

The impact of digitalization on promoting business during crisis: evidence from Armenian SMEs

Evidence from
Armenian
SMEs

Mane Beglaryan

*College of Business and Economics, American University of Armenia,
Yerevan, Armenia*

Anush Drampyan

*Department of Economics and Management, University of Padua,
Padua, Italy, and*

Parandzem Sargsyan

*College of Business and Economics, American University of Armenia,
Yerevan, Armenia*

Received 4 December 2022
Revised 18 July 2023
14 July 2024
Accepted 15 July 2024

Abstract

Purpose – This paper aims to analyze the factors that affect the attitudes of Armenian small and medium enterprises (SMEs) regarding digitalization, examining whether they view it as a tool to foster innovation and business growth, while also assessing the extent to which digitalization mitigated the negative impacts of the COVID-19 crisis.

Design/methodology/approach – The empirical approach is based on data collected from 452 Armenian SMEs, which were further analyzed using SPSS Statistics 23.0 software. Scales for assessing the COVID-19 impact, innovation and digitalization were constructed and validated. To test five hypotheses, binomial logistic regression was conducted to appraise the importance of digitalization for Armenian SMEs, including the ability to mitigate the consequences of the recent COVID-19 pandemic.

Findings – The results of the analysis showed that the economic sector plays a significant role in forming the expectations of firms on the positive impact of digitalization, while the company size does not affect them. This paper found that the provision of online services before the pandemic did not help Armenian SMEs to be less affected by the crisis. Furthermore, the perception of whether digitalization facilitated innovative processes, products and services did not depend on the degree of being affected by COVID-19. Finally, the findings indicate that the more agile companies which had the ability to convert their business model into an e-business model were less affected by the crisis.

Originality/value – This paper contributes to the literature by studying the effect of digitalization on SMEs, as well as how SMEs in small developing countries like Armenia mitigated the negative effects of the COVID-19 pandemic. The current work is unique as, to the best of the authors' knowledge, there are no prior empirical studies focusing on impact of digitalization and innovation induced by exogenous shocks in an under-researched country like Armenia.

Keywords COVID-19, Digitalization, Business agility, Innovation, Small and medium enterprises (SMEs), Armenia

Paper type Research paper



© Mane Beglaryan, Anush Drampyan and Parandzem Sargsyan. Published by Emerald Publishing Limited. This article is published under the Creative Commons Attribution (CC BY 4.0) licence. Anyone may reproduce, distribute, translate and create derivative works of this article (for both commercial and non-commercial purposes), subject to full attribution to the original publication and authors. The full terms of this licence may be seen at <http://creativecommons.org/licenses/by/4.0/legalcode>

1. Introduction

Often referred to as “the backbone of the economy,” small and medium enterprises (SMEs) are the driving force for the economies of both developed and developing countries. They play a major role in promoting economic growth, creating employment and reducing poverty (Wagenvoort, 2003; Beck *et al.*, 2005; Paul *et al.*, 2007; Garicano *et al.*, 2016). In 2018, SMEs comprised more than 99.8% of all enterprises in Armenia’s business economy, with microenterprises constituting 93.6% of them (Organisation for Economic Co-operation and Development (OECD), 2020). SMEs accounted for 68% of total business employment and generated up to 60% of value added in the business sector (OECD, 2020).

The economic crisis induced by the outbreak of the COVID-19 pandemic posed serious challenges for the survival and development of SMEs which were hit even harder than larger companies (Balla-Elliott *et al.*, 2020; Bartik *et al.*, 2020; Dua *et al.*, 2020; Lindsay *et al.*, 2020; OECD, 2020). SMEs accounted for 43% of the income and two-thirds of the employment decline caused by the COVID-19 pandemic (Pedauga *et al.*, 2021).

The outbreak of the COVID-19 pandemic had a severe impact on the economy of Armenia, causing a decline of 7.2% in 2020 [1]. Simultaneously with the crisis caused by COVID-19, Armenian SMEs had to cope with the economic consequences of the country’s large-scale war with Azerbaijan in the final quarter of 2020. The SMEs in Armenia struggled to maintain their operations due to the supply shortages and the decrease in domestic demand. According to the survey conducted by UNECE, only 20% of SMEs were able to achieve their prepandemic levels of earnings by July 2020. For the rest, the earnings declined by up to 50%. The SMEs found it hard to survive, with only 21% stating they could maintain operations without the support from the government, while the remaining 79% emphasized the role of government support, in particular tax deferrals and subsidized loans, for maintaining operations (United Nations Economic Commission for Europe (UNECE), 2020). Armenian SME employees were especially affected by the crisis, having been laid off or having reduced work hours and pay (Beglaryan and Shakhmuradyan, 2020).

In general, SMEs need to adopt e-business strategies to keep up with the economy (Vieru *et al.*, 2015). To be competitive, SMEs need to develop new business strategies involving the utilization of e-business enabling information technologies (Ferrari, 2012). Literature suggests that there are a number of perceived benefits that digitalization provides to SMEs, such as expansion to international markets, facilitation of knowledge acquisition and wider and more intimate interaction with customers, business partners, investors and local authorities; these, in turn, lead to sustainable competitive advantages (Genc *et al.*, 2019; Ballestar *et al.*, 2020; Vadana *et al.*, 2019; Thrassou *et al.*, 2020).

In this technological era, digitalization is also seen as an important tool to deal with crises (Guo *et al.*, 2020; Papadopoulos *et al.*, 2020). It is no surprise that COVID-19 has intensified the need for digitalization and accelerated the process of adoption of digital tools for SMEs (OECD, 2021). Along with other benefits such as improved performance, innovation enablement, enhanced productivity and lower costs (Genc *et al.*, 2019; Ballestar *et al.*, 2020; Vadana *et al.*, 2019; Thrassou *et al.*, 2020), digitalization helps companies to maintain business continuity by enabling remote working practices and a shift to e-commerce (OECD, 2021). In fact, agile organizations managed to not only respond to the threats brought by the crisis but also to capitalize on the opportunity to convert to the e-business model (BM) (Jadoul *et al.*, 2020).

Nevertheless, despite the benefits that digitalization entails for SMEs, they still lag in digital adoption (Kilimis *et al.*, 2019; Gierlich *et al.*, 2019). The peculiarities of SMEs, such as lack of access to finance and limited managerial capital resources (Thrassou *et al.*, 2018), make it harder for them to digitalize.

Considering the major role of SMEs in the Armenian economy and the challenges they faced caused by the pandemic further aggravated by the war, it is important to explore the use of digitalization as a means to deal with the repercussions of COVID-19. Understanding how SMEs leverage digitalization during major crisis situations, especially in the specific context of a developing country like Armenia, is a paramount strategic question that is yet to be fully understood, providing the research focus for the remainder of the current study.

This paper pursues the following objectives. First, we study how the expectations of the Armenian SMEs with respect to digitalization change depending on their size, economic sector and the degree of being impacted by COVID-19. Second, we explore the role of digitalization in overcoming the hardships of the COVID-19 crisis. In particular, we examine whether the SMEs that provided online services before the crisis and were able to convert their BM to an e-BM were less affected by the COVID-19 pandemic.

To answer these questions, an electronic survey was conducted among small and medium companies operating in the Republic of Armenia. The empirical approach is based on data collected from 452 Armenian SMEs. The obtained data were further analyzed using SPSS Statistics 23.0 software. The COVID-19 impact was assessed through scale composition while digitalization and innovation were measured based on OSLO Manual (OECD/Eurostat, 2018). To test five hypotheses, binomial logistic regression was conducted, appraising the importance of digitalization for Armenian SMEs, including the ability to mitigate the consequences of the recent COVID-19 pandemic.

Drawing upon the resource-based view (RBV) and Porter's strategy framework, this study contributes to current literature on digitalization empirically appraising the need to act strategically during crisis situations, seeing it as an opportunity rather than a threat. More specifically, while digitalization is a well-researched topic in general, there is scant research that examined digitalization in the country context of Armenia during the crisis. We contribute to the literature on digitalization and strategy by providing a rich context for the study. Focusing on SMEs from an emerging economy like Armenia, it shows how the country's context impacts the effectiveness of digitalization for SMEs as a tool to fight the crisis and as a catalyst of innovation.

The paper is structured as follows: Section 2 provides a review of the literature on digitalization, its role for SMEs, the relationship between digitalization and agility and the impact of digitalization on innovation. Based on that evidence, five hypotheses on the impact of digitalization on SMEs' ability to deal with the crisis are advanced. Section 3 describes research design and methodology. Section 4 is devoted to the results of the analysis. Section 5 offers a discussion of the main findings. Finally, Section 6 concludes the paper.

2. Literature review and hypothesis development

2.1 Review of digitalization

While there is no universally accepted definition of digitalization in academic literature, it is widely known as the development of new BMs and business processes that can take advantage of newly digitized products (Unruh and Kiron, 2017). Since digitalization is a complex phenomenon, there are several adopted definitions. Researchers distinguish digitization, digitalization and digital transformation as three interrelated yet distinct concepts. Digitization is the process of turning physical information into digital formats for processing, storage and transmission by computers (Dougherty and Dunne, 2011; Loebbecke and Picot, 2015). Digitization is typically driven by technologies that result in enhanced efficiency by automating existing processes, yet digitalization depicts how the use of information and communications technology alters an organization's BM, including creating new or improved ways of delivering services, communicating and improving the quality of offerings (Li *et al.*, 2018; Ramaswamy and Ozcan, 2016). The prevailing phase is called digital transformation. As

such, it presupposes the emergence of entirely new BMs based on radically novel logics to create and capture value (Iansiti and Lakhani, 2017; Kane *et al.*, 2015; Iansiti and Lakhani, 2014; Parker *et al.*, 2016; Verhoef *et al.*, 2021). For the purposes of this paper, we use the broader term digitalization to capture all forms of digital transformation.

