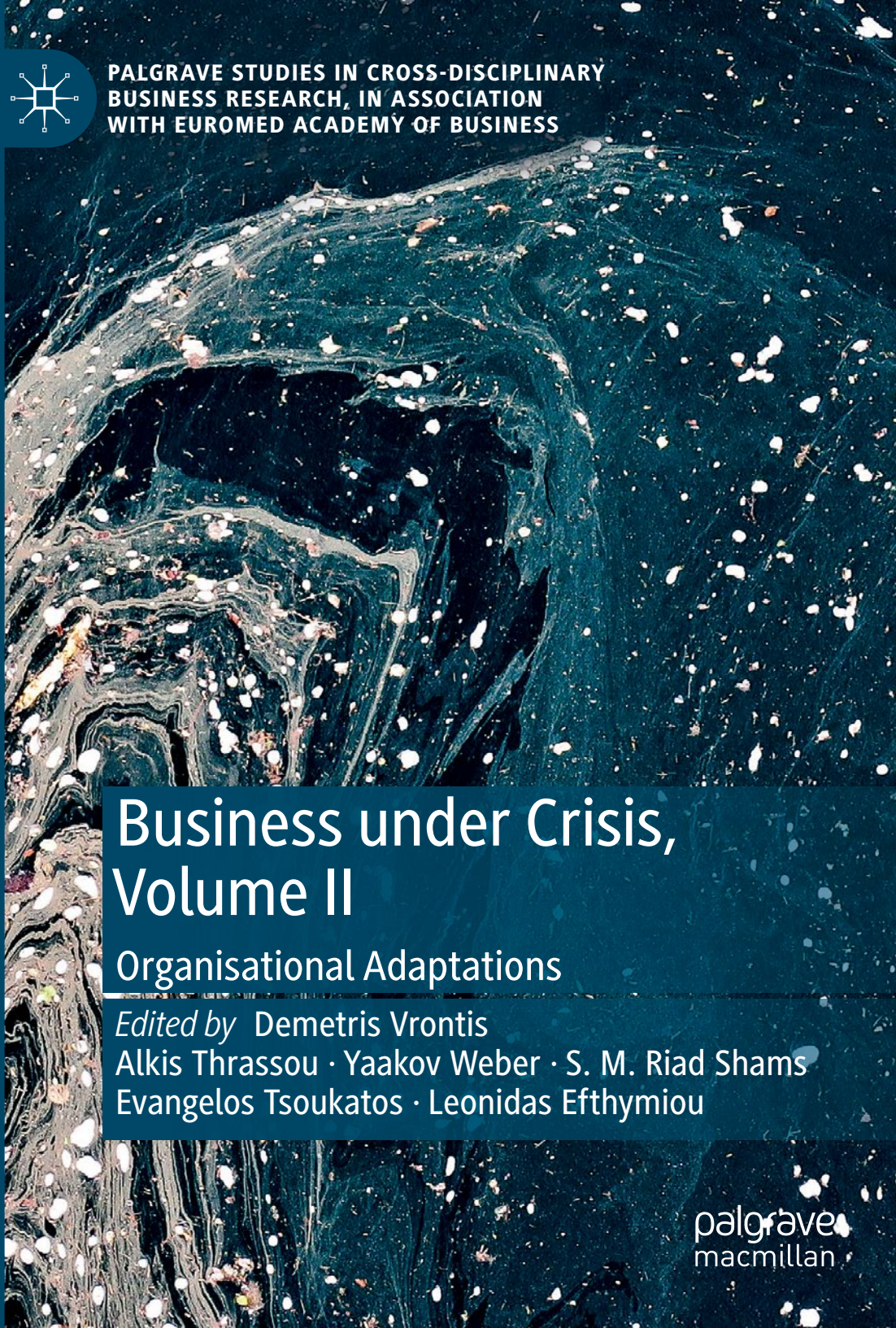

PALGRAVE STUDIES IN CROSS-DISCIPLINARY BUSINESS RESEARCH, IN ASSOCIATION WITH EUROMED ACADEMY OF BUSINESS

Business under Crisis, Volume II

Organisational Adaptations

Edited by Demetris Vrontis
Alkis Thrassou · Yaakov Weber · S. M. Riad Shams
Evangelos Tsoukatos · Leonidas Efthymiou

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Editorial Introduction: Business Under Crises: Organizational Adaptations

Alkis Thrassou, Naziyet Uzunboylu, Leonidas Efthymiou, Demetris Vrontis, Yaakov Weber, S. M. Riad Shams, and Evangelos Tsoukatos

1.1 Book Context and Theoretical Foundations

In the past few decades, businesses have maintained the continuity of their operations in the face of a series of crises (Afthonidis & Tsiotras, 2014), from global financial crisis (2007–2008) (Martinez et al., 2019) to natural disasters like the Christchurch earthquake (2011), Harvey (2017) and Irma (2017) (Wenzel et al., 2020); acts of terrorism such as

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the 9/11 in 2001 (Hurley-Hanson, 2006) and epidemics like Ebola and Avian Flu, (Enderwick, 2009). For the most part, they have recovered quickly (Papaoikonomou et al., 2012). These and other crises may differ in their volume (Enderwick, 2009), nature (Liu et al., 2017) and impact (Cerrato et al., 2016). Yet, what they have in common is their omnibus effects (Williams et al., 2017) and potentially devastating individual (Ratten, 2020), societal and political (Mehta et al., 2020; Efthymiou & Michael, 2016), economic and natural outcomes (Sarkar & Osiyevskyy, 2018; Efthymiou & Michael, 2013). Some commentators were already predicting a similar outcome (Bryce et al., 2020) for the current pandemic, COVID-19, suggesting that worries were exaggerated (Mehta et al., 2020) and that we should carry on as normal (Salanova, 2020).

While global epidemics aren't new in the history (Głodziński & Marciniak, 2016), COVID-19 may have even more disruptive impacts (Ritter & Pedersen, 2020) as it is still ongoing (Kuckertz et al., 2020) and there is great deal of uncertainty (Bryce et al., 2020) about future economic and social conditions. These kinds of extraterritorial crises present a significant challenge for organizations (Liu et al., 2020), including businesses and public institutions (Pedersen et al., 2020). Existing crisis management responses can be ineffective (Cortez & Johnston, 2020) and business continuity can be severely disrupted (Ahn et al., 2018) as

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problems arise out of multiple domains (Nenonen & Storbacka, 2020) and manifest in unfamiliar ways (Shakina & Barajas, 2020). How then should organizations respond effectively to a crisis? Can organizations adapt their critical business functions, maintaining the continuity of their operations in the face of an ever-increasing global pandemic and survive?

In the spirit of the above questions, this book brings together descriptive and prescriptive research studies that shed light on the above questions and contribute to knowledge through solid empirical and/or conceptual scientific theorization. The chapters cover topics such as managerial and strategic adaptation in different sectors like health and tourism and hospitality, multiform organizational adaptations, investments in research, development and innovations, sectoral transformations in different countries, the main problems and prospects that digital transformation opens up under the crisis, leadership inventions during crisis times and the impact of current health crisis on SMEs.

1.2 Business as Usual?

While crises have become usual to some extent, business in the context of a crisis is not so much 'business as usual' (Liu et al., 2020), as it is 'unexpected' (Afthonidis & Tsiotras, 2014), 'unusual' (Cerrato et al., 2016) or represents a new kind of usual (Cortez & Johnston, 2020), requiring a different approach towards doing business (Martinez et al., 2019). However, in an environment of uncertainty, it is more important than ever (Breier et al., 2021) to carry on as close as possible (Liu et al., 2020) to business as usual. In order to do so, Martinez et al. (2019) reported that the underpinning processes have to be able to resist disruption. In this vein, adapting the organizational structure to the environmental changes (Pramanik et al., 2015) that influence the functioning of the organization (Ahn et al., 2018) is essential. Companies and enterprises that have not adapted well (Nenonen & Storbacka, 2020), or adapted fast enough (Schakel & Wolbers, 2021), have suffered serious consequences (Pedersen et al., 2020). Many companies that adapted quickly are still viable (Nenonen & Storbacka, 2020), but will need to reinvent (Schakel &

Wolbers, 2021) and reconfigure (Wenzel et al., 2020) to sustain their viability over the long term (Liu et al., 2017). However, organizations that have adapted in meaningful ways (Schulze & Pinkow, 2020) prove caring are doing more than just surviving (Ratten, 2020). Once the crisis hits, businesses must be empathetic to their stakeholders (Leonidou et al., 2018), need to think fast (Schakel & Wolbers, 2021), respond quickly (Wenzel et al., 2020) and implement strategic movements (Kuckertz et al., 2020), involving communication (Enderwick, 2009), actions and behaviors (Hurley-Hanson, 2006) in order to adapt quickly. Firms need to take stable actions (Kuckertz et al., 2020) to adapt every level of their operating model (Novalia & Malekpour, 2020) if they are to survive; finding new ways of reaching their customers (Schakel & Wolbers, 2021).

In the midst of current uncertainty, a number of companies have already responded to the COVID-19 challenge (Liu et al., 2020) and distinguished themselves (Ratten, 2020) by shifting their services (Sharma et al., 2020) and product lines (Martinez et al., 2019) to meet the highest priority needs of their consumers (Mehta et al., 2020), employees (Shakina & Barajas, 2020) and communities (Cortez & Johnston, 2020). Of course, depending on the type of crisis, the organization might take different forms of action (Lee et al., 2020). To highlight some examples, alcohol distilleries have started to produce hand sanitizers, major beauty and health companies have been producing masks and face shields, and sporting apparel companies have started producing gowns (Sharma et al., 2020). Walk-in food outlets have also shifted their operation models to grocery delivery services (Sharma et al., 2020). In addition, remote working has become business as usual where employees can be just as productive working outside an office (Ratten, 2020). These are just a few examples of companies that recognized change as a need (Priyono et al., 2020) by companies, both internally and externally (Ritter & Pedersen, 2020), and used their mastership to adapt in creative ways (Thrassou et al., 2018a). As a result, these organizations are not only more likely to survive from this current crisis (Salanova, 2020), but will also reinforce their reputations (Bryce et al., 2020) and increase their competitive advantage going forward (Breier et al., 2021).

1.3 Crisis as a Catalyst to Change

Crises are transformative, evolutionary, even revolutionary (Novalia & Malekpour, 2020) in the development of organizations, industries and markets (Enderwick, 2009). And as such they need to be viewed as conduits to change (Sarkar & Osiyevskyy, 2018), accelerators of evolution (Wenzel et al., 2020) and catalysts of innovation (Thrassou et al., 2018b) in organizations. Moreover, crises reform the context in which organizations operate, including consumers and their behavior as individuals (Mehta et al., 2020), collective buyers' market structures and attitudes (Pedersen et al., 2020), and macro-environmental forces such as technology, culture and values (Głodziński & Marciniak, 2016; Efthymiou, 2018; Efthymiou et al., 2020).

One of the greatest challenges for organizations (Liu et al., 2020) and their management (Schulze & Pinkow, 2020) has always been to cope with unexpected changes in their environments (Breier et al., 2021). Although crises are inevitable (Cerrato et al., 2016), not every business is sufficiently equipped for when things don't go according to plan (Afthonidis & Tsiotras, 2014). Most organizations respond to a crisis in the same way (Enderwick, 2009). However, why are there always organizations that not only survive the crisis (Ahn et al., 2018) but also benefit from it (Kuckertz et al., 2020) while others cannot? Although a crisis interrogates the survival of a system (Martinez et al., 2019), it can give rise to either positive or negative organizational outcomes (Salanova, 2020). However, whether positive or negative, developmental outcomes (Salanova, 2020) follow a crisis depending on the nature of the business model (Breier et al., 2021) and organizational behavior during a crisis (Pramanik et al., 2015). In particular, these behaviors shape how resources are allocated (Ritter & Pedersen, 2020), transformed (Novalia & Malekpour, 2020) and acquired (Priyono et al., 2020). In light of the COVID-19 crisis, a lot of firms are starting to realize (Liu et al., 2020) that their business model is not as solid as they had thought (Breier et al., 2021). Consequently, a crisis can often give rise to new business models (Breier et al., 2021) that encompass new capabilities (Ahn et al., 2018),

new value propositions (Lee et al., 2020) and new value demonstrations (Liu et al., 2017), which address new customer needs (Mehta et al., 2020).

Furthermore, it is believed that digital technology (Priyono et al., 2020) enables firms to transform business models quickly (Novalia & Malekpour, 2020; Batiz-Lazo & Efthymiou, 2016a), and not in traditional or linear ways (Breier et al., 2021). Digital transformation is defined as the venture of firms to use new capabilities (Priyono et al., 2020; Lee et al., 2020) by leveraging digital technologies (Breier et al., 2021) in order to transform organizational strategies (Pramanik et al., 2015) and operations (Batiz-Lazo & Efthymiou, 2016b; Afthonidis & Tsiotras, 2014). The transformation of the business model, supported by digital technology (Thrassou et al., 2020), has been documented in the literature as one of the strategies (Papaoikonomou et al., 2012) used to respond to disruptive environmental changes (Pramanik et al., 2015); in particular, technologies that support firms (Priyono et al., 2020) in the determination of new business practices (Ritter & Pedersen, 2020).

In the existing literature, digital technologies are viewed as a suitable response (Priyono et al., 2020) to the disruptive changes caused by the COVID-19 crisis (Liu et al., 2020). The COVID-19 crisis provided a sudden and rapid glimpse into a future world (Liu et al., 2020), one in which digital has centralized in every interaction (Priyono et al., 2020), forcing both organizations (Shakina & Barajas, 2020) and individuals (Ratten, 2020) further up the adoption almost overnight (Bryce et al., 2020). Stay-at-home measures imposed around the world (Mehta et al., 2020) have forced many organizations to function remotely (Kuckertz et al., 2020), and make adjustments that were previously thought not possible to achieve (Ratten, 2020) particularly in a short space of time. A world in which digital channels become the primary (Kuckertz et al., 2020)—and, in some cases, sole (Priyono et al., 2020)—customer engagement model (Mehta et al., 2020). In the health care sector, for example, online consultations (Kuckertz et al., 2020) instead of physical doctor visits have become a reality.

1.4 Never Let a Crisis Go to Waste

While the crisis might have put a failure on business plans (Martinez et al., 2019), it also creates new opportunities (Liu et al., 2020). Businesses can benefit from crises by giving weight to the more minor weaknesses of their organization (Martinez et al., 2019) to be rapidly fixed (Pedersen et al., 2020) and to make more conspicuous changes to their business model (Breier et al., 2021). Some organizations will learn from a crisis (Lee et al., 2020), develop reactive resilience (Bryce et al., 2020) and emerge stronger from the period of turbulence (Dengleri et al., 2019). Managers and scholars (Schulze & Pinkow, 2020), who are now encountered with COVID-19 and its wider consequences (Sharma et al., 2020), look into how to make organizations more resilient (Salanova, 2020) or even antifragile (Bryce et al., 2020). However, it is proposed by Liu et al. (2020) that the current crisis offers opportunities that go beyond improving the condition of an organization. This period of turbulence can also be used to advance business networks (Pedersen et al., 2020) and ultimately the market (Nenonen & Storbacka, 2020). Moreover, the impacts of a crisis can reflect over time (Novalia & Malekpour, 2020). Decisions taken (Enderwick, 2009) and choices made today (Schulze & Pinkow, 2020) may have long-term implications for the future of businesses (Liu et al., 2017).

When an organization—notwithstanding all preventive measures (Williams et al., 2017)—experience a crisis (Shakina & Barajas, 2020), it is important to learn from the situation (Lee et al., 2020). Nothing helps an organization to gain focus (Afthonidis & Tsiotras, 2014) like a crisis. Therefore, it is essential for organizations to learn from previous experiences (Lee et al., 2020), whether they are positive or negative (Salanova, 2020), to cope better with the subsequent crisis (Sharma et al., 2020). Learning from previous crises (Lee et al., 2020) often means to reshape (Nenonen & Storbacka, 2020) or transform the operations and business model into a sustainable one (Novalia & Malekpour, 2020). The ways they learn from and adjust to today's crisis (Lee et al., 2020) will deeply influence organizational performance (Pramanik et al., 2015) in tomorrow's changed world (Novalia & Malekpour, 2020), providing the

opportunity (Bryce et al., 2020) to retain greater agility as well as closer ties (Salanova, 2020) with customers (Mehta et al., 2020), employees and suppliers (Pramanik et al., 2015). Those that are successfully able to make long-lasting gains (Lee et al., 2020) will likely be more successful (Martinez et al., 2019) during recovery and beyond. Consequently, a crisis also offers many treasured lessons (Lee et al., 2020). The global crisis caused by the COVID-19 pandemic is no different (Mehta et al., 2020).

Though the notion of the changes that crises bring about are understood, their mechanism, characteristics, effects and underlying motivators are less so, and vary across the organizational, industry and market typology. Of course, it also depends on the nature of the crisis, its severity, its length, its timeframe, its geographic spread and other factors. This book, thus, brings together incorporate scientific works (chapters) on contextual transformations and reciprocal organizational adaptations that will help delineate the above forces and factors, as well as their interrelationship in differing settings.

1.5 Book Content and Structure

The book presents an additional (to this) 11 works, which have been selected considering their quality, their relatedness to the book theme, and the significance of their contribution to knowledge through solid empirical and/or conceptual scientific theorization. The result is a collection of works that provide a balanced presentation across disciplines (management, strategy, marketing, economics/finance, etc.), geographic regions, market types and industries, and business field foci applications.

Chapter 2 is titled 'Losing Your Main Trade Partner: Adapting Trade Networks Amid Commercial Blockages'. Globalization coexists with crises and the rise and fall of trade blocs seem to be the new normal in trade relations worldwide, for reasons such as protectionism or political conflict. Hence, entire industries have had to adapt to the constant creation and destruction of trade barriers as countries reach the extreme of losing their main trade partner. This chapter examines how industries adapt to such shocking commercial blockages by analyzing the extreme case of the Colombia-Venezuela broken trade relationship. The authors (Luis Miguel

Bolivar and Francisco Javier Maza-Avila) use longitudinal social network analysis to depict the transformation of the countries' egocentric trade network through the snapshot approach and review the manufacturing industries' response from the Colombian side to reconfigure the country's trade network. They then provide a set of lessons learnt.

Then, Chap. 3, 'Public Hospitals in Crisis: Managerial and Strategic Adaptation', looks at the health sector. The authors Lior Naamati-Schneider and Ofer Zaks argue that health systems worldwide function in turbulent local and global ecosystems, affected by economic, demographic, technological and other changes. Recent reforms of Israel's public health services that have led to increased competition—together with chronic under-funding, pressure to reduce per capita costs and increased demand caused by greater health awareness—have created budgetary pressures. The overstressed public hospitals started adopting a strategic and managerial approach, but they are a part of a highly regulated and centralized market with little leeway. The COVID-19 pandemic in Israel—which caused a nationwide emergency—exacerbated the need to find solutions, under conditions of great uncertainty. Consequently, this chapter reviews business and marketing strategies that Israeli hospitals adopted and adapted to an environment that is constantly changing, especially in a medical crisis.

Subsequently, Chap. 4, examines the 'Impact of COVID-19 Crisis, Global Transformation Approaches and Emerging Organisational Adaptations: Towards a Restructured Evolutionary Perspective'. The pandemic crisis of COVID-19, despite its unexpected and explosive spread, constitutes, at the same time, a structural disturbance of global socio-economic balances. Through the fourth industrial revolution and amid the unexpected and profound recessionary economic pressures on a global scale, our world is heading towards a 'new globalisation'. Looking at the economic and social implications of the COVID-19 crisis through several theoretical tools for interpreting the current global transformation, Charis Vlados and Dimos Chatzinikolaou conclude that the global economy is facing a severe threat. A renewed evolutionary theoretical interpretation seems imperative, and any perseverance to simplify and strictly fragment past approaches can only be ineffective. In this context, the long-term and sustainable exit of this crisis seems to require

multiform organizational adaptations, at all levels of operation and by all actors, which seems that this can only come with the joint dynamics of innovation and effective change management.

Within the research and development and innovations (R&D&I) context, Chap. 5 ('Impact of COVID-19 on Investments by Companies in Research, Development and Innovation: The Case of Lithuania' by Erika Vaiginiene, Rasa Pauliene, Reda Nausedaite, and Daiva Mazeikaite) analyses motivational factors which foster Lithuanian companies' intentions to invest in R&D&I under conditions of COVID-19 disease, which caused a pandemic and economical lockdown. Economic lockdown caused by COVID-19 revealed capacities of some innovation-driven companies to demonstrate growth instead of decline. National and supranational governments focused their efforts on increasing the numbers of companies resistant to the pandemic. The results of the research demonstrate the relationship between propensity to innovation, investment into research and partnership with research institutions. A representative Computer Assisted Telephone Interviewing (CATI) survey of Lithuanian companies (N=510) was done for an analysis of the impact of COVID-19 on Lithuanian companies' investments to research, development and innovations. Also, research results disclosed differences, between the whole sample and companies which invest in innovations consistently, in motivational factors.

Moreover, the next two chapters in the book concentrate on sectoral transformations in India and Canada, respectively. Chapter 6, 'Transformations in the Social Sector During the Covid-19 Crisis in India—A Perspective, focuses on the impact of the COVID-19 crisis on social organizations, their resilience in meeting and mitigating new challenges, and the changes transpired within this sector as a result of the pandemic. With India crossing the three million mark of COVID-19 cases, there has been tremendous crisis in the Indian economy, leading to industry-wide disruption. Within this framework, the chapter delves into the social sector in India, which has been at the forefront in handling the socio-economic impact of the pandemic. The authors Ambika Kulshrestha and Sandeep Kulshrestha also highlight the COVID-19 affected internal/external environmental variables that have caused an imbalance in the social value creation and proposition from the beneficiary/other

stakeholder's context and the strategic maneuvers for innovation in various spheres of this sector, towards a paradigm shift.

Chapter 7, 'Business Adaptation in Canada: Contextual Sectoral Transformations and Cross-Fertilisation in the Garment and IT sectors', determines what strategies could be the best for various industrial sectors. The authors Diane-Gabrielle Tremblay and Amina Yagoubi have studied various sectors including the garment and textile industry, and the IT sector; over the years we have come to look at possible combinations and innovations between the two sectors. The idea here is to highlight the challenges businesses will be confronted with in the coming years and to identify measures for future development. In their view, innovative organizational adaptations will be crucial for firms to adapt to the post-pandemic context and it appears that cross-fertilization can contribute to innovation.

Also, in the field of technology, Chap. 8, 'Approaches to the Digital Transformation of High-Tech Companies in Russia Under the Crisis: Problems and New Opportunities', analyses approaches to digital transformation in high-tech industries in Russia in comparison with world practices, characterized by the main problems and prospects that digital transformation opens up under the crisis. In modern conditions of the fourth industrial revolution and the increase of digitalization, companies open up new opportunities. Digital transformation is not just automatization, but a holistic change in the company's approaches to the management of business processes, to building relationships with suppliers and consumers, to human resource management. Tatiana Kokuytseva, Oksana Ovchinnikova and Maxim Kharlamov reveal the key elements of digital strategy and present the recommendations for digital transformation, which will allow companies to build their own effective strategies of digital transformation to overcome crisis and post-crisis phenomena in the economy.

Chapter 9 continues with the challenges and organizational adaptation in the tourism and hospitality industry ('Impact of Big Data on Tourism and Hospitality: Challenges and Organisational Adaptation' by Mustafeed Zaman, Rajibul Hasan and S. M. Riad Shams). The chapter aims to underline how Big Data is shaping the tourism and hospitality industry. From a destination management perspective, this chapter illustrates (1)

the different sources of internal and external data in tourism; (2) the challenges faced by the tourism and hospitality firms in the era of Big Data, and (3) how Big Data is changing the role of the Destination Management Organizations (DMOs) and their organizational structure in order to meet the need of the local stakeholders. Drawing upon studies of Li et al. (2018) and Sheehan et al. (2016), this chapter proposes a conceptual framework of destination management in the era of Big Data. This chapter also provides insightful information for tourism and hospitality professionals and directives for overcoming the challenges faced by the stakeholders of tourism destinations. It also encourages both DMOs and other stakeholders to collaborate in collecting, mining and analyzing Big Data required for the success of their businesses.

In a similar vein, Chap. 10, 'Customs Under Crisis in the New Era: Strategic Analysis of Surveillance Network Project' by Ozgur OZMEN, provides a strategic analysis of Turkey's new Artificial Intelligence based Surveillance Network Project which is being developed for identifying all potential risks of all vehicles and containers passing through customs without any traditional physical inspection. All countries are responsible for having an efficiently working customs and borders system in order to protect the state, companies and the people. Unfortunately, the system always cannot work perfectly due to many reasons such as organized crime groups, pandemics, limited economic resources and so on. Therefore, governments tend to benefit from high-tech solutions. As a big market and a geographic bridge between Europe and Asia, with a considerable number of import-export and transit transactions, Turkey is a long-term sufferer of the customs crisis.

Chapter 11, 'Structural Change with the Help of a Strategic Performance Cycle: How Can More Women Reach Top Management Positions During and After the COVID-19 Crisis?', examines companies' leadership inventions during crisis times. The COVID-19 pandemic struck unexpectedly and affected the entire world, from personal to public life to global economic activity. Companies might tend to focus on immediate concerns, but strategic objectives such as increasing diversity on boardrooms should not be forgotten. The main contribution of this

chapter is twofold: it reviews some of the most recent publications on the effects of the pandemic and it develops a model aimed at helping companies to increase the number of women in their workforce and benefit from the complementary skills of both male and female personnel. Binder Bettina suggests that it is during such crisis times that companies should build on both men's and women's leadership skills.

The final chapter of the book offers insights into the current health crisis and its impact on small businesses in Cameroon. Chapter 12, 'Post-Covid Business Transformation: Organizational Constraints and Managerial Implications for SMEs in Cameroon', pinpoints the paradox of cultural, digital and organizational readiness of small and medium businesses in Cameroon to mitigate pandemic risks and what type of government intervention could be helpful to SMEs. Authors Zhanna S. Belyaeva and Petihu Numbu Levis conducted a survey in ten regions of the country and provided the database for this study. The sample is selected from the list of small businesses having at least a total of 20 employees, with 50 respondents from each region. Analysis is carried using SPSS. ANOVA, regression analysis, linear regression and T-Test will be used in order to define the relationships that best describe the problem under study. The results show that COVID-19 has had a negative effect on SMEs in Cameroon, and government aid plays a very mild role in minimizing it.

In conclusion, the above assortment of internally and externally balanced works, in terms of science and practice, offers a valuable collection of insights on the organizational transformations and adaptations during crisis conditions. The book does not claim to offer any final solution to the contemporary issues and questions regarding crises, like COVID-19, nor a definitive model or direction for theoretical works or managerial implementation. It does, however, suggest fresh and alternative perspectives and offers equitable paradigms of contemporary theories and applications that should stimulate knowledge and provide solid foundations for further research to develop.

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2

Losing Your Main Trade Partner: Adapting Trade Networks Amid Commercial Blockages

Luis Miguel Bolivar and Francisco Javier Maza-Avila

2.1 Introduction

International businesses are used to dealing with challenging trade barriers; however, in recent times, trade crises have hardened, pushing firms to adopt substantial strategy adaptations as a response to new cost structures as well as attractiveness and access conditions of new markets. In the developing world, some of these restrictions are the result of political tensions, ideological disputes, or populist leaderships. Still, in the developed world, these became an increasing research topic since trade blockages have risen in the form of protectionist measures like the US-China trade war, in the form of trade bloc withdrawal like Brexit, or trade disputes

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like the Japan-Korea difference. The consequence of losing a key trade partner is that firms and entire value chains must adapt to cope with the new market access landscape caused by trade policy shocks.

However, firms' response in the form of market selection adaptation strategies in turn also has implications for countries' position in the global trade network, which remain to be accounted for (Brass et al., 2004; Cuypers et al., 2020). Still, understanding these implications is important for policy-making decisions as well as for international business strategy formulation. For instance, when a trade partner decides to block direct commercial relations, the network analysis may tell how that policy measure actually impacts the counterpart's performance (Fagiolo et al., 2008). Similarly, the network analysis will also show how industry shifts its market focus and the general sentiment of the overall market selection decisions (Cuypers et al., 2020).

The objective of this work is to examine how sudden international business restrictions imposed unilaterally by an important counterpart country cause an adaptation in firms' market selection strategies and this, in turn, reshapes the focal country's trade network. We do so by describing the bilateral trade network indicators which reveal the loss of both countries' main trade partners for manufactured goods. We use the Colombia-Venezuela case as research setting. This case is characterised by a series of international business restrictions including trade blockages, border closures, currency exchange restrictions, trade bloc withdrawal, and loss of stability and warranties for foreign direct investment. In this setting, we then investigate how the most affected industries cope with these restrictions and shifted their international business strategy.

In this chapter, we present a longitudinal egocentric network analysis in both countries' trade links. We first identify the milestones in the process of losing the trade partner given a series of policy measures as reported in the media coverage of the issue, and then we contrast this information with the egocentric network indicators. Besides, we present a revision of the main changes in the market selection strategy of manufactured goods exporters. We finalise explaining what Colombian international businesses did when they faced this kind of trade restrictions and loss of market, and how the Colombian overall international trade performance shifted in consequence.

2.2 Literature Review

Before analysing the data, let us consider how a trade partner is lost and what to expect afterwards. We ground our research in the gravity approach (Baier & Bergstrand, 2001; Bergstrand, 1989; Meyer, 1986) in connection with international business theory (Buckley, 2016) and the world trade network approach (De Benedictis & Tajoli, 2011). In this matter, the gravity approach claims that bilateral trade is determined by both the weight of the partners' economy and the distance separating them. Yet, while the weight of the economy is easily measured via GDP, the distance acquires several dimensions, and each dimension has its own set of indicators. For instance, it has been proved that all geographic, political-administrative, economic, and cultural distances negatively affect trade relations among any pair of countries (Baier & Bergstrand, 2001; Ghemawat, 2001). Hence, while the size of the economy provides attractiveness for market-seeking purposes and availability for resource-seeking purposes, at the same time, less distance reduces transaction cost derived from transportation, product adaptation, negotiation, and so forth (Baier & Bergstrand, 2007; Blonigen & Piger, 2014).

Particularly, less administrative and political distance reduces the risk of engaging with the market and allocating resources for serving its customers or sourcing from it (Buckley et al., 2007; Liznodo, 1990). That is how, for instance, political tensions tend to pose higher risks for investors because they are often based on ideological clashes between governments and differing approaches on economic freedoms, thus hindering bilateral business via restrictions to trade, investment, capital repatriation, travel, or resource mobility in general (Bergstrand & Egger, 2013; Buckley et al., 2007; Ghemawat, 2001). This in turn makes transactions less expeditious and more expensive, reducing the likelihood of firms engaging in trade with the counterpart country (Brouthers, 2002; Buckley & Casson, 2009). Thus, when all of these factors converge, even neighbouring countries that share extensive borders, cultural bonds, or complementary economies, may end their business relationships.

Then again, what happens after such bilateral trade and business blockage may be analysed from the world trade network standpoint (De

Benedictis & Tajoli, 2011; Schweitzer et al., 2009). The network approach suggests that as countries hold relationships with plenty of partners at the same time, their position in a global trade network provides benefits for further enhancing openness and alternatives for diversifying its markets (Bolívar et al., 2019). The consequence is that, as one country loses one key partner due to business restrictions, its firms will transform the country's trade network by seeking markets and resources elsewhere. Still, the imposition of barriers to trade, investment, capital flows, and human resources mobility, among others, will have a deferred, yet prolonged, impact on the trade network, since several business relationships depend on permanent asset allocation, enduring business relations, or difficult-to-transact resources (Ricart et al., 2004). This means that it will take some time for firms to find their way out of the counterpart country, while, for instance, they finish their ongoing contracts or sell their foreign assets (Luo, 2000). As a result, the loss of a major trade partner in a given point in time is expected to slowly transform the focal country's trade network by the mechanisms of continuous firm's market-seeking and resource-seeking purposes.

2.3 Methods

We develop our analysis in two stages. In the first stage, we illustrate the bilateral trade crisis timeline and depict the trade network indicators of the two countries, showing the evolution of the bilateral commercial relationship in a 20-year period. And, in the second, we revise the cases for industries' response to the trade blockage shock to contrast their actions against the evolution of the network.

Research Setting

The research setting selected for this study is the case of the broken commercial relationship between Colombia and Venezuela, which was caused by fractured international relations, as well as for political and economic risk materialisation. Both countries are labelled as developing economies

by the IMF and the World Bank, and both rely on commodities exports including oil in both cases and coal, coffee, and other foods in the case of Colombia. However, the importance of the trade relationship between these countries laid in the mutual dependence on the exchange of manufactured value-added goods.

However, an environmental shift in business conditions between the two countries represented an important crisis for Colombian exporters and investors, given that Venezuela was the nearest and most important market for manufactured goods. The product portfolio for exports to Venezuela was widely diversified; the more prominent product categories were vehicles and auto parts, pharmaceuticals, plastics, foods, machinery, apparel, and miscellaneous manufactures. These companies were then in a position in which customers, distributors, or partners from Venezuela were not able to acquire foreign currency to make their payments. Exporters could not freely send personnel to coordinate operations or negotiations abroad; they were restricted to import into Venezuela; they had no investment protection, and what is more, the end-consumer stopped having enough income to make otherwise routine purchases (Hausmann, 2017).

Therefore, in the light of multiple events that hinder the advances in international trade and economic integration in the world, it is of paramount importance to understand what the consequence of losing a trade partner is in terms of both the focal country's trade network and the industries' response to overcome the commercial crises.

Data and Analytical Approach

For the first stage of our analysis, we built a timeline for the bilateral trade crisis by reviewing media coverage specifically on the Colombia-Venezuela bilateral trade crisis. We sourced this data from Colombian national, business, and regional media outlets accessed through MyNews.es dataset and used the search terms "exports to", "trade with", "commerce with", "commercial relation between" combined with the terms "Colombia and Venezuela". As inclusion criteria, we considered articles with key urgent facts specifically about the bilateral trade relationship and obtained a

total of 167 pieces from 2002 to 2017 in 18 sources. We then grouped this data to extract dates, facts, and impact on the trade relationship. As a result, we reported the key milestones and built the bilateral trade crisis timeline.

In a second stage, we built a directed and weighted world trade network (De Benedictis & Tajoli, 2011) for each year, which allows employing a longitudinal network analysis comprised of yearly snapshots of the network indicators (Brandes et al., 2009; Snijders, 2013). This type of analysis shifts the focus from how relationships are structured to how bilateral relationships change over time (Fletcher, 2008; Kossinets & Watts, 2006; Opsahl, 2015). In the network, each country/node *i* is linked to another *j* by the value of their trade relation (imports + exports). Each row then is converted so that the sum of its values is 1; thus, capturing the relative importance of each trading partner (Wasserman & Faust, 1994). We use the official bilateral import values reported by each country, which are available from the International Monetary Fund (IMF) direction of trade statistics (DOTS) dataset to calculate 21 network snapshots from 1997 to 2017. We arranged the network data and performed further analysis in the software UCINET 6 ® (Borgatti et al., 2002) for all countries in the DOTS dataset; then we extracted the data for the two cases of analysis.

Once the network data was built, we calculated four egocentric network indicators that could reflect the end of the bilateral trade relationship as well as its consequences for the quality and quantity of the connections between each country and its partners. Hence, we calculated: the weight of the link between the two countries, the degree centrality in the trade network, the closeness centrality, and the egocentric network density (Wasserman & Faust, 1994). The first indicator accounts for the importance of the counterpart country *j* for the focal country *i* in terms of trade volume so that it reflects the percentage of country *i*'s trade that is concentrated in county *j*. The second indicator is degree centrality, calculated as the number of partners and considering the weight of the relations (Hanneman & Riddle, 2005); it reflects the prominence of the country in the overall world trade network as well as the importance of

the country for its trade partners. The third indicator is closeness centrality; it shows the commercial capability of the country and its firms to diversify its market base; it measures direct exchanges with partners or the ability to reach a higher number of countries with less effort (Everett & Borgatti, 2005). And the fourth indicator, density captures the competitive and commercial environment of the firms; it measures the number of connections between the focal firm's partners in relation to all possible connections (Everett & Borgatti, 2005); a higher density suggests higher interdependence, openness, and a dynamic commercial environment, while a lower density indicates loosely coupled, dispersed, less integrated partners (Hanneman & Riddle, 2005).

Following this, we explored the World Trade Organization (WTO) statistics dataset in order to explore key industries that were especially hit by the crisis. We captured detailed bilateral exports data for both countries by two-digit harmonised system codes from 1997 until 2015, which is the last year on record for Venezuela in official WTO data. With this data we identified exporters' target markets as well as importers' sourcing origins; then we ranked the most prominent industries making international business from the Colombian side, and for each industry, we observed the changes in the importance of Venezuela for its businesses before and during the crisis. We report several cases of industries that relied heavily on the Venezuelan market and that were challenged by its inapproachability. As a complement, we revised the media coverage described before in which these industries were mentioned to capture general themes of adaptation strategies and lessons learnt.

2.4 Findings

The Colombia-Venezuela Commercial Crisis

In this section, we show the results of our data analysis. First, we present a picture of what happened to the bilateral trade relations between Colombia and Venezuela. Next, we look into the consequences of the broken relationship in terms of the egocentric network data.

Crisis Timeline

Concern for the future of Colombian business was of great interest by the main Colombian print media that, given the imminent repercussion of the Venezuelan crisis, carried out a follow-up of the news events associated with it, especially, during its most critical stages. Hence, to illustrate this situation, we have extracted a series of milestones in the break-up process, which we relate in this section. In Fig. 2.1 we match the crisis milestones (Fig. 2.1a) against the changes in the relative importance to the trade of each country to the counterpart (Fig. 2.1b), then, against the volume of Colombian exports excluding mineral commodities (Fig. 2.1c), and against the volume of media coverage on specific bilateral trade issues (Fig. 2.1d).

We started our data analysis purposely in 1997, two years before the beginning of the government of one transformative leader in Venezuela: Hugo Chavez. From 1999 when he took power, Mr. Chavez would lead a profound shift in his country´s political and economic systems emphasising on state control of resources and a redistributive policy. Yet, until 2001 the Chavez government and its policies did not decisively reflect on the bilateral trade relation, at least not on the significance of each country on the other.

However, the relation became fairly unstable from 2002 onwards, coinciding with the arrival of one transformative leader in Colombia: Alvaro Uribe. The start of Mr. Uribe's leadership concurs with the start of a volatile period as noted in Fig. 2.1, and it coincidently ends the year that the commercial relationship reaches minimum levels, starting a third phase.

The concurrence of Mr. Uribe and Mr. Chavez in their respective governments would be marked by a constant international relations conflict. In 2003 a first rhetoric escalation took place. Colombian leaders of the moment accused Venezuelan leaders to collaborate with terrorist groups and denounced their internal economic and social policies before human rights organisations. Venezuelan leaders, on the other hand, accused Colombian leaders to conspire with the U.S.A. to take over the Venezuelan government.

Fig. 2.1 Bilateral crisis timeline

In addition, starting in 2002, the economic policies of both countries went in opposite paths. Colombia embarked on a transformation towards economic freedoms favouring private capitals, liberalisation of trade, foreign investment promotion, and protection, privatisation of state-owned enterprises and utility companies, among others. What is more, they signed free trade agreements (FTAs) with several countries, including the U.S.A. and Canada, and implemented multiple bilateral investment treaties, thus committing to protect private investments. In the meantime, Venezuela withdrew from its FTAs, imposed restrictions to capital repatriation, closed borders multiple times, imposed restrictive currency

exchange schemes, went in nationalisation streaks, and implemented laws limiting private property and economic freedom.

In 2003 Venezuela installed its first restriction to foreign currency exchange. A system called CADIVI started managing access to the currency from people and companies, as well as supervising most capital flows for the country. They imposed quotas to acquire foreign currency, so firms often faced a shortage of money to comply with their payments. The restrictive system motivated the rise of a black market, and had to be modified, overlapped with others, and replaced multiple times (José & Guaita, 2012).

In 2005 Venezuela requests entrance into the integration project Mercosur in which Argentina, Brazil, Paraguay, and Uruguay were members. The country was accepted as associate member thanks to the endorsement from Brazil and Argentina with which they had similar ideological affinities. The full accession of Venezuela to Mercosur was completed in 2013; however, in 2017 the country was indefinitely suspended. The consequence of Venezuela's membership to Mercosur was that as political conflict with Colombia arouse, the former decided to establish commercial relations with a different set of possible suppliers.

In 2006, Venezuela formally requested withdrawing from the Andean Community, a trade bloc where they shared membership with Bolivia, Colombia, Ecuador, and Peru (José & Guaita, 2012; Nelson & Mora, 2011). This measure was considered a retaliation after Colombia signed an FTA with the U.S.A. that same year and both Colombia and Peru started negotiating FTAs with the European Union. Venezuela's leadership labelled this as a betrayal to the regional integration plan and surrender before foreign agendas.

Starting that same year, 2006, a massive expropriation wave took place in Venezuela. The focus of expropriation was real states and oil companies; however, the nationalisation policy affected every sector including tourism, telecom services, manufacturing industries, retail, and so forth. Particularly, multinational enterprises were target to nationalisation policies, including companies like Exxon, Hilton, Casino, or Verizon.

