongoing digitalization agenda around the globe emphasizing a need for governments to create economic incentives and processes that facilitate the transition of businesses to capture the benefits of digitalization (You et al., 2020). It is for this reason that it has become increasingly apparent for governments to focus on developing and scaling-up technology infrastructure to improve access as well as connecting rural communities to the new digital economy. To keep abreast of the changing technology landscape, there is a need for government resources especially in the developing world to build a technology infrastructure that provides baseline support for new and emerging businesses to take advantage of and transition to new technologies. For instance, governments can subsidize or provide electronically enabled devices for small businesses. This may bring transparency in the way businesses operate, helping in the enforcement of tax and labor standards. However, there are major concerns centered around the notion that digitalization can erode firms' ability to monitor, control, and assess the work of employees. This is coupled with the security and safety issues related to firms' exposure to embarrassing data breaches, data theft, and the general vulnerability of the digital infrastructure on which the firm relies. It is worth noting that some businesses still hold the view that it is not safe for them to distribute their products via the internet, and unfeasible to manage their people remotely. In addition, the transition to new technologies is generally difficult for firms. Indeed, when companies suddenly adopt powerful new technologies, productivity often drops in the short-term and then recovers (Rosalsky, 2020a); yet, as noted above, the productivity costs of digitalization may be delayed and long term. Moreover, the analysis also suggests the need for firms to embrace the latest technologies – digital platforms, cloud computing, mobile apps, and other communication tools as central to the organizational architecture. This would go a long way in improving firm processes and productivity, and facilitate effective collaboration between co-workers in isolated locations. There is also a potential for a greater "psychological dividend" to be accrued from technology usage during this crisis. This is where the pandemic has forced many individuals, managers, workers, and customers to embrace technologies that they previously rejected. In noting the wider practical implications of the observations made here, there is also potential that employers would seek to reduce wages of workers performing duties from low-cost locations and low-cost developing countries such as India, Mexico, and Turkey.

The COVID-19 pandemic has been associated with renewed statism, the latter encompassing not only remedial interventions but also a focus on developing industrial policies for sustainable post-pandemic recoveries (c.f. Wright et al., 2021). As part of the post-pandemic reconstruction, it may be desirable for governments to provide incentives for firms to develop digital skills and capabilities, and to improve national physical digital infrastructures. For example, routine and long-term usage of home working and teleworking may reduce traffic congestion and pollution, and make for more efficient working. Again, if firms can no longer count on the business models of the past, new digital skills may be a prerequisite for survival. The pandemic has led to governments making unprecedented usage of digital technologies to gather and monitor citizens, and this is likely to result in increased interest in the further usage of digital solutions.

This rescaling of the state has profound economic and political consequences, as, indeed, early research noted prior to the pandemic (Schou & Hjelholt, 2019). However, in considering the themes and issues raised by this study, it is worth taking further account of contextual effects. A large proportion of government-promoted digitilization has been driven by private firms enjoying close ties with governments, and who have used this opportunity to capture significant amounts of data and shore up monopolistic or oligopolistic market positions (see Wright et al., 2021). Hence, if there is more knowledge about what can be done digitally, there is little sign that this will drive broader and beneficial usage of digitalization across the wider economy, or improve the competitive position of firms at large. Again, whilst optimistic accounts have suggested that digitalization may make firms more competitive, whilst improving the position of workers, more pessimistic accounts highlight how this has contributed to closer surveillance and task fragmentation (Shibata, 2021). The latter can be without improving productivity or adding value to the production process. Indeed, whilst the pandemic may have driven greater digitalization, this may contribute to further oligopolization and a greater focus on generating returns from rents (owing to control of a market or accessing state resources) rather than the production of competitive goods and services. Hence, whilst digitalization may represent a vital element of post-pandemic industrial policy, it brings with it many risks and challenges. If governments cannot always be counted on to act wisely, or in the interests of non-insider firms and wider society, this would suggest a central role for civil society in holding them to account. NGOs continue to play an important role in providing digital skills to SMEs, but of equal importance is the raising awareness of the benefits and risks digitalization poses to them and society at large – in other words, in promoting *informed* digitalization.