Digitalization of businesses has quickened in recent years with firms across all sectors and of all sizes equipping their staff with digital tools (OECD, 2021). This process has been rapidly accelerated by the COVID-19 crisis. According to a new McKinsey Global Survey of executives, companies have expedited the adoption of digital technologies by several years. The share of digital or digitally enabled products in their portfolios has accelerated by a shocking seven years (LaBerge *et al.*, 2020).

The extant literature dedicated to the study of the effects of digitalization on organizations states that the key areas that are affected and enhanced through digitalization are organizational agility, organizational structures, organizational learning, digital innovations and business ecosystems (Joshi *et al.*, 2010; Nylen and Holmstrom, 2015; Kuusisto, 2017). Several studies provide findings on the benefits that digitalization provides. For instance, Thrassou *et al.* (2020) argue that digitalization of BMs offers firms a number of advantages, including cost reduction, a broader selection of products, richer and participative information, efficiency and sufficiency. Moreover, digitalization can become a fundamental source of competitive advantage for businesses adopting it (Bharati and Chaudhury, 2009; Ongori and Migiroy, 2010). Digitalization enables organizations to reinvent their products and enter new markets, to work with a wider range of suppliers and customers and significantly lower the transaction and coordination costs (Lanzolla *et al.*, 2020). According to the Deloitte (2021) Digital Transformation Executive survey, organizations' top reasons to invest in digital transformation included innovation, keeping up with change and resilience. Other drivers of digitalization are customer acquisition, cost savings and higher agility and flexibility (Feichtinger, 2018). Despite the positive impact that digitalization has on firm performance (Tsou and Chen, 2021), it also poses certain challenges to businesses, such as higher exposure to digital security risks and greater likelihood of cyberattacks. Government support as well as integration of digital security risk management into their business processes may substantially reduce these risks (OECD, 2021). Even though digitalization and its outcomes have sparked a great interest among management practitioners and academic scholars, the literature on the role of digitalization in SMEs still remains scarce (Thrassou *et al.*, 2020; Pfister and Lehmann, 2021).

2.2 Digitalization among small and medium enterprises

Due to the challenges posed by the COVID-19 pandemic, the role of digitalization in SMEs has gained even more importance (OECD, 2021). In fact, COVID-19 has served as an accelerator for SME digital transformation. The data from surveys have shown that 70% of SMEs have increased the usage of digital technologies during the COVID-19 crisis (OECD, 2021). These investments resulted in benefits for organizations adopting digitization. Thanks to moving operations online and smart working solutions, businesses overcame lockdowns and disruptions in supply chains (OECD, 2021).

Using data from a survey of Greek firms during the pandemic, Giotopoulos *et al.* (2022) found that further investments in information and communications technology (ICT) infrastructure contribute to the digital development of SMEs. Furthermore, unlike large firms, SMEs, which implemented flexible human resources (HR) practices (such as remote work) and faced delays in the supply chain due to the pandemic, appear to have increased probability of expanding their digital marketing and e-commerce (Giotopoulos *et al.*, 2022).

Undertaking multiple case study research on the digital transformation of seven "Made in Italy" SMEs, Penco *et al.* (2023) studied the role of entrepreneurial orientation (EO) in

interpreting COVID-19, as an opportunity for investing in digital transformation. The authors find that EO helps to address the market opportunities related to digitalization.

Using a sample of 373 observations from 250 Chinese SMEs, [Lee et al. \(2022\)](#) examine the moderating effects of the COVID-19 pandemic on the relationship between digital experience and international orientation (IO). Their results show that the COVID-19 pandemic is mitigating the positive impact of SMEs' use of both foreign and domestic platforms on their IO.

However, the degree to which digitalization can be used by the SMEs to survive and succeed during the COVID-19 pandemic depends on the access to digital technologies and the level of digital literacy of individuals and social groups. Defined as digital inequalities, differences in the access to technologies and the ability to use them were potentiated by the pandemic and put socially and economically disadvantaged people at more risk to socioeconomic consequences of the pandemic ([Beaunoyer et al., 2020](#)). Recent research highlights that SMEs are distinguished by their level of digital maturity based on parameters such as industry/sub industry (e.g. high/low knowledge intensity), size, core activity and BM as well as geographic location ([Ragazou et al., 2022](#)).

Based on a case study analysis of seven manufacturing firms from Indonesia, [Priyono et al. \(2020\)](#) demonstrate that SMEs' degree of digital transformations depends on several contextual factors. First, SMEs with a high level of digital maturity respond to the challenges by accelerating the transition toward digitized firms; second, SMEs experiencing liquidity issues, but a low level of digital maturity decide to digitalize the sales function only; and third, the SMEs that have very limited digital literacy can solve the challenges when being supported by a high level of social capital.

The SMEs that operate in emerging markets and developing economies (EMDEs) tend to deal with limited funding and lack of human and social capital. In some cases, the SMEs are either unaware or lack the technical capabilities to implement the available state-of-the-art technologies. The systemic challenges in the EMDEs continue to inhibit technology adoption by small businesses and, therefore, leave them years behind their counterparts in advanced economies ([Akpan et al., 2020](#)).

According to the RBV, the firm's performance is determined by the resources it has at its disposal. The internal resources of the firm must be configured and used in a way to provide it with a distinct competitive advantage ([Barney, 1991](#)). As suggested by [Eller et al. \(2020\)](#) the configuration of certain resources leads to the success in digital transformation. [Porter \(1985\)](#) further posits that to achieve competitive advantage through the use of technological innovations, the companies should have in place a technology strategy that must present the firm's approach to the development and the use of technology. Digitalization is multifaceted and requires formulation and implementation of adequate digital strategy ([Imgrund et al., 2018](#)). This represents a challenge to SMEs that do not always have capacity to undertake digital transformation, due to a lack of financial resources as well as limited managerial and human capital resources ([Thrassou et al., 2018](#); [OECD, 2021](#)).

This is particularly true for micro and small enterprises that tend to be underdigitalized in comparison to medium and large companies and have not fully realized the benefits of using digital technologies (International Labour Organization (ILO), 2021).

The possibility of implementation of online operations and remote working practices has not been even across economic sectors. Industries in which work can be carried out remotely were less affected by the pandemic, such as information and communications, finance and insurance, professional and scientific work and education ([del Rio-Chanona et al., 2020](#); [Fernandes, 2020](#); [Saltiel, 2020](#); [Beglaryan et al., 2021](#)). [Fairlie \(2020\)](#) found that industry distributions placed Black and Latino American business owners at greater risks of losses in business activity during the pandemic.

Eller *et al.* (2020) identify information technology (IT) adoption, employee skills and digital strategy as three key resources that drive digitalization in SMEs. The companies that were providing online services before COVID-19 already possessed these resources. Hence, it was easier for them to use digitalization as a tool to overcome the crisis, in contrast to companies that still needed to acquire the necessary resources and develop a digital strategy.

Based on the reviewed literature, we advance the following hypothesis:

- H1. Micro and small companies have higher expectations about digitalization leading to innovation and business growth compared to medium-size companies.
- H2. Companies from the tertiary sector have higher expectations about digitalization leading to innovation and business growth compared to those from primary and secondary sectors.
- H3. Businesses which provided some online services before COVID-19 pandemic were less affected by the crisis compared to those with no online services.

2.3 Digitalization and business agility

In today's fast-changing world, organizational agility is seen as a necessity rather than a choice (Alavi *et al.*, 2014). The early definition of business agility was "the capacity to react quickly to rapidly changing circumstances" (Brown and Agnew, 1982), while the present depiction asserts that agile organizations can quickly redirect their people and priorities toward value-creating opportunities (Aghina *et al.*, 2020). The benefit of agility is not only capitalizing on opportunities but also responding to threats in a timely manner (Kuusisto, 2017).

The relationship between digitalization and agility is widely addressed in the literature. Digitalization is perceived as a technology-induced transformation process that improves an enterprise's flexibility, agility and responsiveness (Imgrund *et al.*, 2018). As a next-generation enabling technology, it is one of the five dimensions for enhancement of enterprise agility (Aghina *et al.*, 2020). Organizational agility can be divided into two subsections: *workforce agility* and *business process agility* (Kuusisto, 2017). Flat organizational structures seem to act as enablers of workforce agility (Alavi *et al.*, 2014). By improving access to information for all the personnel, digitalization assists in making modern organizations flatter (Dewett and Jones, 2001) which, in turn, leads to higher workforce agility. Since flatter organizational structures are characteristic of SMEs and, therefore, distinguish them from large companies, enabled by digitalization they may contribute to enhancement of agility (Kuusisto, 2017). Scholars who focus on *business process agility* argue that digitalization enables business process innovation and facilitates flexible business processes, thus generating value for companies (Yang *et al.*, 2014). Further, information technology, information systems and virtual enterprises are considered to be significant agility enablers (Walter, 2020) and IT competence improves agility as one of significant organizational capabilities (Sambamurthy *et al.*, 2003). At the national and industry levels, digitalization positively impacts firm agility (Skare and Soriano, 2021).