Meanwhile, after the global financial crisis, starting from 2009, Colombian exports growth stalled in industries different from oil and coal (Fig. 2.2c). The concentration of this country's exports on oil and

fuels increased, as well as its dependence on the U.S. market. This means that even as exporters struggled to find new markets, diversify, and embed into more integrated networks, they were not able to achieve sustained growth.

By 2010 the bilateral relations were completely broken, and after eight years of rhetoric escalation and mutual accusations of wrongdoing, diplomatic relations were minimum. This same year, after elections in Colombia, a new president, Juan Manuel Santos took office. One of the first announcements of the new government was to appoint the Venezuelan government as a mediator for peace talks with an internal subversive group. The announcement was made during a meeting between the two governments and mistakenly hinted that the role given to Venezuela would mean a return to better diplomatic relations. However, the bilateral relationship was only held for this specific purpose and no advances were made to improve the economic side.

Venezuela held its role as mediator for peace talks from 2011 onwards, even though the bilateral diplomatic relations were permanently under conflict. In 2013, after the passing of Mr. Chavez, a new president Nicolas Maduro was appointed to carry the legacy of his predecessor. This meant that the two neighbour countries kept travelling their separate economic paths with opposing approaches and conflicting diplomatic relations.

Trade and investment restrictions kept making it difficult to establish business relations with Venezuela. In addition, in 2015 a humanitarian crisis was made evident due to a refugee crisis impacting countries like Argentina, Chile, Colombia, Ecuador, and Perú. During this year Venezuela closed borders to block the mobility of people in an effort to mitigate the migration crisis. The intensity of the migration crisis increased considerably since 2017, when Venezuela's socio-political instability accentuated, accompanied by hyperinflation, limited access to health services, and the decrease in food production and availability; all of these contributed to the deterioration of the population's health, food, and nutrition (Doocy et al., 2019).

In sum, we have described the bilateral Colombia-Venezuela trade crisis as one that resulted from both political conflict and political-economic risk materialisation. The political conflict is a bilateral factor derived from the deterioration of the international relations among the countries,

while risk materialisation in the political and economic realms was inherent to Venezuela in particular. The Venezuelan crisis has not only resulted in the deterioration of trade with Colombia, to the detriment of its productive sector but has also generated a migration crisis, considered the largest in Latin America.

Trade Network Longitudinal Analysis and Bilateral Business

Between the two countries of our case, Venezuela is the biggest international trader, with greater imports and exports than Colombia, which is due to its high dependence on oil exports and high reliance on imported manufactured goods. In 2014, Venezuela exported more than 80 billion USD while Colombia exported 63.4 billion USD. In addition, traditionally Venezuela's trade represented around 45% of the GDP, while this indicator averaged around 30% for Colombia in the past decade. Furthermore, we have captured the main trade network indicators for both countries during the study period; in Fig. 2.2 we compare the evolution of the four network indicators described before.

The first element that is key in the bilateral relationship is the relative importance of each counterpart country to each other. In Fig. 2.2a we can divide the observation window into three periods. First, until 2001, there was a "normal" trade relationship inherited from the 1990s, in which the trade volume with Venezuela accounted for around 10% of Colombia's total trade. Then, from 2002 until 2009 a high volatility period marked the transition where firms struggled to make business between the dyad. And finally, after 2010, the relationship reached minimum levels, becoming near null; each country represented less than 2% in the total trade of the counterpart; with the lowest point in 2017 when Venezuela only accounted for 0.7% of Colombia's trade. These values are particularly relevant for the overall economy of the countries because of the low concentration of the export/import destination/origin. Even more considering that during the first period, Venezuela was the second most important export destination for Colombia, and it was the first commercial partner for manufactured goods different from the oil or coal value chain between 2004 and 2009.

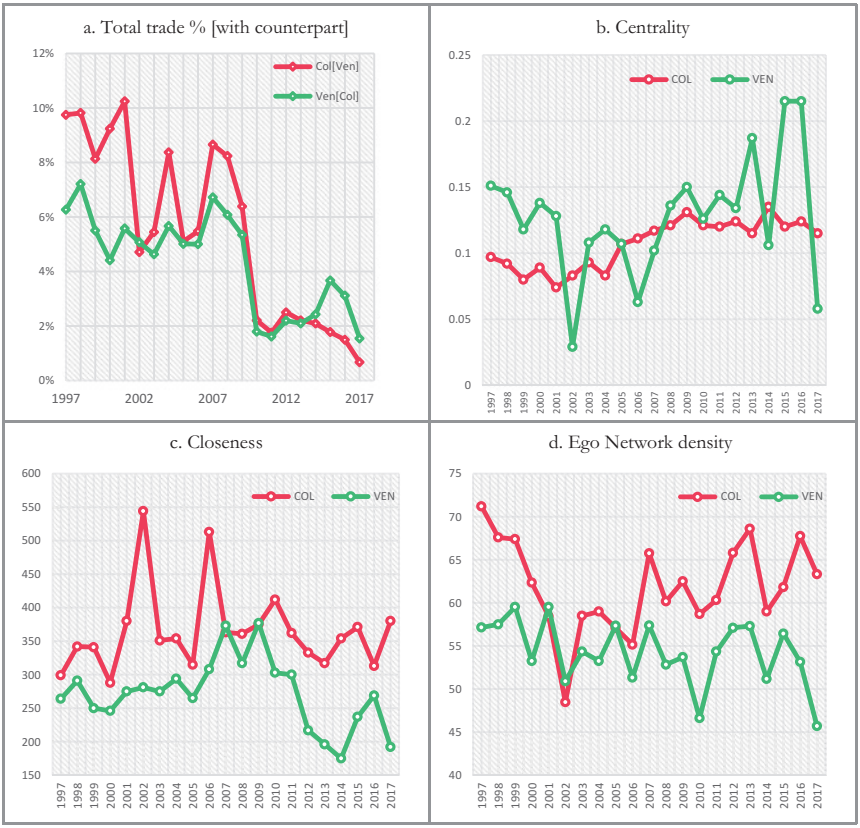

Fig. 2.2 Egocentric network indicators

The second element of the network analysis is centrality, shown in Fig. 2.2b. We notice that until 2001 Venezuela was the most steadily central of the two countries, which was consistent with the higher volume of both imports and exports. Then, the high volatility that followed this period is consistent with the constant shifts in foreign policies as well as the change in the relationships with buying countries. For instance, conflictive relations rose with the U.S.A. and Europe, which were the main markets of Venezuela's oil, while new relations were formed with the least developed economies in Latin America and the Caribbean (Cusack, 2018). Meanwhile, Colombia's centrality increased consistently

starting in 2005, which means its relative importance increased for all the rest of its trade partners. This signals a quest undertaken by its firms to strengthen the country's commercial relations with the rest of the world just when Venezuela's overall relevance as a market was dropping consistently as shown in Fig. 2.2a.

The third measure observed is closeness centrality, shown in Fig. 2.2c. In this indicator, Colombia showed a higher closeness centrality with its trade partners, which is congruent with a more diversified portfolio of products and markets. However, there is no decided change in the average of this indicator over the years. Thus, instead of being a consequence of the deterioration of bilateral trade relations with the one country, this may be understood as a factor that helped in alleviating its effects. In the case of Venezuela, this indicator does change over time, and it shows that the country loses closeness with its partners. This is a signal of the overall deterioration of Venezuela's trade relations with enough partners to cause a long-term reduction of this indicator.

Finally, we measured egocentric network density, an indicator of commercial dynamism of the focal country and all of its partners in conjunction. A denser network implies more dynamic trade relations with more integrated and open economies that simultaneously have plenty of commercial relations among them. The result is that the overall tendency of Venezuela is to embed itself into a less dense trade network with fewer interactions among the partners, meaning that the counterparts are more dispersed and less connected and acquainted among them. On the other hand, as Venezuela meant less for Colombia's foreign trade, the latter embedded itself into a denser trade network. Figure 2.2d shows how, starting in 2007, Colombia's network density increased consistently. This signals a move to more integrated markets with more opportunities for trade and investment.

Firms' Adaptation Strategies

The network analysis shown before indicates that Colombian industries transformed by gaining centrality in the world trade network and embedding into a denser egocentric trade network, all as it maintained its

closeness with diverse partners while its second most important commercial partner became unapproachable. Hence, to best understand such transformation we look into the trade data for Colombia's most prominent industries exporting to Venezuela before and during the bilateral crisis: vehicles and auto parts, sugar confectionery, plastics, and pharmaceuticals. As a result, even though every firm uses particular strategies, in the following sections we identify the general theme of the adaptation strategies (Fig. 2.2).

Vehicles and Auto Parts: Sourcing Matrix Transformation

The vehicles and auto parts industry had the most dramatic change during the crisis. It went from shipping 80% of its exports for Venezuela in 1999 to just 0.2% in 2015 (the last year known from WTO reports). It is worth noting that this industry works under a regional fragmentation strategy worldwide (Lall et al., 2004; Türkcan & Ates, 2011). This also applies to Colombia; the industry is comprised of auto assemblers as well as of mechanical parts manufacturers in the vehicles value chain. Colombian auto assemblers are mostly joint ventures between global brand multinational automakers and local investors; they are connected to other sister companies in several countries of the region dedicated to produce most of the vehicle brands commercialised in Latin America. This industry functions as a sourcing matrix in which the production of different parts is allocated to the most cost-effective location within the region and then distributed to the assemblers.

Consequently, eliminating a member of the matrix would imply a redistribution affecting all members of the value chain. This situation materialised via the imposition of import quotas, high tariffs, and the expropriation of several assembler plants from multinational companies in Venezuela. Some of these companies were already struggling to obtain currency to pay their foreign suppliers and were not able to function properly under government rule due to the lack of connection with the rest of the value chain.

Still, in spite of the bilateral crisis challenge, added to the global financial crisis, the overall tendency of Colombian exports in this industry kept

a positive slope. This concurred with multiple factors, for instance, firms like General Motors or Toyota had diversified their production risks, so they had back up plants capable of producing the same products (and demanding the same parts) in countries like Brazil, Argentina, or Mexico. In addition, it is possible that otherwise direct exports from Colombia to Venezuela transformed into indirect exports via the incorporation of auto parts in vehicles produced in Argentina or Brazil. On the other hand, the industry doubled its market diversification, exporting to 50 different markets in 2010, and 44 countries in 2015, up from 22 markets in 1997, making connections with other regional vehicle value chains in Europe and Asia.

Sugar and Confectionery: Explore the World for Cultural Convergence

The category of sugar confectionaries is highly relevant for cultural reasons, Colombia and Venezuela being two countries with a similar cultural heritage, colony-coloniser ties, traditions, and customs. Hence, end-consumer goods like foods and desserts that are closely linked to cultural identity are as essential for the consumer as they are for suppliers that would have a hard time finding a new set of consumers when they cannot access their niche markets. In this industry, Venezuela was ranked as the third exports destination, as it used to acquire 28% of Colombian exports by 1999, then dropped to sixth place, buying only 8% in 2015. Still, the industry managed to nearly double its worldwide exports in the 10-year period. Furthermore, by 2015 they added a group of countries in the Caribbean as new top markets, ranking Suriname, Guyana, Jamaica, and El Salvador in the top 15 export destinations, as well as included Antigua and Barbuda, and Cuba. This group of countries used to be harder to reach for transport connectivity reasons; however, given the difficulties to grow sales to a more natural neighbour market, firms in the sector managed to develop a distribution network in the Caribbean region and succeeded in developing these culturally converging markets. Moreover, the industry started exporting to 35 new destinations in the 10-year window, thus diversifying their market base.

Plastics and Pharmaceutics Industries: Seize Productivity

Firms in these sectors managed to keep growing in Venezuela although at a slower pace than in most markets. One of the reasons for this growth was the decline in Venezuela's productivity; for instance, in the plastics sector, Venezuela used to export nearly 300 million USD at the beginning of the period, then, by 2015 these exports had dropped by 90%; similarly, exports of pharmaceutics dropped by 91%. In addition, a generalised exodus of private investment affected both sectors; several private-owned firms relocated by closing operations in Venezuela to open new plants and businesses in other countries like Colombia, Panama, Brazil, or even the U.S.A. Some of these firms then imported products back into Venezuela.

For its part, the underlying reason for Colombia's growth was the increase in productivity achieved by higher investment from local and foreign firms. A higher density in the trade network also meant higher integration with the rest of the regional economies like Mexico, the U.S.A., Brazil, Ecuador, and Perú. In consequence, Colombia nearly quadrupled its plastics exports, going from 322 million USD in 1999 to 1.37 billion USD in 2015. Simultaneously, it went from exporting 16% to Venezuela in 1999, to 7% in 2015. Venezuela was the third most important market for plastics before 1999 and reduced its relevance down to the sixth place. As for pharmaceuticals, from 1997 to 2015 Colombian exports increased by 251% as market diversification efforts were made to add 22 new destination countries. The Venezuelan market also kept growing at a slower pace than the rest; it used to rank first in the 1990s and second in recent years.

2.5 Discussion and Conclusion

In the light of the gravity approach (Baier & Bergstrand, 2001), Colombia and Venezuela were meant to be close trade partners. These are neighbour countries, sharing large land and sea borders; they are linked through multiple roads, they have the same language, religion, and cultural

heritage; they had similar human and economic development; and were in a long-standing trade bloc and customs union. All this convergence means there was a small distance between them to establish business relationships (Ghemawat, 2001). Yet, due to political tensions and ideological clashes, there was a sudden reduction in the commercial and investment relationship as expected (Blonigen & Piger, 2014). A cocktail of policies and conflicts had the expected effect on trade and at a certain point made bilateral trade unviable to the point of reducing it to near-zero levels for several years.

It is worth noting that, from the aggregate data on total trade and openness, it would seem that the contraction of the Venezuelan market did not hurt Colombia's commercial growth path; however, by looking at the network data, as well as the strategies of manufacturing industries, it is evident that the bilateral trade crisis posed great challenges for international businesses.

Implications for Firms' Strategies

We have exposed three key coping strategies by looking at the case of four industries that faced a reduction in demand and access to their principal international destination market. So, to overcome this adversity, industry-level data suggest that a common strategy implemented across all sectors was market diversification. This is a logical path for firms that are often used for the comfort of doing business with near countries and have not overcome the difficulties of distance (Ghemawat, 2001). These companies are suddenly prompted to explore competition in distant economies, with further costs of transportation, language barriers, cultural differences as well as tariff and non-tariff barriers (Brouthers, 2002). Yet, in times of political tensions or ideological rivalry, internationally oriented industries, such as plastics producers or pharmaceuticals, have responded by inserting in denser and more intensely competitive trade networks.

Nevertheless, some industries have shown superior preparedness by exploring a diversified set of international entry strategies (Buckley & Casson, 2009). They have diversified risks and established collaboration agreements and joint ventures with suppliers and customers in different

countries, thus building a regional presence capable of absorbing multiple kinds of risk materialisation. For instance, organising manufacturing as a production matrix with dynamic capabilities in diversified locations proved helpful in the auto industry for adapting to changing political and economic conditions such as imposition of export quotas, trade bloc withdrawal, currency exchange restrictions, or economic crisis (Türkcan & Ates, 2011).

Still, companies with less complex products with demand drivers related to demographics or cultural characteristics, like sugary foods, have faced a different kind of challenge. Thus, in addition to overcoming trade restrictions and an economic crisis in their niche cultural market, firms in this industry thrived by, first, finding cultural convergence with other nations and adapting their products to the needs and customs of the new potential markets (Ricart et al., 2004). And second, they have overcome geographical distances by setting a distribution network towards otherwise unconnected demandants.

Implications for Policy-Makers

We have shown that several network-level indicators reveal the path taken by a country's trade network after the deterioration of the link with a key trade partner; hence, paying attention to network measures such as centrality, closeness, or density is key to understand how firms cope with sudden environmental changes and crises (Schweitzer et al., 2009). For instance, higher centrality and closeness with partners in the trade network signals further access to market diversification (Everett & Borgatti, 2005), which has proven to be a key strategy for firms' coping mechanisms.

On the other hand, the egocentric trade network reveals the market dynamism and the type of competitive environment in which the country is embedded. This is a key measure for other kinds of strategies like diversifying a trade matrix or collaborating with foreign investors. Thus, a denser trade network suggests a quest to diversify risks and build a multinational production matrix, for instance, by establishing joint ventures and subsidiaries with partner firms from diverse nationalities (Brass et al., 2004). We believe both centrality and higher trade network density may

be cultivated via integration projects and foreign trade policy management (Bergstrand & Egger, 2013).

Limitations and Future Research Avenues

Network analysis has opened new research avenues for understanding international trade patterns (Kurt & Kurt, 2019) and for recognising bilateral business promotion strategies (Bolívar et al., 2019). In this chapter, we have presented an exploratory research on trade networks' and industries' response to the demise of a principal trade partner in the web of business relations. With this work, we have sought to establish a baseline for further explanatory and confirmatory research. For instance, having built a network indicator at the country level, it is possible to further capture the relationship between variables such as closeness, degree centrality, or network density in the countries' openness, trade performance, and industrial development. Moreover, today's availability of industry-level data on trade, enables to capture the nuances in the relevance of these variables for particular industries. In addition, this research was based on secondary data revealing the industries' responses to environmental change from official datasets and media coverage; however, a valuable contribution would be to consult primary sources at the firm-level to best understand the full scope of the coping strategies as well as the difficulties in the implementation process.

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3

Public Hospitals in Crisis: Managerial and Strategic Adaptation

Lior Naamati-Schneider and Ofer Zaks

3.1 Introduction

This chapter reviews the behaviour of Israeli public hospitals as they adopted business and marketing strategies in a competitive market and during the national medical crisis engendered by the COVID-19 pandemic. These hospitals function in a competitive market subject to a changing ecosystem (the macro global environment and the micro Israeli environment). Changes in the ecosystem are a key factor in forcing adaptation, both under normal conditions and in a national medical crisis. The outbreak of the COVID-19 pandemic in Israel in February 2020 created an entirely new situation that highlights the importance of stable and well-functioning healthcare systems and organisations.

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The chapter will first review the external and internal forces that act upon the Israeli healthcare market. It will then analyse the research data by mapping the organisational processes of adaptation and change that Israeli public hospitals have undergone in response to changes and crises in their environment.

3.2 Healthcare's Changing Ecosystem

Health systems worldwide differ from each other, depending on the country's socioeconomic policy, rules, reforms, and other legal frameworks and restrictions. In many cases they also differ in structure and in managerial and financial behaviour because of the variety in types of organisation, their nature, and their ownership (Shuv Ami, 2011). But all health systems must contend with economic, demographic, and technological changes that are constantly driving up per capita health costs, which must be reined in (Schmid et al., 2010). These changes create a turbulent, competitive, challenging, and complex ecosystem with which the health organisations and their leaders must contend in order to survive (Denis & van Gestel, 2015; Ginter, 2018). The complexity of the ecosystems and the pressure to control per capita health costs have driven health organisations to change their organisational structure and their managerial and economic behaviour (Bin-Nun et al., 2006; Boehm, 1998; McKee & Healy, 2002; Naamati Schneider, 2013; Schmid et al., 2010).

This chapter affords an important view of the behaviour and adaptation of public hospitals in Israel as a case study of creative adaptation to an environment that is turbulent in normal times and especially so in times of crisis.

3.3 Healthcare in Israel: Background

Israel has a pluralistic health system, financed and supported by various actors, including the government, non-profit organisations, health maintenance organisations (HMOs), and even private-sector agents (Chinitz

& Israeli, 2011). This complex structure developed on the legal basis of British and Ottoman laws and on the basis of public solidarity (Bin-Nun, 2019). Over the years, however, the status of the public system has declined, partly as a consequence of the growing private system (Achdut & Bin-Nun, 2012; Bin-Nun, 2019; Naamati Schneider, 2020b).

Starting in 1995, under the National Insurance Law, all Israeli residents became entitled to coverage of a standard basket of health services by one of four non-profit HMOs. The HMOs are funded by the government in accordance with the number of members and their gender, age, and geographic location. This accounting method, known as "capitation," combined with an increase in the array of health services available and the Patient's Rights Law, 1996, has increased competition among the HMOs and throughout the healthcare system (Chinitz & Israeli, 2011; Rosen et al., 2015).

The HMOs purchase health and hospitalisation services from hospitals through various payment schemes. Of the public general hospitals, some are owned by the government, some by an HMO, and some by non-profit organisations. All these hospitals function as part of a system that is highly regulated and centralised: The Ministry of Health arranges and regulates the ownership of hospitals and their specialisations, location, number of beds, and main outlays, such as expensive equipment (Bin-Nun & Ofer, 2006; Chinitz & Israeli, 2011). Under this unique arrangement, the Ministry of Health has the problematic dual role of owner and regulator of some of the hospitals (Leon et al., 2004). This dual role highlights, among other factors, the conflicts of interest and the problems inherent in managing and regulating hospitals that are in constant competition with hospitals owned by the Ministry of Health (The Advisory Committee for Strengthening the Public Health System, 2014; Chinitz & Israeli, 2011; Leon et al., 2004; State Comptroller's Report, 2008, 2015).

In 1995, under the National Insurance Law, an attempt was made to convert government hospitals into independent trusts, but difficulties and resistance, mainly by workers' unions, stymied the effort. The attempt did, however, influence the behaviour of hospital management (Chinitz & Israeli, 2011; Chinitz & Rosen, 1993; Feder-Bubis, 2006; Shasha, 1999). Consequently, in recent decades Israel's health system has seen

increased competition among the health and insurance providers, making the market dynamic, more competitive, and less secure for all medical service organisations, including hospitals (Chinitz & Rosen, 1991, 1993; Naamati Schneider, 2013; Rosen, 2003; Naamati Schneider, 2020a).

As part of the review of the Israeli ecosystem in which the public hospitals operate, as presented in Fig. 3.1, it is worth mentioning the field of Israeli start-ups and high-tech in medicine and biotech. These companies are increasingly defining the ecosystem in which the hospitals function. In recent years, global economic and technological trends have benefited the high-tech industry in Israel: The global growth rate is rising, new technological markets are opening up, and capital on a huge scale is continuing to fuel the accelerated growth of innovative companies (Israel's Life Sciences Industry IATI Report, 2019). Comparative data show that Israel excels in the development of innovative technologies (Zaks, 2020). The high-tech industry has close research and development ties with the

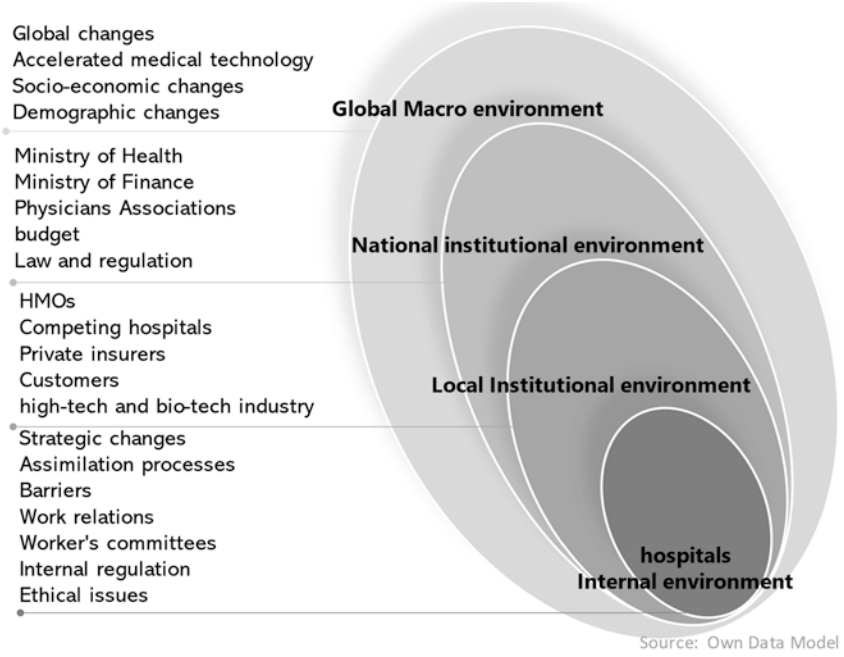

Fig. 3.1 Environmental impact on hospitals

military and extensive connections with academia, the health system, and hospitals in the fields of biotech, artificial intelligence (AI), and big data (Zaks, 2020). The digital health sector is one of the most promising areas in terms of global growth, as it is expected to grow significantly in the coming decade. (The Foreign Investments and Industrial Cooperation Authority, 2020). The healthcare landscape is currently shifting towards a more integrated ecosystem that includes biopharma, MedTech, and digital health and healthcare in a single bioconvergent industry (Israel's Life Sciences Industry IATI Report, 2019).

Israel's highly competitive healthcare market now offers a wide range of advanced technological and digital solutions. This revolution affects the organisation as a whole, redefining its strategies, entrepreneurial processes, and governance mechanisms or structures. (Kokuytseva & Ovchinnikova, 2020).

But far-reaching changes in this complex ecosystem, combined with chronic under-funding of the health system and a lack of staff and job slots, make it difficult for the public hospitals to achieve medical superiority through their economic conduct. They face an unstable and stressful local and global ecosystem that is forcing management at all levels, doctors, and the entire medical staff to adapt to changes in order to survive. Implementing structural and organisational changes is a complex process that has a great impact on the organisation and beyond. For the process to improve, it must be regulated and controlled, because it involves all levels of employees, from medical staff to managers (Ginter, 2018; Naamati Schneider, 2020a; Vrontis et al., 2018)

3.4 Theoretical Background: Organisations, Crisis, and Adaptive Changes

Organisations' relationship with their global macro and micro environment and their ability to adapt and survive in a changing environment are significant elements in the analysis of organisations' mechanisms of existence and survival and have long been important issues in organisational research (Samuel, 2012).

Various models address the adaptation and survival processes of organisations in a competitive business environment. This chapter combines the open systems approach (Katz & Kahn, 1978) and the new institutional theory approach (Scott, 1987) to understand how Israeli public hospitals and their administrations have adapted to environmental pressures and changes.

Both approaches investigate the organisation as a whole while examining the connections between its parts and the external environment. Whereas the open systems approach considers the global environment, the new institutional theory approach also specifically addresses changes and demands of the institutional environment (Samuel, 2012). As part of the definition of the environment, we must also consider dynamic environmental conditions. Consequently, we must examine the ever-changing organisational environment as a factor that generates pressure and a chronic crisis (Kutter, 2017).

A crisis is an unusual, unplanned event that may have a negative impact on the organisation. It can be limited to a specific time or it can be an ongoing process, that is, a chronic crisis (Samuel, 2012). To survive chronic crises, organisations must re-evaluate threats and risks, maintain business continuity, prepare for other crises, and overcome them with minimal damage. Preparation for crises is crucial for success and prosperity in an era of disruptive technological innovation.

The global macro and micro changes in the health system's ecosystem described above (as presented in Fig. 3.1), coupled with the economic starvation and under-staffing of hospitals, constitute a chronic crisis for the hospital administrators and even the medical staff. To survive, hospitals must develop new services and adopt the values, organisational culture, and creative solutions of the business sector (Kash et al., 2014).

The new institutional theory approach posits that organisations tend to institutionalise patterns and social arrangements that are common to their organisational field because of their tendency to act in harmony with the field's norms and cultural construction (Samuel, 2012; Suchman, 1995; Zimmerman & Zeitz, 2002). Nevertheless, it is evident that hospitals are adopting managerial strategies that are not common to their field. Adopting business-oriented strategies is not easy for Israel's public hospitals because they are non-profit organisations functioning in a

highly regulated and centralised environment. Such behaviour is relatively foreign to the realm of health services and is not necessarily suited to the ethical, cultural-organisational, and managerial systems of health service organisations (Naamati Schneider, 2013, 2020a). Consequently, their legitimacy is questioned, and they lack support both within and outside the hospital (Suchman, 1995; Zimmerman & Zeitz, 2002).

3.5 Methodology

Because of the complexity of the hospitals' situation, a qualitative approach, which allows participants to respond in their own words, seemed best suited to comprehending fully how the hospitals are coping. In choosing this form of data collection and research, we took into account that the strategic changes in the hospitals were made in a complex situation and were subject to many environmental factors. However, as we have noted in the description of the theoretical approaches, the impact of external factors is mediated by internal factors—that is, the staff—whose character and worldview are crucial in bringing about change (Samuel, 2012).

The study was based on 60 open-ended in-depth interviews in Israel with managers and doctors within the health system and key figures in the Ministry of Health, HMOs, and public hospitals. The data collected underwent a thematic analysis using the grounded theory approach (Shkedi, 2011; Shleski & Alpert, 2007; Tsabar Ben Yehoshua, 2016).

Included in the data were two sets of interviews, the first set in 2006 in a pilot study that compared strategic changes in two hospitals in Israel and the second set in 2012 in a study conducted in six public hospitals. These data were combined with interviews conducted in 2019 and also in 2020, in the midst of the first wave of the COVID-19 pandemic in Israel.

The hospitals were selected on the basis of three criteria: ownership, location, and size. In each hospital, we interviewed top management and the heads of departments: cardiac surgery, gynaecology and obstetrics, and paediatrics, as well as doctors and managers in the HMOs, the Ministry of Health, and the Ministry of Finance. Interviewees who responded to a call for participants in this study signed a consent form

before the interview began. The interviews were recorded and transcribed with their permission in accordance with transcription rules.

The analysis of the interviews conducted over time affords a broad view that makes visible the processes of change that the health market and the public hospitals are undergoing.

The data also included several interviews that appeared in the media between 2012 and 2020. In addition, as background for the interviews and their analysis, a variety of hospital documents were used: newsletters, marketing newsletters, and reports in the hospitals' official media and websites. The next section describes the main findings.

3.6 Findings

Among all the interviewees there is a consensus that the health market and the hospitals are constantly making far-reaching changes in their strategic, business, and marketing behaviours in order to adapt to the chronic crisis they face. This trend is manifested in the adoption of business patterns and the transformation of hospitals into customer-oriented and competitive organisations. A timeline of the changes reveals that they are escalating in response to reforms and increased competition in Israel and worldwide.

These perceptions exist across various levels of management and across roles in the hospitals. The organisational and behavioural changes are reflected in a number of organisational processes within hospitals.

Development and Implementation of Strategies

Building broad strategies for the organisation is a managerial process that involves developing the goals, competencies, and resources of the organisation while maintaining a reasonable match between them and changing market opportunities. The goals of strategic planning are to redesign the organisation and its products in a way that will fulfil its profit and growth goals (Kottler & Hornik, 2000). Previous studies have found that

strategic management of non-profit organisations contributes to their survivability and improves their performance (Noy, 1988; Shuv Ami, 2011). In most cases, the adjustment and correction in accordance with the uniqueness of the non-profit and the industry in which it operates cause the strategic planning and implementation to benefit the public sector (Noy, 1988; Shuv Ami, 2011).

Strategic planning development processes have been inculcated in Israeli hospitals over the past decade. Because the hospitals are keenly aware of the need to adopt business and marketing strategies throughout the organisation, they are implementing various organisational changes and business and marketing strategies. The extent and scope of the processes and the degree of cooperation within the organisation differ from one hospital to another in accordance with internal forces, organisational structure, and hospital ownership (Chinitz & Israeli, 2011; Feder-Bubis, 2006; Harrison & Shalom, 2006; Naamati Schneider, 2013, 2020a).

Customer-oriented Organisation

The growing awareness of consumers' rights, the increase in consumers' power, the hospitals' view of patients as active consumers rather than as passive users, and the increased competitiveness of the health market have made organisational change in this area vital (Daniel & Darby, 1997).

The health organisations' new focus is customer orientation: meeting customers' interests, needs, and expectations, and delivering appropriate and personalised services (Bruno et al., 2017). In hospitals and healthcare organisations patients are treated as customers, and this includes patients' ability to make services conform to their expectations (Bruno et al., 2017; Daniel & Darby, 1997).

Customer orientation and a high level of service are not natural parts of the medical organisational world. This change in focus reflects the dramatic change that the system, the managers, and the doctors have undergone in their new perception of patients as customers (Harrison & Shalom, 2006; Naamati Schneider, 2013).

Marketing Strategies

In the past, marketing strategies, their transformation into action, and advertising plans were not part of the hospital world. With the advent of competition and changing environmental conditions they have become an integral part of hospital management—along with business development, management processes, and marketing opportunity analysis—and dedicated departments have been established. The extent to which such departments function as part of the organisation's determination of business strategies and behaviours differs from one hospital to another and is also influenced by factors within the organisation. Marketing strategies are clearly having a significant effect on the healthcare market and its organisation; all hospitals declare they engage in some type of marketing in order to survive.

Several main issues arose in connection with the hospitals' marketing activities.

Target customers and market segmentation. Selecting target customers is a concept alien to the medical field and fundamentally contrary to the principle of egalitarian public medicine. Yet hospitals agree on who their preferred customers are. To overcome this ethical difficulty, target customers are chosen in two main ways:

- Expanding the hospital's catchment area—within the country

Hospitals are expanding their activities to all parts of the country by opening centres and clinics in remote areas and advertising outside their official catchment areas, thus making their services accessible to all, including distant customers. These changes require a fast response from hospitals in these areas, and this sets off a chain reaction that increases the problematic nature of uncontrolled competition in the healthcare market. The changes are also increasing competition among the HMOs and expanding their customers' ability to choose service providers, including hospitals.

- Seeking customers from outside the country—medical tourism

Whereas selecting customers in Israel may be considered neither legitimate nor ethical, seeking customers from outside the country, who can pay several times what an Israeli is charged, is perceived by doctors and hospitals as both legitimate and desirable. Medical tourism is often presented as financing unprofitable and loss-producing procedures, and it solves a large part of hospitals' budgetary problems. Medical tourism, undertaken by all hospitals in collaboration with private companies and other organisations, is a huge market, in terms of both the number of operations and the reported earnings. However, the market's continued growth creates a serious conflict of interest for the system (Even, 2010; Linder-Gantz, 2011). Therefore, in recent years there has been extensive regulation and a reduction of scope in order to maintain priority for Israeli patients. Nevertheless, hospitals are still investing great effort in marketing medical and related services for medical tourism, one of the most profitable ways for hospitals to survive.

Strengthening ties with the community. As part of their marketing strategy, hospitals maintain close contact with the community. Their aim is to strengthen their ties with customers, retain existing ones, and attract new ones. Many hospitals send their doctors to work in community clinics so as to create a good relationship with the community and thus bring patients to the hospital. Hospitals also cultivate close contacts with opinion makers (mainly rabbis) in the community. This connection has been strengthened in recent years, and it appears that hospital managers and even department heads are becoming increasingly aware of its importance.

Developing non-medical services. One of the changes observed in hospitals as part of their marketing activity is the adoption of business operations and strategies that are not directly related to profits from medical services. In recent decades, there seems to have been a steady increase in ancillary services offered both to patients and to healthy individuals. The main change, in the perception of hospital managers, is in the understanding that it is worthwhile to leverage the reputation of a public medical centre to provide added value while addressing the purchasing power of the "captive" customers who receive medical services from the hospital. This involves establishing profit centres, including cosmetic and other medical units within the hospital area, shops and malls in the commercial areas, parking lots, maternity hotels, rehabilitation hotels, aesthetic medical services, and alternative medical services.

The prevailing perception is that beyond being profitable, these services and amenities make the medical experience more service-oriented and contribute to a better overall atmosphere, indirectly leading to better service and greater customer attraction.

Social media, internet, and advertising. Hospitals are embracing marketing elements and social media, combined with advertising that is allowed by the relevant law. They engage in widespread social and advertising media activity; use public relations services; produce scientific publications, ads, and commercials; and even engage in lobbying. They declare extensive activity of this sort. It appears that it is becoming more and more accepted as vital to the hospitals' survival, and opposition is declining. Hospitals now operate active websites, including personal areas for patients that contain relevant and up-to-date information, enable easy browsing, and afford associative navigation to relevant information. Some have active forums run by professionals, allow online appointments, send greetings to patients through the site, and provide other services as part of their embrace of digital health service.

As part of their internal marketing activity, hospitals are trying to enhance their attractiveness to the medical staff and medical organisations who work with and within the hospital.

Attracting and Retaining Medical Staff—Inside the Hospital

Senior medical staff members constitute an important marketing tool and make a very significant contribution. Hospitals invest heavily in incentives and rewards for senior medical staff, over and above monetary rewards. Examples include research opportunities, professorships, academic and scientific advancement, and mentoring of interns.

Attracting and Retaining Factors Outside the Hospital

Activities aimed at outside entities include marketing to HMOs, differentiating the hospital and making it more attractive, marketing that includes tour days aimed at private insurance companies, and efforts to

create working relationships. These actions often go beyond what is allowed by the rules, for example, giving such items as food vouchers or other small gifts to paramedics and ambulance staff so they will bring more patients to the hospital. Here, too, it seems that the lack of supervision and regulation leads to improper conduct.

Developing Business Entrepreneurship Related to the Hospitals

In addition to developing business and marketing strategies, hospitals have made extensive efforts in recent years to use hospital research funds as frameworks for the establishment and management of medical technology companies. Hospitals try to utilise human resources—researchers and doctors within hospitals and academic centres—while trying to break out of the hospital's boundaries and thereby enhance both the hospital's reputation and profits. Examples of this can be seen in the development of Hadasit Bio-Holdings Ltd. at Hadassah Hospital in Jerusalem and the Centre for Digital Innovation (ARC – Accelerate, Redesign, Collaborate) at Sheba Medical Centre in Ramat Gan.

The processes described are, as stated, alien to public medical organisations and therefore their implementation has encountered many difficulties. The initial difficulty is regulatory; some of the actions described are prohibited by rules or must be closely monitored by the Ministry of Health. Consequently, the hospitals and their managements have had to find creative solutions that can function within a legal framework that allows more room for manoeuvring than the regulatory framework does. The scope of these actions is growing, both in terms of their number and the finances involved. This is evident also in previous studies and even in the State Comptroller's Report over the years (Chinitz & Israeli, 2011; Naamati Schneider, 2013; Rosen et al., 2015; State Comptroller's Report, 2008, 2015). Health corporation funds are one of these solutions. They were established initially to enable and initiate medical research and receive donations. The funds made it possible to conduct activity with minimal supervision of the Ministry of Health. Over the years, the scope of the funds' activity has increased, and business financial goals have been added to their definition. In 2002, following the hospital association's

attempt to incorporate, the hospital research funds became health corporations (Chinitz & Israeli, 2011; Tabibian, 2013). These corporations—legal entities that are separate from the public hospitals—engage, outside normal business hours, in research, employment, medical tourism, and related medical services that generate additional profits for the hospitals (Bin-Nun et al., 2006; Chinitz & Israeli, 2011).

Today, about one-third of all hospitals' business activities are carried out through health corporations that bypass regulation and supervision and enjoy broader freedom of action than do the hospitals. They contribute significantly to shortening queues for hospitalisation and surgery, employing senior doctors, and conducting medical tourism. They also contribute greatly to positioning hospitals, establishing their reputation, and building added value in a competitive market. Thus, the corporations are major contributors to the attractiveness and economic stability of the hospitals in which they operate.

Additional creative solutions are possible in some hospitals (publicly owned by non-profit organisations) where private medicine is allowed within a public hospital (an activity known by the Hebrew acronym *Sharap*).

These solutions create hybrid organisations (Naamati Schneider, 2020b) that rely heavily on a combination of private medicine, private services, and public medicine. Thus, they constitute specific solutions for the ongoing crisis of hospitals, but they exact a price from the entire health system in terms of equity (Naamati Schneider, 2020b).

Another problem that hospital managements encounter in implementing business changes emerges from the combination of money and medicine. According to the new institutional theory approach, an organisation operates in accordance with its cultural field. But this combination of business and economic considerations is alien to the world of medicine and hence lacks legitimacy to a certain extent. This was observed in varying degrees by managers and employees. Whereas hospital managers have fully embraced the business marketing agenda, physicians have found it difficult to identify with these principles and actions despite recognising their importance. As a result, there is a managerial-organisational problem in enlisting all levels of the organisation in the changes. This allows only a partial adoption of strategies and thus impairs their effectiveness (Ginter, 2018; Naamati Schneider, 2020a).

The Outbreak of COVID-19

The outbreak of COVID-19 in Israel has exacerbated the hospitals' distress in many ways. The pressure on the internal medicine departments, which are constantly on the verge of collapse, has become front-page news because it is a marker of the health system's ability to absorb patients and function in a state of patient overload. Another problem in the wake of the pandemic is the reduction in the number of elective surgeries (Argenziano et al., 2020) and other medical activity, severely damaging the hospitals' economic stability, lengthening the queues for treatment, leading to staff cuts, and damaging hospitals' reputations (Ron & Weiss, 2020).

These changes, combined with the difficulties of treating patients with a disease that is unfamiliar and carries a high risk of infection, have forced the hospitals to produce immediate and creative solutions, both medical and financial. The COVID-19 crisis, which has fuelled the digital transformation and made it a significant growth engine in various fields, has also affected medical services. These technological changes have accelerated changes within the hospitals, at the level of medical treatment and service and at the organisational and managerial level, and thus have enabled public hospitals to create a variety of solutions to deal with the damage caused by the crisis (Bar, 2020).

The hospitals' economic distress, their need to produce profitable activities, and their technological adaptations have accelerated collaborations with start-up and high-tech companies, some of which have been repurposed to meet changing needs. The first and most immediate consequence is the provision of remote medical care, telemedicine, and digital services, accompanied by messages in the media regarding services obtainable digitally and the safety of hospital treatment. Collaboration with technology companies has enabled the provision of immediate solutions for implementing digital medicine, remote data analysis, and other services.