Notwithstanding the above contributions to practice and theory, our analysis has important limitations which cannot be overlooked. It is worth noting that developing countries often suffer from institutional constraints such as lack of supportive internet infrastructure, poor telecom networks, and regulatory frameworks needed for remote working to flourish with rural areas being more heavily impacted relative to cities. Given that developed countries have become largely service-oriented economies such as banking, finance, and software development which lends itself to a degree of remote working, services from sectors such as farming, mining, and manufacturing that epitomize developing economies often have to be delivered or performed face to face. Beside the lack of empirical testing to underpin the analysis, the COVID situation is also still evolving, with multiple unknown outcomes. Thus, an interesting area for the future is to track businesses' activities through these different faces in their responses to COVID. Such analysis has potential to further elevate our understanding of this pandemic. A more robust empirical testing of the relationships outlined is needed to advance the literature. Although pandemics are unwelcome events, a study offering a deeper understanding of how businesses develop resilience capabilities to respond could further advance the literature. Future studies could explore the issues of business renewal and resilience after such a crisis. A valuable direction for future research would be to examine the effects of slow digitalization in leading to possible business failures.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

References

Aceto, G., Botta, A., Marchetta, P., Persico, V., & Pescapé, A. (2018). A comprehensive survey on internet outages. *Journal of Network and Computer Applications, 113*, 36–63.

Adomako, S., Amankwah-Amoah, J., Tarba, S. Y., & Khan, Z. (2021). Perceived corruption, business process digitization, and SMEs' degree of internationalization in sub-Saharan Africa. *Journal of Business Research, 123*, 196–207.

African Business Magazine (2020). Covid-19 exposes Africa's digital divide. Retrieved 20-9-20, from https://africanbusinessmagazine.com/sectors/technology/covid-19-exposes-africas-digital-divide/.

Amankwah-Amoah, J. (2020a). Stepping Up and Stepping Out of COVID-19: New Challenges for Environmental Sustainability Policies in the Global Airline Industry. *Journal of Cleaner Production, 271*, 123000. https://doi.org/10.1016/j.jclepro.2020.123000.