The COVID-19 pandemic has intensified the need for agile practices. Embracing agility has helped companies to survive and succeed in an environment of increased uncertainty, volatility and complexity (Jadoul *et al.*, 2020). Agile organizations have better managed the impact of the COVID-19 crisis compared to their peers. Analyzing 25 companies across seven sectors they found that agile business units responded better to shocks brought by the COVID crisis (Jadoul *et al.*, 2020). Studying the impact of the COVID-19 emergency on business continuity, companies which successfully dealt with the crisis implemented agile business practices and used digital technologies as key enablers (Margherita and Heikkilä, 2021). During the pandemic, SMEs realized that they could boost resilience and use the

opportunity brought by the crisis to increase revenues by making a digital transition and a shift to e-commerce (AmCham Business Magazine, 2021). Current literature discusses the variation in the degree of proactiveness of firms when it comes to seeing this as an opportunity to be exploited. This includes the proactive adoption of innovative e-business solutions during such crises that enables rapid response and business continuity (Saleh Al-Omoush *et al.*, 2020; Ivanov and Dolgui, 2020; Ivanov, 2020; Pantano *et al.*, 2020).

As a key ingredient to digital transformation (Caversan, 2021), agility enabled companies to not only respond to the threats brought by the crisis but also to capitalize on the opportunity to convert to the e-BM (Jadoul *et al.*, 2020).

Hence, we advance the hypothesis that:

H4. Businesses with higher levels of agility were less affected by the COVID-19 pandemic compared to those with lower levels of agility.

2.4 Digitalization and innovation

The Advisory Committee on Measuring Innovation in the 21st Century (2008) defines innovation as:

The design, invention, development and/or implementation of new or altered products, services, processes, systems, organizational structures, or business models for the purpose of creating new value for customers and financial returns for the firm.

Four types of innovation are distinguished: *product innovation*, *process innovation*, *marketing innovation* and *organizational innovation*. *Product innovation* is defined as a new or significantly improved good or service, while *process innovation* refers to a new or improved production or delivery method. *Marketing innovation* indicates significant changes in product design, placement and promotion. Finally, *organizational innovation* is the employment of new methods in business practices, workplace organization or external relations (OECD, 2005).

Depending on the degree of novelty, innovation can be *incremental* or *radical*. *Incremental innovations* improve existing products or services and reinforce established product/service design and technologies. Conversely, *radical innovations* significantly transform existing products or services and make the established products/service design and technologies obsolete (Camps and Marques, 2014).

Various factors influence a company's capacity to innovate. *Organizational-level* drivers that enable innovation are strategy, culture, knowledge management, structure, research and development investment, organizational learning, organizational support and business processes and practices (Dani and Gandhi, 2021). However, at the *individual level* the drivers of innovation are creativity, leadership and employee motivation (Dani and Gandhi, 2021).

Several authors have studied the link between digitalization (IT) and innovation both theoretically and empirically (Joshi *et al.*, 2010). The results of their analysis show that knowledge capabilities that are enhanced through the use of IT contribute to firm innovation. Using a sample of Italian and Spanish ceramic tiles companies, Fernández-Mesa *et al.* (2014) find that information technology competency plays a crucial role in internal and external learning competencies which, in turn, contribute to commercial success of innovation. Nevertheless, Lanzolla *et al.* (2021) emphasize that even though digitalization can foster innovation by enabling discovery of new knowledge, it may also hamper innovation if it reinforces extant knowledge structures. Specifically, whether digitalization will have a negative or positive effect on innovation depends on the extent to which existing competencies and new digital skills complement or substitute each other (Lanzolla *et al.*, 2021).

Another strand of literature focuses on the relationship between the use of IT and innovation results in the context of SMEs. The findings by [Soto-Acosta et al. \(2014\)](#) show that web knowledge sharing in SMEs contributes positively to organizational innovation. [Scutto et al. \(2017\)](#) argue that companies use IT solutions to acquire and manage knowledge dispersed in the external environment to improve intra and interorganizational innovation processes. The authors find that ICTs oriented to intraorganizational (in-house research and development) and interorganizational (open innovation) processes improve SMEs' innovation performance.

Some scholars examine the effects of digitalization considering the context of business model innovation (BMI) ([Arnold et al., 2016](#); [Kiel et al., 2017](#); [Rachinger et al., 2018](#); [Parida et al., 2019](#); [Bouwman et al., 2019](#)). By looking at individual elements of the BM, recent studies state that digitalization mainly impacts value propositions, internal infrastructure management and customer relationships ([Arnold et al., 2016](#); [Kiel et al., 2017](#)). According to [Rachinger et al. \(2018\)](#), there are three ways in which digitalization can influence BMs: optimization of the existing BM (e.g. cost optimization), transformation of the existing BM (e.g. extension of the business) and development of a new BM (e.g. new products or services), the latter being the primary driver of BMI. [Parida et al. \(2019\)](#) in their turn suggest that digitalization enables BMI through the following elements: value creation, value delivery and value capture. In the context of value creation, companies develop new offering configurations, better understand customer needs and engage in collaborative value creation. For value delivery, digital BMs require the development of new capabilities, revision of operational processes and roles and responsibilities in the business ecosystem. Finally, when it comes to value capture, digitalization improves cost efficiency, increases revenue streams and contributes to development of new risk management approaches. In an empirical study, [Bouwman et al. \(2019\)](#) analyze how SMEs can handle digitalization by spending more time and effort on innovating their BMs. They demonstrate that to achieve better performance, SMEs undergoing digital transformation should allocate more resources for BM experimentation and engage more in strategy implementation ([Bouwman et al., 2019](#)).

Digital transformation is an enabler for BMI. It impacts value creation, delivery and capture, which leads to the employment of a variety of new BMs ([Vaska et al., 2021](#)).

Therefore, we advance the following hypothesis:

- H5.* The firms' expectations of digitalization leading to innovative processes, products and services change depending on the degree they were affected by COVID-19.

3. Research design and methodology

3.1 Data and sample

The survey used in this study was administered electronically by the Center for Business Research and Development at the American University of Armenia. The survey was conducted among small and medium Armenian companies, which received invitations for participation and links to the survey via e-mail. In line with the EU definition, the SME definition in Armenia is based on three criteria covering employment, turnover and balance sheet. More specifically, micro enterprises are defined as enterprises that have fewer than ten persons and whose annual turnover or balance sheet does not exceed AMD 100m (185,580 euro). Small enterprises are defined as enterprises that employ fewer than 50 persons and whose annual turnover or annual balance sheet does not exceed AMD 500m (927,900 euro). Finally, medium enterprises are defined as enterprises that have fewer than 250 employees and an annual turnover that does not exceed AMD 1,500m (2,783,700 euro) or an annual balance sheet not exceeding AMD 1,000m (2,041,380 euro) ([OECD, 2020](#)) [2].

The survey has been conducted across the companies of Republic of Armenia (RA). The companies have received invitations for participation in the survey and the links to the survey via e-mail. In case, if the survey link was not opened during the 12 and then 24 h after the receiving the potential respondents received two reminders/1st reminder after 12h, 2nd reminder after 24h/. Those who did not open the link in two days got the 3rd reminder on the 3rd day. The data collection was done in two waves. 1st wave – 16,767 invitations to the companies with three following reminders – 28.03.2021–30.03.2021. The 2nd wave included 35,402 invitations to the companies with three following reminders – 05.04.2021–08.04.2021. The total number of invitations was 52,169, with primary targeting of 44,713 SMEs that had both registered wage earners and positive income in 2020 [3]. The survey was conducted from 28.03.2021 to 08.04.2021, resulting in 452 valid responses where most respondents (69%) stated that they are the owners of the enterprise, which were further analyzed with SPSS Statistics 23.0 software to test five hypotheses stated in the preceding sections of this research.

3.2 Variables measurement

To test the stated hypothesis and to measure the importance of digitalization for Armenian SMEs, the relationship between impact of digitization on Armenian SMEs and consequences of the recent COVID-19 pandemic was studied.

COVID-19 impact. In the questionnaire, a question was included asking whether the COVID-19 crisis has affected a company's business with yes/no response options. As well as a Likert scale question was included asking about the extent of COVID-19's impact on demand/supply chain/staff/other aspects with 1-very low, [..], 5-very high response categories. Further, in logistic regression models, low and very low impact were grouped under the "1-low impact" category while average to very high response options were grouped together as "0-average to high impact."

Innovation and digitalization. The questions for measuring innovation impact were based on the use of OSLO Manual (OECD/Eurostat, 2018) where the fourth version included a number of modifications to take into account a broader range of innovation-related phenomena as well as the experience gained from recent rounds of innovation surveys in OECD countries and partner economies and organizations (see Table 1). To measure the perception of Armenian organizations of digitalization as an opportunity of business growth and overcoming the crisis, the survey instrument included five statements (Likert scale: 1-very low, [..], 5-very high) regarding the positive impact of digitalization on different business activities (see Table 1). The scores of these five items were averaged, and the resulting means were used to calculate the overall positive impact of digitalization scores in further analysis.

Control variables. In the collected data, the sample size by industry groups and subgroups is very small and not representative of the real picture of the Armenian economy; therefore, in the further analysis the companies were divided into the broader sectors of the economy: primary, secondary and tertiary. The three-sector economy model was first developed by Allan Fisher (1939), Colin Clark (1940) and Jean Fourastié (1969). The primary sector includes the extraction of raw materials, the secondary sector deals with manufacturing and the tertiary sector presents services. Information services were not separated as a fourth sector because of the limited number of responses in that group. In addition to the economic sector, the models also incorporated company size, categorizing them into three groups: very small, small and medium-sized. The very small category was used as the reference category in binomial logistic regression models.