Other areas of innovation are remote patient monitoring capabilities and non-contact care for infectious-disease departments with cases of COVID-19, for example, which require remote care, along with

innovative technologies and equipment such as robotics and innovative respirators (Confortes, 2020a). Thus, the current crisis has intensified the digital transformation and business activity of the public hospitals, which may lead to a partial solution of their economic and organisational crisis (Confortes, 2020b).

3.7 Discussion and Conclusions

The chronic crisis in Israel's healthcare system caused by changes in the global and local environment and ongoing under-funding has forced hospitals to make structural and cultural changes (as presented in Fig. 3.2, based on the findings of this study). The changes in public hospitals are reflected in the adoption of competitive business patterns and the hospitals' transformation into customer-oriented organisations with a managerial and marketing business orientation. These changes have accelerated in recent decades.

The need for healthcare, though the system has been starved by declining public funding, and the need to survive economically in a

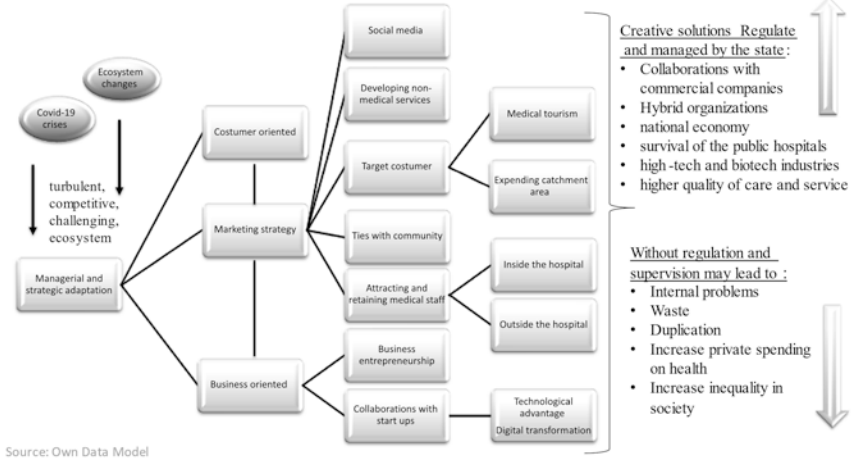

Fig. 3.2 Adaptation and change processes and their implications for the state and the health market

competitive market have led to creative solutions that combine private and public and the creation of hybrid organisations that provide public medicine but rely on profits from private services. This may lead to waste and duplication, increase private spending on health, and consequently also increase inequality in society (Bin-Nun, 2019; Naamati Schneider, 2013, 2020b). Also, it is not free of internal organisational problems, because the hospitals are forced to function outside their natural field. Thus, their actions are viewed as lacking legitimacy by their employees, the environment, and their competitors. And consequently, hospitals must contend with internal problems, such as a lack of cooperation and difficulty in implementing the required changes (Naamati Schneider, 2013, 2020a).

The outbreak of COVID-19 in Israel in February 2020 exacerbated the chronic crisis threatening the survival of public hospitals and the entire health system. In many ways, the current exacerbation, coupled with the changing ecosystem and the creation of collaborations as part of the system's survival and adaptation mechanisms, may provide an exceptional opportunity for the creation of synergies based on similar interests between private companies and public hospitals, with the aim of contending with the pandemic and thus finding an ethical justification for such public-private activity.

The solution must be managed by the state and must be backed up with increased budgets and bureaucratic solutions. Such solutions will facilitate public hospital collaborations with commercial companies and will encourage the flow of resources for dealing with changing market conditions and sudden and ongoing crisis situations. These solutions will reflect a national interest that serves all parties: They will contribute to the survival of the public hospitals and will benefit patients with a higher quality of care and service. At the same time, they will contribute to the national economy and the GNP and will benefit the development of the high-tech and biotech industries, while providing means for contending with emergency situations.

Clearly, a strong and stable health system is needed, and processes of change must be enabled in an organised manner through training and the provision of strategic management tools. Solutions to the healthcare system's chronic crisis must be part of an overall strategy and national

plan that will benefit organisations while safeguarding the interests of the state and the entire population.

This chapter, which presents a status report of hospitals, their adaptation to a changing health market, and their coping with chronic and acute crisis situations, is relevant not only to Israel. It can also serve as a case study for examining and understanding the processes, challenges, and difficulties of organisations in similar health frameworks worldwide, thus enabling key processes of planning and evaluation. This will make it possible to find creative solutions that combine private systems with public ones for the good of the nation and its residents. Such solutions will aim to strengthen and stabilize the health system so that it can function rapidly in times of crisis and great uncertainty, like the COVID-19 crisis with which we are now contending.

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4

Impact of COVID-19 Crisis, Global Transformation Approaches and Emerging Organisational Adaptations: Towards a Restructured Evolutionary Perspective

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4.1 Introduction

The COVID-19 pandemic has transformed our world drastically. It is now recognised as an unprecedented situation of a global crisis that accelerates the transition to the next phase of globalisation and the fourth

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industrial revolution (Altman, 2020; Bonilla-Molina, 2020; Steiner & Gurría, 2020). It touches upon and rearranges all the dimensions of our socio-economic and political reality. This exogenous health crisis leads the global socio-economic system in the next steps of profound structural transformations. It effectively paves the way for new and endogenously created socio-economic mutations. It leads to global social unrest and uncertainty, international recessionary pressures, declining global incomes, and vertical rise in unemployment and poverty in a variety of "traditional" industries (United Nations, 2020a, p. 19). In this context, it seems imperative to reorganise and enrich the theoretical tools at our disposal so that we can more fully interpret and predict these transformations. In other words, considering the COVID-19 global crisis, this chapter aims to explore the ever-changing, value-transforming global socio-economic context in terms of organisational analysis (Thrassou et al., 2019). It focuses on the following questions:

- What are the overall effects of the COVID-19 crisis on the global socio-economic system?
- What is the impact of the COVID-19 crisis on the already existing dynamics of the evolution of globalisation? Does this crisis accelerate or slow down, strengthen or hinder existing developments?
- What are the primary features for organisational adaptation at all spatial and sectoral levels, and what should we do from now on to mitigate adverse effects and enhance the positive outlook?

4.2 Methodology and Structure

This contribution is conceptual, having as aim to examine the field from a generic and critical perspective. By setting broad questions that result from the current COVID-19 pandemic, we venture to explore fundamental and general trends examined in today's literature, which we approach in a semi-systematic way to arrive at a repositioned theoretical framework (Snyder, 2019). Concerning the specific content of this study, we think that a new evolutionary framework is necessary to the extent

that we need to comprehensively understand how to treat, both in theoretical and practical terms, the current COVID-19 health and socio-economic crisis.

In this sense, this contribution attempts, initially, an elliptical presentation and diagnosis of the symptoms of the "disease" of the current COVID-19 crisis on the global socio-economic system, based on the existing theoretical equipment of today's economics and management science on the subject. It then presents specific theoretical perspectives on how we can understand and "treat" this "disease." Finally, it aims to counter-propose theoretical guidelines for creating a new generation of "diagnoses" and "therapeutics" for such symptoms from an evolutionary perspective.

In section 3, we highlight some of the critical impacts of the COVID-19 crisis on the global socio-economic system, following recent literature and reports from international organisations. In section 4, we analyse theoretical approaches and research platforms that interpret how the global socio-economic system evolves and transforms at the beginning of the twenty-first century. Finally, section 5 synthesises the previous information and theoretical orientation to form the basis for a new and enriched theoretical perspective, and section 6 offers final remarks.

4.3 A Brief Outlook of the Socio-economic Crisis Caused by COVID-19

Around the end of 2019, a group of patients with "atypical pneumonia" of unknown aetiology appeared in Wuhan, a city in China, temporarily referred to as "SARS-CoV-2" and today as "COVID-19" (Poon & Peiris, 2020). As of January 30, 2020, when the World Health Organization declared this disease a public health emergency of international concern, a multitude of developments are unfolding globally. From the moment several governments started to take precautionary measures to prevent the virus' transmission, such as lockdowns, social distancing, border closures, and human tracing, an unprecedented economic shock happened (Kang et al., 2020). In these extraordinary conditions for our economic

and social system, digital integration now seems imperative, already causing radical changes in the way of life and our broader way of work and socialisation (Kuc-Czarnecka, 2020).

What is though the significance of these developments? Matthewman and Huppatz (2020) argue that this pandemic crisis is a gateway between one world and the next. In a similar vein, the World Health Organization's Director-General has expressed the view that we have entered an irreversible reality in which there can be "no return to normal" (WHO Director-General, 2020). During the end of 2020, at the macro level of the global socio-economic system, most analyses point to a still uncertain "shape" and curve of the global recession (Gregory et al., 2020). The World Trade Organization has even predicted that the pandemic crisis will overcome in most indices the corresponding financial crisis of 2008–2009 (Azevêdo, 2020). The International Monetary Fund, for its part, has, within a few months, adjusted at least twice its forecast for the global recession (IMF, 2020), while the World Bank has presented a plethora of estimates, the most positive of which have predicted a global recession of at least 4% (World Bank, 2020).

At the same time, the United Nations Conference on Trade and Development (UNCTAD, 2020) forecasted the amount of investment loss for 2021 at 30–40%, while the World Economic Forum (2020a) has calculated that world trade will fall by up to 30%. The latter dimension seems hugely worrying for the immediate future of the world economy. The United Nations report (2020) that drafts a new global humanitarian plan foresees that the international economy will soon be facing the rise of extreme poverty in many vulnerable and least developed countries on the planet (despite the progress of the last 40 years of globalisation). The possible outbreak of famines in impoverished regions due to the profound disruption of global supply chains is another concern noted by this UN report.

This unfavourable picture of the world economy is also reflected in unemployment. The International Labour Organisation (ILO, 2020b) reports that working hours losses in the second quarter of 2020 will reach 14% worldwide, a number equivalent to around 400 million jobs. In a related study, the ILO (2020a) examines how working from home will affect the global economy. Only 18% of workers live in countries that

have the infrastructure to enable them to work from home effectively. Also, only one in four jobs is compatible with remote working in developed countries and only one in six worldwide. The future of work concerns a growing number of scholars and policy centres. Accordingly, a scientific and technical research report of the European Union (Montalto et al., 2020) finds that those who work in the cultural and creative sectors are mostly self-employed, having no other source of income and sick insurance. This fact increases the need to protect them from inequalities that COVID-19 will create in the near and long-term future.

Reading the recent report of the World Economic Forum (2020b) on the future and predictions for the working environment of 2025, it becomes clear that the epidemic has exacerbated existing inequalities that will continue to rise due to the ongoing spread of technology. All vulnerable groups of the working population, such as the unskilled, the long-term unemployed, the new entrants to the labour market, women, workers in temporary rather than well-paid jobs, those employed in the non-formal labour market without insurance cover, are the most affected ones by COVID-19. At the same time, in this explosive macroeconomic and macrosocial global context, old geopolitical and geoeconomic tensions remain and, to some extent, proliferate, especially in times when global governance seems multipolarised (Vlados & Chatzinikolaou, 2020). A typical example is that the EU's relations with China have deteriorated while remaining quite problematic with the USA; for instance, in a survey of the European Parliament's department for external relations, 48% of Europeans have declared that their view of China has worsened after the epidemic (Gaub & Boswinkel, 2020). Simultaneously, international organisations in terms of G7 and G20 seem until now generally unprepared and hesitant to deal with this profound crisis. Such a development shows that at the level of the dominant geoeconomic and geopolitical forces, a lack of effective coordination at the level of global governance mechanisms gives rise to escalated confrontations (Larionova & Kirton, 2020).

In addition to the overall effects of the pandemic, at different industries and clusters of economic activity (capturing disturbances in meso-economic terms) a variety of already profound reversals and reclassifications can be identified. A typical example is the 5% drop in energy demand for

2020, 18% in energy investment and, consequently, 7% in energy-related CO_2 emissions (International Energy Agency, 2020). This development is also related to a 50–60% drop in passengers travelling with civil aviation in 2020 compared to 2019 (International Civil Aviation Organization, 2020). The prospects of many industries, such as tourism and travel (but also infrastructure, catering and media, broadcasting and the sports industry, and many others), appear now nebulous for the foreseeable future, creating a chain reaction of adverse effects on related industries and entire production systems at international level (United Nations, 2020b).

Simultaneously, other industries seem to gain even more attention and to increase their effectiveness. For example, e-commerce retail sales recorded a 30% increase in April 2020 compared to 2019 in the EU27, as opposed to total retail sales that decreased by 17.9% (OECD, 2020). Similarly, the changes that have taken place within a year in the education sector are rapid. In a joint survey by UNESCO, UNICEF, and World Bank (UNESCO et al., 2020) a sample study found that most countries worldwide have taken at least one measure in 2020 to support those at risk of not having access to distance learning. However, three out of ten lower-income countries did not take any action.

At the regional level, the situation is equally worrying as well. As the Food and Agriculture Organization of the United Nations reports (FAO, 2020), rural areas are less likely to adapt efficiently to this crisis, as of the 734 million people living in extreme poverty before COVID-19, 80% work in such areas and particularly in agriculture. These areas have difficult access to sanitation and health services, education, internet, social protection, and public infrastructure. It seems that less developed business ecosystems will experience a decline in their overall returns and not just in the impoverished corners of the planet. According to Epifanova et al. (2020), addressing COVID-19 requires the creation of innovative regional enterprise ecosystems, which make small and medium-sized enterprises sustainable and resilient in times of crisis (Vlados et al., 2019a; Koronis & Ponis, 2018).

At the same time, at the micro level of the economy, developments show that a radical adjustment of business models has already begun, regardless of industry or specific location. According to a survey with

several business leaders by the World Economic Forum (2020b), more than 80% responded that they have already taken steps to speed up the digitisation of working processes. They have also expanded remote work procedures at approximately 80%, as well as automation up to 50%. On top of that, one of the modern challenges in this rapidly changing reality is that working from home has created mental health problems, with managers of many companies now facing a growing lack of trust and dedication of their employees (Parker et al., 2020).

Therefore, we see a rapid change of all conditions due to the current pandemic, in all social and economic activities. Negative macroeconomic trends have already been strongly manifested as a direct consequence of COVID-19, accompanied by the emergence of significant macrosocial problems. New forms of social exclusion, inequality, and poverty (simultaneously, in material and intangible terms) manifest themselves in the halting of the pace of development of many of the world's industries and regions. Many structural weaknesses of less-developed localities worldwide become deeper and cause significant pressures into increasing the resilience and adaptability of all socio-economic organisations at the microeconomic level. In other words, the challenges brought about by the current crisis caused by the COVID-19 pandemic seem that they concern without exception all socio-economic organisations, of all sizes and sectoral focus at the global level.

What tools do we have available today in the arsenal of social sciences to determine how the global system will change after this severe crisis? In the next section, a review of significant relevant theoretical approaches is attempted. The goal is to interpret this global transformation that takes place in the first quarter of the twenty-first century, on multiple levels and from an evolutionary perspective.

4.4 Approaches to the Mutations of the Global Socio-economic System

Someone could argue that Adam Smith and the Classical economists were the first to analyse the evolutionary and historical change of the capitalist system. For Karl Marx, the economic system is the structural base and society is the overarching superstructure. According to Marx and Engels (1848), the constant revolutionary readjustments in the means of production determine the history of humanity, in all production and social relations. In the age of capitalism, there is an increasingly fast continuous development of technology and labour, restructuring of production, incessant shocks that take place and rearrange social conditions, eternal uncertainty, and mobility.

A great point of reference in understanding the dynamics of capitalist development is also the work of Schumpeter. In "Capitalism, socialism and democracy," Schumpeter (1942) suggests that long-term waves emerge that incorporate the dynamics of the capitalist process. Each of these waves contains and assimilates the reactions of a "business revolution," defined through the results of innovation. According to Schumpeter (1928), innovation means economic evolution and unstoppable change. Innovation, as a revolutionary act, is a function of production which leads to industrial expansion and general development of society. Increased specialisation and improved infrastructure are inevitable with this expansion, whose profound features and characteristics are in constant motion and readjustment. In this process, "creative destruction" also takes place as a process in which outdated technologies, ageing industries, and "reassured" businesses gradually decline. At the same time, "modern" technologies, new sectors of economic activity, and innovative enterprises appear (Schumpeter, 1942). In today's crisis conditions of COVID-19, Schumpeter's conceptualisation can offer useful insight since it can explain how existing industries head towards destruction, whereas new forms of socio-economic efficiency in the near and the long-term future take shape.

Several years have passed since Smith, Marx, and Schumpeter introduced valid theorisations on capitalism, with the question that concerned

them in some way to remain unchanged until these days: that is, how all individuals and socio-economic formations change throughout time (Andersen, 2009; Boulding, 1981; Dopfer, 2006; Vlados, 2019b)? The most common answer given by many economists, particularly in the context of evolutionary economics, is that the crisis process itself is the main springboard for constant change (Nelson & Winter, 1982). Furthermore, what do we mean by "constant change"? Is it possible for something to change and remain stable at the same time? Indeed, the only constant force that we are able as individuals to grasp, by our nature, according to the philosopher Heraclitus, is that of dialectic change (Williams, 1989). Well, through a long course of complex dialectic changes, the global economy entered the so-called phase of globalisation, identified to have started at around the 1980s (Levitt, 1983; Michalet, 1976). Also, some scholars place the initiation of globalisation as early as the late nineteenth to early twentieth century ("first" globalisation), when the interconnection of world economies and societies multiplied notably, and the economic frontiers "opened" for the first time (O'Rourke & Williamson, 2002). With a comprehensive and aptly noted definition, Giddens (1990) argues that globalisation links distant localities so that distant events shape local happenings and vice versa.

Over the previous decades, several scholars rushed to suggest a predetermined and universal path for globalisation, towards a supposedly absolute predominance of Western civilisation worldwide. According to Ohmae (1985), the USA, Europe and Japan formed a Triad power with universal strategy, ideological and market dominance, while Thurow (1992) did not have a very differentiated perception by suggesting the definitive establishment of a "triadic" world. From a convergent perspective, Fukuyama (1992) supported the idea that humanity was in the early 1990s facing an "end of history," and an "endpoint of mankind's ideological evolution" and "final form of human government." However, these static and ultimately simplified interpretations of reality are not confirmed today. The current crisis and restructuring of globalisation undoubtedly highlight a dynamically repositioned multipolarity between the different leading powers. They also show a continuous reproduction of heterogeneity and transfer of the centre of gravity, in institutional and functional terms, of the global socio-economic system (Laudicina &

Peterson, 2016; Pieterse, 2018; Vlados, 2020). At the same time, the theoretical approaches available nowadays to the phenomenon of continuous global transformation reveal aspects that seem to be firmly oriented towards harnessing the spirit of evolutionary economic thinking.

According to the neo-Schumpeterian contribution of C. Perez (1983), long-term Kondratieff-type waves appear into the global socio-economic system, which changes radically and irreversibly as a whole within a range of 50–60 years (Kondratieff & Stolper, 1935). The upward trend (upswing) of a long wave starts when complementarity between social and institutional innovation is present, always emerging after the peak of the previous wave. The new "techno-economic" paradigm brings an unprecedented growth in infrastructure, leading to catching the potential growth limits, heading towards the next "paradigm." Within the new techno-economic paradigm, all production units and corresponding economic activities tend to integrate with differentiated efficiency (called generally as "optimal or ideal form of productive organisation"). For Perez, socio-institutional change is a parallel force. The stable growth period is always the combined result of the underlying techno-economic paradigm and socio-institutional change (see Fig. 4.1).

According to Perez, the cohesion of the system depends on the type and space-time contour of long waves. The techno-economic paradigm, which is subject to constant change and renewal after every approximately 50 years, combines with a corresponding institutional framework, the change of which is slower due to the relative inertia of institutions. When there is a mismatch between economic and institutional development, lasting about 20–30 years (long wave's downswing), a "good match" follows that lasts about 20–30 years (upswing). In line with this approach, today, after the fifth Kondratieff wave of information technology (initiated at around 1990), some analysts predict the emergence of the sixth wave (Grinin & Korotayev, 2020), where medical, additive, nano, information, and cognitive technologies will play a crucial development role. Complementing Perez's approach, our world today seems to be in the downswing phase, where there is a change in the techno-economic paradigm. However, corresponding social and institutional arrangements that will "legitimise" these innovations do not appear yet to be present (Raffaelli & Glynn, 2015). One possible criticism of the

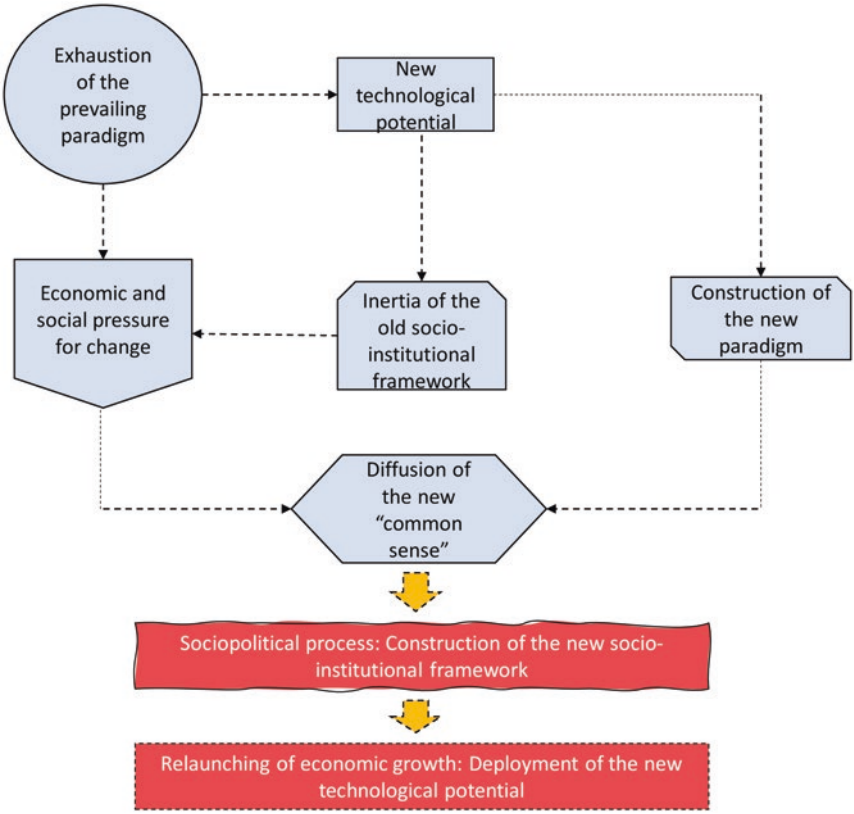

Fig. 4.1 Techno-economic paradigm and socio-institutional change. Adjustment from Perez (2004)

approach of Perez and long waves is that they go into macroeconomic and macrosocial phenomena rather than more specific organisational dimensions and procedures.

The fourth industrial revolution approach, which became famous following the introductory contribution by K. Schwab (2016) and the "Industry 4.0" term introduced by a paper of the German government (BMBF-Internetredaktion, 2016), is critical nowadays. According to the fourth industrial revolution terminology, our world is facing a rapid technological change, which transforms our social and labour relations profoundly. Schwab (2016) suggests that humanity's response to this

emerging challenge must be comprehensive and multifaceted, including both private actors and universities and civil society. This challenge is the ongoing digital revolution in which there is a fusion of technologies that blurs the boundaries between the natural-biological and the digital world (from a historical perspective, the first industrial revolution concerns the mechanisation of production through the steam engine, the second the use of electricity for mass production, and the third the use of information technology to create automated processes).

However, the digital transformation that many governments see nowadays as the optimal growth strategy, after the contributions and diffusion of the fourth industrial revolution terminology, is to some extent unattainable, especially in less developed socio-economic systems. For example, according to Modiba and Kekwaletswe (2020), in sub-Saharan Africa and other countries with a population living in rural areas, there is limited technological accessibility. Although the authors see a trend towards digitisation (in sub-Saharan Africa, 43% of adults already have a bank account, compared with 34% in 2014), they think that technological, organisational, and environmental issues precede digital transformation.

From a mostly business-oriented point of view, a relatively recent approach that deserves mention is "chaotics" by Kotler and Caslione (2009). This perspective manages to combine the influence of the drastically changing internal and external organisational environment in the "new era" that is profoundly different from the previous, traditional one (see Fig. 4.2).

The authors note that our world, already from the last decade, has entered a state of chaos, and no traditional instrument and theory of

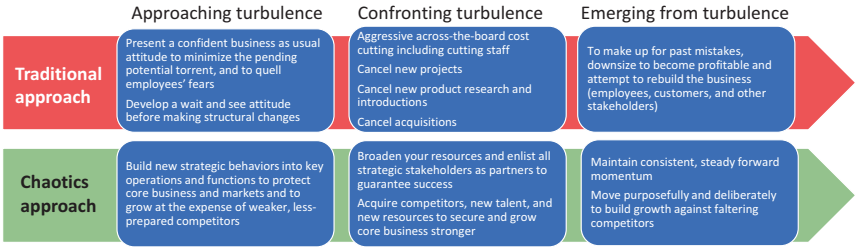

Fig. 4.2 The traditional versus the chaotics approach. Adjustment from Kotler and Caslione (2009)

organisational strategy and survival can be adequate. In the traditional perspective, the exit from the crisis follows a logic of downsizing and rebuilding the business (limiting the size for a superficial increase in profitability). In the chaotic method, any organisation must maintain a continuous and stable forward dynamic to create the conditions to dominate and grow against faltering competitors.

4.5 Towards a Restructured Theoretical Perspective for Understanding Better the COVID-19 Crisis

We think that both in the theoretical direction of the "fourth industrial revolution" and in the chaotic approach of Kotler and Caslione, there are points of inter-fertilisation that could help understand better the current crisis. Vlados et al. (2018a) suggest a broader concept by also arguing that conventional and traditional approaches to economics and management are usually one-sided and simplified and do not focus sufficiently on the system's dynamics. They also argue on the issue posed by innovation nowadays that economics, for several years already, has been progressively moving towards an integrated, systemic, and evolutionary perspective (Arena & Lazaric, 2003).

This stream of thought progressively rejects the conceptual barriers of conventional neoclassical and Keynesian traditions, suggesting the global dimension of the phenomenon of innovation dynamics (Maurice & Sorge, 2000). In this direction, according to Nelson et al. (2018), we are still a long way from a persuasive "evolutionary macroeconomics" integrated into the Keynesian perspective of growth, where demand grows at the same rate as supply. The authors also note that the neoclassical perspective has treated economics as a problem of moving equilibrium between economic actors that behave as "optimal" profit-maximisers, while evolutionary economists use Schumpeter's creative destruction to describe economic development. However, these facts do not mean that economics does not seem "reluctant" to incorporate into its analysis the dimension of what the capitalist firm is and how it "thinks." There are still barriers in "bridging" economics

and administrative sciences to which the study of innovation can provide a new and required evolutionary theoretical framework (Helfat, 2018; Vlados & Katimertzopoulos, 2019).

To begin with, a comprehensive approach to any crisis starts from the perception of organised activity as "Chaosmos," in the sense of the constant synthesis between chaos (complete disorder) and cosmos (fixed order). In this way, following the interpretation of Castoriadis (1993), the concept of chaos is recovering nowadays, reconnecting with the ancient Greek meaning of emptiness, abyss, and infinity, in which a new world always emerges. Accordingly, an attempt to view the crisis in continuous and unifying terms, at the same time at macro, meso, and micro levels, has significant interpretative depth:

> Vlados (2017, pp. 25–26): "*Everything shows that, through the crisis, the 'new globalisation' is trying to emerge and take shape, with significant liquidity to this day, with a particularly challenging 'childbirth,' with the future structural outline still unclear, and in intense socio-economic and political upheavals and shocks articulated and intertwined now on a planetary level. […] today, the overcoming of crisis and the restructuring of the global system, that is, the insertion into a trajectory of a new and stable model of development, requires a leap of innovation aligned and implemented at all levels. Behind the necessity of this 'innovative transcendence' arises inevitably the problem of designing requisite new methodologies and mechanisms of change management, which will enable and make possible this transition*."

This paragraph reflects the main argument of this chapter. As all the evolutionary approaches to the crisis show, our world now seems to be at a critical developmental juncture: either we are heading to a new future of prosperity and expanded social inclusion, or we will regress developmentally to various directions of our economic and social reality. In the approach of the "new globalisation," Vlados (2017) adds that the very way we define the crisis now needs additional analytical treatment and clarification. As the current pandemic crisis shows, no emerging situation can have any coincidental character and impact, nor could our world ever return to any previous normality; on the contrary, we are heading inevitably towards profound structural changes and repositionings, which

have their roots many decades earlier (Kindleberger, 1986). Through a structural understanding, the dealing with the current crisis is not a mechanistic attempt to adapt to a previous regime but an organic process that nurtures a new balance through a series of chain reactions and systemic adjustments. Moreover, the previous phase of globalisation, like the one that follows, based itself evolutionary on specific spatiotemporal processes and, more specifically, on the different forms of innovation and organisation of enterprises and the construction of international accumulation and regulation regimes (Vlados, 2019c).

Today, in the emerging global socio-economic system, the dimension of innovation must be the number one development priority. Some authors focus there, considering that today's innovative dimensions will play a vital role in the future. Torda (2020) analyses the fact that within only a few weeks, several higher education courses were reconstructed, suggesting the need to adapt as quickly as possible to innovative changes that may have significant long-term benefits. Heinonen and Strandvik (2020), categorising innovations resulting from the impact of COVID-19, argue that these create opportunities for rapid business development and managerial rethinking as today's crisis forces organisations to explore business strategies beyond their usual. Also, according to Seetharaman (2020), several firms are restructuring their business models entirely following the crisis of COVID-19.

This effort to strengthen the innovative potential of each socio-economic organisation, cross-sectorally and globally, must succeed as quickly and effectively as possible. This innovation in emerging crisis conditions requires a systematic strategic repositioning effort, continuous technological modernisation, and upgrading of management mechanisms, always through a matched and integrated process of effective change management (By et al., 2011; Vlados et al., 2018b). From a generic perspective, the established system of the global economy from 1980 to date seems to be in a phase of maturation and destabilisation in structural terms (see Fig. 4.3).

The current crisis of COVID-19 pandemic triggers a transformation far more profound than any change in the conjunctural and coincidental fall and decline of the various indicators of the global economic activity. Today, everything shows that we are entering a new phase of searching for

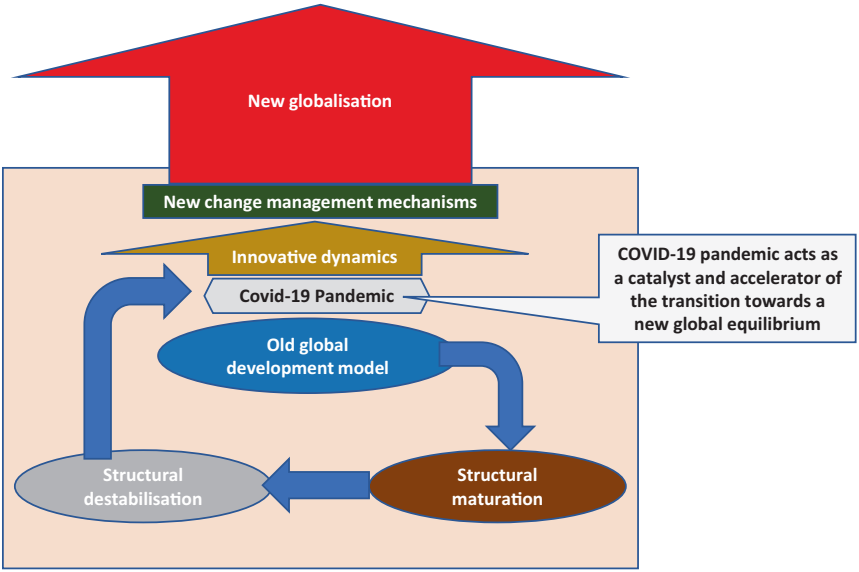

Fig. 4.3 COVID-19, an accelerator towards a "new globalisation"

a global development model, for which the current health and socio-economic crisis seems to act as a catalyst and accelerator of evolutions, creating new conditions in articulating the required new innovative dynamics and change management mechanisms at a national, local, and global level.

4.6 Conclusions and Final Remarks: Theoretical Rearrangement and Dialectic Connection Between the Global Crisis of COVID-19 and the Multiple Organisational Transformations

Overall, this chapter has contributed to the understanding that the advent of a sufficiently stabilising "new globalisation" requires the re-conception of strengthening and cultivation of innovation and the change

management mechanisms that will allow us to manage the new emerging global reality efficiently. The preceding analysis allows us to put forward the following conclusions:

I. The COVID-19 crisis has a direct and profound structural impact on the global socio-economic system. As the various studies of international organisations presented in this article show, we are facing an unprecedented shock to the world economy and society. We cannot yet predict the magnitude of the global recession. It seems that it will move to the highest levels, while the possible downward disruption of leading industries of yesterday's international economy might lead to multiplier and domino effects. In these circumstances, no "injections" of liquidity can cure mass unemployment, which already affects too many traditional industries, exacerbates poverty and inequality, and overall geopolitical stability. The way out of the crisis seems to require a comprehensive understanding of the necessary transformation (digital, strategic, tactical, and functional) at all levels and a repositioned organisational adaptation with a rejection of superficial and ultimately "un-adaptive" ideologies and mentality, which will probably manifest themselves even more firmly in the coming years as an angry "resistance to change." For example, it should come as no surprise that nowadays a "neo-Luddist movement" (McKay, 2020) will undoubtedly have a negative impact on the necessary organisational adaptation to overcome the current crisis.
II. Everything shows that the COVID-19 crisis is not just a cyclical variation in the "quantities" of global capitalism, nor will the world return to a previous state. The crisis we are experiencing today repositions "qualitatively" global capitalism by accelerating its evolutionary trajectory. Thereby, it acts as a catalyst only for the structural transformations that have been nascent in recent years, especially since the 2008 crisis (Andreou et al., 2017). Consequently, approaches that interpret international economy in comparative static terms are necessarily insufficient (Krugman & Obstfeld, 1991; Reinert, 2011); on the contrary, those theoretical orientations that

discuss how to transcend the incumbent evolutionary "Paradigm" of today's socio-economic sciences seem up to date (Kuhn, 1962).

III. Considering the current crisis of COVID-19, we must also focus on a critical neo-Schumpeterian dimension. Since innovation necessarily carries within the "winds of change," in the Schumpeterian form of creative destruction, a necessary repositioned perspective argues that organisational adaptation always includes the dual evolutionary system of both innovation and respective change management (Vlados, 2019a; Vlados et al., 2019b). According to Vlados et al. (2019a), change management always arises because of the continuous dialectic synthesis between strategy, technology, and management. In this context, a socio-economic organisation must produce a new vision and transform its strategy; to make even more efficient use of tools and know-how in terms of technology; to manage even better the available and scarce resources; to effectively innovate on this synthesis and, finally, to successfully assimilate this process of change and to restart, for a new systematic cycle of change management.

In a "Veblenian" sense (Veblen, 1898), institutions also are "living spaces" that adapt to their environment. They are evolving socio-economic "organisms" that shape their external and internal environment simultaneously. Today's drastic change in the external environment reorganises the map of opportunities and threats; therefore, it requires a repositioning of the perception of all socio-economic organisations of their strengths and weaknesses. In addition to the above, it appears that the comparative strengths that seem to be of increasing importance nowadays are adaptability, the "de-materialisation" of the production process, safety, accuracy, and containment of costs.

By extension, we also need a new understanding of how we perceive economic policy, both at the national and international level. Simply stimulating active demand in macroeconomic terms and financial support for businesses does not seem enough. At the public policy level, we also need mechanisms to enhance primarily the ability of socio-economic organisations to develop and adapt (Peneder, 2017; Vlados & Chatzinikolaou, 2019). A faster and efficient adaptation to the emerging

conditions is ultimately the crucial issue for our world to enter a new stabilising development trajectory.

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5

Impact of COVID-19 on Investments by Companies in Research, Development and Innovation: The Case of Lithuania

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5.1 Introduction

SMEs are the core of the European economy, providing two-thirds of private sector jobs and representing 99.8% of all enterprises (European Commission, 2019). Their competitiveness stems from the capacity to innovate; however, crises such as the COVID-19 pandemic are likely to have a disproportionate impact on businesses (Laufs & Schwens, 2014). It seems inevitable that the COVID-19 crisis would leave many businesses financially more impoverished, with the most critical effect being on the

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capacities of SMEs or their ability to support research, development and innovation (RDI). On the contrary, some research reveals that there are links between R&D and expenditures on innovation between cycles of recovery and cycles of economic decline (Roper & Turner, 2020).

States and governments made extensive attempts to expand the numbers of companies that would survive the pandemic. Public policies to encourage private R&D have traditionally consisted of tax allowances and public grants for the partial funding of R&D projects. Numerous researchers have examined the interaction between public R&D subsidies and company R&D to establish public spending efficiency in this sense (Hu et al., 2019; Howell, 2017; Engel et al., 2019). Different views exist about whether government incentives for R&D will inspire companies to innovate at all (Bellucci et al., 2019; Li et al. 2019). However, there is a gap in scientific research on motivational factors that encourage businesses to invest in R&D, especially amidst a pandemic. Hence, it is critically important to consider the company-centred approach towards the rationale for investing in RDI while recovering from the economic crisis associated with the COVID-19 pandemic.

This chapter will first elaborate on the complex nature of business RDI investments and the transformation thereof during the pandemic. We will then discuss what kind of RDI support efforts can serve as catalysts for enabling companies to engage in RDI processes and explain why current RDI support measures fail to sufficiently support these efforts. We will conclude by highlighting some implications for research practice and governance. The structure of this study is as follows. Section 2 provides a theoretical analysis and describes the research design. Section 3 analyses the empirical results, including the main results, and the final section summarises the main findings and policy implications.

This study attempts to (1) determine the nature and scope of innovative activities of enterprises (i.e. size of investments, cooperation with scientific and research institutions); (2) reveal how the intention to invest in RDI has changed since the COVID-19 pandemic and the economic slowdown; (3) analyse the relationship between the propensity to innovate, investment into research, and partnership with scientific and research institutions; and (4) identify government support measures which foster companies' intentions to invest in RDI.

5.2 Literature Review

The pandemic has reshaped the business environment in which companies operate. Reducing or suspending R&D activities was a one-sided response by companies, aimed at lowering their costs during the COVID-19 crisis, as businesses rely on short-term and secure returns on investment. A company's revenue and earnings often fund R&D. Therefore, insufficient resources and cash flows have contributed to a decision to deprioritise R&D or, in some cases, entirely abandon it. Arguing that the most robust plan for future growth is a knowledge-based economy, R&D is considered a viable recovery solution. The world's top innovative companies continue to increase their spending on R&D to encourage innovation, even during a pandemic when operating incomes are limited. But while innovation is an enticing tactic, it is also a painful road consisting of numerous obstacles and setbacks (Perin et al., 2016). Rhaiem and Amara (2019) have found that companies' R&D efforts have collapsed in the range of 40–90%. Companies with less financial leverage may not be as likely to make such risky investments during the COVID-19 crisis. Incentives to innovate can also be diminished by poor consumer appetite and instability.

On the contrary, Eggers (2020) notes that during the pandemic crisis, small and medium-sized companies—which typically have fewer financial resources at their disposal—are under much greater pressure. It is the financial burden that leads these companies to carry out R&D and expand their business. It could be observed that companies preserving their involvement in innovation activities would be better positioned post-COVID (Roper & Turner, 2020). For example, Flammer and Ioannou (2020) studied how US companies changed their physical and intangible capital investments during the Great Recession (2007–2009). Firms that continued to invest in R&D and innovation were able to maintain their competitive advantage by: 1) Being more effective and creative; 2) Responding more quickly to the changing needs and demands of their customers and other stakeholders; 3) Improving their organisational flexibility. This is supported by Spescha and Woerter (2019), who found that non-innovators made the most substantial capital outlays during the economic crisis.

A recession gives businesses an incentive to innovate (Roy et al., 2018). Accordingly, Claudino et al. (2017) examined the components that play a decisive role in an organisation's decision to innovate. The researchers distinguished internal drivers, such as appreciation of the importance and necessity for innovation, integration of innovation into company practice, and partnerships with external collaborators that facilitate innovation. The study suggests that critical variables, such as limited financial capital, limited technical resources and challenges originating in the external world, hinder a company's potential to innovate. As COVID-19 has profoundly challenged governments, societies and industries around the world (Clark et al., 2020), it has also led to a major shift in the state's position (Helm, 2020). Government actions have contributed to stabilising the infection rate, keeping the health system from failing, and shown efforts to support the corporate sector. Policymakers have acknowledged the role of various support measures in the revival of the economy. In addition, government incentives have encouraged companies to increase their investment in R&D and help improve R&D performance (Wang & Zhang, 2017). Government policy initiatives encouraging companies to increase investment in R&D have always played an important role in conventional industrial policy, even more so in recent innovation policies, and especially in the EU. The justification for state aid is focused on the premise that R&D carried out within businesses can promote innovation, either directly or indirectly, leading to the creation of goods, services and processes. Government grants, incentives and loans support direct funding measures, while tax credits refer to indirect support. Current research has centred on the use of various programmes, such as tax cuts, contracts and R&D subsidies. Among the most discussed instruments are R&D subsidies and tax incentives (Martin & Scott, 2000). The latter makes it easy to measure and quantify. It is generally agreed that, compared to indirect support in the form of tax benefits, direct support in the form of grants, subsidies and loans is more acceptable, particularly for R&D projects. Correa et al. (2013) reveals that the effects of public expenditure on R&D are mostly positive and highly significant. Thus, public grants motivate companies to revert funds into R&D. Also, as supported by Afcha and Lopez (2014), R&D subsidies affect a company's

innovation performance. The types and regulations of the various government funding for R&D vary greatly from country to country, and different forms of government support have diverse criteria for innovators (Lee et al., 2014). There are contradictions between the priorities of the government and companies from the viewpoint of resource allocation. Certain companies will also use public R&D grants instead of their R&D investment funds to carry out innovation activities (Gorg & Strobl, 2007). Public R&D incentives can also lead to higher prices, such as higher incomes for researchers, while crowding out private financing (Guellec & Pottelsberghe, 2000).