Amankwah-Amoah, J. (2020b). Note: Mayday, Mayday, Mayday! Responding to Environmental Shocks: Insights on Global Airlines' Responses to COVID-19. *Transportation Research Part E., 143*, 102098. https://doi.org/10.1016/j.tre.2020.102098.
Amankwah-Amoah, J. (2021). COVID-19 pandemic and innovation activities in the global airline industry: A review. *Environment International, 156*, Article 106719.
Amankwah-Amoah, J. Khan, Z., & Wood, G. (2020). COVID-19 and Business Failures: The Paradoxes of Experience, Scale and Scope for Theory and Practice. European Management Journal. DOI: 10.1016/j.emj.2020.09.002.
Amankwah-Amoah, J., Debrah, Y. A., Yu, W., Lin, Z., Danso, A., & Adomako, S. (2021). Technology strategies in emerging economies: Emerging issues, challenges and new research agenda. *Technological Forecasting and Social Change, 170*, 120881. https://doi.org/10.1016/j.techfore.2021.120881.
Anderson, D. and Kelliher, C., 2020. Enforced remote working and the work-life interface during lockdown. Gender in Management: An International Journal.
Appiah, G., Amankwah-Amoah, J., & Liu, Y. L. (2020). Organizational Architecture, Resilience and Cyber-attacks. *IEEE Transactions on Engineering Management.*
Asimakopoulou, K., Coulson, N., Gilbert, D. and Scambler, S., 2021. Covid-19: social and behavioural responses to chaotic decision making. BMJ, 372. Early online at: https://www.bmj.com/content/372/bmj.n249.full.
Atia, N., & Davies, J. (2010). Nostalgia and the shapes of history. *Memory Studies, 3*(3), 181–186.
Autio, E., Sapienza, H., & Almeida, J. (2000). Effects of Age at Entry, Knowledge Intensity, and Imitability on International Growth. *Academy of Management Journal, 43*(5), 909–924.
Autio, E., Mudambi, R. and Yoo, Y. 2021. Digitalization and globalization in a turbulent world: Centrifugal and centripetal forces. Global Strategy Journal. Early online at: https://onlinelibrary.wiley.com/doi/abs/10.1002/gsj.1396.
Baig, A., Hall, B., Jenkins, P., Lamarre, E., & McCarthy, B. (2020). *The COVID-19 recovery will be digital: A plan for the first 90 days*. McKinsey Digital.
Baldassarre, B., Calabretta, G., Bocken, N. M. P., & Jaskiewicz, T. (2017). Bridging sustainable business model innovation and user-driven innovation: A process for sustainable value proposition design. *Journal of Cleaner Production, 147*, 175–186.
Barkema, H., & Vermeulen, F. (1998). International Expansion Through Start-Up or Acquisition: A Learning Perspective. *Academy of Management Journal, 41*(1), 7–26.
Beaunoyer, E., Dupéré, S., & Guitton, M. J. (2020). COVID-19 and digital inequalities: Reciprocal impacts and mitigation strategies. *Computers in human behavior, 111*, 106424. https://doi.org/10.1016/j.chb.2020.106424.
Björkdahl, J. (2020). Strategies for digitalization in manufacturing firms. *California Management Review, 62*(4), 17–36.
Bloomberg, J. (2018). Digitization, digitalization, and digital transformation: confuse them at your peril. Retrieved 2-9-20, from https://www.forbes.com/sites/jasonbloomberg/2018/04/29/digitization-digitalization-and-digital-transformation-confuse-them-at-your-peril/#5616301a2f2c.
Bradley, C., Hirt, M., Hudson, S., Northcote, N., & Smit, S. (2020). The great acceleration. *McKinsey Quarterly*, 1–7.
Brennen, S. J., & Kreiss, D. (2016). Digitalization. In K.B. Jensen, R.T. Craig, J.D. Pooley, & E.W. Rothenbuhler (Eds.). The International Encyclopedia of Communication Theory and Philosophy (pp. 1–11). John Wiley & Sons.
Casadesus-Masanell, R., & Zhu, F. (2013). Business model innovation and competitive imitation: The case of sponsor-based business models. *Strategic Management Journal, 34*(4), 464–482.
Charbonneau, É., & Doberstein, C. (2020). An empirical assessment of the intrusiveness and reasonableness of emerging work surveillance technologies in the public sector. *Public Administration Review, 80*(5), 780–791.