Questions	Response scale
C.1 Has your company taken any action to convert your business activity into an online activity?	Yes, some staff attended training courses/yes, an external consultant was contracted/no
C.2 Have you benefited from the online services that have been provided by the government/NGOs?	Yes/ no/ not applicable
C3. Does your business activity include online services before the crisis?	Yes/no
C4. What has been the growth rate of sales through digital channels since the beginning of the crisis?	No growth/ 10%/ . . . / 50%/ more than 50%
C5. Is it possible to convert your business model to an e-business model?	Yes/No
C6. To what extent is your company expecting a positive impact of digitalization on these aspects?	1-very low, . . . , 5-very high
a) Digitization of processes	1-very low, . . . , 5-very high
b) Innovative products and services	1-very low, . . . , 5-very high
c) Closer/better relationships with customers, suppliers, partners	1-very low, . . . , 5-very high
d) Market share gain	1-very low, . . . , 5-very high
e) New business opportunities	1-very low, . . . , 5-very high
f) Other, please, specify	1-very low, . . . , 5-very high
g) Other, please, specify	1-very low, . . . , 5-very high

Table 1. Survey questionnaire **Note:** Section on “Innovation/digital Transformation due to COVID-19”

Impact area	Primary		Secondary		Tertiary	
	Mean	SD	Mean	SD	Mean	SD
Overall positive impact	2.63	1.42	2.59	1.22	2.65	1.36
Digitization of processes	2.07*	1.49	2.19	1.33	2.69*	1.56
Innovative products and services	2.29	1.46	2.53	1.39	2.68	1.52
Closer/better relationships with customers, suppliers and partners	2.90	1.59	2.69	1.45	2.90	1.40
Market share gain	2.83	1.58	2.84	1.40	2.93	1.41
New business opportunities	2.65	1.35	2.66	1.49	2.83	1.54

Notes: Significant at *** $p < 0.001$; ** $p < 0.01$; and * $p < 0.05$. Scale: 1-very low [. . .] 5-very high

Table 2. Average impact of digitalization and one-way ANOVA test results by economy sectors

4. Results of the analyses

In the collected data, 12% of companies in the sample represented the primary sector of the economy, 13% were from the secondary sector and the vast majority of SMEs (75%) were from the tertiary sector of the economy; these proportions thus replicate the ratio of primary, secondary and tertiary companies in the Armenian economy when the survey was conducted. Table 2 illustrates that Armenian SMEs from all the three sectors of the economy expect an overall average level impact of digitalization (2.63 out of 5, with 1 as “very low” and 5 as “very high”) on producing innovative products and services, digitization of processes, closer and better relationships with their customers/suppliers/partners, gaining market share and having new business opportunities. One-way analysis of variance

(ANOVA) test results indicated that the companies operating in the primary sector of economy had statistically significantly lower expectations about positive impact of digitalization on having more digital processes compared to companies operating in the tertiary sector of the economy, while no statistically significant difference by economy sector was observed in the other impact areas of digitalization (see Table 2).

In the collected data, 76% of the 452 Armenian companies that participated in the survey were very small (micro), 21% were small and only 3% were medium size companies. Compared to the economy sector, expectations of companies about the positive impact of digitalization on any aforementioned impact area were not statistically significantly different by company size (see Table 3).

To test the H2 of this study, which states that businesses which provided some online services before the COVID-19 pandemic were less affected by the crisis, binomial logistic regression was run between the impact of COVID-19 and the statement whether the companies were providing online services before the crisis; economy sector and company size were included as control variables. According to the survey, the COVID-19 pandemic affected 87% of the Armenian SMEs negatively; in particular, 49% of the companies reported the high impact of the pandemic in terms of less demand/orders, supply chain problems, redundant employees, problems related to hiring new employees and forced lockdown. Table 4 (Model 1) illustrates that no statistically significant relationship was found between providing online service before COVID-19 and being affected by the crisis. On the contrary, companies with higher agility which indicated that it was possible to convert their BM into an e-BM had approximately twice higher chances of not being affected by the COVID-19 pandemic compared to companies with lower agility which were not able to convert their business into an e-BM (see Table 4, Model 2). Approximately 30% of companies reported that it was possible to convert their BM to an e-BM, out of which about 85% were companies from the tertiary sector of the economy.

For measuring the role of digitalization in driving innovation in Armenian SMEs during a COVID-19 pandemic, logistic regression was run between the expectation of a positive impact of digitalization on innovative products and services and digitization of processes in contrast to being impacted from the COVID-19 pandemic (see Table 4, Models 3 and 4). The analysis showed that being affected by COVID-19 did not change the expectations of organizations about the positive impact of digitalization on innovation in terms of producing innovative products and services as well as digitization of processes. In addition, the results of Model 3 illustrate that, compared to micro businesses, small businesses had 61.1% lower chances of expecting that digitalization would lead to the production of innovative products and services.

Impact area	Very small		Small		Medium	
	Mean	SD	Mean	SD	Mean	SD
Overall positive impact	2.66	1.36	2.47	1.30	2.34	1.11
Digitization of processes	2.64	1.58	2.32	1.40	2.00	1.51
Innovative products and services	2.70	1.48	2.31	1.52	1.50	0.84
Closer/better relationships with customers, suppliers and partners	2.94	1.40	2.62	1.55	2.33	1.21
Market share gain	2.98	1.43	2.63	1.46	2.00	1.41
New business opportunities	2.85	1.53	2.41	1.44	2.50	1.91

Notes: Significant at *** $p < 0.001$; ** $p < 0.01$; and * $p < 0.05$. Scale: 1-very low ... 5-very high

Table 3.
Average impact of digitalization and one-way ANOVA test results by company size

Explanatory variables	Odds ratio			
	Model 1 (N = 347)	Model 2 (N = 414)	Model 3 (N = 198)	Model 4 (N = 229)
Providing online services before the COVID-19 pandemic	0.694	–	–	–
Possibility to convert a business model to an e-business model	–	2.109*	–	–
Being impacted by COVID-19 (low impact)	–	–	–	0.946
Being impacted by COVID-19 (low impact)	–	–	0.996	–
<i>Company size</i>				
Small	0.482	0.495	0.389**	0.781
Medium	1.444	1.535	0.215	0.954
<i>Economy sector</i>				
Primary	0.310	0.344	0.594	0.594
Secondary	1.110	1.067	1.024	1.501

Notes: Significant at *** $p < 0.001$; ** $p < 0.01$; and * $p < 0.05$. A “very small” category is a reference for a company size variable, and “tertiary” category is a reference for an economy sector variable. If a variable was not included in the model, then it is indicated by the “–” sign. The dependent variable for Models 1 and 2 is whether a company was impacted by COVID-19 or not (0=yes, 1=no); dependent variables in Models 3 and 4 present expectations of the companies about the impact of digitalization on “Digitization of processes” and “Innovative products and services” correspondingly (1-average to high impact, 0-low/very low impact). In Models 3 and 4, the independent variable; “Being impacted by COVID-19” is a dummy variable with categories of 1-low impact and 0-average to high impact

Source: Author’s own work

Table 4. Results of the binomial logistic regression models

5. Discussion and implications

The findings of the survey showed that around 87% of the Armenian SMEs that participated in the survey reported being negatively affected by the COVID-19 pandemic. Further, 50% of them reported that the pandemic had a very high/somewhat high impact on their business operations.

The survey results presented in the preceding section indicate that Armenian SMEs are close to average (2.63 out of 5) when it comes to their expectations about the impact of digitalization on producing innovative products and services, digitization of processes, closer and better relationships with their customers/suppliers/partners, gaining market share and having new business opportunities. Further, it has been observed that the economic sector drives statistically significant differences in the average level of expectations regarding digitalization that impacts the digitization of processes positively, while the company size does not affect the expectations of SMEs about digitalization statistically significantly. Therefore, we were able to support the *H1* stated in this study, whereas the *H2* was not supported. Since the vast majority of the survey respondents are micro and small enterprises with similar profiles, and only 3% of sample consisted of middle size companies, this can be one of the reasons of company size not being a significant determining factor on a company’s perspectives about whether digitalization has a positive impact.

According to the collected data, it was observed that Armenian SMEs that provided online services before the pandemic reported having approximately the same level of impact by COVID-19 compared to the enterprises which did not provide some online services prior to the pandemic. This result leads to the rejection of the *H3* of this study, which is contrary to the literature studied. The underlying reasons for this finding can be explained below.

First, the World Bank survey on internet use in Armenia suggests some possible reasons that can support our finding, which first refer to the low popularity of online services among the Armenian population that is especially different among urban and rural areas; furthermore, in Armenia, the internet is mostly used to access communications and media services (more than 60%) rather than being used for online services, internet banking or other e-commerce activities (8%) (Raja and Mamulyan, 2020). The survey results further reveal that only a small share of the population (13%) buys goods and services online, and online purchasing practices differ significantly across the country (21% in Yerevan, 14% in other urban areas and 9% in rural areas). Although most businesses report using information technology, the share of usage among SMEs for such purposes as sales, customer relations and accounting, does not exceed 50%. Only 20% of SMEs do online contracting and use digital payments for transactions (Raja and Mamulyan, 2020). Similar results are reported in a Global Entrepreneurship Monitor (GEM) study conducted by the America Management Advisory (2019). According to this report, only 17% of SMEs have online sales, and less than 10% of the sales are realized online. Additionally, only 15.6% of the SMEs having online sales use e-commerce marketplace websites. Despite the fact that national policies aimed at facilitating e-commerce have been high on the policy agenda of many governments since the mid-1990s (OECD, 2019), a wide range of policy areas, including e-transaction, consumer protection, cybersecurity and taxation, affect the adoption of e-commerce practices (America Management Advisory, 2019; United Nations Conference on Trade and Development (UNCTAD), 2020). As SMEs, on average, are twice less likely to participate in e-commerce compared to large companies, policy measures in many countries have been directed at promoting e-commerce among these businesses (OECD, 2019).