Given the above, there is no clear-cut view as to what the preferential support measures for companies are. Different views exist on whether government incentives for R&D inspire companies to innovate. It is reasonable to suggest that different subsidy designs have different impacts on the innovation of businesses, which need to be further explored (Bellucci et al., 2019). While government funding for R&D investment in companies is widely perceived to positively impact innovation, the question at stake is: which public support mechanisms are successful for companies when it comes to improving their R&D activity? Would public support measures for R&D encourage businesses to raise their R&D investments, or the opposite? This evidence is certainly a critical addition to effective policymaking. Similarly, the public-private sector R&D partnership is strategically important for national-level innovation. Still, private firms are hesitant to participate in R&D ventures because it is seldom of direct value to the business. Therefore, governments are responsible for promoting joint R&D initiatives between private and academic organisations (Bae & Lee, 2020). Several systematic reviews and meta-analyses have been published on the impact of innovation subsidies and the effects thereof on the composition of business R&D expenditures. However, concerning motivational factors to invest in R&D, especially during the COVID-19 crisis, little has been done to systematically consolidate and incorporate the core findings. We are still missing a clear image of the relationship between the propensity for innovation, investment into research, and partnership with scientific and research institutions.

5.3 Methodology

The methodology used in the study follows the tradition of the quantitative survey approach—a representative Computer Assisted Telephone Interviewing (CATI) survey of Lithuanian companies. The survey was conducted by the company Eurotela, a member of ESOMAR (not-for-profit organisation that promotes the value of market, opinion and social research and data analytics), which follows the ESOMAR quality requirements. The study applied a random sampling approach with representative (5% error percentage) selection of companies according to NACE 2 (Statistical classification of economic activites in the European Community) activity sectors extracted from the contact database owned by Eurotela. During the survey, the aim was to ensure that the respondents' sample size in one county did not exceed 25% and would not be less than 1% of all respondents. Vilnius County (the capital) is the most represented in the answers, that is, 13.9%, and the least represented is Utena County, with 6.1% of answers. A total of 24.9% of top managers and 75.1% of middle managers answered the questionnaire. The questionnaire was prepared on the basis of the recommendations of the Oslo Manual (2015), the Law on Technology and Innovation of the Republic of Lithuania, the Lithuanian Innovation Strategy for 2010–2020, and the OECD Technical Article on Science, Technology and Innovation. The questionnaire was also coordinated with representatives of the Lithuanian Science, Innovation and Technology Agency. To evaluate the importance of motivational factors, we used the 10-point Likert scale, which is compatible with the education evaluation scale used in Lithuania (Saris & Gallhofer, 2007).

Analysis of the data collected during the study was performed using the analysis of frequencies (crosstabs), and the analysis of support measures was additionally used for the correlation.

A total of 3134 (*population sample*) potential respondents were contacted, of whom 510 (further *general sample*) agreed to participate in the survey. A total of 130 respondents labelled themselves as being innovation-oriented (further innovation-oriented sample) companies, meaning that they have experience in implementing innovation development projects; 112 respondents indicated that their company collaborates with higher

education and research institutions (hereinafter HEIs); 61 respondents labelled themselves as being innovation-oriented and collaborating with HEIs.

5.4 Results

Every fourth company participating in the survey involves innovation development and implementation processes (25.5%, n=130). Out of which 68.6% (n=89) implement company-level innovations, 30% (n=23) implement market-level innovations and 14.6% (n=19) implement world-level innovations.

Equipment or technologies were most often renewed (69.2%) among the companies, which involve innovation and implementation processes (n=130); 46.9% of those companies develop new products or new services; 38.5%—renewed or implemented new processes; only 16.2% (n = 21) of the innovation-oriented companies were engaged in improving their business model.

Further, we have investigated the coherence between innovation type and such factors as company size, company age, market orientation (Lithuanian, foreign, or both), county and business sector. We found that equipment and technology development innovations are equally dispersed among different size, age, market orientation, and county or sector companies. However, there is a coherence between the new product or service development and such factors as market orientation and the business sector. Companies providing administrative services (83.3%) and companies from the information and communication sector (75%) stand out as the most active in developing new products or services. New processes development is a common feature of all foreign market-oriented companies. In contrast, companies oriented exclusively towards the Lithuanian market are the least engaged in the development of new products or services. Development of a new business model is the least common type of innovation among Lithuanian companies; however, it is quite often observed among companies from the transportation and storage (66.7%), and accommodation and food services (55.6%) business sectors. Medium-sized companies emerge as the ones which most often develop new processes and new business models.

One-third of the innovation-oriented companies could not or did not agree to indicate the share of corporate income allocated to innovation. Among the companies that answered the question, most often (every fifth in 2017 and 2018) they allocate up to 5% of annual revenue to RDI or do not allocate anything at all. One in six allocates up to 10% of revenue, with larger amounts being allocated by a relatively small proportion of companies. A trend was observed in 2018 and 2019, in which the percentage of annual revenue invested in RDI increased.

Only one in five of the companies in the general sample cooperate with HEIs. In most cases, cooperation is limited to one institution (59%); 14% of companies in the general sample collaborate with two HEIs. Companies that are not engaged in collaboration with HEIs state that there is no need, or there is a lack of information or initiative from both sides; they lack the resources necessary for collaboration; the price is too high; mutual mistrust and different attitudes prevail, or attempts to cooperate have been unsuccessful.

Research results revealed that the COVID-19 pandemic prompted investment in RDI activities by 3% of Lithuanian companies, while 40% indicated plans for reduced investment in RDI activities. Companies cited slowdowns, reduced turnover, revenue or profit, reduced workload and limited customer mobility, uncertainty, and instability as the main reasons for their plans to reduce investments in RDI (see Fig. 5.1).

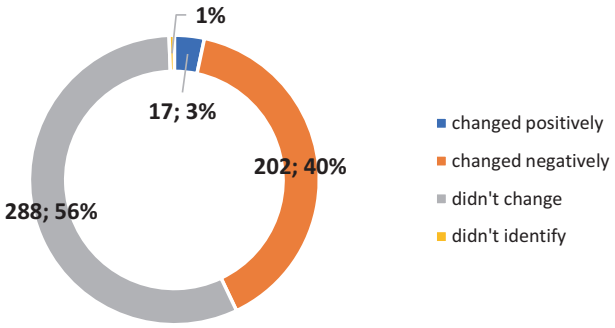

Fig. 5.1 Impact of COVID-19 on companies' intentions to invest in RDI, (%) (N=510)

Table 5.1 Pearson correlation between propensity to innovate, investment into research and partnership with scientific and research institutions

	1	2	3	4
1. Over the past three years, the company carried out innovation development and implementation projects		.492[a]	-	.353[a]
2. Planned to invest in RDI in 2020	.492[a]			.360[a]
3. COVID-19 altered plans to invest in RDI activities	-	-		-
4. Collaboration with HEIs	.353[a]	.360[a]		

[a]Pearson's R correlation is significant at the 0.01 level (2-tailed).

Furthermore, research results demonstrate a strong positive relationship between a company's collaboration with HEIs, its innovation development activities during the past three years, and its plans to invest in RDI in 2020. Data also revealed no significant relationship between a company's collaboration with HEIs, its plans to invest in RDI in 2020 and the impact of COVID-19 on the company's plans to invest in RDI activities. Thus, COVID-19 would not change a company's propensity to invest in RDI, providing it collaborates with HEIs and has several years' experience in carrying out innovation development and implementation projects (see Table 5.1).

Consequently, Lithuanian companies—which are fully engaged in the RDI development ecosystem—are less vulnerable to economic shocks. As policymakers acknowledge the role of various support measures in the revival of the economy and the importance of government incentives to encourage companies to increase their investment in RDI development, it is vital to identify support measures that assure optimal encouragement of such activities.

Full general sample data analysis revealed that 72.4% of companies' investments into RDI could be encouraged by providing 'subsidies (non-repayable support)', 'employee training' (64.9% of respondents), 'capital investment' (51.6%), 'guarantees' (50%) and 'soft loans' (49.8%). 'Assistance to develop RDI activities' is the least acceptable measure for RDI investment. In comparison, companies with experience in implementing innovation development projects define a much broader spectrum of government support measures as valuable and necessary

instruments to encourage RDI initiatives (see Table 5.2). Companies with experience in implementing innovation development projects stress the more substantial importance of 'subsidies', 'employee training', 'capital investment' and 'guarantees', but, also, they emphasise 'supporting investment in green innovation', 'soft loans', 'support for product commercialisation', 'support for digitisation of activities/products/services', 'promotion of international cooperation' and 'promotion of networking in Lithuania'. The Pearson correlation analysis confirmed a statistically significant positive relationship in all cases, which means that the more companies use various support measures, the more they feel their benefits and the need to get them.

Collaborative R&D between the public and private sectors is strategically crucial for innovation at a national level; however, private companies are reluctant to invest in R&D projects because there is rarely a clear benefit to the company. Thus, governments have to play a crucial role in facilitating collaborative R&D activities between research institutions and the private sector (Bae & Lee, 2020). Therefore, we extend our analysis to understand the difference between companies that collaborate with HEIs and companies that do not (see Table 5.2).

Companies that collaborate with HEIs emphasise almost the same government support measures as companies with experience in implementing innovation development projects; additionally, they mark 'assistance for RDI activities' as a necessary measure to encourage RDI investment encouragement. While companies that do not collaborate with HEIs are in the same need of government support as full survey sample companies.

It is intriguing that companies that collaborate with HEIs emphasise the importance of the most significant government support measures. However, the importance of those measures is lower for them than for companies with experience in implementing innovation development projects (see Table 5.2). It might mean that companies that collaborate with HEIs have achieved the highest engagement with the RDI ecosystem and have developed their innovation development capacities.

Finally, companies with experience in implementing innovation development projects and collaborating with HEIs stress the importance of almost all government support measures for the development of RDI activities under COVID-19 conditions.

To conclude, the higher the level of engagement by companies in the RDI ecosystem, the more significant the demand for different government support measures is. Nonetheless, none of the analysed samples stressed the importance of 'free consultations and expert assistance' (see Table 5.2 and Table 5.3). This might mean that companies want to be free to hire experts who correspond to their quality requirements.

It leads to the conclusion that government support measures should be dedicated to a specific sample of companies, subsidies and employee training when fostering non-experienced companies in RDI activities; however, companies that are more engaged in the RDI ecosystem require more sophisticated government support measures.

5.5 Conclusions and Further Research

Numerous researchers have examined the interaction between public R&D subsidies and company R&D to establish public spending efficiency in this sense (Hu et al., 2019; Howell, 2017; Engel et al., 2019); however, different views still exist about whether government incentives for R&D will inspire companies to innovate at all (Bellucci et al., 2019; Li et al. 2019). Public policies encourage private R&D that traditionally consists of tax allowances and public grants for the partial funding of R&D projects; however, there is a gap in scientific research on motivational factors that encourage businesses to invest in R&D, especially amidst a pandemic.

Several systematic reviews and meta-analyses have been published on the impact of innovation subsidies and the effects thereof on the composition of business R&D expenditure; however, concerning motivational factors to invest in R&D, especially during the COVID-19 crisis, little has been done to systematically consolidate and incorporate the core findings. We are still missing a clear image of the relationship between the propensity to innovate, investment into research, and partnership with scientific and research institutions. Therefore, governments are responsible for promoting joint R&D initiatives between private and academic organisations (Bae & Lee, 2020); however, there is no clear-cut view as to what the preferential support measures for companies are.

Table 5.2 Evaluation of governmental measures to encourage investment in RDI activities despite the impact of the COVID-19 pandemic: the difference between full survey sample and companies with experience in implementing innovation development projects (%); the difference between companies that collaborate with HEIs and companies which do not collaborate with HEIs (%)

	General sample (n=510)			Companies with experience in implementing innovation development projects (n=130)			
Measures	Average of ratings	Moda	Positive (6-10 points) rated (%)	Average of ratings	Moda	Positive (6-10 points) rated (%)	The difference in means of evaluations
Free consultations, expert assistance	4.89	1	40.8	5.45	1	47.7	0.56
Subsidies (non-repayable support)	7.47	**10**	**72.4**	8.22	**10**	**83.1**	0.75
Investment in capital	5.66	1	**51.6**	6.57	**10**	**63.8**	0.91
Soft loans	5.54	1	49.8	6.29	**10**	**60**	0.75
Guarantees	5.7	1	**50**	6.41	**10**	**63.8**	0.71
Assistance for RDI activities	4.08	1	31.8	5.45	1	46.2	1.37
Assistance in marketing and branding activities	4.25	1	32.4	5.31	1	46.2	1.06
Assistance in the implementation of innovation management activities	4.53	1	34.7	5.55	5	47.7	1.02
Support for digitisation of activities/ products/services	4.91	1	42.4	5.7	1	**52.3**	0.79
Promotion of international cooperation	4.8	1	39.8	5.78	1	**52.3**	0.98
Promotion of networking in Lithuania	4.7	1	37.5	5.77	5	**50**	1.07
Support for product commercialisation	4.76	1	39.4	5.95	1	**56.2**	1.19
Supporting investment in green innovation	5.22	1	45.7	6.43	**10**	**61.5**	1.21
Employee training	6.62	**10**	**64.9**	8.07	**10**	**80.8**	1.45

	Companies that collaborate with HEIs (n=112)			Companies that do not collaborate with HEIs (n=398)				
The difference in positive evaluations (%)	Average of ratings	Moda	Positive (6-10 points) rated (%)	Average of ratings	Moda	Positive (6-10 points) rated (%)	The difference in means of Evaluations	The difference in positive Evaluations (%)
6.9	5.34	1	45.6	4.77	1	39.5	0.63	6.1
10.7	7.63	**10**	**75.0**	7.42	**10**	**71.7**	0.21	3.3
12.2	5.96	**1**	**56.2**	5.57	1	**50.3**	0.39	5.9
10.02	5.47	**1**	**53.5**	5.55	1	48.8	-0.08	4.5
13.8	5.74	**1**	**51.9**	5.68	1	49.6	0.06	2.3
14.4	5.45	1	**50.1**	3.7	1	26.6	**1.75**	**23.5**
13.8	5.13	1	42.9	4.01	1	29.5	**1.12**	**13.4**
13	5.6	1	48.3	4.23	1	30.9	**1.37**	**17.4**
9.9	5.9	1	**57.2**	4.64	1	38.3	**1.26**	**18.9**
12.5	5.51	1	**50.1**	4.6	1	37.0	0.91	13.1
12.5	5.66	1	**50.1**	4.43	1	34.0	**1.23**	**16.1**
16.8	5.86	1	**56.2**	4.45	1	34.7	1.41	21.5
15.8	6.12	**10**	**58.1**	4.96	1	42.2	**1.21**	**15.8**
15.9	7.47	**10**	**73.3**	6.38	**10**	**62.5**	**1.09**	**10.8**

Table 5.3 Evaluation of governmental measures to encourage investment in RDI activities despite the impact of the COVID-19 pandemic: the difference between companies with experience in implementing innovation development projects and companies with experience in implementing innovation development projects and also collaborating with HEIs (%)

	Companies with experience in implementing innovation development projects (n=130)			Companies with experience in implementing innovation development projects and also collaborate with HEIs (n=61)				
Measures	Average of ratings	Moda	Positive (6–10 points) rated (%)	Average of ratings	Moda	Positive (6–10 points) rated (%)	Difference in means of evaluations	Difference in positive evaluations (%)
Free consultations, expert assistance	5.45	1	47.7	5.43	1	47.5	0.02	0.20
Subsidies (non-repayable support)	8.22	**10**	**83.1**	7.82	**10**	**78.7**	0.40	4.40
Investment in capital	6.57	**10**	**63.8**	6.48	**10**	**63.9**	0.09	-0.10
Soft loans	6.29	**10**	**60.0**	6.16	**10**	**64.0**	0.13	-4.00
Guarantees	6.41	**10**	**63.8**	6.61	**10**	**63.9**	-0.20	-0.10
Assistance for RDI activities	5.45	1	46.2	6.32	**10**	**59.0**	**-0.87**	**-12.8**
Assistance in marketing and branding activities	5.31	1	46.2	5.77	5	**50.8**	**-0.46**	-4.60
Assistance in the implementation of innovation management activities	5.55	5	47.7	6.05	5	**54.2**	**-0.50**	**-6.50**

Support for digitisation of activities/products/ services	5.7	1	**52.3**	5.95	**10**	**57.4**	-0.25	-5.10
Promoting of international cooperation	5.78	1	**52.3**	5.93	**8**	**57.4**	-0.15	-5.10
Promotion of networking in Lithuania	5.77	5	**50**	5.97	5	**54.1**	-0.20	-4.10
Support for product commercialisation	5.95	1	**56.2**	6.59	**10**	**65.5**	**-0.64**	**-9.30**
Supporting investment in green innovation	6.43	**10**	**61.5**	6.67	**10**	**63.9**	-0.24	-2.40
Employee training	8.07	**10**	**80.8**	8.26	**10**	**85.2**	-0.19	-4.40

Consequently, a great deal of work remains to be done in order to better understand the investment into RDI, whereas the phenomenon is a vital component of industrial competitiveness in both periods of steady growth and economic crisis, no matter how long it lasts and how deeply it breaks the established rhythm in any company, in any market. The scientific literature review and the study of Lithuanian companies provide an organising frame of reference, both for scholars and managers. First, scholars must further understand how the pandemic has reshaped the business environment in which companies operate. As a consequence of the impact of the COVID-19 crisis, reducing or suspending R&D activities was one way companies aimed to lower their costs during the COVID-19 crisis, whereas businesses rely on short-term and secure returns on investment. Second, a company's revenue and earnings often fund R&D, therefore insufficient resources and cash flow have contributed to a decision to deprioritise R&D or, in some cases, entirely abandon it. Moreover, incentives to innovate could have also been diminished by poor consumer appetite and instability on the market. Therefore, while government funding for R&D investment in companies is widely perceived to positively impact innovation, the question at stake for scholars is: which of the public support mechanisms are successful when it comes to improving the R&D activity of companies? Would public support measures for R&D encourage businesses to raise their R&D investments, or the opposite? This evidence is certainly a critical addition to effective policymaking.

The survey involving Lithuanian companies (n=510) revealed that every fourth company participating in the survey is engaged in developing innovation and implementation processes (25.5%). Most companies implement company-level innovations (68.6%), but every seventh company states that it also implements world-level innovations (14.6%). The research reveals that the implementation of equipment and technology renewal type innovations is not influenced by any of the studied factors, that is, county, company size, duration of the activity, market orientation or sector of activity; however, the development/implementation of a new product or service is influenced by its customer orientation and the business sectors themselves. It should also be noted that only one out of five surveyed companies cooperates with scientific and research institutions,

with cooperation in most cases being limited to a single institution. However, the research results demonstrate a strong positive relationship between a company's collaboration with higher education and/or scientific institutions, its innovation development activities during the past three years, as well as its plans to invest in RDI in 2020 and in the foreseeable future. Research results revealed that the COVID-19 pandemic prompted investment by 3% of Lithuanian companies into RDI activities, while 40% indicated they have reduced investment plans into RDI activities because of slowdowns, reduced turnover, revenue or profit, reduced workload and limited customer mobility, uncertainty and instability. However, data also revealed no significant relationship between the mentioned factors and the impact of COVID-19 on companies' plans to further invest in RDI activities. Thus, it can be stated that COVID-19 would not change a company's propensity to invest in RDI, providing it collaborates with HEIs, since the companies have several years' experience in carrying out innovation development and implementation projects.

For managers, the study of Lithuanian companies discussed above highlights two related concerns. First, as alluded to above, the research reveals that the higher a company's engagement in the RDI ecosystem, the more significant the demand for different government support measures is. Second, companies with experience in implementing innovation development projects and collaborating with HEIs emphasise the importance of almost all government support measures for developing RDI activities under COVID-19 conditions. For scholars, it might mean that companies that collaborate with HEIs have achieved the highest level of engagement with the RDI ecosystem and have developed their innovation development capacities. Different views exist on whether government incentives for R&D inspire companies to innovate; therefore, it is reasonable to suggest how different subsidy designs impact the innovation of businesses, which needs to be further explored (Bellucci et al., 2019). It leads to further research into government support measures considering a specific sample of companies, whereas the companies which are more engaged in the RDI ecosystem require more sophisticated government support measures. We hope the current study provides an impetus for future research in this area.

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6

Transformations in the Social Sector During the Covid-19 Crisis in India: A Perspective

Ambika Kulshrestha and Sandeep Kulshrestha

6.1 Introduction

The Covid-19 pandemic that commenced towards the end of 2019 surged ahead in the year 2020. It has affected people, economies, and businesses across the globe, thereby transforming lives, trajectories of economies, and business operations (McKinsey, 2020; Forbes, 2020).

Several strategies have been outlined to steer back the businesses on track that have led to transformations. The current study tries to find out the challenges faced in the key operational areas of the organisations, in the development sector in India and the strategies taken to mitigate them resulting in transformations (Business Standard, 2020). The pandemic has caused disruptions at every level, posing challenges to the organisations. Several key areas like programmes, funds and donors management, and human resources are the major ones amongst those getting affected.

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To absorb the changes around them has become a necessity for these organisations to survive and sustain. Their continuance is directly related to the well-being of the beneficiaries that they are connected to, along with the society that gets affected, especially in recent times of the pandemic where their contribution has been immense. Almost every time a disaster strikes, especially natural or man-made, the civil society/social sector/development sector, hereinafter referred to as the development sector, arose to the cause, thereby playing a pivotal role in a variety of ways (Aldrich, 2008; Wagle & Warghade, 2006; Jalali, 2002; Mondal et al., 2015).

Along with the pandemic, the amendments, with respect to the Foreign Contribution Regulation Act, 1976 (FCRA), which came into effect on 29 September 2020, have presented a different narrative which demands strategic transformations synchronous to strict compliance from the NGOs/development sector, to the rules as laid down by the amended act.

The aim and the research problem of this chapter is to find out the transformations that have taken place in the development sector in India, during Covid-19. Through a deep examination of the literature, using qualitative and quantitative methodology of surveys, interviews, statistical tests, and the results thus obtained, this study tries to find out the challenges that the organizations in this sector faced prior to Covid-19 and were experiencing during the pandemic, with respect to the key operational areas. It will find the strategies that they have taken to reduce the challenges thus leading to transformations. The next section of the chapter, that is Sect. 6.2, provides a review of the literature, while Sect. 6.3 describes the methodology adopted. Section 6.4 presents the findings; Sect. 6.5 provides discussionsand Sect. 6.6 presents the limitations, and future research.

6.2 Review of Literature

Disasters

Disaster is a serious disruption of the functioning of a community or a society at any scale due to hazardous events (UNISDR, 2016). Crisis/

catastrophes/disasters have been construed to be natural phenomena (Kim, 2017). However, Russell Dynes differs to this point in his study, as below:

> The Lisbon earthquake, Nov 1, 1755 can be considered the first "modern" disaster and a turning point in human history, which moved the consideration of such physical events as supernatural signals toward a more neutral or even a secular, proto scientific causation. It evoked a coordinated state emergency response also a forward-looking comprehensive plan for reconstruction which included mitigation efforts to reduce future disaster effects. (Dynes, 1997)

Hence natural hazards are joint products of nature and society. Unlike the other threats akin to wars, hazardous industrial technologies are only partly created by humans (Mitchell, 1999). In recent times, it is the social and technological crisis that has gained prominence and Korea, USA, and Japan segregate disasters as 'three types of hazards: natural, technological and social' (Kim, 2017).

Despite human-created crisis, humans themselves are most vulnerable to natural disasters. Hence it is important for institutions to be prepared, by employing strategies towards managing the environment, in the mega cities, especially in the twenty-first century. In the cities, new kinds of hazards are being fashioned and old ones reshaped so that existing ways of dealing with both are thrown into doubt (Mitchell, 1999). Covid-19 has proven this point.

Disasters create an impact and pose a threat of interruption of normal effective procedures for reducing tensions, concurrently increasing tensions dramatically, as well. (Perry, 2006). Globalization and consequent structural adjustment programmes like poverty, urbanization, environmental degradation, terrorism, pollution, industrial disasters, human-made disasters, and so on are expected to increase soon (Jayaraj, 2007).

Dealing with Disasters

While managing disasters (Dynes, 1997), 'comparing actual conditions with a theoretical model can lead to better understanding of the current

situation, facilitate planning process and comprehensive completion of disaster management plans', which is one of the existing approaches (Asghar, 2006).

Community based solutions, inter-agency/inter-organisational collaboration, civic engagement, and community and organisational capacity building are the methods required on the part of the authorities and multiple organisations for managing disasters. Thus, 'Disasters can be seen as a window of opportunity for development' (Kapucu, 2014).

For social-political transformations to occur, the non-governmental organisations (NGOs) engaging in the political processes and addressing root causes like working in collaboration on state funded programmes, and so on, become important (Blackburn, 2018). Constant dialogue between the state and the NGOs has been propagated by (Ramu, 2013). The government supports through policies and regulations conducive for sustenance of the state and the NGO nexus. Clark (1993) and Kilby (2007) propose a network between local communities and the social organisations.

However, in the process, preparedness for disaster mitigation and reconstruction remain neglected since NGOs are focused only on relief and rehabilitation. There are various stages to disaster management that need to be addressed, necessarily by organisations dealing with disasters, as pointed out by Jayaraj (2007):

a. Disaster mitigation
b. Disaster preparedness

Mitchell (1999) states that when unknown disasters arise, the existing plans and preparedness may not be effective. Hence these two stages get side-tracked and new plans for rehabilitation and relief must be drawn up.

c. Rehabilitation
d. Post disaster reconstruction.

These stages have been prescribed as Petak's Four-Phase Model on Disaster Management (Petak, 1985). McLoughlin (1985) proposed an integrated emergency management model (Kim, 2017). Hence, as Asghar

(2006) points out, such theoretical models prove to be the base on which new plans for reconstruction and relief can be drawn.

The 1960s marked a rift in relief and development arenas which subsequently picked up pace in the 1970s, in turn discouraging NGOs from getting involved in disaster management strategies and programmes (Vye, 2007).

Development Sector

This sector is also known as the civil society sector/social sector. NGOs/non-profits/self-help groups (SHGs) are the chief participants in this sector. Globally this sector has grown to become a third sector, concurrent to agriculture and industry. The organisations in this sector have no affiliation to any political party, community, or religion. They are ever surrounded by a complex turbulent environment and hence tend to be professional like the corporations.

This sector is divided into funding NGOs (foreign or Indian) and grassroots or implementing NGOs, that are local. Some of them perform both the functions. The larger ones have different divisions handling multiple functions that include resource generation, development support, strategic planning, human resource department, communications, finance, IT, and so on (Education Times, 2009).

Role of the Development Sector in Managing Disasters

The development sector has been actively involved in managing disasters in recent times. And this involvement cannot be attributed to be a government strategy but was a response to specific disasters. Collaborative effort in response to disasters is the base on which this sector functions and which provides a better scope for rehabilitation (Kapucu, 2014).

Brief History of Role of NGOs

In 1995, after the Kobe earthquake in Japan, this sector was pushed to the forefront of the public radar, terming the disaster as a 'catalyst for change' owing to the NGOs' involvement in relief work, which again was termed as 'volunteer revolution'. During the 2011 Japan earthquake, local coordination platforms were created for providing support, coordinated efforts for various activities to the afflicted at the local level where dialogue happened between the victims, NGOs, government, and community organisations.

Other than those mentioned above, there were non-affiliated volunteer groups and national/international NGOs that were actively working for the victims, hence collaborations between the non-affiliated groups were also felt necessary. Samaritans Purse, a US-based humanitarian organisation, is an example of this kind that worked to provide post disaster relief for housing in Miyagi and Iwate (Carrasco, 2018).

In May 2009, as cyclonic storm Aila created havoc in the coastal areas of West Bengal in India, NGOs like WWF, Save the Children, Sabuj Sangha, and others played a vital role by providing relief and rehabilitation measures to those affected including providing food grains, cooked food, medical relief, clothes and so on (Mondal et al., 2015).

The time between the impact of the disruption or disaster and the rehabilitation and recovery process is a long one. The NGOs need to be aware of the effects of their actions on the beneficiaries that they serve as the rehabilitation efforts on their part tend to differ in case of human-made and natural disasters (Vye, 2007).

Through the work of NGOs and government grants, rebuilding can be a productive way to overcome the challenges and after-effects of natural disasters. In case of the Hurricane Hugo, in 1989, 486.5 million dollars were utilised towards construction, thereby aiding in job creation for 8200 people and their growth, which was indicated by Guimaraes et al. (1992) and McKenzie (2011) in their respective studies.

Functional Areas Within the NGOs That Faced Challenges During Disasters

Donations:

Fund raising by the development sector is not done for making profits and is not similar to profit-centric corporations. Donations are extremely important to the NGOs. There were increased donations by NGOs in cases like the Haiti earthquake in 2010. In 2010, the US aid to the Chile government totalled 10 million dollars for the relief work in case of the earthquake and Tsunami. In case of California, in 2002, donations to NGOs through private funding and government grants decreased over a period, as against other cases where there was a net increase in donations despite there being an increase in disasters. The study concludes that hurricanes generate a greater increase in donations to non-profits than other types of natural disasters (McKenzie, 2011).

A study by Kim et al. (2014) reveals a peak in private donations after the 2005 Tsunami in the Indian ocean. A well-known NGO in the USA attracted lesser donations in the aftermath of the Asian Tsunami than the smaller and less known Food for the hungry.

Funds Management:

A report in the *Charity Times* mentions about challenges faced in raising funds, during floods in Southern China in 2020. It specified dwindling in the amount of funds raised compared to the budgeted targets. The primary reason cited in the report is donor fatigue owing to coronavirus in the earlier part of the year, during which public donated widely to hospitals and medical centres. People prefer to provide clothes and food rather than cash (Zhong, 2020).

Other Challenges Faced by NGOs:

There are certain government policies that can pose a challenge to the operations of the NGOs regarding foreign funding received, fund raising, taxation, subsidies, duties on imports, and so on. And these can be a contradiction to the integrated emergency management model proposed by McLoughlin (1985) depicted in the study by Kim (2017). Policies on the part of the state to enable an atmosphere of strong collaborative relationships between the state and the NGOs is propagated by Clark (1993) in his study.

Transformations

Changes are produced as a reaction to a crisis. However, a crisis often allows changes to be made that, in other circumstances, might be difficult to achieve. If faced courageously, it can be an obvious opportunity to progress, making significant changes (Carreras et al., 2009).

Change has always been a constant, be it in any sector of the economy globally, be it owing to natural or unnatural disasters, or in areas such as technology. The businesses across the globe have also experienced transformations in different segments over a period (Anthony et al., 2019). The development sector in India has undergone transformations with respect to adoption of digital technologies in relation to its various operations (Rao, 2020).

The NGOs made changes in their policies after the Uttarakhand (India) flood disaster for incorporating interventions related to natural calamities and made it their core objective (Ramu, 2013). Reconstruction is a rebuilding measure and is applicable after certain disasters. After the cyclone in November 1996 in Andhra Pradesh (India), the technical team made an on-the-spot assessment and made eight recommendations to mitigate the extent of damage caused to the buildings in the cyclone prone areas (Jayaraj, 2007).

Laughlin mentions four reasons for transformations to occur in organisations providing references to various other studies. The first reason being when the disturbances destabilising the organisations are powerful and the second being the commitment level of the people involved and the design of the organisations. Brunsson (1985) in his study mentions strong and weak ideologies in relation to the commitment. The third reason is the level of commitment to the organisational ethos or to their position in the organisation which is related to power dependencies. And the fourth reason is the competency of those involved, where the greater the competency levels, the higher is the possibility of change.

However, Laughlin argues that in contrast to the above-mentioned reasons, organisations have a tendency to being conservative and avoid fundamental change. (Laughlin, 1991).

6.3 Methodology

This chapter is based on a practical research problem and is self-explanatory. It tries to find the challenges in various areas faced by the organisations and the strategies taken to mitigate them, thereby leading to transformations. Hence, the data collected is qualitative and descriptive. The primary data collection methods include survey questionnaires and interview questions. The interview questions are designed to provide scope to the interviewees in providing details of the challenges and the strategies thereof.

Interventions are felt unnecessary, as the methodologies adopted are found to be sufficient to provide the required data. This approach also helped in carrying out the analysis of the collected data using the details provided by the respondents in the survey and the interviews. The questionnaire is based on multiple choices where the respondents can select their choices specifically, according to the options provided below each question. All questions are investigated without any influence on the respondent's choices. They are directly related to the topic thus ensuring face validity. Content validity is ensured when all the elements with respect to the organisations and with regard to the research questions are sampled and tested.

Based on the objective and the qualitative method of the study, the population size is limited to two parameters:

1. Development Sector and
2. India

Hence the sampling frame included the above two parameters in a precise way. Also, owing to the research method applied, a non-probability sampling technique is used with a sampling mix of convenient, snowball, and purposive sampling methods:

Survey

The aims of the Survey are (a) to find the challenges that the key operational areas of the organisations have faced before Covid-19 and (b) to find the challenges they are facing during the pandemic and the strategies taken to reduce them. The survey questionnaire is created using 'Google Forms'. Convenient sampling is used by forwarding the survey link, online, to all those directly associated and working with the development sector and are contacts directly known to the authors. Snowball sampling is used by forwarding the link to various known contacts directly or indirectly linked to the sector. These people, in turn, forward the same to a variety of people directly working and associated to the development sector.

It is an anonymous survey, hence the names of the respondents and their organisations are unknown to the authors.

The multiple choice survey questionnaire is divided into parts. The first part covers demographic variables including gender, age, role in the organisation, areas working for. The second part covers different variables like human resources, staff and beneficiary safety, funding challenges and non-availability of alternative funding, programme management, donor management. This part also includes questions related to challenges faced prior and during Covid-19 in these areas and strategies used to counter the challenges. The data received on challenges faced by the organisations pre-Covid and during Covid-19 was analysed using the Chi-Square test. The variables are selected according to the literature review, the author's work experience in the development sector, and the designed research model.

The respondents are provided sufficient time to respond. Owing to the sampling techniques used, the sample size was unfixed. Twenty-four responses were received.

Interviews

Interviews were conducted to explore the challenges they are facing during the pandemic, in the key operational areas and the strategies taken to

reduce them leading to transformations. The research problem is reflected in the following research question:

RQ: What are the transformations that have taken place in the development sector in India, during Covid-19?

For the interviews, a purposive sampling technique is used. They are conducted after the responses from the survey questionnaire are received. The interviews are conducted specifically to find out the challenges faced in various areas, the strategies taken to mitigate the challenges and the transformations that have occurred in the areas. Hence these interviews are based on the responses received from the survey questionnaire and the results of the statistical test (Chi-Square) carried out, to know the specific areas in relation to which the interview questions need to be based. The following two parameters are picked up based on the results of the Chi-Square test, to frame the interview questions:

a. The functional areas (Donor, Programme, and Funds management) in which the organisations faced challenges during Covid-19 and
b. The strategies that the organisations pursued to reduce the challenges.

A list of people associated, directly and indirectly, working with the organisations from the development sector and known to the authors is made using convenient sampling, based on the person's contact availability. Not all the people in the list can be interviewed. People included in the list are not necessarily respondents to the survey questionnaire. Sixteen people participated in the interviews.

Structured interviews are conducted using a fixed set of questions that are based on the two parameters mentioned above. The questions have been structured as under:

1. Effect on Donor Management during Covid-19
2. Future Strategies for effective Donor Management
3. Effect on Programme Management during Covid-19
4. Future Strategies for effective Programme Management
5. Effect on Funds Management during Covid-19
6. Future Strategies for effective Funds Management.

The interviews are conducted using a mobile phone device. The time for each interview depends on the length of information that each of the interviewees provides.

The names of the interviewees and their organisations have been kept anonymous and hence have not been mentioned in the chapter, except for a few references in the findings section in the form of quotes.

Data Analysis

For Survey Questionnaires:

The objective of the study is to know the challenges faced in various areas during Covid-19, hence it is imperative to analyse initially whether a relationship exists between the two variables ('Areas in organisations' and 'Covid-19'). For this purpose, the responses received through the survey are analysed using quantitative data analysis techniques. Hypothesis is formulated using the Chi-Square test, to find out the result.

Transformations:

The research hypotheses to be studied in this chapter are:

H1
Donor management has been affected during Covid-19.

H2
Programmes have been affected during Covid-19.

H3
Delivery to beneficiaries has been affected during Covid-19.

H4
Staff and beneficiary safety has been affected during Covid-19.

H5

Human resources have been affected during Covid-19.

H6
Funds management has been affected during Covid-19.

The hypotheses are designed to investigate whether the key operational areas in the organisations, in the development sector, were affected during Covid-19. These hypotheses, if true, would prove that these areas did get affected during Covid-19.

For Interviews:

The responses received from the interviewees are analysed using the qualitative data analysis technique. All the responses received are grouped as per the questions that are asked to the interviewees. Answers to each of the questions are analysed by describing the participant's experiences, providing an overall perspective to the challenges faced, and the solutions they arrived at in relation to Covid-19.

The interview questions are presented in the form of a statement and below each statement the responses in Sect. 6.4, as received from the interviewees, are mentioned after collating and analysing the data as mentioned above.

6.4 Findings

Of the survey responses, the 24 responses received revealed the following, as mentioned in Table 6.1 below:

Five out of the 24 respondents mentioned they did not face challenges in the period prior to Covid-19, while the remaining 19 respondents mentioned that they faced challenges prior to Covid-19 and all the 24

Table 6.1 Age group and hierarchical levels of respondents

Age group	Respondents	Hierarchical level	Respondents
31–40	5	Middle management	2
41–50	7	Senior management	11
51–60	9	Top management	8
61–70	3	Independent professionals	3

Table 6.2 Challenges faced

	Pre Covid-19		During Covid-19	
	By respondents			
Areas	Number	%	Number	%
Donor management	6	31.6	3	12.5
Programme management	5	26.3	12	50
Delivery	3	15.8	0	0
Staff and beneficiary safety	1	5.3	14	58.3
Human resources management	0	0	12	50
Funds management	0	0	14	58.3
Others	4	21.1	0	0

Note: There is more than one area where one respondent faced challenges, hence the responses are grouped accordingly.

Table 6.3 Strategies to counter the Covid-19 challenges

	Respondents	
Development sector	Number	%
Streamlining cost and financial management	13	54.2
Staff training and retraining	11	45.8
Job cuts	3	12.5
Prioritization in programme management	13	54.2
Employee coaching and counselling	12	50
Exploring other funding sources like government, philanthropies, and so on	11	45.8

Note: There is more than one area where one respondent envisaged strategies, hence the responses are grouped accordingly.

respondents mentioned they were facing challenges during Covid-19. The details are mentioned in Table 6.2.

All 24 respondents mentioned the strategies to counter the challenges faced in the areas mentioned in Table 6.3.

Table 6.3 reveals the following:

Three people out of 24 selected Donor management in the functional areas facing challenges during Covid-19. Six people out of 19 chose it for areas that have been facing challenges prior to Covid-19.

Five people out of 19 selected Programme management in functional areas that have been facing challenges prior to Covid-19. Twelve people out of 24 selected it in areas facing challenges during Covid-19.

Three people out of 19 selected Delivery to beneficiaries in areas that have been facing challenges prior to Covid-19. Covid-19 has no effect on this area at all.

One person out of 19 selected Staff and beneficiary safety in areas that have been facing challenges prior to Covid-19. Fourteen people out of 24 selected it in areas facing challenges during Covid-19.

Twelve people out of 24 selected Human resources management in areas affected during Covid-19. This area never faced challenges prior to Covid-19.

Fourteen people out of 24 selected Funds management in areas affected during Covid-19. This area never faced challenges prior to Covid-19.

'Others' as an area has been detailed in the findings of the Chi-Square test, as mentioned in "Pearson's Chi-Square" section.

Based on the survey responses, further analysis is done using the Chi-Square test to find out the relationship between Covid-19 and the areas depicted in Table 6.2.

Pearson's Chi-Square

Table 6.4 reveals the following:

There is a relationship between Covid-19 and Funds management (Chi-Square = 19.71). Four people out of 24 selected 'Others' for areas facing challenges during Covid-19. Two out of these 4 people selected 'Streamlining cost and financial management' shown in Table 6.3, increasing the number of people selecting this as a strategy to 15 and 1

Table 6.4 Chi-Square test

Areas	Chi-Square value	Df	*p*-value	Result
Donor management	1.2308	1	3.84	Insignificant
Programme management	4.463	1	3.84	Significant
Delivery to beneficiaries	3.2	1	3.84	Insignificant
Beneficiary	16.388	1	3.84	Significant
Human resources management	16	1	3.84	Significant
Funds management	19.71	1	3.84	Significant
Others	4.3636	1	3.84	Significant

out of the 4 people selected 'Exploring other funding sources' increasing the number of people selecting this as a strategy to 12.