Christensen, C. M., Antony, S. D., & Roth, E. A. (2004). *Seeing what's next*. Boston: Harvard Business School Press.
Collis, D. (1991). A Resource-Based Analysis of Global Competition. *Strategic Management Journal, 12*, 49–68.
Conroy, D.A., Hadler, N.L., Cho, E., … and Goldstein, C.A., 2020. The effects of COVID-19 stay-at-home order on sleep, health, and working patterns: a survey study of United States health care workers. Journal of Clinical Sleep Medicine, pp.jcsm-8808.
Cortez, J. (2020). Remote-Work Technology Fuels M&A Activity During Pandemic. Retrieved 2-9-20, from https://www.wsj.com/articles/remote-work-technology-fuels-m-a-activity-during-pandemic-11599211800?mod=searchresults&page=1&pos=1.
Covin, J. G., & Slevin, D. P. (1989). Strategic management of small firms in hostile and benign environments. *Strategic Management Journal, 10*(1), 75–87.
Dingel, J. I., & Neiman, B. (2020). *How many jobs can be done at home?, No. w26948*. National Bureau of Economic Research.
Ebrahim, Z., & Irani, Z. (2005). E-government adoption: Architecture and barriers. *Business Process Management Journal, 11*(5), 589–611.
Effah, J. (2016). Institutional effects on e-payment entrepreneurship in a developing country: Enablers and constraints. *Information Technology for Development, 22*(2), 205–219.
Effah, J., & Nuhu, H. (2017). Institutional barriers to digitalization of government budgeting in developing countries: A case study of Ghana. *Electronic Journal of Information Systems in Developing Countries, 82*(1), 1–17.
Elliott, R. J. R., Schumacher, I., & Withagen, C. (2020). Suggestions for a Covid-19 post-pandemic research agenda in environmental economics. *Environmental and Resource Economics, 76*(4), 1187–1213.
Faragher, J. 2020. Government Back to Work Campaign is Stepped Up. Personnel Today 28/8. Available at: https://www.personneltoday.com/hr/government-back-to-work-campaign-is-stepped-up/.
Grant, R. M. (1991). The resource-based theory of competitive advantage: implications for strategy formulation. *California Management Review, 33*(Spring), 114–135.
Haight, M., Quan-Haase, A., & Corbett, B. A. (2014). Revisiting the digital divide in Canada: The impact of demographic factors on access to the internet, level of online activity, and social networking site usage. *Information, Communication & Society, 17*(4), 503–519.
Hensher, D. A., Wei, E., Beck, MatthewJ., & Balbontin, C. (2021). The impact of COVID-19 on cost outlays for car and public transport commuting-The case of the Greater Sydney Metropolitan Area after three months of restrictions. *Transport Policy, 101*, 71–80.
Higgins, D. M. (2013). The black swan effect and the impact on Australian property forecasting. *Journal of Financial Management of Property and Construction., 18*(1), 76–89.
Hjálmsdóttir, A., & Bjarnadóttir, V. S. (2021). "I have turned into a foreman here at home": Families and work–life balance in times of COVID-19 in a gender equality paradise. *Gender, Work & Organization., 28*(1), 268–283.
Hodder, A. (2020). New Technology, Work and Employment in the era of COVID-19: Reflecting on legacies of research. *New Technology, Work and Employment, 35*(3), 262–275.
Hudson, A. (2012). Is the paperless office possible? Why it is so hard to go paperless? http://news.bbc.co.uk/1/hi/programmes/click_online/9735525.stm.
JoyBusiness (2020). Pandemic has catapulted banking sector into the future – Banking consultant. Retrieved 30-8-20, from https://www.myjoyonline.com/business/banking/pandemic-has-catapulted-banking-sector-into-the-future-banking-consultant/.
Kniffin, Kevin M., Narayanan, Jayanth, Anseel, Frederik, Antonakis, John, Ashford, Susan P., Bakker, Arnold B., Bamberger, Peter, Bapuji, Hari, Bhave, Devasheesh P., Choi, Virginia K., Creary, Stephanie J., Demerouti, Evangelia, Flynn, Francis J., Gelfand, Michele J., Greer, Lindred L., Johns, Gary, Kesebir, Selin, Klein, Peter G., Lee, Sun Young, Ozcelik, Hakan, Petriglieri, Jennifer Louise, Rothbard, Nancy P., Rudolph, Cort W., Shaw, Jason D., Sirola, Nina, Wanberg, Connie R., Whillans, Ashley, Wilmot, Michael P., & Vugt, Mark van (2021). COVID-19 and the workplace: Implications, issues, and insights for future research and action. *American Psychologist, 76*(1), 63–77.