The *H4* was supported by the data, according to which companies which indicated that it was possible to convert their BM into an e-BM had approximately two times higher chances of not being affected by the COVID-19 pandemic compared to companies which did not have the capacity to do so. This was in line with the literature discussed previously, according to which companies who successfully dealt with the crisis implemented agile business practices and used digital technologies as key enablers (Margherita and Heikkilä, 2021) while among organizations' top reasons to invest in digital transformation were innovation, keeping up with change and resilience (Deloitte, 2021; Digital Transformation Executive survey).

Finally, our *H5*, which states that the firms' expectations of digitalization leading to innovative processes, products and services change depending on the degree they were affected by COVID-19, was not supported by the collected data. This result can be explained by the peculiarities of business awareness among Armenian SMEs such as reluctance to shift to e-business, seeing digitalization as an additional cost burden instead of business agility. According to the results of the UNECE survey, only 19% of SMEs in Armenia mentioned e-commerce as a coping strategy against the COVID-19 crisis. This was explained by the low demand of e-commerce in Armenia, where consumers prefer shopping at physical stores (UNECE, 2020). The limited use of the internet for economic activities by individuals and businesses in Armenia can be explained by the low level of digital literacy among individuals and low level of awareness of advanced technologies among SMEs. The Caucasus Barometer found that a year before the pandemic one thirds (34%) of the individuals did not have basic skills to use computers and only every 14th (7%) was equipped with advanced computer skills (Akhvlediani, 2021). Furthermore, less than one-third of SMEs have heard of such basic enterprise management solutions as enterprise resource planning (ERP), customer relationship management (CRM) or electronic invoicing systems. Awareness of even more advanced technologies, such as internet of things (IoT), artificial intelligence, blockchain, three-dimensional (3D) printing and others, is, unsurprisingly,

even lower (Uvarova, 2021). Another potential obstacle to digitalization in Armenia could be cybersecurity, as Armenia lags behind adequate legislative and policy frameworks on cybersecurity and has the lowest number of secure servers in the region (Akhvlediani, 2021). Finally, the large-scale war in November 2020 had a negative impact on the economy of the country and significantly decreased the potential positive influence of the digital transformation of businesses (Uvarova, 2021).

6. Conclusion

As in other developed and developing countries, SMEs play a crucial role in the economy of Armenia, hence their ability to respond to the crisis is vital for the economic recovery. This study aims to explore how the Armenian SMEs perceive the impact of digitalization in spurring innovation and whether digitalization has been effective as a tool to mitigate the negative impact of COVID-19 crisis.

Supporting existing literature, the findings of this paper demonstrate that SMEs who are more agile, in that their BM is easy to convert into an e-BM, were less likely to be affected by the COVID-19 crisis. However, the results of our analysis did not find any support for the notion that the presence of online services pre-covid has helped the companies to better fight the consequences of the pandemic. This was explained by certain specificities of the Armenian business environment, such as low popularity of online services among the population due to a low degree of digital literacy, as well as reluctance of SMEs to shift to e-commerce activities and to invest in digitalization, seeing it as a cost burden rather than a means to improve resilience and foster innovation.

Considering the importance of digitalization, threats and uncertainties caused by the COVID-19 pandemic, and the major role of SMEs as economic players, the current work is very timely. It provides SMEs and government agencies with essential information about the significant benefits that digitalization can bring in helping them to cope with the impact of the COVID-19 pandemic, become more agile and adapt more easily to the new reality after the pandemic. It also demonstrates that while digitalization is an effective tool to fight the repercussions of the crisis, the level of its effectiveness might largely depend on the given country's context. While governments should continue their efforts directed toward the digital transformation of SMEs, greater attention should be placed on policies aimed at increasing digital literacy of the population and raising digital awareness of SMEs, so that they can take advantage of the opportunities of engaging in economic activities online.

Digital competence and transformation are crucial to March in harmony with the rest of the global business community accounting for rapid consumer taste convergence with an imperative to build that into a company value proposition and remain competitive. In this regard, digital literacy and the ability to exploit digitalization to a firm's full potential is a must to ensure the long-term sustainability and growth of businesses nowadays. That can be achieved through the adoption of appropriate BMs, and revisiting firm-level capabilities to engage in strategic renewal. Incentives must be created for firms to deal with this, helping managers accelerate their digital toolkit and potentially allowing them to embark on a journey of complete digital transformation. Given the resource-scarcity issue of SMEs lacking sufficient funds to enhance employee learning and development, the reluctance of many managers to engage in a higher level of digital adoption can be explained due to reliance on existing well-established rules, norms and predictable business profitability compared with experiments that may impose threats to their established routine. Such training programs should emphasize not only digital competence skill-building but also the ability to manage the "strategic paradox [4]" and new ways of working. Since many SME managers are faced with the tension of balancing existing performance with new learning,

triggering significant challenges for many of them, an adequate amount of time and customized training programs need to be accounted for to result in progressive change and sustained behavioral change.

Since digitalization depicts how the use of information and communications technology alters an organization's BM, including creating new or improved ways of delivering services, communicating and improving the quality of offerings, digitalization is seen as an important tool to deal with repercussions of crises. Relatedly, [Laudien and Daxböck \(2016\)](#) argue that path-breaking mechanisms such as exogenous and endogenous shocks are often needed to trigger changes in traditional product-based logic. Therefore, policymakers can take far more proactive measures not only to handle the consequences of COVID-19-conditioned turbulence but also as a crisis management tool for similar exogenous shocks that put SMEs at survival risks. That entails but is not limited to designing an incentives system for SMEs to invest in their digital solutions, as well as launching large-scale business education and awareness campaigns amplifying the role of digitalization. In line with current literature suggesting that firms craft digital strategies to leverage digital technologies for rapid innovation and responsiveness to offer new value propositions and operational excellence ([Hess et al., 2016](#)), the findings of this study can be insightful not only for Armenian SMEs but also for similar developing economies where SMEs account for a significant share of the economy.

We acknowledge the current limitations of the study which also provide multiple promising avenues for future research. While our study provides very interesting insights within the country context of Armenia, due to its small sample size, the generalizability of the empirical study may be difficult. Further, while we reference recent global reports (UNECE, GEM) as to the level of digitalization with the current state of affairs justifying our empirical findings, due to low response rate we are unable to completely rule out the nonresponse bias. As such, future studies can improve our research design. Further, while our data were captured from a single informant, we were unable to undertake steps to ensure that common method bias did not affect the findings. We were unable to collect any data regarding the same SMEs' performance one year after the initial survey collection to confirm our findings. We also recognize that our study focuses on firm-level digitalization aptitude while future research can empirically investigate the effects of digitalization on multilevel models or across different levels of analysis. This would require data from multiple informants in the SMEs, preferably from both managerial and nonmanagerial employees, to ascertain their actual perceptions of digitalization in relation to business growth and sustainability.

Notes

1. <https://data.worldbank.org/indicator/NY.GDP.MKTP.KD.ZG?locations=AM>
2. Exchange rate as of October 2019, <https://www1.oanda.com/lang/it/currency/converter/>
3. According to the "SMALL AND MEDIUM ENTREPRENEURSHIP IN THE REPUBLIC OF ARMENIA" Report of the National Statistical Committee, in 2019, there were in total 75,180 companies in Armenia, of which 135 were large, 4,272 were small, 743 were medium sized. The greatest number of the enterprises were microenterprises 70,030, of which 31,547 with 0 wage-earners. For most practical purposes, we can consider the survey to be statistically representative.
4. "Strategy paradox" is a term introduced by Michael Raynor in 2007 and is defined as a "consequence of the need to commit to a strategy despite the deep uncertainty surrounding which strategy to commit to" ([Raynor, 2007](#), p. 42).