There is a relationship between Covid-19 and 'Programme management' (Chi-Square = 4.463). In the case of 4 people who selected 'Others', 1 person out of the 2 who selected 'Streamlining cost and financial management' also selected 'Prioritization in Programme management', increasing the number of people selecting this as a strategy to 14.

There is a relationship between Covid-19 and 'Human resource management' (Chi-Square = 16). In the case of four people, one person who selected 'exploring other funding' also selected 'cutting down jobs' increasing the number of people selecting this as a strategy, to four.

One out of the 4 people only selected 'emphasis on staff training and retraining' and 'employee coaching and counselling' increasing the number of people selecting these as strategies to 12 and 13, respectively.

There is no relationship between Covid-19 and 'Donor management' (Chi-Square = 1.2308) and 'Delivery to beneficiaries' (Chi-Square = 3.2).

There is a relationship between Covid-19 and 'Staff and beneficiary safety' (Chi-Square = 16.388).

For the Chi-Square test, categorical discrete variables are used, which is the number of respondents in the survey who have specifically selected the areas in their respective organisations that faced challenges during Covid-19. Experimental design is used because the cause is Covid-19 and the effects are the challenges faced in the areas.

To know the effect of Covid-19 on these organisations, while calculating the Chi-Square test, the number of people who said 'Yes' to have faced challenges in the relevant areas as mentioned in Table 6.2, prior to Covid-19 and during Covid-19, are considered along with those who have said 'No' to have faced challenges, in the similar areas, prior to Covid-19 and during the Covid-19 period.

The reason for using this test is to find out if the independent variable (Covid-19) and the dependent variables (the functional areas in the organisations) are related or not and thereby to know the strength of the effect during Covid-19 on these areas.

The survey responses received are a small sample that is representative of the entire population. And since the population parameter is unknown here, inferential statistics is used, which will take the sampling error into

account, although there is an increased probability of there being a difference between the population parameter and the sample statistic The probability of sampling error is increased in the case of the survey because non-probability sampling techniques are used. All the organisations in this sector in the country did not receive equal chance of getting chosen in the sample. Over this aspect, the authors had no control since the snowball sampling method is used.

Based on the survey responses and the Chi-Square test results, it is decided to focus on Programme and Funds management. For this study, Donor management is considered to be a part of Funds management. Human resources management is not provided the required focus in this study because it is a large area with a variety of factors to be looked into. The authors believe this area alone needs a separate study, along with staff and beneficiary safety.

The interviews, therefore, focus only on Programme, Funds and Donor management. Representatives from the senior and top management are interviewed regarding the three areas.

The interview questions based on Donor, Programme and Funds management have been divided as follows along with the interviewee responses below each question:

1. Effect on Donor Management During Covid-19:

These organisations receive their funds or donations from various sources like high-net-worth individuals, individuals, corporations that provide the Corporate Social Responsibility (CSR) funds, donor agencies, government, crowdsourcing and other sources.

Donations received decreased by 50%, with the annual donations getting affected. Those donors who had committed earlier, continued to provide donations. In certain cases, donor funding was put on hold. Some funding partners continued providing the payments while some reduced them. Marketing and Promotional challenges were also encountered, on account of Covid-19, to get the required funds from the donors.

2. Future Strategies for Effective Donor Management:

Revenue generation through the donors was planned by some of these organisations. However, the response from the donors was dismal, although at the time of writing this chapter, some organisations are still trying their best to raise funds.

Some organisations took feedback of the work on programmes from their partners and provided an update to the donors, including the updates in relation to any changes. On the other hand, some decided to go digital thus using social media platforms for the donors by introducing webinars, online marketing campaigns, and so on.

3. Effect on Programme Management During Covid-19:

Many of the programmes have resumed not on a full scale, but reasonably on a good scale. The regular work on programmes would commence now, at a snail's pace, as an after-effect of the pandemic. The focus has been shifted from regular programmes to Covid-19 with non-priority programmes being shifted for the future, thereby affecting existing programmes.

Camps for beneficiaries were put on hold. Hospitals and staff used for beneficiaries were used for Covid-19 patients, thus affecting programme targets. Staff field visits for surveying programme operations were halted, thus reducing confidence in their partners on the part of the organisations.

4. Future Strategies for Effective Programme Management:

Most organisations have decided to go digital with respect to their programmes. Covid-19 has paved the way for new innovations. One of the interviewees provided the following information:

> *In some states in India, like Madhya Pradesh, there have been radio programmes that have been created by some consultants for educating the blind children.*

For monitoring Programme operations, partners have been asked to use online platforms and send videos of the ongoing field work. Door to

door surveys have been adopted instead of camps. Beneficiary hospitalisation is reduced to a single day compared to three days pre-Covid-19.

One of the interviewees provided the following information:

> *In case of Eye Care hospitals or Primary Eye Care clinics, a transparent shield or a barrier is placed in between, to avoid the patients' (beneficiaries') breath, from affecting the Optometrist and Ophthalmologist sitting on the other side of the equipment and who are addressing the patients' issues.*

Capacity building of field workers would be prioritised (Kapucu, 2014). Thus, certain changes are permanent in nature or at least have a long-term outlook.

5. Effect on Funds Management During Covid-19:

CSR funds were affected. Budgeted costs for some operations have increased owing to time lag. Financial aid in some areas has been received from the government. Funding for major activities got reduced compared to general ones. Funds were repurposed for Covid-19 activities on government request (Ramu, 2013), thus the regular activities got compromised in the process.

There is huge disbursement of funds which provides a scope for corruption for which anti-corruption and accountability measures would become necessary (Mullard & Aarvik, 2020).

6. Future Strategies for Effective Funds Management:

Partners would receive content and tech support except for funds. Funds are being segregated based on priority and urgency before being disbursed. Local NGOs to whom funds have been disbursed for Covid-19 are made accountable for their operations, to ensure appropriate and effective utilisation of funds, for the actual cause. Staff have also been effectively utilised by reallocating them work. Resources have been reallocated. Considering the huge impact on Funding, the local NGOs are starting to become self-sufficient in raising their funds using new

methods. Raising funds using online platforms has been adopted by various NGOs.

With reference to the FCRA Amendments, the following can be inferred;

a. Effect of FCRA Amendments on the Strategies as Regards Donor, Programme and Funds Management:

FCRA Guidelines have been cited by an article in the newspaper *The Mint* (Livemint, 2020).

Programmes:

Entire Programme structures would be reengineered thus affecting their quality and sustainability. Smaller field level NGOs dependent on funding partners would get affected.

Funds:

Funds cannot be transferred to other organisations out of surplus funds. Foreign funds received online would now be under the FCRA scanner. Transfer from one FCRA account to another is not allowed. From funds received, 20% is allowed for use as administration expenses.

Donors:

Grants from donor agencies cannot be transferred to partners.

b. Strategies with respect to FCRA guidelines in the areas: Donor, Programme and Funds management:

Donors:

Researchers would be hired, who would get paid directly by receiving funds from donor agencies, which is allowed.

Programmes:

Direct implementation into programmes will be carried out by the funds department. Scenario planning has been adopted as a practice.

Funds:

Direct funds transfer either to the beneficiaries or by signing a memorandum of understanding (MOU) between the partner and the donor agencies is being considered. Hence the work of these organisations will

continue as it is, but funds will be directly transferred from the donor agencies to the partners.

Locked up money will be used for various payments (e.g., payment to vendors for purchase of equipment) to be used for programmes because such funding organisations cannot fund their partners who also have an FCRA account. Till the existing funds in their account are not exhausted, this practice will be adopted, post which MOUs with donor agencies would be signed (from where such organisations receive donations).

Donor agencies would directly transfer funds to overseas account and not Indian accounts, in case of organisational units registered overseas. These units will transfer funds to partners in India.

6.5 Discussion

The survey results and interview responses can be interpreted as under:

Donor management did not get affected much; however, the interviewees mentioned that the receipt of regular donations decreased during Covid-19. Concurrently, donations for Covid-19-related activities increased. That explains the effect on Donor management as per the survey results (McKenzie, 2011; Kim et al., 2014).

Delivery to beneficiaries did not get affected during Covid-19, but the interviewees mentioned of instances where the beneficiaries did suffer as the regular programmes implemented by the NGOs were put on hold. Thus, it can be construed that differences in the results of survey and interviews are seen because of the sampling method used, where all the organisations in the sector did not receive an equal chance of getting selected in the sample.

Staff and beneficiary safety is getting affected because the organisations are actively participating in Covid-19-related programmes. Hence, the staff safety did get affected as they were exposed to the risk of getting infected. This is clear from the interview responses. Similarly, certain programmes having resumed after lockdown, the beneficiaries continue to be at a risk of getting affected by Covid-19.

The responses received from the interviewees for strategies with respect to FCRA amendments, point out towards reconstruction of policies, on

the part of the NGOs, in the areas of Donor, Programme and Funds management, by adhering to the new guidelines as prescribed (Clark, 1993; Ramu, 2013).

The interview responses for effect on funds mentioned that government funding has been received and this can be linked to exploring other funding resources as mentioned in Table 6.3.

The aim of this chapter is to find out the transformations that have occurred in this sector during Covid-19 (Carreras et al., 2009; Ramu, 2013).

Thus 'Disruption is sometimes better also because you can think of new strategies'. One of the interviewees shared this opinion which can be linked back to the literature review in which a reference to this opinion is that, 'disasters can be seen as a window of opportunity for development' (Kapucu, 2014). The organisations have adopted a process of updating the donors of the latest changes and the work on programmes by taking a feedback from their partners.

Prioritising capacity building of field workers has been taken into consideration. Methods adopted for carrying out various activities have been changed. For example, in case of eye care, one of the partner organisations conducted the entire process in one day compared to three days taken initially. Some of the partner organisations are also conducting door to door surveys instead of organising camps to avoid people from gathering.

Some of the Funding organisations are categorising funds based on priority. Accountability of partners is being increased. For example, some of the organisations take pictures of the programme activities and beneficiary signatures to monitor receipt of resources by them, and so on. Some of the partner organisations have effectively occupied their staff by proper allocation of work without laying them off.

Some of the funding organisations have asked their partners to be self-sufficient and autonomous by providing only technical and content support. The method adopted is an example of competency in organisations considered to be a factor towards effective transformations as referred to in the study by Laughlin (1991).

Most of the organisations have adopted digital technologies and are using social media platforms for marketing and various technologies for program-related activities (Anthony et al., 2019).

The following example from a report in *Economic Times* (Singh, 2020) is with reference to a study as depicted in the literature review. The study pointed out to having a network between local communities for disaster response (Kilby, 2007).

> *Organisations like the GreenDream Foundation have, in certain cases, collaborated with technology institutes in the country thereby synergizing the expertise of individuals and students in this area with their vision, respectively. A Covid-19 SOS platform, to help physically challenged and senior citizens has been started through volunteers within walking distance. This platform uses GPS-based technology to find and assign the most suitable volunteers within minutes.*

6.6 Research Limitations and Future Research

This study has some limitations which constitute future research.

The first limitation is about the sample size which is far less and could not cover all the organisations in this sector, and because of which, any other changes during Covid-19 in case of Donor, Programme and Funds management have not been captured in this study.

The second limitation is the area on Human resources management and Staff and beneficiary safety, which has not been researched further through interviews to know the implications during Covid-19 and the transformations that have occurred in these areas. These two functional areas have scope for research.

The third limitation is that the literature review has highlighted that along with 'relief' and 'rehabilitation', 'mitigation' and 'preparedness' have to be considered as well, in the case of disaster management. This has been pointed out in the studies by (Jayaraj, 2007), along with studies by Petak (1985) and McLoughlin (1985)and which forms a part of the study by Kim (2017). The interview responses reveal the steps taken by the various organisations towards the process of rehabilitation. However,

this aspect has not been stressed upon in this study and has scope for research (Verayanti, 2011).

The fourth limitation is that the literature review depicts a study that points out towards 'Donor Fatigue' which is not explored in this study and which has a scope to be researched upon (Zhong, 2020) and which can be linked to the interview response on effect on funds where they had to be repurposed for Covid-19 activities.

The respondents to the interview mentioned that technology and its use in this sector were on the forefront (Rao, 2020). However, this area has been insufficiently explored providing a scope for research.

One of the respondents mentioned in the interview that donors from various countries were preferring bigger and credible NGOs to the smaller ones, when it came to funding. Inversely, there is a study that says that donors prefer smaller NGOs to fund. (Kim et al., 2014). There is indeed a scope for research in this area as well.

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7

Business Adaptation in Canada: Contextual Sectoral Transformations and Cross-Fertilisation in the Garment and IT Sectors

Diane-Gabrielle Tremblay and Amina Yagoubi

7.1 Introduction

In the present difficult economic context related to the COVID-19 pandemic, many businesses and sectors are faced with major challenges. In the aftermath of the pandemic, unemployment and precarious working conditions have increased throughout the globe. In Canada we have gone from a very low historic unemployment rate of around 5% in February 2020 to very high unemployment of about 15% in the spring of 2020. Unemployment has then resumed to about 7% at the beginning of 2021.

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As in many countries, social or physical distancing has been applied quite strongly throughout all Canadian provinces. As was the case in 2020 and 2021, the year 2021 will most probably be under the sign of the COVID-19 pandemic.

In such a difficult economic context we have tried to determine what strategies could be the best for various industrial sectors over the years. We have studied various sectors including the garment and textile industry and also the IT sector; over the years we have come to look at both sectors and possible combinations and innovations between the two sectors. This is what we will put forward in this article. The idea here is to highlight the challenges businesses will be confronted with in the coming years and to identify measures for future development. In our view, innovative organisational adaptations will be crucial in order for firms to adapt to the post-pandemic context and it appears that cross-fertilisation can contribute to innovation.

The first suggestion would be to accelerate innovation and particularly try to develop innovation strategies in the form of open or collective innovation and cross-fertilisation. Many sectors will be confronted with post-pandemic adaptation so we will try to concentrate here particularly on the textile-garment and IT innovation options, but many sectors could benefit from the strategies put forward here.

The coming months and year will be challenging for many businesses, and sectors, and this chapter looks into these challenges and tries to highlight measures for future innovation and growth.

To restore lost markets and jobs, and also develop new post-pandemic markets, innovation seems to be the master word, although it is not always so easy for firms to innovate. While large firms in some sectors are doing well (in particular the GAFA companies which have clearly benefited strongly from the crisis), most firms don't have the funds or capacity to hold on till their previous clients come back. Nevertheless, innovation appears to offer a way out.

Our general research question is: how can firms adapt to the changing economic post-COVID context? Our preliminary suggestion is to seek to accelerate the innovation strategies, and particularly the collective innovation strategies in the form of open innovation and ecosystem or cluster development for creativity and innovation.

In terms of methodology, the analysis is based on participant observation and 78 interviews in the sectors studied, over the years from 2015 to 2018, as well as literature review on adaptation of these sectors in recent months. We will develop on the IT and textile-garment sector and put forward ideas for innovation and creativity in business in these sectors through collaboration and innovation between these two sectors. We will present the idea of 'cross-fertilisation' or transfer of creative ideas from one sector to another, or from external actors to the internal organisational context.

Before the pandemic we conducted a research on smart clothing and wearables. In the perspective of the post-pandemic context, we analyse the conditions for the emergence of an ecosystem of digital and technological innovation for the development of wearables and smart clothing, a new niche that offers opportunities for innovation in the post-pandemic garment industry and markets. This strategy could also inspire other sectors, in particular in relation with the collaboration in an ecosystemic perspective.

This can be done on the basis of collaboration between actors of various sectors and industries that traditionally do not work together, but might be encouraged to do so with supportive public policy and incentives. This cross-fertilisation between IT, textile and garment sectors could respond to new needs in fields such as health care, aerospace, welfare, safety, sport, gerontology, and so on in growing markets. If companies in these two sectors do not all seem familiar with the ecosystemic perspective and programmes to support ecosystems, they nevertheless recognise the critical importance of exchanges, collaborations, and cross-fertilisation between the IT and garment sectors to develop new products and markets through innovation.

7.2 Methodology

We chose a qualitative method for this research and the research design was partly inspired by our previous research on clusters and networks (Tremblay, 2014). We did two studies on the fashion industry, including some 78 interviews (2009–2014: 48 interviews; 2015–2018: 30

interviews). Inspired by previous research (*cf.* Yagoubi & Tremblay, 2017) and a literature review conducted over recent years (2017–2020), we analyse the prospects for companies to adapt to the present pandemic context. The interviews were all transcribed in full and a thematic analysis was done on the content of the interviews and literature review.

7.3 Research Context

For the garment sector, the closure of shops and transfer to online retail present a huge challenge. In our view, strategies for survival need to be largely based on the development of innovations and new markets.

We argue here that in order to face the challenges of globalisation in the garment or apparel sector in particular, the State and a range of actors need to participate in the construction of a business ecosystem of digital and technological innovations. In a constantly changing environment where new needs and uses are emerging, the innovations we analyse (wearables and smart clothing) are the products of numerous interactions and exchanges, as well as R&D activities and support (financial aid and various measures) in the private and public sectors.

In our research on public policies and the collaborations they encourage, we studied the development of products integrating IT in the garment-fashion sector: in general, for wearables (e.g., textiles: sweaters, gloves; glasses: Google Glass; watches: Pebble Watch, Apple Watch; fashion accessories and artistic productions: interactive clothing, etc.), and more specifically smart clothing, as well as communicating or technologised products (Wolfe and Bramwell, 2010).

Wearables are defined as:

> *'Wearable technology' and 'wearable devices' are phrases that describe electronics and computers that are integrated into clothing and other accessories that can be comfortably worn on the body. Examples of wearable devices include glasses, watches, headbands, and jewelry. While these technologies show great influence in fashion and entertainment, they have the largest impact in the areas of health, medicine, and fitness. Librarians are also exploring wearable technolo-*

> *gy's potential for enhancing services and expanding outreach to their organisations.* (Wright & Keith, 2014, p. 204)

Smart clothing is an innovative product that meets a variety of contemporary uses and needs with the development of research into smart textiles and clothing incorporating new technologies. Thanks to extensive research carried out in collaboration with several stakeholders (research centre, universities, private/public institutions, companies, transfer centres, etc.), and partly funded by public policies, new niches are emerging in different sectors: health, well-being, safety, sport and so on (e.g., connected clothing, sensitive to cold or light, recording of heart rhythms). In the textile sector, R&D activities enable innovations to be made to create new clothing.

A third generation of textile, intelligent, communicating and connected devices, and garments is born: "They contain components integrated in the fibers themselves, during the process of production of fibers or thread" (CTT, 2016), which presages more and more spectacular advances. Therefore,

> Smart fabrics represent a growing market, which is emerging through research into the textiles of the future. The applications are multiple: better protection of the body in hostile environments (thermoregulating clothing, increasingly lighter cosmonaut combinations), security, self-defense and prevention [...], but also textiles that contribute to the well-being of the body in the field of cosmetics or medicine […], all these applications […] are characteristic of the concerns of contemporary society. (Rinaldi, 2007, our translation, p. 31)

First, we have presented the context of our research. Now, we introduce the concept of a business ecosystem characterised by an inter-entrepreneurial and organisational dynamic that promotes innovation. Next, we present the concept of innovation which is seen as a result of a set of interactions and collaborations, also involving cross-fertilisation. Now let us look at a definition of the emerging ecosystem, which we use as a theoretical framework for this research.

7.4 Theoretical Framework and Research Questions

Our article aims to identify the structure of the ecosystem (actors, relationships between them, organisational forms) as well as the elements that could promote its post-pandemic development and innovations. We are interested in the role played by public authorities and support programmes and highlight the collaborative dynamics between public and private partners.

With the rise of new technologies (robotics, artificial intelligence, networks and platforms, etc.), new entrepreneurial practices are emerging, encouraging many interactions. As for the ecosystem, it takes shape from cross-sectoral, inter-company collaborations requiring, as we will see, the involvement of actors acting collectively (Beuret, 2010). Our research results allow us to propose for the post-pandemic future the development and strengthening of an ecosystem of digital and technological innovations, supported by the State and public policies ideally. But first let's define this concept of the business ecosystem

The business ecosystem approach is related to the work of Moore (1993, 2006), who defines it as:

> *In a business ecosystem, companies coevolve capabilities around a new innovation: they work cooperatively and competitively to support new products, satisfy customer needs, and eventually incorporate the next round of innovations. For example, Apple Computer is the leader of an ecosystem that crosses at least four major industries: personal computers, consumer electronics, information, and communications. The Apple ecosystem encompasses an extended web of suppliers that includes Motorola and Sony and a large number of customers in various market segments*. (Moore, 1993, p. 76)

As noted above, suppliers, customers and other organisations are part of the ecosystem. The main characteristics of this ecosystem are summarised as follows:

- The actors are heterogeneous and can be either companies (suppliers, producers, etc.), institutional bodies, interest groups, shareholders and so on. They can belong to one or more ecosystems;
- Business ecosystem actors belong to different business sectors. This situation is reinforced in the context of convergence between several industries: information technology, telecommunications and media that are restructuring around ICT and the Internet. The very notion of industry disappears;
- Competitive logic is based on the cooperative dynamic with the emergence of one or more leaders whose position may change according to the evolution of the resources and skills of the companies involved (Daidj, 2011, pp. 114–115).

Ecosystems are different from industrial clusters because they are based on several types of actors from different industries and especially on several sectors of activity. Many authors observe that because of the considerable developments in IT, it is no longer possible to think in terms of isolated industries. Moreover, this new type of ecosystem is characterised by the development of "platform industries" and a redistribution of roles between the different actors.

7.5 Our Vision of Innovation

Innovation is defined as a "process of creative destruction" (Schumpeter, 1911). Innovation can no longer be seen as an isolated activity (Tremblay, 2014) taking place within a company only; it must meet needs, a market, in a particular context.

Whereas it used to be based on a linear process, in an R&D laboratory, innovation becomes transversal and involves many sectors, and relies on so-called creative activities. Nowadays, it occurs through processes of interactions and collaborations between producers, organisations and users (Tremblay, 2014).

Thus, to understand the trajectories of digital and technological innovations, it is necessary to observe the interactions between actors (formal/informal; sustainable/temporary) who participate in the design and

marketing of innovative products. We have found that actors motivated by R&D projects and the creation of new products usually end up finding a common agreement, compromises, which allow collaborations and legitimacy to actions.

As far as the wearables and smart clothing market is concerned, collaboration in these new areas remain complex. They are "inter-order" and concern "actors who belong to […] several orders (public, private, third sector or community) and who intervene in various sectors" (Belley & Gaboury-Bonhomme, 2013, p. 3).

Therefore, the successful implementation of digital and technological innovation will result from exchanges, confrontations, cooperation and consultation between actors from different sectors (IT, design, clothing, textile, etc.) and disciplines (geriatrics, health, wellness and sport, etc.), and R&D activity groups. There is an increasing involvement of engineers in the design of innovative goods.

The ability of actors to learn and collectively innovate strengthens cross-sectoral exchanges and the transfer of **knowledge** and **expertise** (Belley & Gaboury-Bonhomme, 2013, p. 5). It also fosters innovation through cross-fertilisation which occurs during "the fruitful reunion of different elements: scientific teaching and research, high-tech business projects and financial resources" (Faberon, 1990, p. 1).

Finally, cross-fertilisation is another concept at the heart of our suggestions of strategies; it refers to the productive exchanges between two or more environments, companies or other organisations. It results from the dynamics of an innovation environment supported by a set of actors, by the support of public authorities, but above all being realised at the heart of inter-organisational or inter-individual exchanges.

We will see in the results of the research the example of projects that bring together several participants from different backgrounds (designers, engineers, technicians, researchers, etc.) and the role that the State has been able to play in this regard, to support them and bring them together to cooperate. In the next section, we present our research results.

7.6 Some Results and Propositions

Let us first recall the definition of smart clothing and textiles. They send signs, codes: "by passing information through the Internet, clothing will become a communication platform and a relay of information" (Futura, 2014).

Smart textiles and ready-to-wear have built-in digital components (computer components, sensors and small electronic devices), providing value-added products and services: communication capability, data collection and energy transfer.

Smart textiles push the boundaries of the garment and fashion sectors, functionality and technology by enabling communication, data collection and even energy transfer. These textiles can be adapted to user needs or conditions in a variety of contexts, including sports, fitness, safety, protection, home health surveillance and chronic disease management.

In addition to research and collaboration, there are three areas of support and development that contribute to innovation and could foster post-pandemic recovery:

1. Public support (measures and programmes) and the roles of intermediary actors; 2. The interactions of the digital and technological innovation environment, and the innovation production processes; 3. Cross-fertilisation dynamics and knowledge exchanges.

1. *Public support (measures and programmes) and the roles of intermediary actors*

   The local business ecosystem for digital and technological innovation in Quebec is based on governance that, in the area of IT, is "approached from the perspective of [...] entrepreneurship, innovation and business growth" (MEIE, 2015, p. 25). It includes "a network of actors" (companies, NPOs, governments, organisations, universities, etc.), as well as "relations between institutions (scientific, technological, industrial, commercial, financial, political), private and public (companies, research and engineering laboratories, administrations)" (Boutillier & Uzidinis, 2010, p. 4).

2. *Support programs*

   Public programs and policies contribute to the development of business ecosystems by promoting the appropriation of digital and IT in different industries, through public support.
   For example, the SME 2.0 programme initiated by Investment Québec offers loans, loan guarantees and equity investments. The SME 2.0 programme aims for "the development, experimentation and validation of an approach to support companies in the implementation of a technology project". It targets the fashion-garment sector and one of the objectives can be to develop more exchanges and collaboration of research and development with the sector of information technologies.
3. *Fiscal and financial incentives*

   Support to the IT sector requires substantial support to R&D centres and IT upgrading and transfer agencies, which can certainly be relevant to the post-pandemic recovery. A few years ago, international comparisons showed that tax incentives for R&D were significant in Quebec, with a tax subsidy rate of 55% (MEIE, 2015, p. 12).

   A support component for innovative technology companies has also been set up by the government and concerns financial and fiscal measures for the start-up of technology-based companies resulting from the results of R&D. Tax breaks are amongst the instruments used (MEIE, 2015, p. 13).

   Tax credits are often identified by businesses as the most important start-up support. These include competitive R&D tax credits for SMEs (MEIE, 2015, p. 12) and the tax credit for integrating IT into manufacturing and primary sector SMEs (MEIE, 2015, p. 15).

It does not seem, however, that these measures are very heavily used in the garment sector, as there are many very small companies, who do not have the resources to directly access these programmes. This explains the importance of intermediary actors and liaison and transfer bodies as well as technology transfer centres, which often act as intermediaries or gatekeepers between public programmes and small businesses, helping the

latter access the various support programmes. This leads us to deal specifically with the actions of these intermediary actors.

The Intermediary Actors

In 2012, the CEFRIO Liaison and Transfer Centre was mandated by the government to provide a picture of IT adoption in the garment-apparel and aerospace industries. The objective was to provide support to industrial players in the introduction of technologies. In the garment-fashion sector, the PM 2.0 programme aims to encourage industry to integrate as many resources as possible to become an innovative Fashion 2.0 industry. Various resources are put forward: Web 2.0, Internet of Things (IoT), IT (applications; cloud computing; transactional websites; management software package; etc.): social media or social web platforms (e-com); crowdsourcing or open cooperation, co-creation (SocialAttire.com; Krush.com; etc.); crowdfunding or crowdfunding campaigns (Kickstarter.com; etc.); e-commerce; and so on. (CEFRIO, 2013).

CEFRIO has thus played a major role in the transfer of IT in 15 SMEs in the clothing-fashion sector, but it showed that the transfer is not easy and is sometimes done slowly towards the SME. On the other hand, while wearables and smart apparel companies are of course different from other companies in the sector, since they are somehow "born" in IT, they also face the difficulties of other SMEs in the more traditional areas of resource management and operations, or in the marketing of innovative products.

Vestechpro, the Centre collégial de transfert en technologie de l'habillement (CCTT—or college technology transfer centre), is another leading organisation in Montreal. It plays a major role in strengthening the cohesion around the ecosystem of digital and technological innovation to develop the market for wearables and smart clothing. Vestechpro is the local voice for the emerging wearables and smart apparel market. This non-profit organisation is supported in part by the governments (federal and provincial). By mobilising stakeholders (politicians, academics, associations, industry...), it participates in the ecosystem and promotes the development of business models for innovation, partnerships,

technology watch and accompanies innovative companies, offering advice and training. The organisation has a specialised laboratory with anthropometry equipment, various technologies as well as a team of experts.

Vestechpro is probably the most important intermediary in terms of the direct transfer of knowledge and technology to SMEs. It is very active in this area, organising meetings where IT companies, wearables and smart clothing firms can meet. It also welcomes other groups from the ecosystem, such as researchers, public officials, designers and many other companies and industry representatives close to this sector who come here to discover what is being done and, above all, for many, to forge collaborations. In our view, this example of a very active ecosystem is an excellent example of what could—or should—be done in the post-pandemic context to foster business activity and innovation.

While several authors claim that business ecosystems are mainly the result of the action of pivotal firms, the importance of these intermediary bodies shows that the garment and fashion ecosystem results from the actions of a community of intermediary and public organisations as well as actions of the private sector.

Metropolitan Clusters and New IT Directions

In May 2016, funding for the Metropolitan Information Technology Cluster (TechnoMontréal, created in 2007) and Apparel-Fashion Cluster (activated in 2015) was renewed, with support by the Montreal Metropolitan Community (CMM) and the Government of Quebec. This cluster programme, which promotes innovation, competitiveness and best practices, is made possible by a private and public partnership between industrial actors, businesses, metropolitan actors and (provincial and federal) government funding, and other partners (Chamber of Commerce, Conseil emploi métropole...). The performance of the different industrial clusters is assessed regularly and will be again in the near future. It is hoped that they will be valued and supported to foster innovation and business revival in the post-pandemic context.

The garment-fashion cluster is very recent (2015) because being composed of a wide diversity of actors, and SMEs especially, it took more

time to structure itself as an industrial cluster, in comparison with the aeronautics sector which is much more concentrated, with a few large dominant firms. The IT cluster, TechnoMontréal, supported by the Action Plan established by the Government of Quebec in the Digital Economy Plan (PAEN, 2016) orients its activities towards "opening silos and fostering cooperation between different sectors of the economy, thus providing a context conducive to innovation and digital progress in Quebec" (CMM, TIC, 2016). The IT and fashion-garment clusters are expected to collaborate around the wearables market in particular, whether in R&D activities or product design. This type of cooperation is important for any sector that is trying to appropriate new digital technologies.

To support these appropriations, the Government of Quebec is investing in fiscal measures to establish a high-performance digital ecosystem (PAEN, 2016, p. 6), in line with five priorities, including support for a business environment and technological innovations.

To stimulate innovation, the government is supporting collaboration between researchers, business and organisations, because the work of the various liaison and transfer agencies has clearly shown that it is not enough to develop support programmes in government offices. Indeed, programmes need to be advertised and their content, as well as their potential practical uses and effects, made known. All this needs to be well understood within companies to foster participation and innovation.

The Textile-Garment Industry

The textile industry is important in the smart garment sector, as the latter uses raw textile materials. The textile industry therefore needs to meet new requirements and quality controls for the production of smart fabrics. This has led to the development of a new programme specifically focused on this industry. Thus, the National Research Council of Canada (NRC) has partnered with industry by creating the Alliance for Innovation in Smart Ready-to-Wear (the Alliance), an alliance that aims to raise the profile of the smart textile industry and make Canada a global leader in this emerging sector (CNRC, 2016; TechnoMontréal, 2016; Tech_fashion, 2016).

These are general innovation objectives in the industry objectives, but it is important to note that an action specifically dedicated towards smart clothing has been implemented. This shows that smart markets, which are partly linked to digital technology, are of interest to the state, partly linked to e-health and the aging of the population, not to mention the very high costs of public health budgets. This has led the state to work with different industries and find ways to support new strategies in the development of new industrial niches in digital products and services. This is the case for this new Alliance for Innovation in Smart Ready-to-Wear (the Alliance), created to support the textile industry, and indirectly garment, by bringing together 30 Canadian companies from all parts of the supply chain to share ideas, collaborate on projects and develop innovative products that will revolutionise the smart apparel and textile industry. (CRSC, Alliance, 2016).

The importance of inter-company and inter-industry collaborations, which are encouraged by the State and government representatives is thus reaffirmed here at the Canadian government level.

The R&D activities developed at the level of intelligent textiles are the result of collaborations of a set of intermediary actors and the mobilisation of various sources of expertise, including those of Technology Transfer Centres (CTT), research centres supported by public policy and funding.

The Dynamics of Cross-Fertilisation and Knowledge Exchanges

Digital and technological innovation applied to wearables and smart clothing is developing in several fields (health and well-being, surveillance, gerontology, sport, etc.) and that is why many sectors, industries, fields of activity are mobilised around new projects to develop new products and services through networks. We find actors as diverse as designers, engineers, artists, technicians, artisans and so on, who develop projects together. This variety of sources of knowledge is important and confirms the usefulness of external sources of information as is suggested in the theory on open innovation, which affirms that internal sources of

knowledge are not sufficient for a firm to innovate (Scaillerez & Tremblay, 2019).

Our results show that some companies are exploring new avenues by focusing on these innovative niches. We also note that this dynamic is based on the willingness and interest of stakeholders from different backgrounds (political, associative, academic, industrial) and on the support of R&D activities. Support for the production and marketing of digital and technological innovation is important.

However, there are gaps in this area and this is noted by the CTT (Technology Transfer Centre) because many companies are small, do not have a specific R&D department and therefore contract with R&D suppliers, higher education institutions, para-governmental organisations and associations and the CTT network, or develop R&D partnerships with other companies (CTT, 2008). On the other hand, several interviewees testify to difficulties encountered by their company and others in the development of wearables. Such an ecosystem requires increasingly sophisticated expertise and our interlocutors tell us that they are not always accessible, or not known to them. The role of transfer or intermediary agencies is thus crucial in bringing the various experts together.

While the prototyping of intelligent and innovative objects in the apparel sector requires different expertise (textile, ICT, design, electronics, etc.), weaknesses are observed in terms of training and manpower (MEIE, 2015). It is difficult to find people specialized in IT but also simultaneously in the garment-fashion industry to solve problems such as Wi-Fi and electronic connections, washing electronic textiles, resistance to detergents, and so on. Companies must work with several specialists and sectors, develop new collaborations, often in the context of public research. Moreover, according to the MPED (2015–2020), public and private actors encourage inter-cluster collaborations to foster innovation and the performance of industrial clusters. Thus, beyond intra-cluster collaborations, there are attempts at inter-cluster collaborations, particularly between the IT and garment-fashion clusters.

The Development of the Smart Clothing or Wearables Market

With regard to the smart clothing or smart clothing market, it should be noted that new companies are emerging (e.g. Entreprises Carré technologique or OMsignal, in Montreal). For many of these young Quebec companies and some designers, the smart and communicating portable object is offered in several products and is based on R&D activities as well as cross-fertilisation and cross-sectoral networking involving the ICT industry, often represented by TechnoMontréal.

The company *Carré technologique*, a pioneer in Montreal and world-renowned, has developed a smart T-shirt: Hexoskin. While the company produces smart clothing, it is also recognised as a software development company. Its T-shirt with sensors is a product that aims to detect chronic diseases, accompany athletes and so on. Used for sports, well-being and health, the T-shirt measures the heartbeat, breathing, effort and so on. The team had initially started working with the aerospace sector and is now supported by several players (Research Centres, Technology Transfer Centres, etc.) and receives a good number of grants and subsidies for R&D work and marketing. This is made possible as a favourable ecosystem emerges, as mentioned by one Interviewee:

> *Our product did not appear in a vacuum, it appears because of a technological ecosystem. We are trained as engineers… We are trained in biomedical engineering, signal processing…*

The company *OMsignal*, also from Montreal, which straddles the apparel and ICT industries (software, applications, etc.), is also developing an innovative product in the smart clothing and wearables niche. To innovate, the company also invests in R&D and works with designers, engineers, computer scientists and so on. For its marketing, the company was able to collaborate with Ralph Lauren to market and launch its connected T-shirt.

All companies in the sector are witnessing new dynamics of collaboration encouraged by the ecosystem and its actors (industries, governments, transfer centres, researchers, etc.): between ICT, clothing and also increasingly health experts, e-health (or digital health devices), which is taking up more and more space in the ecosystem. These collaborative dynamics

are strongly supported by public policy, whether it's R&D funding, industry clusters or other research support programmes. This is how some companies can enter the international market.

Wearables and Garment-Fashion Tech

If firms manage to produce intelligent clothing based on knowledge in the fields of textiles and IT, it remains that the sale of these products requires taking into account the aesthetic dimension and design. Indeed, firms have to consider the appearance and design of the garment. For market and product design, collaboration with designers is required (CTT, 2008). However, in the field of fashion design, the search for innovation is not new and this facilitates cooperation.

In Montreal, innovative experiments in the field of fashion wearables (textiles and smart clothing) have been carried out thanks in part to public grants in university research laboratories. This research has been carried out for a certain number of years by designers, professors/researchers, such as Ying Gao, Joanna Berzowska and Barbara Layne (from Concordia University in Montreal). To take only the example of Ying Gao, designer and researcher, she is renowned and has been exhibiting interactive clothing worldwide since 2009. Many bear witness to the effervescence and creativity of the City of Montreal in these fields, thus fostering innovation.

The publicly funded Studio SubTel Research Laboratory (Concordia University, Montreal), specialised in techno-fashion, innovates by applying new technologies to textiles and clothing. The teams are made up of a diversity of actors such as artists, computer scientists, engineers and so on. As was mentioned in our interviews with them, there were some difficulties encountered in the collaborations but the desire to innovate and create brought actors together and the confrontation of visions and ideas led to a high level of creativity and innovation. It is precisely by thinking about the challenges and limits that these teams find the best way to exchange their expertise according to the objectives of the project, and manage to bring together experts from the artistic and technological fields, which are not so often brought together. In our view this case of cooperation is illustrative of new innovation dynamics which must be

put forward in the coming years as cooperation within ecosystems appears to draw the road to innovation and competitive success.

Cooperation around innovation between the apparel and fashion, textile and especially the IT industries is at the beginning of its development. For the moment these initiatives are not so numerous, but there is more and more interest, especially in the sports, e-health and gerontology sectors. While the number of research and cooperation initiatives increases, it is believed that these types of collaborations could also pave the way for a successful exit from the COVID-19 crisis, or at least contribute to revitalise various industries in the future post-COVID context.

7.7 Conclusion

To conclude, we return to our research question and the results that can be put forward for a successful exit from the COVID-19 crisis. There is clearly a business interest in the new IT and apparel sectors and in cross-fertilisation (Tremblay & Yagoubi, 2017), but this interest is rather new. We observed cross-fertilisation and exchanges between companies in the IT, textile and clothing sectors, as well as between business and universities and colleges, and it appears that this type of cross-fertilisation is essential for innovation, as recent theories on open innovation suggest (Tremblay, 2014). The role of networks and relational proximity between the actors appears crucial, as was suggested by previous theories and research (Belley & Gaboury-Bonhomme, 2013; Boutillier & Uzidinis, 2010; Tremblay, 2012). It could surely contribute to innovation in other sectors, too many of which are maybe still too closed upon their traditional production activities and still working in silos. Many firms and industries are still not open enough to cooperation and innovation through exchange and cross-fertilisation of ideas.

Also, we found that to increase innovation in the emerging ecosystem, public policies must support collaborations between several sectors, industries (IT, clothing, fashion, and increasingly health in this case). Not only must they provide public financing and support for innovation

and R&D, but they must also provide support to foster collaborations and knowledge exchange. This is essential because emerging and small companies are often unfamiliar with public R&D programmes and do not always see how they could benefit from them. Theories on the usefulness of ecosystems thus appear confirmed here (Daidj, 2011; Moore, 2006; Schenk & Guittard, 2016), as do those on open innovation (Tremblay, 2020).

Public regulation therefore seems important to support the business development of the new ecosystem of digital and technological innovation, in the field of e-health, smart garments and e-privacy, amongst others.

Thus, contrary to many studies that claim that business ecosystems result mainly from the action of pivotal firms, we believe that the garment-fashion ecosystem results from the actions of a community of intermediary organisations, as well as public and private organisations, as was suggested in previous research (Daidj, 2011; Schenk & Guittard, 2016).

We have found that large commercial enterprises are not the only or even key players in this ecosystem. In addition to medium-sized enterprises, public and intermediary organisations have played a major role in the ecosystem through their support programmes.

Let us mention some of the limitations of our research. First, as with most research, we had to focus on a few areas of activity. If this leads to a better understanding of the dynamics of collaboration and exchange and the ecosystem specific to these sectors, it may be possible to transfer the findings to other sectors, but they should be studied in more depth. In the post-pandemic context, there will no doubt be many other sectors that will want to develop an ecosystem or cluster strategy, and develop this type of cross-fertilisation and exchange, to promote their economic recovery, or at least this is to be hoped.

The present pandemic context calls for a renewal of innovation and creativity for businesses to find new markets, develop new products or tweak the characteristics of their products, as is the case for IT or textile-garment products. As in the past, but probably even more so in the present highly difficult COVID-19 context, garment industry firms will need various forms of cooperation and networking between a diversity of

actors in the field of information technology and textile-garment to develop innovations and survive beyond the pandemic.

Cooperation on research and innovation as well as cross-fertilisation between various sectors and the IT industries is at the beginning of its development, and for the moment these initiatives are not so numerous. However, as their numbers increase, these various ecosystems and cooperation should pave the way for new emerging products, services and markets, and eventually for a successful exit from the COVID-19 crisis, or at least contribute to revitalise various industries in the future post-COVID context.