Kreiser, Patrick M., Anderson, Brian S., Kuratko, Donald F., & Marino, Louis D. (2020). Entrepreneurial orientation and environmental hostility: A threat rigidity perspective. *Entrepreneurship Theory and Practice, 44*(6), 1174–1198.
Lanzolla, Gianvito, & Suarez, Fernando F. (2012). Closing the technology adoption–use divide: The role of contiguous user bandwagon. *Journal of Management, 38*(3), 836–859.
Leonard-Barton, D. (1992). Core capabilities and core rigidities: A paradox in managing new product development. *Strategic management journal, 13*(S1), 111–125.
Lokuge, Sachithra, Sedera, Darshana, Grover, Varun, & Dongming, Xu (2019). Organizational readiness for digital innovation: Development and empirical calibration of a construct. *Information & Management, 56*(3), 445–461.
Lozada, C. (2020). The great acceleration. Retrieved 10.5.2021, from https://www.washingtonpost.com/outlook/2020/12/18/coronavirus-great-acceleration-changes-society/.
Lupton, Deborah (2020). 'Better understanding about what's going on': Young Australians' use of digital technologies for health and fitness. *Sport, Education and Society, 25*(1), 1–13.
MacLeavy, Julie (2021). Care work, gender inequality and technological advancement in the age of COVID-19. *Gender, Work & Organization, 28*(1), 138–154.
Miele, Francesco, & Tirabeni, Lia (2020). Digital technologies and power dynamics in the organization: A conceptual review of remote working and wearable technologies at work. *Sociology Compass, 14*(6). https://doi.org/10.1111/soc4.v14.610.1111/soc4.12795.
Miller, D., & Friesen, P. (1984). *Organizations: A Quantum View*. Englewood Cliffs, NJ: Prentice-Hall.
Morgan Stanley (2020). Dear Fellow shareholders: Retrieved 2-9-20, from https://www.morganstanley.com/about-us-2020ams/pdf/2020_Letter_to_Shareholders.pdf.
Nambisan, Satish, Lyytinen, Kalle, Majchrzak, Ann, & Song, Michael (2017). Digital Innovation Management: Reinventing innovation management research in a digital world. *Mis Quarterly, 41*(1), 223–238.
Peachey, K (2019). Millions choose a cashless lifestyle. Retrieved 20-9-20, from https://www.bbc.co.uk/news/business-48542233.
Peachey, K (2020). More than half of all payments made by card even before coronavirus. Retrieved 20-9-20, from https://www.bbc.co.uk/news/business-52905265.
Phan, Phillip H., & Wood, Geoffrey (2020). Doomsday Scenarios (or the Black Swan Excuse for Unpreparedness). *Academy of Management Perspectives, 34*(4), 425–433.
Pisano, G., & Teece, D. (1994). The dynamic capabilities of firms: An introduction. Industrial and Corporate Change, 3(3), 537–556.
Rachinger, Michael, Rauter, Romana, Müller, Christiana, Vorraber, Wolfgang, & Schirgi, Eva (2019). Digitalization and its influence on business model innovation. *Journal of Manufacturing Technology Management., 30*(8), 1143–1160.
Retana, G. F., Forman, C., Narasimhan, S., Niculescu, M. F., & Wu, D. J. (2018). Technology support and post-adoption IT service use: Evidence from the cloud. MIS Quarterly, 42(3), 961-978.
Ritter, Thomas, & Pedersen, Carsten Lund (2020). Digitization capability and the digitalization of business models in business-to-business firms: Past, present, and future. *Industrial Marketing Management, 86*, 180–190.
Rosalsky, G. (2020a). Is Remote Work Here To Stay? Retrieved 2-9-20, from https://www.npr.org/sections/money/2020/06/30/882834590/is-remote-work-here-to-stay.
Rosalsky, G. (2020b). Why Remote Work Sucks, According To Science. https://www.npr.org/sections/money/2020/04/28/846671375/why-remote-work-sucks-according-to-science.