References

- Aghina, W., Handscomb, C., Ludolph, J., Róna, D. and West, D. (2020), "Enterprise agility: buzz or business impact?", McKinsey and Company, available at: www.mckinsey.com/business-functions/people-and-organizational-performance/our-insights/enterprise-agility-buzz-or-business-impact (accessed 20 March 2020).
- Akhvlediani, T. (2021), "Digital literacy in times of the COVID-19 in the eastern partnership countries", EaP CSF COVID-19 POLICY PAPER, available at: www.ceps.eu/personal-site/tinatinkhvhledianiceps-eu/digital-literacy-in-times-of-the-covid-19-in-the-eastern-partnership-countries/
- Akpan, I.J., Udoh, E.A.P. and Adebisi, B. (2020), "Small business awareness and adoption of state-of-the-art technologies in emerging and developing markets, and lessons from the COVID-19 pandemic", *Journal of Small Business and Entrepreneurship*, Vol. 34 No. 2, pp. 123-140, doi: [10.1080/08276331.2020.1820185](https://doi.org/10.1080/08276331.2020.1820185).
- Alavi, S., Wahab, D.A., Muhamad, N. and Shirani, B.A. (2014), "Organic structure and organisational learning as the main antecedents of workforce agility", *International Journal of Production Research*, Vol. 52 No. 21, pp. 6273-6295.
- Al-Omoush, K., Simón-Moya, V. and Sendra-García, J. (2020), "The impact of social capital and collaborative knowledge creation on e-business proactiveness and organizational agility in responding to the COVID-19 crisis", *Journal of Innovation and Knowledge*, Vol. 5 No. 4, pp. 279-288.
- AmCham Business Magazine (2021), "Innovation, information technology, entrepreneurship and investment", available at: https://amcham.am/wp-content/uploads/2021/12/AmCham-Business-Magazine-FallWinter-2022_Innovation-Information-Technology-Entrepreneurship-and-Investment.pdf
- Ameria Management Advisory (2019), "The Information and Telecommunication Sector in Armenia, 2019", Yerevan.
- Arnold, C., Kiel, D. and Voigt, K. (2016), "How the industrial internet of things changes business models in different manufacturing industries", *International Journal of Innovation Management*, Vol. 20 No. 8, p. 1640015.
- Balla-Elliott, D., Cullen, Z., Glaeser, E.L., Luca, M. and Stanton, C. (2020), "Business reopening decisions and demand forecasts during the COVID-19 pandemic", *SSRN Electronic Journal*.
- Ballestar, M.T., Diaz-Chao, A., Sainz, J. and Torrent-Sellens, J. (2020), "Knowledge, robots and productivity in SMEs: explaining the second digital wave", *Journal of Business Research*, Vol. 108, pp. 119-131.
- Barney, J. (1991), "Firm resources and sustained competitive advantage", *Journal of Management*, Vol. 17 No. 1, pp. 99-120, doi: [10.1177/014920639101700108](https://doi.org/10.1177/014920639101700108).
- Bartik, A., Cullen, Z., Bertrand, M., Glaeser, E.L., Luca, M. and Stanton, C. (2020), "How are small businesses adjusting to COVID-19? Early evidence from a survey", *SSRN Electronic Journal*, doi: [10.2139/ssrn.3574741](https://doi.org/10.2139/ssrn.3574741).
- Beaunoyer, E., Dupéré, S. and Guitton, M.J. (2020), "COVID-19 and digital inequalities: reciprocal impacts and mitigation strategies", *Computers in Human Behavior*, Vol. 111, p. 106424, doi: [10.1016/j.chb.2020.106424](https://doi.org/10.1016/j.chb.2020.106424).
- Beck, T., Demircuc-Kunt, A. and Levine, R. (2005), "SMEs, growth, and poverty: cross-country evidence", *Journal of Economic Growth*, Vol. 10 No. 3, pp. 199-229.
- Beglaryan, M. and Shakhmuradyan, G. (2020), "The impact of COVID-19 on small and medium-sized enterprises in Armenia: evidence from a labor force survey", *Small Business International Review*, Vol. 4 No. 2.
- Beglaryan, M., Gabrielyan, V. and Shakhmuradyan, G. (2021), "Human resource management during the COVID-19 pandemic: 3vidence from Armenia", *Journal of Eastern European Management Studies*, pp. 117-130.

- Bharati, P. and Chaudhury, A. (2009), "SMEs and competitiveness: the role of information systems", *International Journal of E-Business Research*, Vol. 5, pp. 1-9.
- Bouwman, H., Nikoub, S. and Reuver, M. (2019), "Digitalization, business models, and SMEs: how do business model innovation practices improve performance of digitalizing SMEs?", *Telecommunications Policy*, Vol. 43 No. 9, p. 101828.
- Brown, J.L. and Agnew, N.M. (1982), "Corporate agility", *Business Horizons*, Vol. 25 No. 2, pp. 29-33.
- Camps, S. and Marques, P. (2014), "Exploring how social capital facilitates innovation: the role of innovation enablers", *Technological Forecasting and Social Change*, Vol. 88, pp. 325-348.
- Caversan, F. (2021), "Agility: the key to digital transformation (and tips for getting it right)", Forbes, available at: www.forbes.com/sites/forbestechcouncil/2021/10/15/agility-the-key-to-digital-transformation-and-tips-for-getting-it-right/?sh=2a88fb49321a (accessed October 2021).
- Clark, C. (1940), "The morphology of economic growth", *The Conditions of Economic Progress*, Macmillan, London, pp. 337-373.
- Dani, M.V. and Gandhi, A.V. (2021), "Understanding the drivers of innovation in an organization: a literature review", *International Journal of Innovation Science*, Vol. 14 Nos 3/4, pp. 476-505, doi: [10.1108/IJIS-10-2020-0201](https://doi.org/10.1108/IJIS-10-2020-0201).
- Del Rio-Chanona, R.M., Mealy, P., Pichler, A., Lafond, F. and Farmer, D. (2020), "Supply and demand shocks in the COVID-19 pandemic: an industry and occupation perspective", *Oxford Review of Economic Policy*, Vol. 36 No. Supplement_1, pp. S94-S137.
- Deloitte (2021), "Putting digital at the heart of strategy", available at: www2.deloitte.com/us/en/insights/topics/digital-transformation/digital-acceleration-in-a-changing-world.html (accessed 22 April 2021).
- Dewett, T. and Jones, G.R. (2001), "The role of information technology in the organization: a review, model, and assessment", *Journal of Management*, Vol. 27 No. 3, pp. 313-346.
- Dougherty, D. and Dunne, D. (2011), "Digital science and knowledge boundaries in complex innovation", *Organizational Science*, Vol. 23 No. 5, pp. 1467-1484.
- Dua, A., Ellingrud, K., Mahajan, D. and Silberg, J. (2020), "Which small businesses are most vulnerable to COVID-19—and when", McKinsey and Company, available at: www.mckinsey.com/featured-insights/americas/which-small-businesses-are-most-vulnerable-to-covid-19-and-when?cid=other-empl-alt-mip-mck&hllid=749%209140e9ccc43c9a2c06c6fc7cc5a35&hctky=12130754&hdpid=a4997f62-946f-47c1-b9fc-47a6c68dd16a (accessed 18 June 2020).
- Eller, R., Alford, P., Kallmünzer, A. and Peters, M. (2020), "Antecedents, consequences, and challenges of small and medium-sized enterprise digitalization", *Journal of Business Research*, Vol. 112, pp. 119-127, doi: [10.1016/j.jbusres.2020.03.004](https://doi.org/10.1016/j.jbusres.2020.03.004).
- Fairlie, R. (2020), "The impact of COVID-19 on small business owners: evidence from the first three months after widespread social distancing restrictions", *Journal of Economics and Management Strategy*, Vol. 29 No. 4, pp. 727-740.
- Feichtinger, G. (2018), "Digitalization in SME: a framework to get from strategy to action", Master Thesis, Technische Universität Wien, Vienna.
- Fernandes, N. (2020), "Economic effects of coronavirus outbreak (COVID-19) on the world economy", *SSRN Electronic Journal*, doi: [10.2139/ssrn.3557504](https://doi.org/10.2139/ssrn.3557504)
- Fernández-Mesa, A., Ferreras-Méndez, J.L., Alegre, J. and Chiva, R. (2014), "IT competency and the commercial success of innovation", *Industrial Management and Data Systems*, Vol. 114 No. 4, pp. 550-567.
- Ferrari, A. (2012), *Digital Competence in Practice: An Analysis of Frameworks*, JRC IPTS, Sevilla.
- Fisher, A.G. (1939), "Production, primary, secondary and tertiary", *Economic Record*, Vol. 15 No. 1, pp. 24-38.
- Fourastié, J. (1969), "Die große hoffnung des zwanzigsten jahrhunderts (deutsche übersetzung der 1963 unter dem titel" Le grand espoir du XXe siècle" veröffentlichten erstausgabe)", Auflage, Köln.