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8

Approaches to the Digital Transformation of High-Tech Companies in Russia Under the Crisis: Problems and New Opportunities

Tatiana V. Kokuytseva, Oksana P. Ovchinnikova, and Maxim M. Kharlamov

8.1 Introduction

Digital transformation as an isolated phenomenon is relatively new but has already become a subject of discussion among researchers, practitioners, and users of digital technologies. Even opponents of digitalization are fully aware that technological formations are changing; digital business processes are replacing most of the analogy ones. Many processes

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have been completely digitalized; new configurations of business processes, new communication formats, new technological solutions have been emerging. But it should be noted that strategy, not technology, drives digital transformation (Kane et al., 2015). The strategy depends on the goals of the company, its peculiarities, external and internal factors, problems of the company. That is why institutional structures are becoming more flexible, adapting to the variable external environment.

Digital transformation is not just automatization due to new technologies (Albukhitan, 2020); it is a change in the main business and production processes in a company through the implementation of high-tech platform solutions. High-tech companies are most affected by digital transformation, as they are at the forefront of digitalization. In this regard, the issues related to the peculiarities of digital transformation in high-tech companies are getting more crucial, as the management paradigm in relation to digital business processes is modified.

Thus, the purpose of this study is to present the approaches to the digital transformation of high-tech companies based on the study of the best practices and Russian experience of digital transformation as well as on revealing the problems of digital transformation under the crisis.

8.2 Theoretical Foundation

The current development of the world economy is characterized by accelerated scientific and technological progress in the context of financial and economic turbulence caused by the effects of the coronavirus pandemic. Institutions that strive to survive have to adapt to the new digital landscape, which requires the development and deployment of digital technologies, and information and communications technologies (ICT). The use of ICT has a positive effect on the economic growth of the nation. The ICT growth effect can be maximized through the availability of skilled human resources and enabling ICT policy environment (Solomon & van Klyton, 2020). Digital technologies also have an indirect impact on economic and environmental performance at the micro (enterprise) level through greater efficiency of the digital supply chain (Li et al., 2020). Digital technologies cut across all areas of companies'

activities—from research and product design to the implementation of Omni-channel retailing strategies (Christoforou & Melanthiou, 2019).

However, in order to achieve a positive economic effect of digitalization, it is not a fragmented implementation of automation projects that is required, but a comprehensive digital transformation. However, most companies now interpret digital transformation as the automation of production processes. According to Saeed Albukhitan (2020), the digital transformation process is more than just introducing new technologies, investing in instruments, or upgrading current systems.

Digital transformation is a change in the main business and production processes in a company through the active implementation of platform solutions and an increase in manufacturing productivity on this basis.

Today, scholars and practitioners have identified two main approaches to digital transformation:

- Technological or inner-functional. This approach is classical for many Russian companies. According to this approach, the company identifies digital technologies, which, as part of a pilot project, are being implemented at a separate production site or in a division. And then it assesses the effect that the introduction of this digital technology brings about. In this case, a company can hardly see a company-wide effect;
- Cost-oriented or cross-functional. According to this approach, the company determines the result it wants to get and sources of value creation, searches for alternative sources of value creation and then chooses digital technology that will produce the desired effect.

The proponents of the second approach—Kane et al. (2015)—rightly argue that "strategy, not technology, drives digital transformation", which confirms the thesis that companies need to develop digital technologies to solve business problems (Kane et al., 2015).

The same approach is followed by José António Porfírio, Tiago Carrilho, José Augusto Felício, Jacinto Jardim, who consider that digital strategy is a synergetic sum of information technology (IT), information systems (IS) and strategic initiatives, driven by managers' decisions

deciding to exploit these available infrastructures (Porfírio et al., 2020). For that, they use software and other equipment that support the companies' operations (production, commercial, financial, etc.) and the development of people within the organization, by executing a strategy aligned with its purpose and mission, to exploit the potential of new (more) digital business models and achieve more sustainability and success (Wirtz, 2019).

If an organization is to remain competitive, it must not only respond to changes, it also must anticipate them and drive innovation itself. To do this, companies need to plan ahead and be active designers of their future. This is where the digital transformation strategy comes in handy. A digital transformation strategy helps policymakers answer the questions about their business, such as the current level of digitization, a vision of its future, and how to achieve it. When adopting digital technologies, companies need to develop three core competencies related to awareness, informed decision-making and rapid adoption. Designing and implementing a digital transformation strategy has become a key challenge for many organizations in the manufacturing industries, but how such a strategy can be developed remains an open question (Albukhitan, 2020).

Saeed Albukhitan (2020) identifies the following stages in the formation of a digital transformation strategy: defining the vision and goals, assessing the organization's readiness for digital transformation, designing the end user and employee experience, reviewing and selecting solutions and vendors, creating implementation roadmap, and adjusting organization culture and infrastructure.

8.3 Methodology

During the study, the authors analyze the world's best practices in the field of digital transformation on the example of the largest high-tech companies (Boeing, Airbus, etc.), available in open sources. Besides, an analysis of Russian high-tech companies was conducted from the standpoint of evaluating their digital transformation cases. However, the experience of Russian companies in this area is insufficient to summarize the problems faced by the companies.

In order to make the findings of the study relevant, the authors surveyed 32 managers responsible for digital transformation in Russian high-tech companies. These people work on different positions in the hierarchy of the organization. Their opinions on the implementation of digital transformation were recorded and summarized. The results of the survey allowed to make the conclusions of the study on the problems of digital change more accurate.

The respondents were the employees of the companies: top management (15%), project managers (75%), and executors in projects (10%). All respondents had higher education and worked in the industry from 3 to 16 years.

The respondents revealed general and specific problems during the survey. Specific problems were excluded from the generalization because they were heterogeneous. The general problems were divided into four large blocks. The ways to solve these problems were consolidated.

The authors purposefully moved away from detailing problems and their solutions, assuming that Russian companies do not yet have sufficient experience in implementing digital transformation.

8.4 Discussion

Best Practices of Digital Transformation in High-Tech Industries

Nowadays, high-tech companies that seek to maintain and increase their market share are actively introducing innovations in various areas of their activities, at various stages of the product life cycle ranging from researching/developing to managing economic processes associated with marketing research, building logistics chains, and so on. The fourth industrial revolution has led to the fact that today it is possible to manage all these processes quite effectively using digital technologies, such as cloud solutions, artificial intelligence, and so on. However, while for some companies these are new opportunities and a key to success, for others it is growing technological barriers to development. As a number of digital

experts note, today there are three keys to the company's success (Bespalov, 2020).

The first component in the success of a high-tech company is its ability to create and use a complete digital twin of a product. The creation of a complete digital copy of a product, including a digital description of mechanical and electronic components (chips and related software), integration of product requirements (functional, technical, etc.), behavioral models, and so on, allows companies to effectively manage changes in real time, risks and challenges (problems), transforming them into competitive advantages. The digital twin should also provide feedback so that based on this feedback the producer could improve processes and designs via the Internet of Things (IoT).

Examples of applying digital twin methodology are SpaceX and NASA, which first suggested the idea when they used a digital twin to rescue the Apollo 13 mission crew and today use it for space exploration, including for their Mars rovers (Digital Twins).

The second component of success is a personal approach to the customer. Today, customization as a trend has not been limited to the service sector alone, but also high-tech industries. However, for the aerospace industry, the issue of customization is not new, since the creation of innovative products (the development of a satellite with certain technical characteristics for a specific customer, the development of software for specific national goals in the area of space-exploration activities, etc.) has historically been aimed at meeting the needs of particular customers (in the Russian Federation—Roskosmos, the Ministry of Defense of the Russian Federation or others). However, today, in the light of addressing the national goal of increasing manufacturing and exports of civilian products, the issue of a personalized approach is somewhat complicated by the fact that the external market makes much higher demands for the products manufactured, their quality, production times, and so on. This issue requires building up not only and not so much the technological competencies of Russian enterprises, but the development of professional competencies and so-called soft skills of employees. And given the existing generation gap in enterprises and the absence of any apprenticeship scheme, that is a system for transferring key knowledge and skills from the older generation of workers who have the Soviet scientific school

background to younger employees who are just entering the industry, it is quite difficult to achieve this goal.

The third key to success is the flexible open digital ecosystem. Today value is added only by 50% of the possible 100%, because large financial and temporary losses of enterprises are incurred at the intersections of integration processes. The emergence of a single digital environment will help reduce these losses and increase labor productivity and efficiency of enterprises. One of the main trends in the development of modern society and economy is the widespread integration of disparate processes into a single system in order to increase the efficiency of interaction coupled with the widespread use of digital economy achievements. This systematization makes it possible to improve the exchange of information between different industries and participants in the value-added supply chain and to increase the speed of processing and executing orders. Every year, an increasing number of companies are resorting to the principle of integrating disparate processes into a single system. In most industries, the need for a comprehensive, systemic approach to management is linked to market, regulatory bodies and the recent requirements of third-party stakeholders (Butrova et al., 2019).

Examining foreign experience in managing innovations and economic processes at aerospace enterprises let us turn to such prominent companies in this industry as Boeing, Airbus and Lockheed Martin, which are among the world's top ten leading aerospace companies (Top 10 Best Companies…).

Boeing is perhaps one of the pace setters in applying digital technology to optimize its operations and increase its efficiency. Boeing applies digital twins to design aircraft. A digital twin is designed for a new aircraft, followed by simulations to predict the performance of various airline components throughout the product life cycle. As a result, Boeing engineers can predict the lifetime of individual components. Boeing has achieved 40% improvement in the quality of its parts and components thanks to the introduction of digital technologies in the form of a digital twin. The company plans to digitize all of its design and development systems in the future and plans to share this information with its partners. Boeing is also working on using a digital twin to achieve the best cargo load balance. Using Internet of Things (IoT) sensors, we can

determine an accurate yet safe cargo load for the digital twin, increasing cargo revenue per flight.

Boeing applies 3D printing technology. In 2017, in partnership with Norsk Titanium AS, a supplier of titanium components for additive manufacturing, the production of 3D printed parts for the latest model 787 was launched. The use of additive manufacturing technologies instead of traditional ones reduces costs. Getting FAA approval for 3D printed parts is a huge step for Boeing and its partners and opens the door to additional savings amounting to tens of millions of dollars (Digitalisation Takes Off…).

Boeing uses RFID tags to reduce its costs. Previously, the company faced the problem of loss and/or damage to spare parts due to improper installation in the workshop. The digital solution helped halve costs: first, it reduced improvement working hours and time lost, and second, it significantly cut labor costs during final delivery and inspection, as less manual work was required (Digitalisation Takes Off…).

The company suggests comprehensive and flexible business solutions aimed at organizing a more efficient repair process, minimizing investments in inventories, optimizing and maintaining costs at a predictable level. Boeing implements the concept of a tailor-made approach to customers, working closely with them to find individual solutions that will contribute to the success of their business strategy. Boeing strives to deliver superior service for every customer, ensuring efficiency and simplicity at every stage of inventory management (Subdivision Material Services).

To promote greater integration with its partners, the company is implementing the Partnership for Success program, in which it cooperates closely with key suppliers to reduce their own supply chain costs. If a company is to be proactive, it should work closely with its partners not only to keep cutting its costs, but also to share the technologies that can revolutionize production (Digitalisation Takes Off…).

Airbus also employs a digital twin developed jointly by Airbus and software manufacturer ASCon Systems. The creation of a virtual production twin enhances the transparency of activities and allows CEOs to manage changes more effectively. Often, most of the time is spent on assessing the condition and problem (almost 80%), while very little time

is left to solve the problem itself. The digital twin can help solve this problem quickly identifying the problem or predicting its occurrence (Digital Twin…).

Airbus uses digital twin products. Airbus design engineers create a virtual model that provides the basis for the automatic generation of producer manuals so that operators relying on tablet PCs and augmented reality goggles could assemble products by following the device manuals.

The availability of virtual aircraft models at Airbus enables virtual testing, which reduces the time spent on physical testing. It helps improve design, services, and so on, so that development time is reduced (The digital transformation of Airbus).

Airbus also uses the Skywise digital platform, which is aimed at unifying all company data to add value for its customers. Airbus employees and suppliers have access to it. The platform has several components: servers that store data and various applications for managing this data (templates, algorithms) (The digital transformation of Airbus). The company, like Boeing, places great emphasis on ensuring that suppliers are digitalizing as well, as it is important to develop innovative products and services for the entire value chain.

Lockheed Martin has been implementing the Digital Tapestry project since 2013. Digital Tapestry is the company's next-generation digital manufacturing technology, a model-based design tool that integrates design and manufacturing into a single process. It goes beyond CAE design by providing a digital virtual environment called the Collaborative Human Immersive Laboratory where designers can manipulate elements, or even entire machines, to see how they interact and operate. At the same time, the system creates a constant stream of automatically updated specifications (Lockheed Martin moves…).

In 2017 Lockheed Martin expanded its Digital Tapestry strategy. The company intends to create digital twins of products, processes, and tools. Thus, Lockheed Martin will be able to manage processes more effectively at each stage of the aircraft life cycle (Digital Twins for Aerospace).

Lockheed Martin is also active in digital technology. The Lockheed Martin Block IIR (SatSim) GPS satellite digital twin was built in 2018 for the Air Force Space and Missile Systems Center. It allowed vulnerability scanning and penetration testing performed on the entire GPS

system, including the satellite itself, its ground control station, and radio frequency communications between them. The objective of the project was an end-to-end presentation of the GPS IIR control system (Digital Twinning Takes Flight).

Russian Experience of Digital Transformation of High-Tech Industry Companies in Modern Conditions

The digital transformation of Russian companies is of great importance. In 2019, methodological recommendations were made on digital transformation of state corporations and partially government-owned companies with the aim of forming common approaches to the development of the strategic planning document "Strategy of digital transformation" for government corporations and State-owned companies.

The methodological recommendations regulate the events and key stages of the federal project "Digital Technologies", which was approved by the Presidium of the Government Commission on Digital Development, the Use of Information Technologies to Improve the Quality of Life and the Business Environment (Metodicheskie rekomendacii …). Methodological recommendations regulate the procedure for the development and implementation of the strategy, the main direction of digital transformation; it provides the guidance for the strategy structure, content, and monitoring of its implementation.

Such strategies have been approved by Russian Railways, the Russian Venture Company, Kamaz, Rosatom and Rosseti, Roskosmos, and so on. In some Russian state-owned companies (Aeroflot, Helicopters of Russia, Sovkompol, GTLC and others) digital transformation strategies are structural sections of other strategic documents. By July 2021, at least 30 other digital transformation strategies are to be adopted (Primery cifrovoj ekonomiki v Rossii).

The leading industries in digitalization are retail (69%), banks and insurance (65%), telecommunications and communications (60%). Russian companies have already actively employed Data Analytics (34%), the Internet things (28%) and Process Robotisation (RPA) (24%) (Kak

prohodit cifrovaya transformaciya v Rossii: rezul'taty issledovaniya KMDA).

When analyzing the Russian high-tech companies' cases of digital transformation in the current context, let us consider a Russian holding company for aircraft construction, which was one of the first to introduce elements of the Internet of Things and cloud technologies into its projects. The information is obtained from open sources (Cifrovizaciya predpriyatiya: kejs holdinga «Vertolety Rossii»). The company is engaged in designing and testing the prototypes of helicopter technology, as well as their further introduction into mass production. It uses a PLM system. In particular, NX and Teamcenter solutions by Siemens are utilized to develop helicopter technology. Thanks to this technology, errors are corrected at an early design stage and no breakages occur during testing.

Thanks to the 3D models being developed, the Russian holding company managed to shorten the time for electronic approval of design documentation, reduce the number of design errors, and the cost of modifying equipment for mass production.

The company's first pilot project was the one for designing and producing an aircraft based on information technology; it was completely designed in virtual space without paper use, which made it possible to halve the cost of developing a helicopter and its corrections during the subsequent modification of the aircraft.

The company also uses a unified information system with round-the-clock access to up-to-date design documentation and the ability to communicate with developers to discuss models due to the specifics of production. In the future, it is expected that a single system will enable all project participants to monitor and control the production of helicopters at each stage. One of the key principles for a digital enterprise is secure and regulated access to reliable information, regardless of the location of the employee or the system.

However, the implementation of a pilot project is not yet a digital transformation of the company, so we can speak about the first steps in this direction. The coronavirus pandemic and the lockdown in spring 2020, on the one hand, contributed to an increase in the digitalization of Russian enterprises (transition to a remote mode of operation, wider use of digital communication tools such as WhatsApp, Microsoft Teams,

Zoom, etc., digitalization of electronic document management, etc.) and more rapidly enforced development of digital competencies by employees of enterprises. On the other hand, the problems of digital transformation of Russian companies in high-tech industries, especially state-owned ones, have become more acute because of their specificities.

Problems

Digital transformation, as any change, faces challenges. The analysis of the Russian and foreign high-tech companies made it possible to systematize these problems.

1. Lack of human resources
   Digital transformation, especially in high-tech industries, requires highly qualified employees who have not only traditional professional knowledge, but also digital competencies. However, today almost all high-tech companies experience a shortage of such human resources.
2. Insufficient maturity of business processes
   For digital transformation, each company needs clear standardized business processes, assignments of responsible persons at each business process stage, standardized reporting forms, and so on. However, today, business processes in Russian high-tech companies are often complicated because of their unstructuredness. Therefore, it is difficult to do digital transformation. At the same time, there is also a so-called organizational resistance. It means that employees do not contribute to the optimization of business processes, and even complicate them, concentrating knowledge and tasks on themselves, because of their fears to be fired or a lack of appropriate digital competencies. This is often the case for state-owned companies. Therefore, training and optimization of business processes should be the priority measures in a digital transformation plan. End-to-end business processes should be considered as well as business units should be involved in digital transformation.

3. Information security
   Digital transformation bears information security risks as databases accumulate information on financial transactions, production technologies, inventions, industrial samples, company specialists, and so on, which can leak due to negligence, deliberate actions of unreliable employees, or can be subject to hacking attacks.
   According to KPMG (Cifrovye tekhnologii v rossijskih kompaniyah), more than half of Russian CEOs and 68% of foreign ones consider these risks to be of paramount importance. Therefore, information security is also a critical issue that needs to be addressed in digital transformation.
4. Lack of methodological tools (strategies, programs, methodology for digital transformation)
   Making any organizational and economic changes or transformations conventionally has an objective, goals, instruments for their implementation, aims, and expected results. In other words, an effective digital transformation requires a strategy, plan, or program. According to the report by the NRU HSE, in 2017 only 12% of companies had a Digital Strategy for the next five years as a separate document. The same number (17%) of companies did not plan to implement digital technology at all in the next five years. More than a quarter of companies (27 %) used digital technology only for operational planning within a year.
   About 26% of companies did not single out "digitalization" in a separate area of activity, but they considered the possibility of applying digital technologies (12% as stand-alone projects or 14% as long-term investment projects) (Cifrovaya ekonomika: global'nye trendy i praktika rossijskogo biznesa). However, based on the more recent data (according to the KPMG study) (Cifrovye tekhnologii v rossijskih kompaniyah) 70% of the executives of foreign companies believe that their companies have a detailed plan for digital transformation; as for the Russian Federation it accounts to 63%. However, even fewer companies have the methodological tools to implement such plans: a methodology for assessing the effectiveness of digital transformation, a methodology for assessing digital competencies, a methodology for choosing a priority area for digital transformation, and so on.

5. Financing
   Digital transformation is an expensive long-term project for any company. Today 90% of companies use only their own funds or loans to carry out digital transformation (Nazvany klyuchevye napravleniya dlya usileniya strategij cifrovoj transformacii kompanij v 2021 godu). At the same time, the budget of the companies is very different:

€ 555 thousand–€ 1.1 mln—9% of all companies
€ 333 thousand–€ 555 thousand—13% of all companies
€ 111 thousand–€ 333 thousand—15% of all companies
€ 11 thousand–€ 111 thousand—27% of all companies
More than € 1.1 mln—36% of all companies (Cifrovye tekhnologii v rossijskih kompaniyah; Cifrovaya ekonomika: global'nye trendy i praktika rossijskogo biznesa).

Most Russian companies implement individual projects of automation within separate functional units, thereby replacing the concept of digital transformation with the concept of automation of production processes. Few companies see digital transformation as a strategic project with a budget of over € 10 million (Cifrovye tekhnologii v rossijskih kompaniyah). However, in the coronavirus pandemic, which caused a lockdown both in Russia and all over the world, the budgets of Russian companies are likely to be cut following a 17.5% cut in the budget of the national program "Digital Economy" for 2021–2023 (Byudzhet «Cifrovoj ekonomiki» sokratitsya na 117 milliardov).

We would like to draw attention to one more problem that emerged during the global fight against COVID-19—the problem of noncompliance of staff skills with the requirements of production. All this entails a loss of productivity in almost all industries and regions. According to BCG estimates, productivity losses due to mismatches in demand and supply of skills could increase from 6% to 11%, and the shortfall in global GDP will amount to 18 trillion dollars by 2025.

New Opportunities for Digital Transformation

Digitalization opens new opportunities for both small and medium enterprises, giving them the opportunity to compete in the market (Fjellström et al., 2020), and large companies in high-tech sectors of the economy. Digitalization and ICTs (among others) are gradually and most visibly closing the gap between SMEs and large firms in terms of competencies and market access (Thrassou et al., 2020).

Digital transformation opens new opportunities for producing value added, improving the quality of manufactured products and customer service support, reducing costs and the time from an idea to its implementation and mass production. For example, full digital twins of products, the simultaneous unification of components, a database of them and the statistics on various arrangements as well as the data processing center can reduce time and costs on the creation of prototypes due to the fact that virtual functional modeling and technical modeling for the resistance of products to external factors will be carried out virtually (cheaper, quicker, more accurately).

Summarizing the above, it should be noted that digital transformation carries risks and threats, but also opens up new opportunities. In general, recommendations for overcoming the challenges of digital transformation are presented in Fig. 8.1.

Digital Transformation Strategy

Digital transformation should be implemented in an integrated and systematic way within the enterprise, including creating new mechanisms for managing human capital, transforming the business model of the enterprise, making organizational and structural changes, changing the culture, approaches and principles of management. Only a systematic and cross-functional approach to digital transformation can increase the competitiveness of an enterprise. Moreover, the issue of increasing economic efficiency in the short or medium term through digital transformation is controversial: the introduction of digital technologies in production and management is high-cost and high-risk; therefore, it is comparable, in fact, with the introduction of innovations.

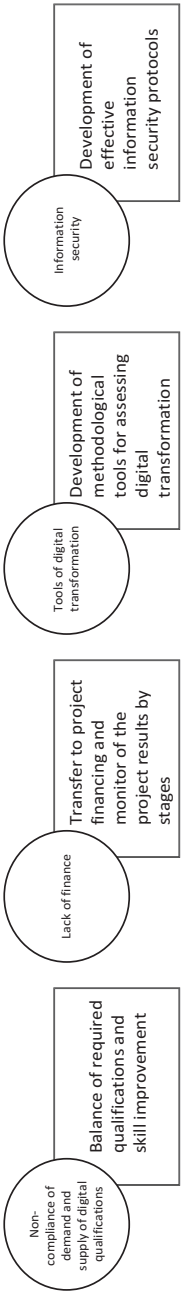

Fig. 8.1 Problems of digital transformation and possible ways to solve them

Fragmentary implementation of digital technologies is not a digital transformation of an enterprise and we can expect from such an implementation only automation and optimization of individual processes, but not a breakthrough.

Digital transformation is not a cure-all, so it can and should be implemented by enterprises well in advance, rather than in a crisis with lack or shortage of their resources.

Moreover, the DT will not likely lead to a qualitative and quantitative leap in the development of existing business directions. It is likely to ensure the rapid growth of the company (advanced development, so to speak) in new business directions for the market and company.

Digital transformation of an existing enterprise requires preliminary work (after assessing the feasibility of implementing the DT as a whole, based on the phase of its life cycle), including the development of a strategy. It (digital strategy) describes the vision of the company's development in the context of digitalization, including the strategic measures to achieve it, corporate culture, value creation centers, period of implementation, results, and so on (Lipsmeier et al., 2020). It should determine:

- the goal of DT (either CEOs try to increase productivity, enter new sales markets, increase revenues, etc.);
- management principles (flexibility, efficiency in decision-making, multi-iterative revision of approved plans, readiness for certain risks, etc.);
- organizational mechanism for the generation and implementation of digital solutions (i.e. who, how and in what way will make decisions on a project realization to implement digital solutions in a particular area of the enterprise's activity);
- the current and target business model;
- technologies that CEOs plan to implement (e.g., on the basis of other companies' cases), or areas (marketing, design, production, etc.) in which management wants to implement digital technologies;
- competencies (including the current level of competencies, the level of human resources development at the enterprise, assessing the possibility of implementing DT using these competencies, determining their "types" (i.e. what competencies are needed) and sources of searching for the necessary competencies);

- financial resources (i.e. the current level, the required level, the way of obtaining the necessary resources and their cost);
- risks (financial, reputational, personnel, etc.), the assessment of acceptable level of risks and ways of managing them;
- expected outcome (in addition to the set objective, the description of various scenarios for the enterprise development).

The development of a digital strategy is a challenge for companies (Holotiuk & Beimborn, 2017). The success of digital transformation, expressed in conquering new markets, advanced development, or other economically significant result for the enterprise, depends not so much on the level of digital maturity (readiness for digital transformation) of the enterprise, on the scope of the enterprise operations or its scale, but on the effectiveness of a well-thought-out managerial decision, implementing a transformation strategy.

Let us highlight the following key features of modern approaches to managing innovative and economic processes at aerospace enterprises in the context of digitalization: the use of digital twins of products, processes and production as a basis for reducing costs; cutting risks and predicting the dynamics of the subject of modeling in a real environment; individual approach and the formation of common digital platforms; technology exchange as a factor in reducing costs, the time of introducing the product to market and increasing the product value in the supply chain. Undoubtedly, the introduction of digital technologies is an expensive project, but today it is not only a temporary trend and an opportunity to increase their competitiveness, but also a new technological barrier for organizations that use traditional approaches to management and organization of production.

Recommendations for Digital Transformation

When implementing digital transformation, high-tech companies must first analyze the business environment in which they operate, determine their business priorities, and optimize business processes. At the same time, it is necessary to understand that organizational and environmental

(in modern conditions—and epidemiological) conditions should also be taken into account, which significantly affect the implementation of projects related to digital transformation.

It seems possible to highlight some recommendations when implementing digital transformation.

1. Digital strategy. Setting the goals of the strategy should be based on the identified priorities for the company's development. To implement an effective digital transformation strategy, the company needs to focus on specific priorities, such as making its organization more adaptable. Each ambitious goal should have its own implementation strategy; hence the company needs to prioritize projects and goals while implementing a digital transformation strategy.

   In addition, it is necessary to establish appropriate mechanisms for realizing the strategy. The scale of the objective and projects under implementation may be unachievable owing to unclear realization mechanisms, uncertain distribution of tasks among the actors, and inelastic processes.
2. Rate of changing. In today's environment, the speed of decision-making and the flexibility of business processes are prerequisites for competitive advantage. Management decisions should be made quickly in response to changes in the current situation and communicated to the executors as soon as possible.
   In this regard, there is a need for well-established processes for communicating information to management and channels for interaction within business processes. However, all participants in the business process must realize why these decisions have been made and what should be done to put them into life. In this case, the optimal process architecture is the one, which includes the strategic, business, and operational levels. This architecture will increase the speed of information communication across the levels, since information insignificant for a higher level can be processed and analyzed at a lower one, at which operational decisions will be made within the competence of this level.

3. Digital expertise. For effective implementation of digital transformation, a company needs to train personnel. It should be noted that this is not only the level of personnel education, but also about their awareness of business processes, their insight into company development in general or the project. Staff training is essential to the success of digital transformation.
4. New technologies. While realizing digital transformation it is necessary to identify and systematize the competences available in the company (best practices).
   The use of these competences in the educational environment of the organization allows improving organizational procedures.
   New technological solutions increase the efficiency of the company's digital transformation. The increased efficiency can be achieved through an integrated IT infrastructure that allows the results of project management to be used in the company's activities (e.g. in the form of a common repository, fully integrated with other technological solutions) (Fischera et al., 2020).
5. Teamwork and communication. At present, companies tend to implement several projects simultaneously. These projects often have different objectives and implementation mechanisms. However, these projects can be implemented by people who are the team members of other projects. These projects need to be integrated into the overall digital strategy of the organization in order to avoid inconsistencies in objectives and ensure efficient use of resources.
   In addition, there is a need for adequate communication among stakeholders. It seems reasonable to establish a common digital communication platform within the company, which has the functions of a social network and is accessible to all personnel. It should be noted that in the context of the COVID-19 coronavirus pandemic, companies have set up similar communication platforms for telecommuting, mainly within Zoom, Microsoft Teams, and so on. However, these sites are used for specific events (meetings, webinars, etc.) without ensuring constant communication between employees, that is, they do not have the universal accessibility that off-line communication has. In this case it is possible to use business chat rooms, but they are often overloaded with excessive information. However, a company's

communications platform should be designed to deliver the information needed and in a timely manner to those who need it.

6. Transparency. Due to the fact that organizational improvements are time-consuming, their success can be achieved in the long term. So, they may not be available for employees' comprehension in the short term. To avoid misunderstanding on the part of staff and to stimulate efficiency, a company needs a digital transformation implementation plan, which is connected to the company's digital strategy and is available to each staff member. Each employee must understand what is being implemented at the moment in the company and why.

8.5 Conclusion and Implications

Summing up the above, the success of digital transformation depends directly on the strategic approach to it. Although digital transformation is an important component of a company's competitiveness, it is currently not well studied. At the same time, the rapidly changing external environment requires companies to make rapid technological changes that keep up with the times. Sometimes such changes are evolutionary, but sometimes, as it became obvious in the case of the coronavirus pandemic, they are almost revolutionary, with most companies having to relocate their employees to remote operations as quickly as possible.

It should be stressed that digital transformation is not just about processes and technologies, but more about the people who implement it. Therefore, companies first need to pay special attention to personnel training, the availability of information on the objectives and implementation mechanisms of the digital transformation strategy, as well as to the nature of the decisions taken. There must be effective communication and the "bank of best practices" of digital processes in any company under the digital transformation. This approach ensures that each staff member is involved in the digital transformation process and that business processes at the organization are efficient and effective.

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9

Impact of Big Data on Tourism and Hospitality: Challenges and Organisational Adaptation

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9.1 Introduction

The development of Information and Communication Technologies (ICTs) has radically changed customers' behaviour and their way of travelling (e.g., Buhalis & Law, 2008; Xiang et al., 2015; Zaman et al., 2016a, 2016b; Navío-Marco et al., 2018). Today's tourists are more connected

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than ever and use digital technologies/devices during all the travel stages (i.e., pre-travel stage, during the travel and post-travel stage) (e.g., Wang et al., 2016). In 2019, 84% of French travellers prepared their trip on the Internet, and the use of digital technologies for travel and tourism has significantly increased vis-à-vis the previous years (Lecho Touristique, 2020). For example, during the pre-travel stage, tourists may use comparison websites (i.e., Kayak, Trivago, etc.); read online reviews (i.e., Trip Advisor); and consult travel blogs, social media, and so on, in order to search for information on the destination, accommodations, and other tourist attractions. During the travel stage, tourists also search for information on local attractions/activities, restaurants, and so on, and share their stories on social media by using their smartphone and other mobile devices (Wang et al., 2016). After the trip, tourists usually share their experiences on review websites (i.e., Trip Advisor), which may also help potential tourists to learn about that particular service/attraction/destination and take their decision (Hernández-Méndez et al., 2015; Zaman et al., 2016a; Jiang et al., 2020). Although it's very challenging for tourism and hospitality firms to anticipate the needs of tourists throughout these travel stages, these stages allow them to generate, record, and store a massive-scale data, which can bring opportunities and give them competitive advantages (Kambatla et al., 2014).

In addition, the tourism and hospitality industry is highly impacted by the novel coronavirus (COVID-19), which is considered as the deadliest virus in the recent history and has created a worldwide crisis (e.g., Sharma et al., 2020; Vo-Thanh et al., 2020). As of February 10, 2021, the virus has infected more than 100 million people and taken away more than 2.3 million lives worldwide (Worldometers, 2021). In order to deal with this pandemic, most countries have taken drastic actions such as closing their borders for non-residents and tourists, full or partial lockdown at the national and local level, closing all the non-essential commerce, restriction on public and private gatherings, encouraging remote working when possible, and so on (e.g., Frank & Grady, 2020). All the businesses that were in face-to-face contact with the customers were forced to shut down in order to ensure social distancing (Sharma et al., 2020). Like other small businesses, the tourism and hospitality industry was highly impacted by these restrictions (Gössling et al., 2021). According to the United

Nation World Tourism Organization (UNWTO), international tourist arrivals were expected to decline by 70–75% for the whole of 2020 vis-à-vis the previous year (UNWTO, 2020). Therefore, the tourism and hospitality industry is going through the deadliest crisis in recent history (Vo-Thanh et al., 2020), and it should explore the opportunity of Big Data.

Although there is no definition of Big Data, it is often explained with "V"s by researchers (e.g., Gantz & Reinsel, 2011; Laney, 2001; Li et al., 2018; Jovicic, 2019). Laney (2001) explained Big Data with "3V", which stands for Volume, Variety, and Velocity. Later in 2011, Gantz and Reinsel added another "V" and these authors claimed that the data should create "Value" for the companies. Baggio (2016) detected three additional "Vs": "Variability", as the meaning of data varies across contexts; "Veracity", as relevant data must be reliable, valid, and complete; and finally "Visualisation", as ability to present complex data patterns in graphically understandable ways is another important characteristic. Although ICT allows companies to capture and detain an enormous amount of data, which could create additional sources of competitive advantage for firms, most of the firms do not have the ability to analyse and visualise these data. In the context of travel, ICT allows tourism and hospitality firms to capture and detain a huge amount of data throughout the travel stages but the industry is still facing challenges to deal with these data. Therefore, the aim of this chapter is threefold: (1) to understand the different sources of data in tourism and hospitality industry; (2) to underline the major challenges that the tourism and hospitality firms may face in order to deal with the Big Data; and finally (3): to highlight the organisational adaptation that the tourism and hospitality firms may need to create value from these data.

In order to attain the aim of this chapter, the following section presents the Big Data in tourism and hospitality by analysing the existing literature. Section 9.3 presents the challenges faced by the tourism and hospitality firms. In this section, we have mobilised the technology acceptance theories in order to underline major challenges. Section 9.4 presents the organisational adaptations that tourism and hospitality firms should ensure in order to deal with the Big Data. In this section, we have mobilised the principal-agent theory in order to explain the role of the

Destination Management Organisation (DMO) as a "gatekeeper" of the destination. Finally, Sect. 9.5 concludes the chapter by underlining the contributions.

9.2 Big Data in Tourism and Hospitality

Based on the existing research on Big Data in tourism, Li et al. (2018) categorise three types of data according to their sources: user-generated content (UGC) data, device data, and transactional data. According to Li et al. (2018), UGC data include online textual data and photos; device data include GPS data, mobile roaming data, Bluetooth data, and so on; and finally, transactional data include web search data, webpage visiting data, online booking data, and so on. Therefore, data are omnipresent in tourism and hospitality with the development of ICT. From a destination management stand point; we may consider two types of data: internal and external data of the destination.

Internal Data

Regarding the internal data, first of all, we can consider the data coming from the stakeholders (Sheehan et al., 2016). If we consider the example of a tourist destination, it consists of multiple stakeholders such as national, regional and local governments/authorities, local communities, local residents, service providers such as hotels, restaurants, and finally tourists (Zaman et al., 2020). In a recent research, Zaman et al. (2020) illustrate how an online platform managed by the Destination Management Organization (DMO) (i.e., local tourist office) may facilitate the exchange among these stakeholders in order to tackle negative impact of tourism. All these stakeholders generate and detain a huge volume of data (i.e., historical data, performance data, customer data, etc.), which could bring competitive advantages for the destination and its stakeholders.

Regarding the sectoral data, we may consider the data from hotels, camping sites, transport, and so on. If we take the example of the hotel industry, hotel data are often considered as the key performance indicator for the destination. Although the turnover, average daily rate (ADR),

occupancy rate, revenue per available room (RevPAR) are considered as the key performance indicators for hotels (Zaman et al., 2016b), some of these data might be very useful for other stakeholders of the destination in order to understand the demand. For instance, data on the occupancy rate of the hotels will allow the destination to forecast the number of tourists they are going to have on a given date and other service providers such as restaurants and tourist attractions may anticipate to this number.

For the internal data, the seasonality and weather of the destination are highly important. Tourism industry is highly seasonal (Buhalis, 2000; Amelung et al., 2007; Song & Li, 2008) and some activities highly depend on the weather information (Bigano et al., 2006; Becken, 2013). For example, the beach destinations are mostly visited during the summer while ski stations are crowded during the winter. Therefore, destinations should use the data of their peak and low seasons in order to anticipate the tourist demand (Kulendran & Wong, 2005). The weather also plays a vital role for travel and tourism (e.g., Becken, 2013; Becken & Wilson, 2013; Falk, 2014). Falk and Hagsten (2016) illustrate the impact of early snowfall for Swedish ski resorts. For instance, if a tourist is looking for a beach destination and he has three options, he will most likely choose the option with the most favourable weather. In addition, the weather may also modify the behaviour of the tourists during the travel stage (McKercher et al., 2015). For example, during rain, tourists prefer to do indoor activities, such as visiting museums, rather than roaming outside. Therefore, having the weather forecast for a few months will help tourism and hospitality firms to anticipate the demand.

Besides these data, tourism and hospitality firms also need to take into consideration the number of MICE (e.g., Meeting, Conference, Events, Festival, Concert, etc.) the destination organises around the year. These tourism supply data will help tourism and hospitality firms to anticipate the demand.

External Data

External data consist of the data that come from outside the destination. First of all, tourism and hospitality professionals should take into consideration the calendar—school holidays and public holidays of the places

from where most of the tourists come from (Buhalis, 2000; Ryan, 2003). For instance, if most of the tourists in France are coming from the UK, tourism and hospitality professionals should take into consideration the school and public holidays in the UK. These data help tourism and hospitality firms forecast the demand. As mentioned earlier, the development of ICT (Information and Communication Technologies) has radically changed the consumers'/tourists' behaviour (destination choice and buying behaviour, etc.) (Buhalis & Law, 2008; Frías et al., 2012; Jacobsen & Munar, 2012; Xiang et al., 2015; Wang et al., 2016; Zaman et al., 2017). In addition, this buying behaviour differs according to tourists (leisure vs business tourists) and is mainly characterised by price sensitivity, flexibility as to the date of stay, ability to book early, and the existence of periods of high demand (trade fairs for business travellers, school holidays for leisure customers, etc.). The share of each type of clientele therefore varies according to the period (weekday, year-round), the destination (conventional city popular with business travellers, seaside resort for leisure travellers), and the type of accommodation. Indeed, the level of range and type of services offered by the establishment (seminar rooms, wellness areas, etc.) also determine the type of clientele that predominates. Therefore, the data on the each of these segments and their behavioural patterns will help tourism and hospitality firms to better anticipate and adapt their pricing strategies (i.e. Revenue Management). For example, Kuokkanen (2013) proposes a conceptual model of destination-centric revenue management (DCRM) that allow optimising the revenue of the destination by sharing the data between the businesses. Moreover, tourism and hospitality professionals should take into consideration the data from the tourist's origin. For instance, the airfare and weather at the tourist's origin may vary according to the demand. Finally, as explained earlier, most tourists use the Internet to search information and make reservations. This generates a huge quantity of transactional data (web search data, webpage visiting data, online booking data, etc.) (Li et al., 2018). Figure 9.1 illustrates the internal and external data in tourism and hospitality.

As illustrated in Fig. 9.1, tourism and hospitality firms need to deal with the internal and external data at the same time. Therefore, the

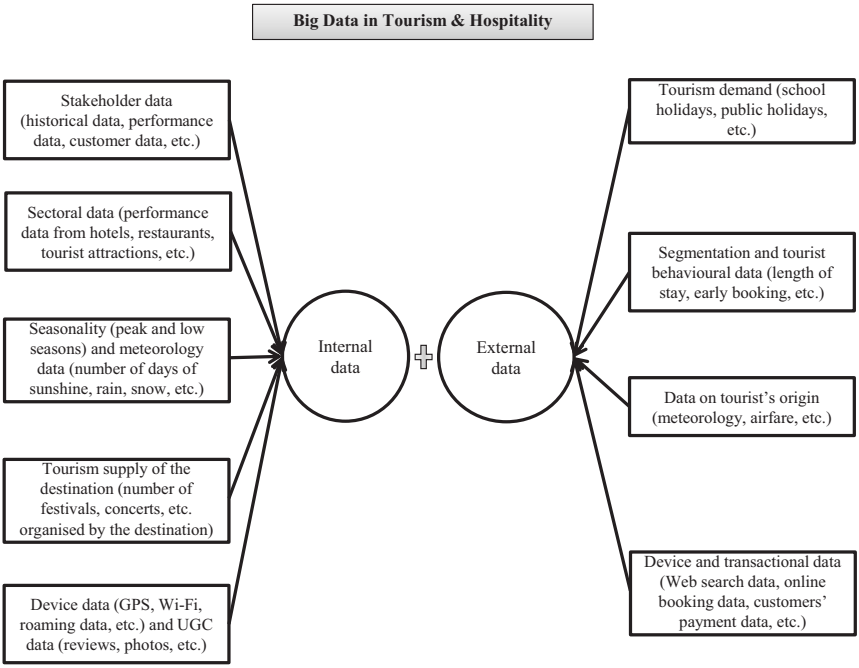

Fig. 9.1 Illustration of Big Data in Tourism and Hospitality (Source: Authors)

question could be raised how tourism and hospitality professionals could collect and analyse these data and disseminate the results to all the stakeholders of the destination so that it can create value for everyone.