Ross, J. (2017). Don't confuse digital with digitization. MIT Sloan Management Review (https://sloanreview.mit.edu/article/dont-confuse-digital-with-digitization/).
Saarikko, Ted, Westergren, Ulrika H., & Blomquist, Tomas (2020). Digital transformation: Five recommendations for the digitally conscious firm. *Business Horizons, 63*(6), 825–839. https://doi.org/10.1016/j.bushor.2020.07.005.
Schou, Jannick, & Hjelholt, Morten (2019). Digital state spaces: State rescaling and advanced digitalization. *Territory, Politics, Governance, 7*(4), 438–454.
Seetharaman, Priya (2020). Business models shifts: Impact of Covid-19. *International Journal of Information Management, 54*, 102173. https://doi.org/10.1016/j.ijinfomgt.2020.102173.
Sheng, J., Amankwah-Amoah, J., Khan, Z., & Wang, X. (2020). COVID-19 Pandemic in the New Era of Big Data Analytics: Methodological Innovations and Future Research Directions. *British Journal of Management.*
Shibata, S., 2021. Digitalization or flexibilization? The changing role of technology in the political economy of Japan. Review of International Political Economy. https://www.tandfonline.com/doi/full/10.1080/09692290.2021.1935294.
Smith, J. (2019). Why businesses need to go paperless now. Retrieved 30-8-20, from https://www.itproportal.com/features/why-businesses-need-to-go-paperless-now/.
Sostero M., Milasi S., Hurley J., Fernández-Macías E., Bisello M., (2020). Teleworkability and the COVID-19 crisis: a new digital divide?, Seville: European Commission, 2020, JRC121193.
Soto-Acosta, Pedro (2020). COVID-19 Pandemic: Shifting Digital Transformation to a High-Speed Gear. *Information Systems Management, 37*(4), 260–266.
Spicer, A., 2020. Organizational Culture and COVID-19. Journal of Management Studies, 57(8), pp.1737-1740.
Standing, G. (2016). *The corruption of capitalism: Why rentiers thrive and work does not pay.* London: Biteback Publishing.
The Economist (2002) Business: Saving trees; Adobe versus Microsoft. 365(8298), 64.
Utterback, James M, & Abernathy, William J (1975). A dynamic model of process and product innovation. *Omega, 3*(6), 639–656.
Varlık, N. (2020). Rethinking the history of plague in the time of COVID-19. *Centaurus, 62*(2), 285–293.
Verma, Surabhi, & Gustafsson, Anders (2020). Investigating the emerging COVID-19 research trends in the field of business and management: A bibliometric analysis approach. *Journal of Business Research, 118*, 253–261.
Vural, C. A., Roso, V., Halldórsson, Á., Ståhle, G., & Yaruta, M. (2020). Can digitalization mitigate barriers to intermodal transport? An exploratory study. *Research in Transportation Business & Management, 100525*.
Wang, B., Liu, Y., Qian, J., & Parker, S. K. (2021). Achieving effective remote working during the COVID-19 pandemic: A work design perspective. *Applied Psychology, 70*(1), 16–59.
Wilson, M. E., & Chen, L. H. (2020). Re-starting travel in the era of COVID-19: Preparing anew. *Journal of Travel Medicine, 27*(5), p.taaa108.
World Health Organization. (2020). *Coronavirus disease (COVID-19): Weekly Epidemiological Update*. Geneva: WHO.
Worldometers (2021). Coronavirus Cases. Retrieved 18.07.2021, from: https://www.worldometers.info/coronavirus/.
Wright, Mike, Wood, Geoffrey, Musacchio, Aldo, Okhmatovskiy, Ilya, Grosman, Anna, & Doh, Jonathan P. (2021). State capitalism in international context: Varieties and variations. *Journal of World Business, 56*(2), 101160. https://doi.org/10.1016/j.jwb.2020.101160.
Yang, J.C. (2020). COVID-19 Exposed Widening Gap In Digital Divide. https://www.realclearpolicy.com/articles/2020/09/11/covid-19_exposed_widening_gap_in_digital_divide_576988.html.
Yerkes, M.A., André, S.C., Besamusca, J.W., Kruyen, P.M., Remery, C.L., van der Zwan, R., Beckers, D.G. and Geurts, S.A., 2020. 'Intelligent'lockdown, intelligent effects? Results from a survey on gender (in) equality in paid work, the division of childcare and household work, and quality of life among parents in the Netherlands during the Covid-19 lockdown. PloS one, 15(11), p.e0242249.
You, Kefei, Bianco, Silvia Dal, & Amankwah-Amoah, Joseph (2020). Closing Technological Gaps to Alleviate Poverty: Evidence from 17 Sub-Saharan African Countries. *Technological Forecasting and Social Change, 157*, 120055. https://doi.org/10.1016/j.techfore.2020.120055.
Zhang, Hongxu, Amankwah-Amoah, Joseph, & Beaverstock, Jonathan (2019). Toward a construct of dynamic capabilities malfunction: Insights from failed Chinese entrepreneurs. *Journal of Business Research, 98*, 415–429.
Zheng, Yingqin, & Walsham, Geoff (2021). Inequality of what? An intersectional approach to digital inequality under Covid-19. *Information and Organization, 31*(1), 100341. https://doi.org/10.1016/j.infoandorg.2021.100341.

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