-
- Garicano, L., Lelarge, C. and Van Reenen, J. (2016), "Firm size distortions and the productivity distribution: evidence from France", *American Economic Review*, Vol. 106 No. 11, pp. 3439-3479.
- Genc, E., Dayan, M. and Genc, O.F. (2019), "The impact of SME internationalization on innovation: the mediating role of market and entrepreneurial orientation", *Industrial Marketing Management*, Vol. 82, pp. 253-264.
- Gierlich, M., Schüritz, R., Volkwein, M. and Hess, T. (2019), "SMEs' approaches for digitalization in platform ecosystems SMEs' approaches for digitalization in platform ecosystems", *Paper presented at Twenty-Third Pacific Asia Conference on Information Systems*, July, Xi'an.
- Giotopoulos, I., Kontolaimou, A. and Tsakanikas, A. (2022), "Digital responses of SMEs to the COVID-19 crisis", *International Journal of Entrepreneurial Behavior and Research*, Vol. 28 No. 7, pp. 1751-1772.
- Guo, H., Yang, Z., Huang, R. and Guo, A. (2020), "The digitalization and public crisis responses of small and medium enterprises: implications from a COVID-19 survey", *Frontiers of Business Research in China*, Vol. 14 No. 1, pp. 1-25.
- Hess, T., Benlian, A., Matt, C. and Wiesböck, F. (2016), "Options for formulating a digital transformation strategy", *MIS Quarterly Executive*, Vol. 15 No. 2, pp. 123-139.
- Iansiti, M. and Lakhani, K. (2014), "Digital ubiquity: how connections, sensors, and data are revolutionizing business", *Harvard Business Review*, Vol. 92 No. 11, pp. 3-11.
- Iansiti, M. and Lakhani K.R. (2017), "The truth about blockchain", *Harvard Business Review*, Vol. 95, No. 1, pp. 118-127.
- International Labour Organization (ILO) (2021), "Small goes digital – how digitalization can bring about productive growth for micro and small enterprises", available at: www.ilo.org/wcmsp5/groups/public/-ed_emp/-emp_ent/-ifp_seed/documents/publication/wcms_808632.pdf
- Imgrund, F., Fischer, M., Janiesch, C. and Winkelman, A. (2018), "Approaching digitalization with business process management", *Paper presented at Multikonferenz Wirtschaftsinformatik (MKWI)*, March, Luneburg.
- Ivanov, D. (2020), "Predicting the impacts of epidemic outbreaks on global supply chains: a simulation-based analysis on the coronavirus outbreak (COVID-19/SARS-CoV-2) case", *Transportation Research Part E: Logistics and Transportation Review*, Vol. 136, p. 101922.
- Ivanov, D. and Dolgui, A. (2020), "Viability of intertwined supply networks: extending the supply chain resilience angles towards survivability. A position paper motivated by COVID-19 outbreak", *International Journal of Production Research*, Vol. 58 No. 10, pp. 1-12.
- Jadoul, Q., Nascimento, A., Salo, O. and Willi, R. (2020), "Agility in the time of COVID-19: changing your operating model in an age of turbulence", McKinsey and Company, available at: www.mckinsey.com/business-functions/people-and-organizational-performance/our-insights/agility-in-the-time-of-covid-19-changing-your-operating-model-in-an-age-of-turbulence (accessed 18 November 2020).
- Joshi, K.D., Chi, L., Datta, A. and Han, S. (2010), "Changing the competitive landscape: continuous innovation through IT-eknowledge capabilities", *Information Systems Research*, Vol. 21 No. 3, pp. 472-495.
- Kane, G.C., Palmer, D., Phillips, A.N. and Kiron, D. (2015), "Is your business ready for a digital future?", *MIT Sloan Management Review*, Vol. 56 No. 4, pp. 37-44.
- Kiel, D., Arnold, C. and Voigt, K. (2017), "The influence of the industrial internet of things on business models of established manufacturing companies – a business level perspective", *Technovation*, Vol. 68, pp. 4-19.
- Kilimis, P., Zou, W., Lehmann, M. and Berger, U. (2019), "A survey on digitalization for SMEs in Brandenburg, Germany", *IFAC-PapersOnLine*, Vol. 52 No. 13, pp. 2140-2145.
- Kuusisto, M. (2017), "Organizational effects of digitalization: a literature review", *International Journal of Organization Theory and Behavior*, Vol. 20 No. 3, pp. 341-362.

-
- LaBerge, L., O'Toole, C., Schneider, J. and Smaje, K. (2020), "How COVID-19 has pushed companies over the technology tipping point—and transformed business forever", McKinsey and Company, available at: www.mckinsey.com/business-functions/strategy-and-corporate-finance/our-insights/how-covid-19-has-pushed-companies-over-the-technology-tipping-point-and-transformed-business-forever (accessed 5 October 2020).
- Lanzolla, G., Pesce, D. and Tucci, C.L. (2021), "The digital transformation of search and recombination in the innovation function: tensions and an integrative framework", *Journal of Product Innovation Management*, Vol. 38 No. 1, pp. 90-113.
- Lanzolla, G., Lorenz, A., Miron-Spektor, E., Schilling, M., Solinas, G. and Tucci, C.L. (2020), "Digital transformation: what is new if anything? Emerging patterns and management research", *Academy of Management Discoveries*, Vol. 6 No. 3, pp. 341-350.
- Laudien, S.M. and Daxböck, B. (2016), "Path dependence as a barrier to business model change in manufacturing firms: insights from a multiple-case study", *Journal of Business Economics*, Vol. 86 No. 6, pp. 611-645.
- Lee, J.Y., Yang, Y.S., Ghauri, P.N. and Park, B.I. (2022), "The impact of social media and digital platforms experience on SME international orientation: the moderating role of COVID-19 pandemic", *Journal of International Management*, Vol. 28 No. 4, p. 100950.
- Li, L., Su, F., Zhang, W. and Mao, J-Y. (2018), "Digital transformation by SME entrepreneurs: a capability perspective", *Information Systems Journal*, Vol. 28 No. 6, pp. 1129-1157.
- Lindsay, A., Neha, J., Mahajan, D., Maxwell, M.N. and Pandher, A.S. (2020), "Tracking the impact of coronavirus on US small businesses", McKinsey and Company, available at: www.mckinsey.com/industries/financial-services/our-insights/tracking-us-small-and-medium-sized-business-sentiment-during-covid-19 (accessed 29 May 2020).
- Loebbecke, C. and Picot A. (2015), "Reflections on societal and business model transformation arising from digitization and big data analytics: a research agenda", *The Journal of Strategic Information Systems*, Vol. 24 No. 3, pp. 149-157.
- Margherita, A. and Heikkilä, M. (2021), "Business continuity in the COVID-19 emergency: a framework of actions undertaken by world-leading companies", *Business Horizons*, Vol. 64 No. 5, pp. 683-695.
- Nylen, D. and Holmstrom, J. (2015), "Digital innovation strategy: a framework for diagnosing and improving digital product and service innovation", *Business Horizons*, Vol. 58 No. 1, pp. 57-67.
- OECD (2019), *Unpacking E-Commerce: Business Models, Trends and Policies*, OECD Publishing, Paris, doi: [10.1787/23561431-en](https://doi.org/10.1787/23561431-en).
- OECD/Eurostat (2018), "Oslo Manual 2018: guidelines for Collecting, Reporting and Using Data on Innovation", 4th ed., *The Measurement of Scientific, Technological and Innovation Activities*, OECD Publishing, Paris/Eurostat, Luxembourg, doi: [10.1787/9789264304604-en](https://doi.org/10.1787/9789264304604-en).
- Organisation for Economic Co-operation and Development (OECD) (2005), "Prepared by the working party of national experts on scientific and technology indicators", *The Measurement of Scientific and Technological Activities: Guidelines for Collecting and Interpreting Innovation Data: Oslo Manual*, 3rd ed., OECD, Paris, para. 177.
- Organisation for Economic Co-operation and Development (OECD) (2020), *SME Policy Index: Eastern Partner Countries 2020: Assessing the Implementation of the Small Business Act for Europe*, SME Policy Index, European Union, Brussels/OECD Publishing, Paris.
- Organisation for Economic Co-operation and Development (OECD) (2021), "The digital transformation of SMEs", *OECD Studies on SMEs and Entrepreneurship*, OECD Publishing, Paris.
- Ongori, H. and Migiro, S.O. (2010), "Information and communication technologies adoption in SMEs: literature review", *Journal of Chinese Entrepreneurship*, Vol. 2 No. 1, pp. 93-104.
- Pantano, E., Pizzi, G., Scarpi, D. and Dennis, C. (2020), "Competing during a pandemic? Retailers' ups and downs during the COVID19 outbreak", *Journal of Business Research*, Vol. 116, pp. 209-213.

-
- Papadopoulos, D., Baltas, T.N. and Balta, M.E. (2020), "The use of digital technologies by small and medium enterprises during COVID-19: implications for theory and practice", *International Journal of Information Management*, Vol. 55, p. 102192.
- Parida, V., Sjödin, D. and Reim, W. (2019), "Reviewing literature on digitalization, business model innovation, and sustainable industry: past achievements and future promises", *Sustainability*, Vol. 11 No. 2, p. 391.
- Parker, G., Alstyne, M.V. and Jiang, X. (2016), "Platform ecosystems: how developers invert the firm", *MIS Quarterly*, Vol. 41 No. 1, pp. 255-266.
- Paul, S., Whittam, G. and Wyper, J. (2007), "The pecking order hypothesis: does it apply to start-up firms?" *Journal of Small Business and Enterprise Development*, Vol. 14 No. 1, pp. 8-21.
- Pedauca, L., Sáez, F. and Delgado-Márquez, B.L. (2021), "Macroeconomic lockdown and SMEs: the impact of the COVID-19 pandemic in Spain", *Small Business Economics*, Vol. 58 No. 2, pp. 665-688, doi: [10.1007/s11187-021-00476-7](https://doi.org/10.1007/s11187-021-00476-7).
- Penco, L., Profumo, G., Serravalle, F. and Viassone, M. (2023), "Has COVID-19 pushed digitalisation in SMEs? The role of entrepreneurial orientation", *Journal of Small Business and Enterprise Development*, Vol. 30 No. 2, pp. 311-341.
- Pfister, P. and Lehmann, C. (2021), "Returns on digitisation in SMEs—a systematic literature review", *Journal of Small Business and Entrepreneurship*, Vol. 35 No. 4, pp. 574-598, doi: [10.1080/08276331.2021.1980680](https://doi.org/10.1080/08276331.2021.1980680).
- Porter, M.E. (1985), "Technology and competitive advantage", *Journal of Business Strategy*, Vol. 5 No. 3, pp. 60-78, doi: [10.1108/eb039075](https://doi.org/10.1108/eb039075).
- Priyono, A., Moin, A. and Putri, V.N.A.O. (2020), "Identifying digital transformation paths in the business model of SMEs during the COVID-19 pandemic", *Journal of Open Innovation: Technology, Market, and Complexity*, Vol. 6 No. 4, p. 104.
- Rachinger, M., Rauter, R., Müller, C., Vorraber, W. and Schirgi, E. (2018), "Digitalization and its influence on business model innovation", *Journal of Manufacturing Technology Management*, Vol. 30 No. 8, pp. 1143-1160, doi: [10.1108/JMTM-01-2018-0020](https://doi.org/10.1108/JMTM-01-2018-0020).
- Ragazou, K., Passas, I. and Georgios, S. (2022), "Investigating the strategic role of digital transformation path of SMEs in the era of COVID-19: a bibliometric analysis using R", *Sustainability*, Vol. 14 No. 18, p. 11295.
- Raja, S. and Mamulyan, G. (2020), "Internet use in Armenia: how do individuals and businesses use the internet to access opportunities?", World Bank, available at: <https://blogs.worldbank.org/europeandcentralasia/internet-use-armenia-how-do-individuals-and-businesses-use-internet-access> (accessed 01 May 2020).
- Ramaswamy, V. and Ozcan, K. (2016), "Brand value cocreation in a digitalized world: an integrative framework and research implications", *International Journal of Research in Marketing*, Vol. 33 No. 1, pp. 93-106.
- Raynor, M. (2007), "The strategy paradox", Deloitte Review, Issue 1, available at: www2.deloitte.com/content/dam/insights/us/articles/the-strategy-paradox/US_deloitte_review_The_Strategy_Paradox_aug07.pdf
- Saltiel, F. (2020), "Who can work from home in developing countries?" in Wyplosz, C. (Ed.), *COVID Economics: Vetted and Real-Time Papers*, CEPR Press, Paris, London, pp. 104-118.
- Sambamurthy, V., Bharadwaj, A. and Grover, V. (2003), "Shaping agility through digital options: reconceptualizing the role of information technology in contemporary firms", *MIS Quarterly*, Vol. 27 No. 2, pp. 237-263.
- Scuotto, V., Santoro, G., Bresciani, S. and Giudice, M. (2017), "Shifting intra- and inter-organizational innovation processes towards digital business: an empirical analysis of SMEs", *Creativity and Innovation Management*, Vol. 26 No. 3, pp. 247-255.
- Skare, M. and Soriano, D.R. (2021), "A dynamic panel study on digitalization and firm's agility: what drives agility in advanced economies 2009–2018", *Technological Forecasting and Social Change*, Vol. 163, p. 120418.