9.3 Challenges and Opportunities

Although tourism and hospitality industry disposes a huge number of internal and external data, the main challenge for this industry is to analyse and visualise these data so that it could create value for business (Baggio, 2016). In addition, Zaman et al. (2018) also highlight the importance of real-time analysis of these data. Firms may detain a huge amount of data but if these data are not analysed in real-time, it will not give them any competitive advantage. Therefore, one of the challenges for

tourism and hospitality firms is to analyse and visualise the data in real-time and include them into their decision-making process and marketing activities. For example, tourism and hospitality firms may use GPS and mobile roaming data of the tourists in order to do context-based mobile marketing (e.g., Buhalis & Foerste, 2015). If tourism and hospitality professionals are not able to analyse and visualise the data in real-time, they will not be able to understand the contextual elements of the tourists and their marketing strategy will be less effective (e.g., Buhalis & Foerste, 2015). Therefore, data may bring opportunity for tourism and hospitality firms to implement a real-time marketing strategy (e.g., Scott, 2011; Buhalis & Sinarta, 2019).

One of the major challenges that tourism and hospitality firms are facing is their small size. In the literature of technology adoption, the size of the firm has been identified as one of the crucial factors to adopt new technologies and it has both positive and negative impacts on technology adoption (e.g., Thong, 1999; Oliveira & Martins, 2010; Giotopoulos et al., 2017). Most of the tourism and hospitality firms are the SMEs; some of them are family-run businesses (e.g., Zaman et al., 2016b) and they don't have the competencies and resources (i.e., financial resource, human resource, and technological resource) to collect, analyse, and visualise this huge amount of data in real-time (Zaman et al., 2018). Therefore, another challenge for tourism and hospitality firms is to make strategic partnerships in order to acquire these competencies and resources (Latour, 2005; Paget et al., 2010, Zaman et al., 2018).

When it comes to the partnership, the tourism and hospitality firms are highly dependent on online travel agencies (OTAs). For example, if a hotel wants to sell a room on a specific date, it should decide at what price the room should be proposed in order to be competitive in the market. In order to take such a decision, the hotel should take into consideration the internal and external data as explained earlier in Fig. 9.1. Hotels do have their own performance data (i.e., historical data, occupancy rate, average daily rate, RevPAR, etc.), but they do not disclose any information to their competitors as well as to the external environment. As most of the hotels do not have the competencies and required resources to analyse and visualise their data, they rely on the online travel agencies such as Booking.com; Expedia, and so on (Tyrrell, 2017). Although these

online travel agencies have the competencies and proper resources to analyse these internal and external data, the objective of these tech giants is to maximise their own profit rather than ensuring the interest of the stakeholders of the destination (i.e., independent hotels). Therefore, the OTAs define the price of the market and the independent hotels are obliged to follow the trend and pay a huge commission (up to 30%). In this regard, the challenge for the destination is to find a "principal-agent" that will ensure the interest of the stakeholders of the destination (e.g., Bergen et al., 1992).

Finally, the COVID-19 pandemic has created a global crisis, and the tourism and hospitality industry is highly impacted (Vo-Thanh et al., 2020). Most of the researchers in tourism management are talking about the degrowth of tourism and trying to find a sustainable development/growth policy for tourism and hospitality (e.g., Hall et al., 2021). Therefore, the challenge for the destinations, especially for the DMOs, is to use the Big Data during the crisis in order to have a better visibility on their tourism activity and anticipate tourism demand.

9.4 Organisational Adaptation

Destination management is ensured by a destination management organization (DMO), which should safeguard the leadership and go beyond the traditional promotional missions for a better impact on their competitiveness (Sheehan et al., 2016). It is also reflected in the destination's ability to attract and satisfy visitors; to offer them integrated experiences throughout their stay; and, to monitor the impact of visits (Del Vecchio et al., 2018). Furthermore, given the numerous opportunities of Big Data generated across social media sites, the DMO has a role in collecting and analysing such data in order to ensure a better understanding of tourist behaviour and enhance its performance (Amatulli et al., 2019). Sheehan et al. (2016) defined the role of DMO as a "gatekeeper" between inside and outside stakeholders of the destination. According to Sheehan et al. (2016), as an intelligent agent of the destination, the role of a DMO is to organise stakeholders into a knowledge network.

Business intelligence (BI) describes "concepts and methods to improve business decision making by using fact-based support system" (Power, 2007, p. 128, cited by Mariani et al., 2018). By applying a Business Intelligence (BI) in leading Swedish mountain tourism destinations, Fuchs et al. (2014) proposed a knowledge infrastructure approach which addressed both the generation of customer-based knowledge within a tourism destination and the BI-based supplier-oriented knowledge application to support suppliers' decision-making. Therefore, collecting real-time information on destination by sector and by stakeholders is one of the priorities for DMOs. In this regard, the DMOs should not only limit their mission to marketing and promotional activities; they should change their role and adapt their organisation to collect real-time data.

Among the different propositions regarding organisational adaptation, Kuokkanen (2013) proposes the Destination-Centric Revenue Management (DCRM) model. According to the DCRM model, the shareholders of the destination should collaborate among themselves and adopt a collective strategy in order to increase the demand and the number of tourists. These collaborations were mostly effective during the "low season" in order to create additional demand (Sainaghi, 2013). In the context of COVID-19, we do argue that these collaborations will be highly effective in order to create additional demand during the crisis. As a "gatekeeper" of the destination, the DMO should play the role of "moderator" in order to bring together all the stakeholders and adopt a collective strategy (Sheehan et al., 2016). As a "gatekeeper", the DMO should take into consideration the internal and external data of the destination, analyse and visualise these data, and share the information with all the stakeholders of the destination. For instance, when most of the hotels are empty, the DMO can organise or propose some festivals/concerts/events in order to attract more tourists. These are the new roles that the DMOs should ensure in order to deal with the Big Data.

In addition, these data could be also used to tackle the overtourism and other negative impacts of the tourism (Seraphin et al., 2018, 2019). During the peak tourist seasons, DMOs may use Big Data in order to raise the price and reduce the number of visitors. Seraphin et al. (2019) explain how DMOs can delocalise tourist attractions and create community-based festivals outside the main city to tackle overtourism.

Therefore, by using Big Data, DMOs will be able to monitor the performance of the destination (i.e., number of tourists, occupancy rate of the hotels, etc.) in real-time and increase or reduce the demand accordingly.

As explained earlier, one of the challenges for the DMOs is that they do not have the competencies and resources to analyse and visualise this huge amount of data (Zaman et al., 2018) but the DMO can collaborate with other technological firms or local start-ups in order to acquire these competencies. For example, the "*Charentes Tourisme*" (situated in western France) collaborates with a start-up "RMD Technologies" and this start-up analyses the internal and external data of the destination and provides real-time performance indicators for every stakeholder of the destination (Charentes Tourisme, 2019). In addition, *Charentes Tourisme* has also recruited a "*Revenue Manager of the Destination*" in order to train the local hoteliers. Therefore, organisational adaptation is required to deal with the Big Data. Although the "Revenue Manager" is a well-known profession for private firms (i.e., hotels, airline companies, etc.), destinations need to adapt and introduce new professions in order to meet the needs of the stakeholders of the destination.

Another organisational adaptation for the DMO will be its ability to make some strategic partnership and acquiring data. For example, the *Singapore Tourism Board* has signed a partnership with the Mastercard in order to share data such as tourists' spending patterns and get technological support (Campaign, 2020). These data will help the *Singapore Tourism Board* to carry out some joint marketing campaign and enhance visitors' experience. In France, some DMOs have signed a partnership with the "Météo France" (French National Weather Forecasting Bureau) in order to have the weather forecast for six months. These data help DMOs to anticipate the demand. Therefore, today's world is data driven and DMOs or Tourism Boards could not limit their activities to promotion and welcoming tourists; they should adapt their missions, change their roles, and propose smart solutions to its stakeholders. Therefore, we propose the following model:

Figure 9.2 proposes the new role of the destination in the era of Big Data. The model also illustrates the partnerships and the organisational changes necessary in order to propose decision supports and training to all the stakeholders of the destination.

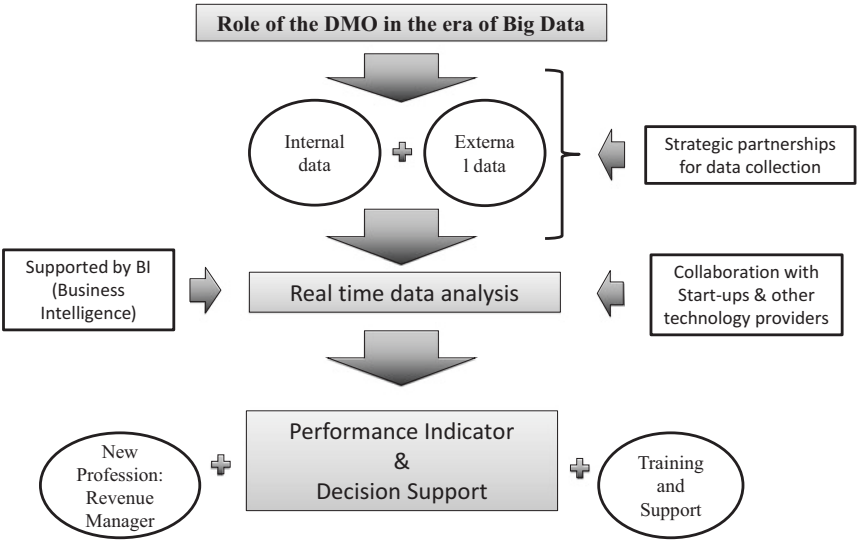

Fig. 9.2 Role of the DMO in the era of Big Data (Source: Authors)

9.5 Conclusion

This chapter illustrates (1) the different sources of data in the context of tourism and hospitality, (2) how Big Data is shaping DMOs and their roles and, (3) the technological and organisational challenges faced by the tourism and hospitality firms in the Big Data era. Drawing upon studies of Li et al. (2018) and Sheehan et al. (2016), this chapter proposes a conceptual framework of destination management in the era of Big Data. Therefore, this proposed model enriches the framework proposed by Sheehan et al. (2016) and outlines managerial implications for destinations. This study provides insightful information for DMO managers and directives for overcoming the challenges faced by tourism stakeholders of destinations. It also encourages both DMOs and other stakeholders to collaborate in collecting, mining, and analysing Big Data required for the success of their businesses. Moreover, the chapter recommends DMOs to change their traditional role of marketing to the more advanced position of managing Big Data and value creation in the competitive global markets. The boundary spanner role of the DMO between the

internal destination environment and the external competitive environment requires higher capabilities in Big Data.

The COVID-19 pandemic leaves the whole tourism industry with the challenge of coping with unprecedented changes in purchasing preferences, travel behaviours, and so on. Business intelligence will, as a result, be ever more critical to a destination's sustainability. Unless third parties are capable of gaining the trust of the destination's stakeholders and succeed in generalising the usage of decision support services within destination ecosystems, the post-COVID tourism industry is liable to rely more on distribution platforms (OTAs, peer-to-peer accommodation, or food delivery), integrated hotel chains, or international food franchises, depleting even further the capacity for value retention by the destination and its independent, smaller-scale lodgers, restaurants, and so on.

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10

Customs Under Crisis in the New Era: Strategic Analysis of Surveillance Network Project

Ozgur Ozmen

10.1 Introduction

International trade has been economically and politically crucial for ages. In the last period of the world, globalisation is increasing the number of import and export transactions exponentially worldwide. International trade of products and services is an important tax source for governments. Many individuals and corporates try their best to avoid tax duties at customs. However, it may not be a simple matter of tax evasion and can be directly connected to an organised crime such as drug trafficking, smuggling, money laundering and so on, according to the US Department of State (International Narcotics Control Board, 2005; Roman et al., 2006).

All countries have responsible customs and borders controls for protecting their State, companies and people by punishing the transgressors. However, pandemics, limited sources, political instability and so on sometimes prevent adequate customs operations. The increasing concern

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about customs and borders management leads governments to find semi-automatic/automatic solutions for customs and border control operations in order to serve a fast, accurate and effective inspection of goods and transport vehicles (Digiampietri et al., 2008). The Covid-19 pandemic has proven that digital customs applications are vital in the new normal world concept as it was emphasised both in the WCO Revised Kyoto Convention (RKC) and in the WTO Trade Facilitation Agreement (TFA) (World Custom Organisation, 2020).

As artificial intelligence (AI) is going to be fundamental of medical service for customer relations in health institutions, it is expanding to all areas of business all over the world (Mihoreanu, 2020). The global trade of today generates huge volumes of data by international movement of goods. AI can be used at customs and border management in order to analyse and predict results more accurately and faster than human beings. The applications of AI in other sectors can be modified easily for usage in customs such as visual research, predictive analytics and so on. The actual implementation of AI in customs and border management covers collecting revenue models for tax and other duties, correct classification of products in the Harmonic System, identifying anomalies, usage of augmented and mixed reality glasses for detection of non-genuine and contraband products, analysing and prediction of scanned X-ray images of vehicles and containers, using facial recognition and visual research for identifying risky vehicles, and so on. Furthermore, AI can be used in customs management for gathering and sharing the data with other authorities, countries, enterprises and agencies as well. In the near future, implementations of integrated blockchain and AI on the end-to-end intelligent monitoring for the entire supply chain can be done as it is predicted by Globally Networked Customs (GNC) (World Custom Organisation, 2019).

This study tries to determine a strategic view of Turkey's Surveillance Network Project by A'WOT Analysis. It aims to point out possible risks and solutions of the project and to answer whether this project will function efficiently in Turkey in order to solve the actual customs and border problems. The chapter begins with an introductory section focusing on AI implementations in customs and border management. This is followed by a brief description of Turkey's Surveillance Network Project. In

the next section, the research methodology is explained and research results are presented in a Strength, Weakness, Opportunities and Threats (SWOT) table. Then the A'WOT table is structured by using multi-criteria decision-making software in order to present the factor priorities. Finally, in the conclusion, A'WOT analysis is completed with final considerations and references for future studies.

10.2 Literature Review

Actual Usage of Emerging Technologies in Customs and Border Management

Customs organisations are using different types of AI implementations all over the world and day by day new ones are being developed. In this study, we focus on AI projects structured on predictive analysis of X-ray and other types of image sources by which the physical control of the goods and prevention of human traffic can be performed with minimised Covid-19 risk. Many developed countries have been using AI-based systems for collecting and analysing data and images for customs and border management.

China as one of the front-runners of AI in the world has already made high-tech changes at customs for improving efficiency and saved human resources in the last years. The Chinese Customs Intelligent Image Review System is structured on AI to acquire information on products, and it also forms the automatic recognition algorithm corresponding to the historical machine inspection images obtained from X-ray, computed tomography (CT) and other devices. It combines information of products, articles, transportation tools and scanned images in order to support customs officers for manual image discrimination. Seven million inspection images from vehicle scanners and more than 800,000 CT images were collected by Chinese authorities for establishing the intelligent review algorithm for machine inspection images. The "Thin Plate Spline" image warping algorithm, which is already applied to the vehicle scanners and CT sites, warns the customs officers of any unconformity by

accepting the historical image of any vehicle from the same inspecting machine, using it as a reference point. On the other hand, the "Image & Declaration Comparison" algorithm compares the declarations and image by matching them with the quantity or weight of the products. Even in the pilot period of the algorithm, guns and its components and control tools, some ivory, drugs, and so on, were detected. Nowadays, the system is integrated into the custom's machine inspection operation process and it makes the supervision more intelligent and efficient (World Custom Organisation, 2019). Furthermore, China has started a pilot programme in Guangzhou Customs District, which is a hybrid system of augmented reality (AR) and AI in which a robot implements the control process for inspecting goods in order to reduce inspection and waiting times (General Administration of Customs of the People's Republic of China, 2021)

Brazil's Customs AI initiative AJNA also focuses on the analysis of the scanned images (Brasílico, 2017). It is a new project, where all containers passing through Port of Santos—Brazil's largest port—are scanned and images are hosted in servers for future analysis. Python SciKit-Learn library and TensorFlow are used for finding out undeclared cargo. Furthermore, random forest regressors are being used for predicting the weight of the products with the help of the images and convolutional auto encoders which measure the divergence between the images of a container and other containers filled with similar goods (World Custom Organisation, 2019). The Container X-Ray Image Analyzer AJNA system currently has three deep learning models which detect drugs, weapons and falsely declared goods. The third model requires integration of AJNA with SISAM (The Customs Selection System Through Machine Learning) which is also another AI-based system which analyses all import declarations registered in Brazil's Customs (Filho, 2019). In the AJNA system, the workflow begins with capturing and processing the images with the AVATAR module. Then computer vision and machine learning models are able to use the images from the database (AJNA - X-Ray Images for Customs, 2021)

Japan Customs are acknowledged by the effective usage of AI for image identification and risk assessment at high volume of import and export operations. In 2017, AI image analysis and risk assessment was run for

the international postal stream. An algorithm for image analysis was developed after a number of images were collected from X-ray devices and processed by machine learning. It is a continuous process so Japan Customs still improves the method of image selection, image processing and the algorithm (World Custom Organisation, 2019). AI analysis on X-ray image is one of the main measures taken by the Japanese Government in SMART Customs Initiative 2020 (Japan Customs, 2020). The Finance Ministry of Japan started using the AI system, "trained" by deep-learning technology for analysing the X-ray image of parcel shipments for recognising and flagging illegal materials instantly (Nikkei Asia, 2021). Also, Japan Customs aims to make available an AI-based device which detects stimulants hidden in the body. Furthermore, the development of "AI Chatbots" works 7/24 by responding to customs inquiries, and "AI Electronic Filling Gates" can carry out custom inspection at the airport without any staff intervention (Teller Report, 2020).

In the Netherlands, the Customs Administration of the Netherlands (CAN) started the ACXIS project in 2013 for automated comparison of images which led to the world's first container X-ray interpretation algorithms. Due to the success of the project, CAN decided to further develop algorithms, especially in deep learning. Because X-ray technology is being used for many years for customs and borders management, its limitations are known by professionals (World Custom Organisation, 2019). Thus, C-BORD project that has received funding from the European Union's Horizon 2020 research and innovation programme combines X-ray with technologies of evaporation-based detection, advanced radiation detection, next-generation X-ray inspection, tagged neutron inspection and photo fission in order to prevent potential frauds, instead of X-ray alone (C-BORD, 2020). Furthermore, European Customs Administrations has started the COSMIC CBRNE (Chemical, Biological, Radiological, Nuclear and Explosives) project that uses dedicated sensors and muon interaction combined with X-ray technology. The project includes the research, design and implementation of a three-stage (primary, secondary, focused manual inspection) detection system using a new set of innovative sensors (COSMIC CBRNE, 2020).

Turkey's Surveillance Network Project

The Turkish Ministry of Trade takes action against customs fraud by using AI-based systems in order to provide swift and effective customs controls. Within the infrastructure of the new Surveillance Network Project, the scanning image will be transferred to the Command-and-Control Centre located in Ankara, the capital city. The images will be dispatched, managed and analysed from a single centre and also hosted in servers as original source file formats obtained from X-ray devices. So, all vehicles and containers passing through Turkish Customs will be inspected three times, that is, by the AI algorithm, the customs officers at the borders and the officers at the Ministry's Command and Control Centre located in Ankara. The Turkish Ministry of Trade aims to prevent unregistered transactions by movement of goods at import, export and transit operations. Therefore, the collected data by the Surveillance Network System will be shared with neighbouring countries also. In this way a rapid logistics transit corridor will be established by eliminating re-scan of the same vehicle in both countries' customs (Esin Attorney Partnership, 2020).

The Surveillance Network Project will be developed by the national Scientific and Technological Research Council of Turkey (TÜBİTAK) with the agreement signed on 27 April 2018 with a budget of 15.2 million Turkish Lira. The expected completion date of the project is February 2022. Already 68 X-ray High-Tech scanning systems are actively used in all important gates and ports of Turkey. It is proposed to get custom inspection completed within minutes in place of hours by regular physical inspection. Furthermore, the data collected at the centre will be useful for comparing the entry-exit images of transit passing vehicles and containers through Turkey. In this way, any potential fraud of leaving the transit goods inside Turkey without paying taxes will be prevented (Daily Sabah, 2020).

10.3 Methodology

Basics of SWOT and AHP

SWOT analysis started to be used in research since the end of the 1960s for building and implementing a good fit strategy (Pesonen et al., 2001). It analyses internal and external environments for getting a systematic approach for strategic decisions (Wheelen and Hunger, 1995; Hill & Westbrook, 1997; Kangas et al., 2001). SWOT analysis tries to balance the internal factors as Strengths and Weaknesses that occurred in the environment and they are interfered easily and external factors as Opportunities and Threats that are caused by the environment and couldn't be interfered with (Gurbuz, 2010). SWOT analysis is widely preferred in scientific literature covering research topics from services of general interest (Constantin et al., 2013) to healthcare management systems (Voinea & Pamfilie, 2009) and New Zealand soccer (Vrontis et al., 2014).

Analytic Hierarchy Process (AHP) was developed by Saaty as a theory for multiple criteria decision-making (Saaty, 1980). It measures the priority scales by using comparisons and judgements of participants (Saaty, 2008). The AHP theory prioritises the factors and layers in a hierarchical structure which is distinguished by common criteria or attributes (Saaty, 1994). AHP can easily be combined with other methods and tools for developing hybrid models. The popular hybrid versions of AHP are Quality Function Deployment (QFD), SWOT analysis, Data Envelopment Analysis (DEA) and so on. (Ho, 2008).

A'WOT Hybrid Multi-criteria Method

A'WOT was developed by integrating AHP into SWOT in order to eliminate the weak points of SWOT analysis (Kurttila et al., 2000; Pesonen et al., 2001). The main weakness is, SWOT is that it is only limited to structuring factors and giving brief descriptions about them (Hill & Westbrook, 1997). Also, the factors are decided based on personal capabilities and experiences of the participants. However, AHP is adding value to the SWOT analysis by realising executions of SWOT groups and

Table 10.1 1–9 Scale for AHP (Saaty, 1980)

Intensity of Importance	Definition	Explanation
1	Equal importance	Two activities contribute equally to the objective
3	Moderate importance	Experience and judgment slightly favour one over another
5	Strong importance	Experience and judgment strongly favour one over another
7	Very strong importance	Activity is strongly favoured and its dominance is demonstrated in practice
9	Absolute importance	Importance of one over another affirmed on the highest possible order
2, 4, 6, 8	Intermediate values	Used to represent compromise between the priorities listed above
Reciprocal of above non-zero numbers	If activity i has one of the above non-zero numbers assigned to it when compared with activity j, then j has the reciprocal value when compared with i	

factors more analytically. It also analyses factors by means of the eigenvalue technique (Kangas et al., 2001).

Although the academic literature of A'WOT studies covers almost all areas such as satellite and space industry (Lee et al., 2020), agroforestry (Shrestha et al., 2004), electric and electronic sector (Şeker & Özgürler, 2012), cultural heritage assets (Bottero et al., 2020), universities and regional innovation systems (Nastase & Kajanus, 2008), evaluation of forest residues as biomass (Kurt, 2020) and so on, it is not possible to find any strategic analysis focusing on customs and AI (Table 10.1).

The A'WOT analysis was done by using Super Decisions program as described below (Gallego-Ayala & Juízo, 2011):

- The SWOT analysis was performed in the workshop by participant in order to identify the factors of each SWOT group
- AHP was applied by the Super Decisions program in order to get the priority for each factor in all SWOT groups separately. (With the requirement of consistency must be less than 10%).

Table 10.2 General characteristics of the questionnaire respondents

Characteristics	No.	Percentage of total sample (%)
Gender		
Male	10	91
Female	1	9
Institutions		
Academic and Research Institutions	2	18
Government Agencies	5	46
International Transport Companies	1	9
Private sector	3	27

- AHP was applied through the Super Decisions program when the requirement of consistency must be less than 10% in order to get the priority for each factor in the all SWOT groups.

The research group consisted of two academics, four bureaucrats from the Turkish Ministry of Trade—different departments, one Commercial Counsellor from the Turkish Embassy, one mid-level manager from an international transport company and three different levels of professionals from private enterprises that are dealing in international trade operations as the gender and professional distributions, which is shown in Table 10.2. All participants are invited by the author and the only requirement for joining this focus group is having more than ten years of experience in international trade activities.

In this study, the research was started by contacting the Turkish Ministry of Trade and interviewing them about the project by phone. Then an official request was sent to the ministry in order to get information and official documents about the Surveillance Network Project. Furthermore, some customs sites were visited for field study and observations were noted. Finally, a few days before the workshop the official letter of the Ministry of Trade which gives a brief information about the project was shared with the participants of the focus group in order to refresh their information about the project. Participants' feedback for each category of SWOT was analysed, discussed and decided by an online workshop due to limitations of Covid-19 restrictions. A descriptive qualitative study using focus group approach was used in order to determine SWOT factors. In this workshop, the moderator of the focus group—the author of this research—asked semi-structured questions for guiding discussions under four SWOT groups as a group

process technique for making the participants discuss primarily external factors and then internal factors in order to identify the SWOT factors. The content analysis approach was used for organising the qualitative information obtained from participants into a SWOT structure.

10.4 Presentation and Analysis of Findings

SWOT Analysis

As a result of the literature review, discussions of the workshop of experts and visiting customs, the SWOT factors of the Surveillance Network Project were structured as shown below (Table 10.3).

A'WOT Analysis

The A'WOT table is structured by analysing the SWOT factors within the Multi Criteria Decision Making software Super Decisions as seen in Fig. 10.1

The pairwise comparisons of SWOT Groups and SWOT Factors were modelled in the Super Decisions software by using a 1–9 Saaty's scale. At the beginning, the respondents made the comparisons of SWOT groups and in the second phase they compared the factors within each SWOT group. When the inconsistency was higher than 0,1, the respondents were kindly asked to remake the comparisons. Finally, in order to get the final result of the model, all respondents' judgements were combined by the geometric mean as it is recommended by Super Decisions and also widely practised in the literature. Then it was entered into the model as a single judgement (Super Decisions, 2020). The result is more accurate when combined judgements of the group members are used in the Analytic Hierarchy Process. (Whitaker, 2007) (Table 10.4)

Table 10.3 SWOT Analysis

Strengths	Opportunities
(S1) The image file of the scan will be verified by AI which can minimise the possibility of corruption at customs. (S2) The financial support of the EU for this project and other ongoing custom projects is crucial. (S3) By this new system, image files will be shared automatically in the original file format with the control centre in Ankara, other customs in Turkey and neighbouring countries. (S4) More accurate smart risk analysis will be executed in place of physical inspections. (S5) The data cannot be manipulated or erased by customs officers or third parties. (S6) The new system will lead customs officers to work more efficiently, accurately and free of risk for dangerous material inspection.	(O1) By this program international technical custom infrastructure will be developed with Bulgaria, Iran, Georgia and Nakhchivan. (O2) Turkey's customs infrastructure would be integrated with EU customs in the future. (O3) Developing know-how and experience about the Surveillance Network Project may lead to export of this system to other countries. (O4) It is possible to integrate the Surveillance Network Project to other AI-based custom control systems.
Weaknesses	**Threats**
(W1) The developers, Turkish Ministry of Trade and Tubitak don't have any previous experience and know-how about any similar project. (W2) The Surveillance Network Project is an infant project and it is modelled relatively basic when compared with its equivalents worldwide.	(T1) Political and economic instability in Turkey and its neighbours is a risk for development and running this system. (T2) The unwillingness of partner countries such as Iran, Iraq, Nakhchivan and so on, may risk the establishment of the rapid logistics transit corridor. (T3) Decreasing Turkish currency may cause a financial obstacle for importing the necessary high-tech equipment due to budget limitations.

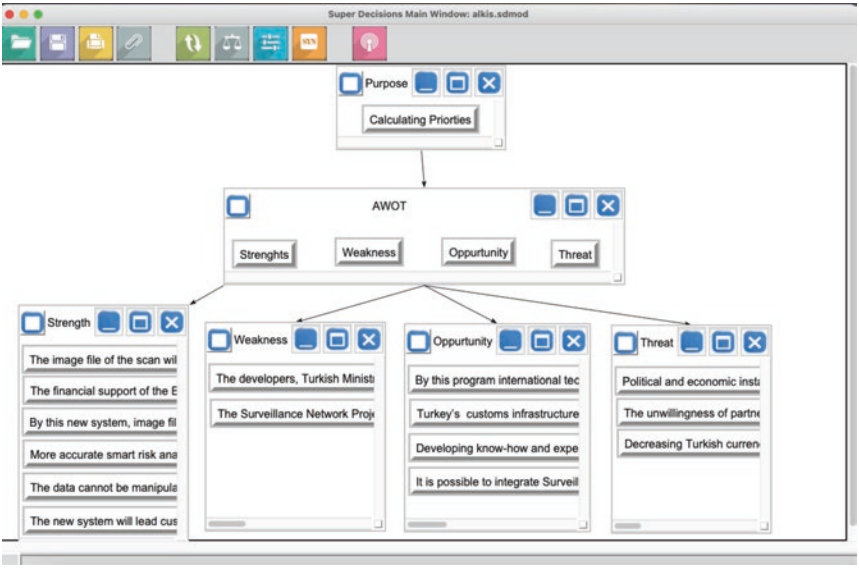

Fig. 10.1 The structured model in super decisions

10.5 Conclusion and Recommendations

Turkey is a long-term sufferer of the customs crisis and started a combat against the frauds with support from the EU. It is a big market with a huge number of import-export transactions. Also, being a bridge between Europe and Asia it covers many transit routes passing through its borders. Thus, The Turkish Ministry of Trade began the studies for the Surveillance Network Project to be in operation not later than February 2022. By this project, it is aimed to build a technical infrastructure based on Artificial Intelligence (AI) for identifying all potential risks of all vehicles and containers passing through Turkish Customs without any physical inspection. By this research, it is aimed to provide a comprehensive image on the Surveillance Network Project, focusing on its strategic analysis. Based on a complex A'WOT Analysis, the main strengths and weaknesses of the programme are outlined and opportunities and threats are approached in a detailed manner with priority ranks. In a more general perspective, the analysis provided in this paper aims to test the feasibility of this project in

Table 10.4 The priorities of A'WOT groups and factors

A'WOT group	Group Priority	A'WOT Factors	Factor priority within the group	Overall factor priority
Strengths	0.66082	(S1) The image file of the scan will be verified by AI which can minimise the possibility of corruption at customs.	0.28131	0.18590
		(S2) The financial support of the EU for this project and other ongoing customs projects is crucial.	0.02553	0.01687
		(S3) By this new system, image files will be shared automatically in the original file format with the control centre in Ankara, other customs in Turkey and neighbouring countries.	0.09472	0.06259
		(S4) More accurate smart risk analysis will be executed in place of physical inspections.	0.42066	0.27798
		(S5) The data cannot be manipulated or erased by customs officers or third parties.	0.13272	0.08770
		(S6) The new system will lead custom officers to work more efficiently, accurately and free of risk for dangerous material inspection.	0.04506	0.02978
Weaknesses	0.05385	(W1) The developers, the Turkish Ministry of Trade and Tubitak don't have any previous experience and know-how about any similar project.	0.8	0.04308
		(W2) The Surveillance Network Project is an infant project and it is modelled relatively basic when compared with its equivalents worldwide.	0.2	0.01077

(*continued*)

Table 10.4 (continued)

A'WOT group	Group Priority	A'WOT Factors	Factor priority within the group	Overall factor priority
Opportunities	0.20253	(O1) By this program international technical custom infrastructure will be developed with Bulgaria, Iran, Georgia and Nakhchivan.	0.54705	0.11079
		(O2) Turkey's customs infrastructure would be integrated with EU customs in the future.	0.28482	0.05768
		(O3) Developing know-how and experience about the Surveillance Network Project may lead to export of this system to third countries.	0.05772	0.01169
		(O4) It is possible to integrate the Surveillance Network Project to other AI-based customs control systems.	0.11041	0.02236
Threats	0.08280	(T1) Political and economic instability in Turkey and its neighbours is a risk for development and running this system.	0.59363	0.04915
		(T2) The unwillingness of partner countries such as Iran, Iraq, Nakhchivan and so on, may risk the establishment of the rapid logistics transit corridor.	0.15706	0.01300
		(T3) Decreasing Turkish currency may cause a financial obstacle for importing the necessary high-tech equipment due to budget limitations.	0.24931	0.02064

Turkey, to point out possible risks of the project and to provide potential adequate solving solutions.

Analysing and prediction of scanned X-ray images of vehicles and containers is one of the actual implementations of AI usage in the customs and borders management. Especially, developed countries have started benefiting by the use of AI systems for collecting and analysing data and images in customs for a while. China's Customs Intelligent Image Review System combines information of products, articles, transportation tools and scan images obtained from X-ray, CT and other devices. Also, Thin Plate Spline System warns the customs officers when it finds out any unconformity comparing the historical images of the vehicle. Furthermore, the Image and Declaration Comparison algorithm compares the declarations and images by matching them with the quantity or weight of the products. Brazil's AJNA System is structured on AI in order to find out undeclared cargo and predict the weight of the products with the help of the images. Japan Customs started to use AI image analysis and risk assessment for the international postal stream in 2017. Also, they intend to develop devices and algorithms for detecting stimulants hidden in the body. In the Netherlands, the ACXIS project was started in 2013 for automated comparison of images which is a pioneer of container X-ray interpretation algorithms. C-BORD project supported by European Union's Horizon 2020 combines X-ray with a set of technologies in order to prevent frauds effectively instead of using X-ray technology alone. Furthermore, COSMIC CBRNE project was started by European Customs Administrations for combining X-ray technology with the new set of innovative sensors for the detection of CBRNE materials hidden in containers.

Turkey's Surveillance Network Project analyses and predicts scanned X-ray images of vehicles and containers for import, export and transit transport operations. Within the infrastructure of the Surveillance Network Project, all vehicles and containers passing through Turkish Customs will be inspected by AI algorithms, officers at the borders and other officers at the Ministry's Command and Control Centre. It is aimed to share the collected data with neighbouring countries as well. So, a rapid logistics transit corridor will be built within Turkey and its neighbours.

In order to analyse the Surveillance Network Project, different methods were executed in this study: workshop of experts, interviews with specialists, site visits at customs facilities and A'WOT done by Super Decisions software. A'WOT is the hybrid model of AHP integrated with SWOT in order to eliminate the weaknesses of SWOT by adding priority to related factors. Participants with different backgrounds, professions and sectors were invited to the online focus group in order to get a more accurate critical review about the project. As a result of literature review, workshop, interviews, field visits and comparisons done by Super Decisions, A'WOT factors of the Surveillance Network Project were structured.

Results show that the EU-funded Surveillance Network Project will be very useful for Turkey in order to solve the customs and border management crisis. The factor with highest priority (S4) underlines the importance of accurate smart risk analysis in place of traditional inspection which may also be helpful for minimising customs officers' Covid-19 risk because of physical inspection. As pointed out by the second highest factor (S1) the AI-based analysis will be very effective against customs frauds such as human trafficking, narcotics and so on. Furthermore, the third highest factor (O1) is visualising that this project will lead to establishing an integrated international high-tech customs control infrastructure with neighbouring countries which may increase the volume of international trade activities.

On the other hand, the Surveillance Network Project is an infant project which needs to be developed and improved as sophisticated as possible for approaching a closer level with its worldwide equivalents. As mentioned before, developing a high-tech customs infrastructure between neighbours is very crucial for this project. However, Turkey's neighbouring countries have high corruption level and political and economic instability which may affect the future of the project at international dimension.

Finally, this study is a pioneer research analysing strategically a surveillance programme with AI which is mainly studied from the engineering perspective. The study aims to increase the awareness of how AI-based surveillance programmes are crucial for an effective and well-running customs and border management. The study hopefully may lead

governments and agencies to develop logically consistent developing and promoting policies for a faster and accurate customs control system which would bring growth in the international trade volume and eliminate illegal activities at customs and borders. It is hoped that this study will contribute to the expansion of literature and further studies on this topic are encouraged using different methodologies in the near future, especially after the development of the project.

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11

Structural Change with the Help of a Strategic Performance Cycle: How Can More Women Reach Top Management Positions During and After the COVID-19 Crisis?

Bettina C. K. Binder

11.1 Introduction

The world is in the midst of a crisis and at the core is the COVID-19 pandemic, which started at the beginning of 2020 in China (ECDC, 2020). At the end of January 2020, the World Health Organization (WHO) evaluated the first cases of pneumonia in China as a "public health emergency of international concern" only to declare the world-wide rapid increase of cases of COVID-19 to be a pandemic as of March 11, 2020 (WHO, 2020). The WHO admitted from the very beginning that there is no "one size-fits-all" solution to the crisis, but recommended that "each country should assess its risks, the measures in place and their

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social acceptability, and rapidly implement the necessary interventions at the appropriate scale to stop or slow down COVID-19 while minimizing economic, public and social impacts" (WHO, 2020). The measures adopted by most of the countries resulted in a drastic reduction of economic activity and a complete change of what was by then perceived as "normal". Children had to stay home as schools were closed, free time activities and social encounters had been limited, and the free movement of persons between countries was for a while no longer possible. Words such as "lockdown", "social distancing" or "face mask" dominated the public discourse and people's lives and continues to do so as in autumn 2020 a second wave of infections affects the world.

According to a report of the International Monetary Fund (IMF), the real GDP at European level is expected to fall by 7% in 2020, the highest decline since World Wide II, while the real GDP of the United States is expected to fall by 4.3% for the same year (IMF, 2020). Country leaders and business leaders united their efforts in order to overcome what threatens to be the "worst recession since World War II" (World Bank, 2020). Yet, some leaders appear to be more successful than others. Jacinda Ardern, New Zealand prime minister, became an icon in the fight against the pandemic and had been praised for her "leadership style focused on empathy" (Friedman, 2020) as well as for her way of showing "clarity, compassion and competence" (Serhan, 2020). Under her leadership, New Zeeland achieved, though temporarily (102 days), a "COVID-free" status (Menon, 2020). She is however, not the only female leader with outstanding results in crisis management: Germany's chancellor, Angela Merkel; Denmark's prime minister, Mette Frederiksen; Finland's prime minister, Sanna Martin are some more examples speaking for women's abilities to lead successfully in times of crisis. This is not to say that male leaders did a poor job in managing the crisis, but the question is why are women so scarce among senior leaders? We argue that it is during such crisis times, that companies and countries need both men's and women's capabilities in order to emerge from such difficulties. Furthermore, research has shown that "certain leadership behaviours more frequently adopted by women are critical to navigate through the crisis safely and to perform well in the post-crisis world" (McKinsey & Company, 2009:1).

Yet, as of January 2019, there were only 6.6% women acting as heads of state and 5.2% women as heads of government worldwide (UN, 2019). In business, the situation is not much different, with only 6.6% women as CEOs of Fortune 500 companies and 29% worldwide occupying a senior management role (Catalyst, 2020). At the same time, many actors worldwide argued on numerous occasions that it is necessary to better use the talent pool represented by women. Angela Gurría (2016) on behalf of the Organisation for Economic Co-operation and Development (OECD) stated "We must harness the full participation of women in strategic decision-making to drive change. This is the only way to build the foundations for a stronger, more sustainable and inclusive growth, one that benefits all and and creates opportunities for all". OECD also signalled that women spend much more time doing care and domestic work, and suggested that by redistributing, and reducing it, this could be a first step towards empowering women. The International Labour Organization (ILO) in a report from 2019 found out that a growth in female employment is positively correlated with a growth in the gross domestic product (GDP) at the national level. ILO (2019: 1) recommends companies "to embrace gender diversity as part of their talent management strategy". The European Union (EU) has in place a "Gender Equality Strategy" and aims for a "Union of equality" (European Commission, 2020).

In the following section, we conduct a literature review on different aspects (leadership style, leadership capabilities, women on boards and firm performance) looking for reasons which might explain the dearth of women in leadership positions and beyond. In a second step, by developing a strategic performance cycle with eight steps, this paper envisages measures and solutions for companies aiming to achieve a high women quota and to increase at the same time the companies' value.

11.2 Gender and Leadership Styles

In a recent report of the Pew Research Center, Parker et al. (2018) scrutinized the attitudes of the American population on gender and leadership and found out that while the Americans believe that there is a gender

difference in the leadership style of women and men, they consider both women and men equally capable to be in leadership positions. Gender discrimination is seen according to the Pew Research Center survey as the main barrier for women leadership, but other reasons may exist, as for example the fact that business and politics are not "ready" to hire or elect women.

In the EU, according to a survey from 2017, most of the people believe gender equality is important, not just for a democratic society, but also for business and economy in general. At the same time, 44% of the respondents think that the most important role of a woman is to take care of her family and home, and the man's role is to earn money (European Commission, 2017: 4). Such beliefs, together with gender stereotypes, and other cultural factors clearly affects the representation of women in top positions. The European Commission puts many efforts into combating gender inequality but admits that the progress is slow: "Attitudes and behaviours are changing very slowly, which shows a need for the continuous commitment of all actors" (European Commission, 2019: 5).