-
- Soto-Acosta, P., Colomo-Palacios, R. and Popa, S. (2014), "Web knowledge sharing and its effect on innovation: an empirical investigation in SMEs", *Knowledge Management Research and Practice*, Vol. 12 No. 1, pp. 103-113.
- The Advisory Committee on Measuring Innovation in the 21st Century (2008), "Innovation measurement: tracking the state of innovation in the American economy", available at: http://users.nber.org/~sewp/SEWPdigestFeb08/InnovationMeasurement2001_08.pdf (accessed January 2008).
- Thrassou, A., Vrontis, D. and Bresciani, S. (2018), "The agile innovation pendulum: a strategic marketing multicultural model for family businesses", *International Studies of Management and Organization*, Vol. 48 No. 1, pp. 105-120.
- Thrassou, A., Uzunboylu, N., Vrontis, D. and Christof, M. (2020), "Digitalization of SMEs: a review of opportunities and challenges", in Thrassou, A., Vrontis, D., Weber, Y., Riad Shams, S.M. and Tsoukatos, E. (Eds), *The Changing Role of SMEs in Global Business, Volume II: Contextual Evolution Across Markets, Disciplines and Sectors*, Palgrave Macmillan, Cham, pp. 109-131.
- Tsou, H. and Chen, J. (2021), "How does digital technology usage benefit firm performance? Digital transformation strategy and organisational innovation as mediators", *Technology Analysis and Strategic Management*, Vol. 35 No. 9, pp. 1114-1127.
- United Nations Economic Commission for Europe (UNECE) (2020), "The impact of COVID-19 on trade and structural transformation in Armenia: evidence from UNECE's survey of micro, small and medium enterprises", available at: <https://unece.org/info/events/event/350564>
- United Nations Conference on Trade and Development (UNCTAD) (2020), "Global cyberlaw tracker: summary of adoption of E-Commerce legislation worldwide", available at: <https://unctad.org/topic/e-commerce-and-digital-economy/e-commerce-law-reform/summary-adoption-e-commerce-legislation-worldwide>
- Unruh, G. and Kiron, D. (2017), "Digital transformation on purpose", MIT Sloan Management Review.
- Uvarova, O. (2021), "SMEs digital transformation in the EaP countries in COVID-19 time: challenges and digital solutions", EaP CSF COVID-19 POLICY PAPER, available at: <https://eap-csf.eu/wp-content/uploads/SMEs-digital-transformation-in-the-EaP-countries-during-COVID-19.pdf>
- Vadana, I.I., Torkkeli, L., Kuivalainen, O. and Saarenketo, S. (2019), "Digitalization of companies in international entrepreneurship and marketing", *International Marketing Review*, Vol. 37 No. 3, pp. 471-492.
- Vaska, S., Massaro, M., Bagarotto, E.M. and Dal Mas, F. (2021), "The digital transformation of business model innovation: a structured literature review", *Frontiers in Psychology*, Vol. 11, p. 539363, doi: 10.3389/fpsyg.2020.539363.
- Verhoef, P.C., Broekhuizen, T., Bart, Y., Bhattacharya, A., Dong, J.Q., Fabian, N. and Haenlein, M. (2021), "Digital transformation: a multidisciplinary reflection and research agenda", *Journal of Business Research*, Vol. 122, pp. 889-901.
- Vieru, D., Bourdeau, S., Bernier, A. and Yapo, S. (2015), "Digital competence: a multi-dimensional conceptualization and a typology in an SME context", *Encyclopedia of Information Science and Technology*, 3rd ed., Mehdi Khosrow-Pour Information Resources Management Association, USA Volume IX Categories, Kauai, HI, Net-Sy.
- Wagenvoort, R. (2003), "Are finance constraints hindering the growth of SMEs in Europe?", *European Investment Bank Papers*, Vol. 8, pp. 23-50.
- Walter, A. (2020), "Organizational agility: ill-defined and somewhat confusing? A systematic literature review and conceptualization", *Management Review Quarterly*, Vol. 71 No. 2, pp. 343-391.
- Yang, C., Wang, Y., Nevo, S., Jin, J., Wang, L. and Chow, W.S. (2014), "IT capability and organizational performance: the roles of business process agility and environmental factors", *European Journal of Information Systems*, Vol. 23 No. 3, pp. 326-342.

Further reading

- Abgaryan, D. (2016), "Analysis of statistical sources on e-commerce in Armenia", (in Armenian), *Banber: Bulletin of Yerevan University: Sociology and Economics*, Vol. 3 No. 21, pp. 40-51.
- Antony, J., Kumar, M. and Madu, C.N. (2005), "Six sigma in small- and medium-sized UK manufacturing enterprises", *International Journal of Quality and Reliability Management*, Vol. 22 No. 8, pp. 860-874.
- Beck, T. and Demircuc-Kunt, A. (2006), "Small and medium-size enterprises: access to finance as a growth constraint", *Journal of Banking and Finance*, Vol. 30 No. 11, pp. 2931-2943.
- Dundon, T. and Wilkinson, A. (2018), "HRM in small and medium-sized enterprises (SMEs)", in Collings, D.G. Wood, G.T. and Szamosi, L.T. (Eds), *Human Resource Management: A Critical Approach*, Routledge, London, pp. 194-211.
- Harvie, C., Narjoko, D. and Oum, S. (2013), "Small and medium enterprises' access to finance: evidence from selected Asian economies", *ERIA Discussion Paper Series*, pp. 1-54.
- OECD (2008), "Working party of national experts on scientific and technology indicators", *The Measurement of Scientific and Technological Activities: Guidelines for Collecting and Interpreting Innovation Data—The Oslo Manual*, 4th ed., OECD, Paris.
- Rothwell, R. and Dodgson, M. (1991), "External linkages and innovation in small and medium-sized enterprises", *R&D Management*, Vol. 21 No. 2, pp. 125-138.
- World Bank (2019), "World bank group support for small and medium enterprises: a synthesis of evaluative findings", available at: <https://openknowledge.worldbank.org/handle/10986/32536> (accessed 16 September 2019).
- World Bank Blogs (2020), "Internet use in Armenia: how do individuals and businesses use the internet to access opportunities?", available at: <https://blogs.worldbank.org/europeandcentralasia/internet-use-armenia-how-do-individuals-and-businesses-use-internet-access> (accessed 1 May 2020).

About the authors

Mane Beglaryan, Associate Professor, MBA Program Chair, College of Business and Economics, American University of Armenia, 40 Baghramyan Avenue, Yerevan 0019, Republic of Armenia, Main research interests: innovation, entrepreneurship, organizational culture and learning, organizational resilience, small and medium enterprises, strategic human resource management.

Anush Drampyan, Financial Analyst, Leyton Italia, Via Francia, 21/c, 37135 Verona, Italy. Former postdoctoral researcher, Department of Economics and Management "Marco Fanno", University of Padova, Padova, Italy. Main research interests: innovation, digitalization, small and medium enterprises, financial accounting, banking and regulation, fintech. Anush Drampyan is the corresponding author and can be contacted at: anushdrampyan@gmail.com

Ms Parandzem Sargsyan, Adjunct lecturer, Master of Science in Management, College of Business and Economics and General Education, American University of Armenia, 40 Baghramyan Avenue, Yerevan 0019, Republic of Armenia. Main research interests: organizational resilience, digital transformation and business agility.

For instructions on how to order reprints of this article, please visit our website:

www.emeraldgroupublishing.com/licensing/reprints.htm

Or contact us for further details: permissions@emeraldinsight.com