The situation in Asian countries such as Japan, South Korea or China is not much different from the one in the United States or in the EU. In Japan for instance one can find the image of "good wife, wise mother", which is to a certain degree similar with the perceived role of women in the EU as caregivers and this again leads to the fact that women are less likely to pursue a career and aim for a leadership position (Binder et al., 2020). Kobayashi (2018) pleads for a mind-set change in Japan and points out that "women need the right environment to flourish. […] The key is not to judge women with a men's yardstick but to judge both in the same fair way". In China, though government policies have tried to and managed to increase the number of women in leadership positions, gender role perception is still highly influential (Sun & Li, 2017).

Zenger and Folkman (2019) conducted a study at the corporate level, asking individuals to rate leaders, their effectiveness and their leadership competencies. The findings show that the low number of women in senior levels is not due to the lack of skills or capabilities. They write: "Women are perceived by their managers – particularly by their male managers – to be slightly more effective than men at every hierarchical

level and in virtually every functional area of the organization" (Zenger & Folkman, 2019). Moreover, according to the same study women ranked better than men on 17 out of 19 leadership capabilities. The first five most important capabilities, which make the difference between very good and average or poor leaders, are initiative, resilience, self-development, result-driven, and integrity and honesty. As we will see later on, some of these capabilities are also the most needed ones for crisis management. The two capabilities on which male managers score better are technical or professional expertise and strategic perspectives. Zenger and Folkman's (2019) study contains one more important findings, which might shed some light on the reasons why there are fewer and fewer women as the level of hierarchy is higher. This might be connected with self-perception and confidence. Based on the responses of more than 8500 female and male leaders, Zenger and Folkman (2019) found out that women tend to see themselves as less competent than they are, while men are rather overconfident about their capabilities. This has immediate consequences, for instance, a woman might decide against applying for a certain job, as she assesses her skills and capabilities as insufficient. However, women's confidence in themselves tend to increase with the age and they also start rating their effectiveness higher than men later in their careers, if they get the opportunity to climb the corporate ladder.

Many studies are dedicated to investigating the relationship between diverse executive and supervisory boards and firm performance. Though the findings are mixed, there are studies showing a positive relationship between diverse boards and financial performance. By investigating more than 1000 companies from 15 countries, McKinsey and Company (2020a) found out that companies that have a high percentage of women in executive positions clearly outperform companies with fewer or no women executives. Christiansen et al. (2016) looking at two million companies from 34 European countries found a high positive correlation between the number of women in senior positions and the return on assets (ROA) of the respective companies. According to their study "Exchanging just one male member of the senior management team/board for a female member would be associated with 8-13 basis points higher ROA, or about a 3-8 percent increase in profitability" (Christiansen et al., 2016: 14-15). Shambaugh (2016) argues in favour of what she calls

"integrated leadership", claiming that women bring in leadership intuition, collaboration and emotional intelligence. Overall, there is a shift in what used to be a male world and women are gradually more present in decision-making positions both in business and politics. However, the COVID-19 crisis has the potential to undo much of the progress achieved till now as will be shown in the next section.

11.3 COVID-19 Crisis and its Effects on the Women's Working Life

To quote a McKinsey and Company report (2020b), COVID-19 crisis "turned workplaces upside down" (p. 6), women being affected the most. If we consider the previous section and for instance the social expectations and the roles women take in their families, it is not surprising that in the midst of the challenges posed by the pandemic (closed schools and kindergartens, ill family members, etc.), women decided or have been forced by circumstances to quit their jobs, take a leave of absence, or shift from full-time to part-time work, clearly bringing their career to a halt. McKinsey and Company (2020b) makes clear that the crisis affects differently different people and that gender is just one dimension to be considered. However, being a mother generally puts extra pressure on female employees, but for Black and Latina women in America the pressure is even higher (p. 19). According to data from the World Economic Forum (2020), in the United States since the start of the pandemic, 7% Hispanic, 5.6% Black and nearly 3% white women lost their jobs. Aside from the aspects emphasized by the McKinsey and Company (2020b) report, such as childcare and home schooling responsibilities, family health and so on, the World Economic Forum indicates that women work in service industries, which were hit hard by the crisis.

In a study for the EU, Wenham (2020: 6) signals that "[…] the impact of the (short and long term) socio-economic effects of COVID-19 fall disproportionally on women". Wenham too underlines the fact that the women are more prone to losing their jobs also due to their employment in "feminised industries", such as hospitality, tourism, education and so

on (p. 49) and in precarious work (p. 50). At the same time women are the most exposed to COVID-19 infection, as many of them work in the healthcare system—76% of the healthcare workers in the EU are women (Wenham, 2020: 6). Alon et al. (2020) speak of a "shecession" (she-recession) for the year 2020 and warn that the effects of the rise in women unemployment go well beyond the phrase "gender inequality" and that it can lead to "a deeper and more persistent recession". According to the latest Eurostat press release from October 2020, there were some 15.603 million unemployed women and men in the EU as of August 2020, the unemployment rate for women being 7.6% and that for men 7.1% (Eurostat, 2020).

The increase in women's unemployment is coupled with a regress of the number of women in leading positions in companies. In Germany for instance as of September 2020, the number of women in executive positions of the 30-DAX companies decreased, six women leaving the executive board in just one year (AllBright, 2020: 8). The AllBright report identified two trends of German companies during the COVID-19 crisis year: on the one hand the public traded companies (DAX, M-DAX, S-DAX) reduced the number of their executive managers and they returned to the old and familiar norm: "the male manager" (AllBright, 2020: 4). The effects of this regress remain to be seen, but through these losses of female leaders, German companies are behind other international competitors, which have a much higher women quota in executive boards.

11.4 Resilience During Crises and Beyond

In hard times characterized by stress and adversity, women show resilience, coping with the challenges often better than their male counterparts. The concept of resilience is a complex one and is being used in relation to a huge range of subjects, from developmental policies up to urbanism, climate change, but also business and management and psychology. An individual shows resilience by emerging stronger after a crisis than he was before it. Moreover, as we have seen above, resilience is also considered a decisive quality of very good leaders (Zenger & Folkman,

2019). Seligman (2011) suggests that resilience can be learned and fostered through leadership development programmes. Companies too can prove resilience if they "are able to respond more quickly, recover faster or develop more unusual ways of doing business under duress than others" (Linnenuecke, 2017: 4). Therefore, resilient companies need resilient leaders. Yet, resilience is not just a reactive feature of individuals and companies. Resilience can be also a proactive feature, if there is an awareness for strategic contingency management and efforts are put into preventing possible crises. Leveson et al. (2006: 95) for instance investigate resilience at system level and define resilience as "the ability of systems to prevent or adapt to changing conditions in order to maintain (control over) a system property". Hale and Heijer (2006: 37) underlines the fact that resilience is not a static state, but a continuous process within an organisation and "resilience can always disappear or be proven ineffective in the face of particular threats".

We argue that companies become more resilient if they actively engage in attracting and retaining a diverse workforce, while encouraging and fostering both women and men leadership styles at the top. The current COVID-19 crisis made it clear once again, how important it is for companies to preserve a sustainable environment and a resilient behaviour is key here. Enterprises should act proactively resilient by introducing at early stages new management concepts, new key performance indicators (KPIs) and systems, which can provide a sense of purpose and direction. Proactive resilience can be translated into quantitative or qualitative measures: for instance, a gender quota can be introduced for the management and supervisory board, which can be complemented with a qualitative KPI regarding their feeling of participation and empowerment. Previous experiences when crises were faced should be scrutinized, so that learnings can be derived and reactivated. A company needs to build on the strengths of its employees and if women prove to be more resilient, more result-driven, better communicators, and so on (as shown by Zenger & Folkman, 2019), companies need to make sure they do have a balanced workforce at all levels and especially at the decision level.

It is often thought that crises bring about not only challenges, but also opportunities (Keeler, 1993; Anderson, 2018). Boin, and 't Hart (2003) argue that crisis and leadership are closely interconnected, but they show

that implementing reforms and change during crisis should be well pondered by leaders. During crises leaders face enormous stress and uncertainty, and decision-making can be tough considering that resources are limited and often priorities have to be revisited. COVID-19 obviously brought many disruptions in our social and economic systems, but this should not lead to worsening of women's employment or of their chances to access top positions and contribute through their abilities to overcoming the current crisis and other challenges. The following section introduces a strategic instrument, which aims to help companies to tap into women's capabilities, to create and uphold a pool of capable women, who can accede senior leadership roles and improve the gender balance within companies and on their boards. We strive therefore to bridge theory and practice as asked, for instance, by Thrassou et al. (2019).

11.5 Methodology

The literature review conducted above has shown both the effects of the COVID-19 pandemic on women's labour market participation and women's capabilities in contributing to a successful crisis management. In order for companies to make use of women's management skills in dealing with crises and other challenges, they need to ensure first that women occupy decision-making positions. Figure 11.1 gives a short overview on the methodological approach taken in this chapter.

The strategic instrument developed in this chapter is partially built on the model of a Stage-Gate process (see for instance Cooper, 1994, 2008). While the original Stage-Gate process aimed at successfully launching new products to markets, the strategic performance cycle we propose in this chapter offers a "road map" for increasing stage-by-stage women's presence in companies. Each stage of the strategic performance cycle is marked by specific KPIs, which make an assessment of the progress easier. In the original Stage-Gate model, the KPIs would be considered as part of the gates, or "quality-control check points" (Cooper, 2008: 215). In our model, stepping from one stage to another is a fluid movement, acknowledging the need to adapt to rapid changes in the environment. The strategic performance cycle is an overarching process with the aim to

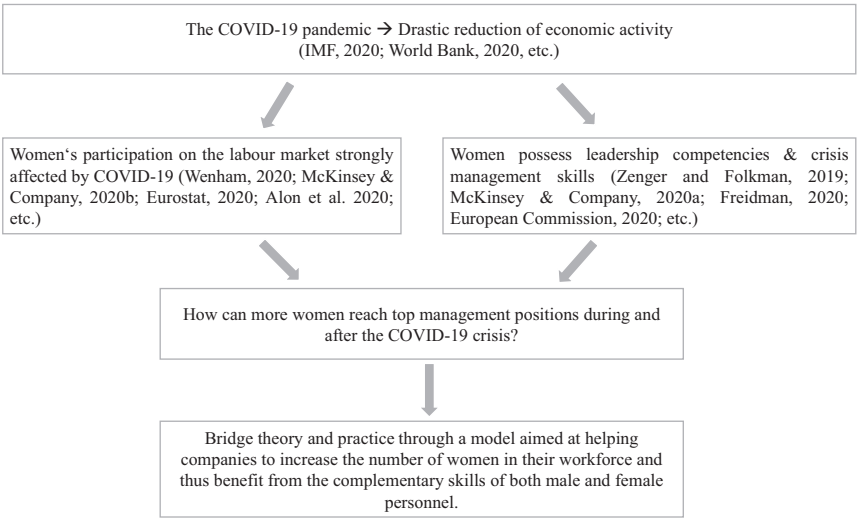

Fig. 11.1 The COVID-19 pandemic and women's participation on the labour market

build a business case for more women on all company's levels and transform their integration into a company practice.

11.6 Strategic Performance Cycle and Gender Balance in Companies

Figure 11.2 presents the strategic performance cycle.

The strategic performance cycle is an instrument, which can help companies boost the presence of women on boards by following eight steps. In the next paragraphs, each step and its implications are shortly presented:

Strategic Relevance

Many companies nowadays are interested in integrating more women in management or supervisory boards not just in countries where legislation imposes a women quota but also in countries where it is optionally expected. Therefore, achieving a women quota is strategically relevant for

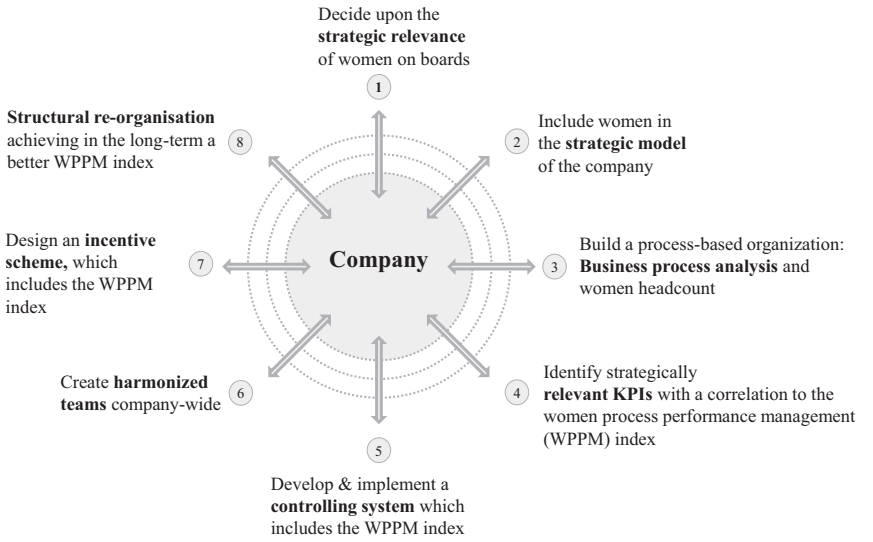

Fig. 11.2 Strategic Performance Cycle

most companies. Consequently, companies search for an approach and a course of action to pursue a better integration of women into their boards and their business in general, but sometimes it is not clear which path would be the most appropriate. For instance in Germany, listed companies must achieve a gender quota of 30% on their supervisory boards. For managers this means that they need to search for a solution or an implementation concept. The KPI "women quota" must therefore be integrated not just in the vision and mission statements of the companies, but also at an early stage in the strategic planning process. In the tactical planning phase, women should appear in the organization charts by name, to show that the realization of a women quota of 30% is not just a faraway dream, but the company is actually promoting women and is envisioning a pool of women talents. In the operating planning and budgeting process more women should be hired as responsible line managers who report planning figures for their departments.

Moreover, the KPI women quota should be included into strategic performance management tools such as the Balanced Scorecard (BSC). Women quota could be for instance included in the internal perspective of the BSC and increase in this way the focus on this critical area.

Strategic Model

A strategic model for a period of five to ten years should be developed and evaluated. Such a model could contain several strategic KPIs such as the Earnings before taxes (EBT), the women quota, early warning indicators, scenario targets including worst case, best case and trend scenarios. Using the scenario technique or other strategic instruments, the KPI women quota can be emphasized. The slogan "What gets measured gets done" shows how relevant it is to integrate the women quota in scenarios for example as prognosis for the next ten years. The KPI women quota could be split into "smaller" indicators such as the target for female recruitments in the overall workforce, the number of women in middle management, the number of women in the management board, the number of women in the supervisory boards and so on. The business model, together with the vision and the mission of a company should offer a comprehensive and unified image in terms of goals and messages. If the company addresses mainly female customers, the company would surely benefit from emphasizing the important role played by women leadership and the commitment towards achieving a high women quota. Woman quota can be related also to other sustainability goals of the company. Whether it is self-commitment or law compliance, increasing the number of women at the top of companies should be clearly communicated and lived throughout the company.

Moreover, women quota can be a goal at the departmental level also. The business model can stipulate that only those managers are eligible for a performance bonus (e.g. 20%) if their department or team have a women quota higher than 30%. This could be a consistent business model to increase the women quota in the long term also at management level.

Business Process Analysis

In the third step of the strategic performance value creation cycle a business process analysis has to be conducted. First, activities, sub-processes and main processes of different departments or of the company as a whole

should be identified. This business process analysis can be done using anonymous interviews about the total headcounts in the cost centres. To know how many women headcounts work in these processes, the interviewers should keep a separate recording of male and female headcounts. The headcount data remains anonymous, but male and female capacities are distinguished for calculating the women quota for each individual activity, sub-process and main process. Second, cost drivers of the processes such as number of orders, number of male or female recruitments, number of women in management positions, and so on are identified. Third, the total process costs should be calculated for the main processes, for the sub-processes and finally for the activities. If one considers some 20 main processes in a company, it seems easy to calculate the process costs that should be finally divided into male and female capacities. For the hundreds of sub-processes the process calculation of the total process costs split into female and male costs could be more time-consuming. The total process costs calculation for the final thousands of activities is still necessary because the activities are allocated at the end to sub-processes and main processes differentiated in male and female process costs. Fourth, the process cost rate must be calculated so that it can finally be said what the process costs are for one order execution and so on. The process cost rate divided into male and female costs can identify processes, for example, with a high performance and show if these processes have a high women quota too. Fifth, the allocation of activities to sub-processes and finally to main processes can show the male process costs and the female process costs, for example, for one order. In companies with a low women quota, the female process costs over all activities seem low compared to the male process costs. At the latest at this point it should be clear that the women quota must be increased by starting to recruit more women into management and supervisory boards and to the departments and teams too.

The process cost rates can be implemented into a product calculation instead of the burden rates used for the indirect areas. Process cost rates, for example, for the sales process costs, the maintenance process costs or the security process costs are always interesting when they are integrated in a product calculation. Divided into male and female process costs additional information can be made available.

Relevant KPIs

For increasing the women quota, it is necessary to measure a special KPI, which we call "women process performance management (WPPM) index". This KPI should increase over a long strategic planning period and has the following formula:

$$WPPM = \frac{\begin{array}{l} Customer\ Importance \times \\ Customer\ Satisfaction \end{array}}{\begin{array}{l} Process\ Cost\ Rate\left(Women\ Capacities\right) \div \\ Benchmark\ Cost\ Rate\left(Women\ Capacities\right) \end{array}}$$

With the help of a customer survey, two KPIs are to be measured: the customer importance related to one process and the customer satisfaction attributed to it. It is important to measure both these KPIs because the customer should be able to evaluate whether, for example, an order process is important for him and whether he is satisfied with the order fulfilment in time. The customer survey should be accompanied by a business process analysis as described above. The result of this business process analysis should be the process cost rate, this time calculated considering the women capacities. By comparing this process cost rate based on women's capacities with a benchmark process cost rate of women's capacities of another company, a quotient can be built and a final equivalence number can be calculated.

If the women WPPM index is higher than 1, the strategic performance and value creation is good. If the index is lower than 1, then the qualitative and quantitative premises should be optimized. A better position in comparison with the main benchmark competitor should be achieved, for instance, by improving the process cost rate via better recruitment of qualified women or improving customer experience.

Controlling System

The controlling system consists of the planning process, the cost accounting process and the reporting process. The WPPM index can be integrated into a planning system. This means that the yearly budgeting

process includes the women quota and the WPPM index and incorporates these two KPIs for the next fiscal year for each department of an enterprise.

In the cost and managerial accounting process cost types, cost centres and cost objects are identified. These cost elements are planned including additional KPIs like the women quota and the WPPM index for each cost centre. For example, the cost centre, order management must plan the costs, the relevant budget with the number of orders, the women quota as target for this cost centre and the WPPM index. To calculate the WPPM index it must be ensured that the cost centre is big enough and that customer contact (of internal or external customers) is fostered. Additionally when a process cost rate and a benchmark cost were identified, the WPPM index can be calculated and planned.

The relevant KPIs should be integrated in the monthly reporting process. A special chapter for important qualitative KPIs in each month end report ensures that the women quota and the WPPM index are continuously measured and a development trend can be registered. This is important when these two figures are also considered in determining the management variable remuneration.

Harmonized Teams

Once processes are identified and KPIs are defined in a controlling system, the employees should be aware of them and consider them in their daily work. Harmonized teams where women and men work together often achieve better results and the defined KPIs like EBT, cost target and women quota are achieved easier. When women work together with several male team members, extraordinary ideas and remarkable product and process innovations take place and the team comes to unique results. In most cases, critical questions outside specifications are raised by women, and discussed together in the mixed teams.

To design a harmonized team it must be clear that the management supports harmonized teams formed by both men and women. Starting from the top management level, women should work together with men in management boards and supervisory boards but also at the lower

management level and throughout the entire company. Moreover, it is recommendable to integrate women into the structural organization and to show women and men by name in the company organigram. In process-oriented organizations, a harmonized team can be linked to a project or a process and should be led by a process responsible. The more process responsible are female, the better the KPI women quota becomes. Furthermore, the number of women in harmonized teams can be measured on a project basis (short term) or process basis (in the long run).

Incentive Scheme

External factors can influence the number of women in companies. For example, more lectures can be held at universities to attract more academic women, there should be more job ads looking for the best women in the media or more transparent information in the year-end reports about the number of women or the women quota in management or supervisory boards.

Internally there should be a consistent target setting process supported for instance by Management by Objectives (MBO) meetings. Managers and employees should meet at least twice a year to discuss about the already achieved personal targets and about the future expectations until end of the year. It is not enough to discuss only KPIs like the achieved profit, contribution margin or the sales figures. Additionally, the women quota, the WPPM index should be measured and based on target achievement, the variable part of the annual remuneration should be granted.

Structural Re-organization

The result of a process-based analysis should be to obtain a better effectivity and a higher efficiency company-wide. The KPIs women quota and WPPM index can be measured based on processes, at team level, at departmental level and for the entire enterprise. Process optimization teams (POTs) can be created to design the actual order process, the ideal process flow and the optimized standard process cycle. It should be

ensured that an optimized standard process cycle includes the KPIs women quota and the WPPM index.

11.7 Discussion and Conclusion

This chapter focused on the importance of women's capabilities to contribute in times of crisis and beyond to better economic performance, better management and to a fairer world. By conducting a literature review of some of the most recent reports and articles, we showed how women's participation in the labour market has been affected by the current COVID-19 crisis more than men's participation (IMF, 2020; World Bank, 2020; Alon et al., 2020; World Economic Forum, 2020; etc.) and how women's responsibilities and the workload to overcome the crisis increased for them (McKinsey & Company, 2020b; Wenham, 2020, etc). We connected this with cultural beliefs, stereotypes and the social roles women take in their families (Parker et al., 2018; European Commission, 2017; Binder et al., 2020, etc.), but at the same time, we provided evidence from the literature that women do have the skills and capabilities to master challenges just as well, if not better than men (Zenger & Folkman, 2019; ILO, 2019, McKinsey & Company, 2020a, Friedman, 2020, etc.). Their resilience in times of crisis, their communication skills, their empathy, their perspectives and other leadership traits, are important resources that companies should be aware of and build on them. Yet, there still are many visible and invisible barriers, which impede in some cases women's labour market participation, and in other, the advancement of their career (AllBright, 2020; McKinsey & Company, 2020b). We acknowledge that a change of mentality is needed and it could start from small things such as men recognizing that some of their achievements would not have been possible if women would not have been there for them, taking a day off whenever their kids were ill, doing some extra work in the household and so on.

At the same time, there are structural barriers, which need to be tackled if things are to change and concrete measures are needed (European Commission, 2020). The introduction of women's quota in many countries aims at improving women's representation in top positions, but the

progress is slow and as we have seen, the progress can be easily undone by a crisis (McKinsey & Company, 2020b). By developing a strategic instrument in our chapter, we hope to help companies take concrete steps into acknowledging the importance of women's capabilities and skills and this not only in times of crisis but also in non-crisis times. Therefore, the main contributions of this chapter are twofold: it reviews some of the most recent publications on the effects of the pandemic and it develops a model aimed at helping companies to increase the number of women in their workforce and benefit from the complementary skills of both male and female personnel. The implementation of the strategic performance cycle by companies can be a step towards more sustainable societies. Moreover, companies need to proactively build their women talent pools irrespective of the current situation, and also as a preparation for more difficult times. If women are just as capable as the men in managing and leading, companies that do not acknowledge this fact can only lose in the competition with other companies, which do that. The culture of a company plays also an important role and when for instance a pregnant woman is suddenly no longer taken seriously, as she was before, then this should raise some questions. One last aspect, which should be underlined, is the importance of how the topic of women representation in top positions is presented in different sources, especially media: emphasizing women's skills and capabilities, and not just the gender dimension, might actually change mentalities.

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12

Post-COVID Business Transformation: Organizational Constraints and Managerial Implications for SMEs in Cameroon

Zhanna S. Belyaeva and Petiho Numbu Levis

12.1 Introduction

The COVID-19 Pandemic has probably been one of the most significant global health disasters the globe has experienced since the eighteenth century (1889–1860). Its contagion seems stronger than those of the worldwide subprime crisis (2007–2009). COVID-19 did not take long to spread out of China, to the world. Its effect is felt in the health sector and across other vital industries, most notably the economic and social sectors. As businesses remain shut down and lockdowns become compulsory for contamination reduction purposes (Karen, 2021), there is a possibility that we are heading towards the most significant recession in history as the race to finding a vaccine is still far-fetched. The nuances of this Pandemic are extensive and could be more devastating as time goes on. Its effect could be

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less felt by large firms with an efficient crisis management strategy. Large businesses have the power to stay alive for almost a year before beginning to feel the real-time effects of the current pandemic.

In contrast, SMEs are not expected to hang in for that long as there already exist tight issues threatening their existence before the outbreak (Akinboade, 2015). The COVID-19 pandemic seems more like the last kick towards fastening the closing down of SMEs, and unless quick measures are put in place, many small businesses will not exist post-pandemic. Empty streets have become the new normal during the COVID-19 pandemic. Millions of people are being laid off, and shops shut down, public gatherings banned, travel restrictions and physical distancing imposed as a third of the world practices some part of a lockdown to slow down the spread of the virus (Nicola, 2020).

Nowadays, SMEs in Cameroon are considered firms with less than 50 employees and record annual sales below 50 million francs (Oludele, 2015; Talom, 2020; Akinboade, 2015). They account for a striking 95% of the economy (Juliette, 2019). With the coming in of the Enterprise Creation Formality Centers (ECFC) that eases business establishment, the number of companies created in Cameroon has been rising with over 80% being SMEs. The national institute for statistics revealed that in 2019, there were 209,482 companies in the country opposed to 2009's total of 93,969 companies. On September 3, 2020, the Ministry of Small and Medium-sized Enterprises, Social Economic and Handicrafts confirmed that 14,229 SMEs were created in 2019. Compared to the 13,423 SMEs created in 2018, the 2019 figure represents an increase of 800 SMEs (Business in Cameroon, n.d.).

In Cameroon, the tourism and airline industry, import-export companies, retailers, restaurants and many considered non-essential services have been hit, some more than others**.** Many have changed their business models to suit the present scenario with almost every business increasing or slowly tilting towards technological tools (online meeting, sales and purchases, delivery, lectures and communications) as person-to-person activities increasingly become risky (Papadopoulos, 2020; Lau, 2020; Coombs, 2020; Schmidtke, 2020; Kamal, 2020). For businesses to advance sustainably and become resilient, it is vital to understand and address their weaknesses and develop their strength. The Legatum Index

helps bring out the prosperity picture of each evaluated country, ranging from economic, institutional and social dimensions. Cameroon lacks mostly in safety and security, health, Governance and market access and infrastructure. The SDG ranking provides a visual representation of countries' performance. Thus helping nations visualize their priorities for action. Cameroon's most significant sustainability challenges are lack of sustainable cities and partnerships to achieve the nation's goals. Cameroonian based businesses and governments can use the index and ranking to set their growth goals and estimate their development attainment level especially as the Pandemic has affected the nations operations, finance, transportation and digital path.

Before COVID-19, Cameroon recorded its all-time high Legatum prosperity rank of 147 out of 167 countries. Thus, an indication that the nation is better prepared now more than ever before to match the virus's impacts on all sectors. According to (Legatum Institute, 2020), though Sub-Saharan Africa is the weakest performing of all seven major regions, it is the third most improved region since 2010. Its top prosperity is in personal freedom and natural environment in which it holds the fifth position. The Economic and Monetary Community of Central Africa (CEMAC) member countries are not doing any better as Cameroon a leading nation in the region ranks 151, far behind Gabon and Equatorial Guinea which stand at 122 and 131, respectively. Directly behind Cameroon on the ranks is Congo which ranks better than Chad with 12 places and lastly, the Central African Republic, which is last in the region ranks 166 beating only Sudan.

On the other hand, SDG index (2020) puts Cameroon at 133 despite having 12 existing significant challenges, 3 challenges moderately improving but insufficient and 2 achieved goals in climate change and responsible consumption and production. Compared to the Legatum index, Cameroon is not the only CEMAC nation to improve in rating in the SDG report. Joining Cameroon is Congo and Gabon which rank 135 against 152 and 111 against 122 with Equatorial Guinea not ranged, Chad and the Central African Republic maintain their position. Although the grades improved, the problems never changed as a lot is yet to be done by the continent and the CEMAC region, in particular, to stand out of the red line.

Research Dilemma

The Global lockdown has forced lots of companies to transform their business models and reshape their organizational scope. Simultaneously, several researchers have studied the effects of COVID-19 on national and world economies and to an extent, global corporation (Naveen, 2020; Hoekman, 2020; Dawar, 2020; Buchel, 2020; Gruszczynski, 2020). This piece will focus on examining the post-COVID transformations of SMEs in Cameroon. It evaluates and analyzes the challenges, technological changes and the role of a specific sector. It envisages seeking whether the mentioned aspect of COVID could cause changes in SMEs' business model. Better still strive to know if this mini enterprises' business model noted some changes and whether these changes could be driven by the challenges, the presence or absence of technology (like the role of social media, internet and computer expertise) and sector of operation.

This piece has five parts. The first part outlines concerns of COVID-19 and some history of health care pandemic, and its consiquences in the applied research. The next part explores the literature on pandemic's effects on businesses and economies. This begins with discussing some significant business challenges, especially SMEs in such a crisis period, and extend to the empirical literature. The third section unveils the methodology of the study. At the same time, the fourth part analyzes the primary findings present in the questionnaires' results, and the last area will be the conclusion and recommendations for small businesses.

12.2 Literature Review

COVID-19 Pandemic and its Challenges to businesses

The deadly Coronavirus first broke out in Wuhan, China (Lucy, 2020b; Zhu, 2020). The World Health Organization declared COVID-19 a global health emergency on January 30, 2020 (Gallegos, 2020). On March 11, 2020, the WHO reported the virus a global pandemic urging all nations to unify their strength in fighting against this deadly virus

(Prabhakar, 2020). COVID-19 is an infectious disease which spreads rapidly through droplets of saliva and nasal discharge. Common symptoms include fever, tiredness, dry cough, aches and pains, conjunctivitis, diarrhea, headache, loss of taste or smell and sore throat. To protect infection, individuals should wash their hands with soap or an alcohol-based rub often, avoid touching our face and practice coughing into a flexed elbow. To prevent getting others infected, maintain a meter distance always, stay home if you feel sick. Until date, Cameroon recorded 26,848 infected cases of COVID-19 with 448 deaths (WHO, 2020).

A decade before the current pandemic, global prosperity had continuously increased. This was partly driven by rising interconnectedness between economies and people's life experience, which improved due to better living conditions and a rise in technological and educational standards, across all nations. Economic openness is owed to better communication, comfortable transport, modernized infrastructure, better property rights, substantial investor rights and finance being accessible. This year's improvement in global growth has not followed the track of previous years as Africa, Asia-Pacific and Western Europe stalled, and North America slightly deteriorated due to the COVID-19 pandemic. The challenges faced by SMEs in Cameroon during the outbreak are divided into four (transportation, operational, digital and financial) and are explained below.

TRANSPORT ISSUES: As of March 18, 2020, all passenger flights from abroad into Cameroon were suspended, except for vessels transporting consumer products and goods considered essential. Cameroon's air, land, and sea borders were shut. Visas into Cameroon were suspended, inter-urban and urban travel were limited to cases of extreme necessity, bus drivers, taxis and motorbikes were urged to drop the number of passengers they carried significantly in a bid to respect the WHO measures to curb the spread of the virus (PM's Office, 2020). With movements restricted, businesses shutting, the chain of transportation was undeniably disrupted. A breakdown in supply chain challenges companies and extensively consumers. Supply chain managers now have a much more demanding task of stabilizing their supply network (Gerdeman, 2020). With more time needed to pass road checks and other health measures

implemented, the supply chain is disrupted and inevitably leads to a production delay. In a time of fear and uncertainty, shortages spring the economy rapidly into a depression.

Getting access to raw materials has become difficult as many channels have been weakened or cut off completely. Negative impacts on both product and service business (Rapaccini, 2020), include operations and supply network disturbances. Apple had announced a fall in their devices' supply as essential components in creating its products were delayed from China (BBC news, 2020). In Cameroon, the government-imposed lockdown has limited the transportation of goods within the territory, and manufacturing companies feel the pain most. CHOCOCAM, a large chocolate producer, has not received cocoa from farmers while it's beginning to exhaust its reserves. The supply chain disruptions force the raw materials scarcity or come in late. The market access deficiency resulting from the stay-at-home orders makes the logistics even harder as exports are almost impossible. Domestic consumption is vital, especially for less developed countries like Cameroon.

OPERATIONAL ISSUES: All training milieus public and private of the various education levels, from nursery school to higher education in Cameroon, were closed. Additionally, college and university competitions like the FENASSCO (Federation of National Secondary School Competitions) and University games were postponed for four months. Though left open during the day, restaurants, bars and entertainment spots were being shutdown progressively after 18:00 while a regulation system was set to limit the number of consumers entering shopping centers and markets at a time. Staff management was initially an easy process as individuals were supposed to report at work and sign themselves in and stay at work. Checking active staff presences needed just an office or field step down to confirm the active presence or not. With the advent of the coronavirus, individuals who aren't laid off are forced to work from home, which is very difficult in staff control. Many persons ended up signing in and stepping into other things.

Working from home is a common phenomenon in many organizations during the pandemic (Mustajab, 2020). The outbreak is a signal for all organizations to examine their existing strategies and operational rules for employee protection from infections while at work amidst a

pandemic of this nature (Levin-Scherz, 2020). Thus, in-person meetings will be unnecessary and remote work strategic (Gerdeman, 2020). Fluctuations in work and social conditions have led to a complex environment for human resource management as they fight to maintain limited staff and stay efficient. Furthermore Al-Mansour (2020) identified other approaches used by various organizations concerning human resource management during the crises, including the suspension of work contracts, staff downsizing, salary reduction, and layoffs. Operational change has left many doubting if things will return to what it was before the outbreak.

DIGITAL ISSUES: As physical gatherings become risky and even forbidden in almost half of the world's nations, Cameroon prohibits meetings of more than 50 persons throughout its territory. Thus, a more significant part of services which were once physical have resorted to going digital to stay alive amidst the current pandemic. Schools have turned to E-learning, fitness clubs have initiated online fitness classes, and food and grocery delivery services have become remote. We now have access to a significant number of services remotely which weren't there before. Businesses that cannot transform their way of functioning and are not considered essential enterprises are forced to close down. The COVID-19 pandemic has so far led to a rise in social media usage, web-based technology and consequently the internet, which makes numerous communication technology options available to manage newly established remote workers as emails aren't entirely satisfactory (Donthu, 2020; Bacq, 2020; Larson, 2020; Sheth, 2020).

With firms increasingly adopting new operations requiring new designs and varying digital touches, several businesses such as tourism, events hosting, hair salons, spas, flight companies and the movie theatres cannot move to a digital platform and continue functioning. Slammed are those who need some kind of physical touch and because of this can't fit into the digital track. The increasing demand for technology has led to the creation of several broken programs which have been deficient to small businesses.

FINANCIAL ISSUES: Maintaining constant cashflow at a time like this is a very daunting task. The COVID-19 pandemic has hit the financial sector like no other. Business shutdown has become rampant. Those

who struggle to stay open have little or no income to resist the pandemic's effects, especially as sales are mostly dropping, rents not declining and bills piling up. The airline sector has seen more than three-fourths of their operations snatched, and though some functions are being carried out, the financial resources to keep going is gradually fading away.

Despite the vital role of SMEs in economic growth (Josée, 2015), they are still exposed to significant vulnerabilities. They are almost totally dependent on debt, most especially loans from financial institutions. In a usual situation, financial shortages can be solved by simple loaning but with the current pandemic and SME's inability to raise finance from other sources at short notice can convert what used to be a simple liquidity issue into a problem of solvency. Should a wave of SME failures occur in Cameroon, all efforts will go down the drain as temporarily laid off or furloughed workers will instead become officially unemployed. Financial institutions that acted as loaning instruments will experience large losses in their loan book, leading to an inevitable financial crisis. Government and public contributions to address these SMEs' liquidity shortages is vital in ensuring an apparent recovery of the economy.

An external crisis which threatens economic affairs as the coronavirus outbreak when met with financial resource shortages will only exacerbate the economic loss (Eggers, 2020). Most countries first provide aid by reducing the burden of cash flow limitations (Kuckertz, 2020), while securing jobs and sustaining the economy via financial assistance to businesses. Conclusively, businesses that cannot transform their operations and become remotely accessible, and in-turn fall under the category of businesses that are not resilient financially and have limited access to cash and credit will permanently shut down first. How government and business will adapt to this change, will determine how rapidly Cameroon will recover from this shock.

Empirical Literature

Scholars have continuously researched on the current pandemic's effects on business and implications. Tang (2021) empirically analyzed whether or not the coronavirus disease outbreak caused supply chain disruptions

in Taiwanese firms located in China. The findings show an existing link between the COVID-19 attack and the logistics and supply chain disruption and a negative cumulative abnormal return within these firms, especially those selling in international markets. Kaplanski (2010) finds that bad mood and anxiety can push people scared of loss and uncertainty of investment return to avoid investing any longer; thus, negatively impacting returns on assets. Ritter (2020) supports the idea of the COVID-19 pandemic being able to boost business model innovations. According to Zenker (2020), innovative capabilities play a crucial role in crisis recovery. Using Euro control data and the European network manager Lucy (2020a) identifies the responses individual airline operators took to contract and consolidate their operations. The results indicate that the business model change was at the level of reconfiguring their networks and capacity, rationalizing the fleet, reducing staff numbers and flight operations. He (2020) observed that many businesses have resisted unethical business practices during the COVID-19 pandemic and have proactively engaged themselves in various corporate social responsibility activities. For instance, Coca-Cola, Chevron and Ford have modified their business models by manufacturing different types of personal protection equipment (facemasks, sanitizers, hand soaps, sensitization t-shirts and more) in the global effort for the fight against COVID-19.

Herstatt (2020) with a normative-conceptual perspective examines how far frugality, and among other things, frugal innovations, can play a role in better surviving post-pandemic effects and what implications exist for stakeholders. This piece concludes that it is necessary for entrepreneurs and frugal innovators to develop a multidimensional understanding of affordability geared towards ensuring financial, societal, infrastructural and ecological affordability of frugal technologies, business models, products and services.

The impact of working from home during the current pandemic in Indonesia was examined by Mustajab (2020). The study results indicate that the productivity levels drop due to poor digital infrastructure and emotional disturbances of employees' social lives due to social distancing. Carnevale (2020) identified difficulties in working from home, namely person-environment misfit, contemporary family structure segment vulnerabilities and work-family conflict. The work from home concept

cannot hold in all business areas, especially those highly dependent on offering in-person services to customers. In Cameroon's case, working from home will favor workers having better technology available at home and adequate internet supply.

Donthu (2020) concludes that employees are continuously losing their jobs even faster than it was during the great depression. Tarki (2020) follows in another vein by claiming that the COVID-19 crisis should not directly lead to layoffs because those who handle this crisis's economic consequences tactically will recover faster and become resilient. Organizations should recognize the conditions in which they would want to extend the benefits and protections they offer to their employees to increase income security (Susser, 2020).

Researchers like Hougaard (2020), Rapaccini (2020) and Sharma (2020) indicate that business organizations should be resilient to respond to the current pandemic. Companies can explore COVID-19 pandemic to create new business opportunities (Nenonen, 2020) and technologically advance. When the COVID-19 pandemic is over, concerns are whether these crises-implemented strategies will be sustainable (Crick, 2020). The mentioned puzzles are structured into specific research: How have pandemic challenges affected your business model? What is the effect of technology in the operation of SMEs during the pandemic? What is the role of sector consideration in the business model of SMEs? Going by these specific concerns, the following hypothesis is of particular interest: H0—the challenges of COVID-19 has no significant effect on the business model of SMEs; H1—technology has played no role in the operation of SMEs during the pandemic; H2—the sector of operation does not significantly contribute to a change in the business model in the pandemic.

12.3 Research Design and Methodology

The study is designed to outline peculiarities of SMEs development in post-COVID new normal in Cameroon. Though it may support future research (pure) regarding the post-crisis solution package, its urgent need was tailored to examine business constraints and raise possible solutions

to issues created by the global pandemic in this sector. It is challenging to avoid qualitative analysis through quantitative analysis since it required the narrative argumentative and local presence of a clause to support the study's predictive futures. Quantitative techniques were adopted to evaluate the status quo of SMEs amid the pandemic. Still, qualitative arguments were raised (using the quantitative analysis results) to project the post-COVID era. Primary statistical techniques were used to gather the required observation that piloted the investigation. The study variables were quantified via the use of a questionnaire.

Though the pandemic has affected all nations, its severity is not the same across countries, but its effect is globally felt (Melissa, 2021). Households, firms and governments have recorded some adverse pandemic effects (Gostin, 2020). This study focuses on examining the post-COVID business model of small and medium-sized enterprises. The unit of research is not different from the SMEs in Cameroon.

It should be noted that all sectors may have some of its institutions categorized as being in the study's target group. Restaurants, bakeries, schools (secondary and universities), mainly private micro-financial institutions and other small manufacturing firms are among the SMEs mentioned. Big corporation and multinational companies, especially those of the transport industry, may find it easy to survive the pandemic's shocking waves. It may be different for SMEs with limited capital and falling sales. This is the reason why this sector was chosen, especially as they support and survive many households in Cameroon and contribute immensely to the nation's GDP.

Sampling and Operationalization

The study was designed to work with 300 SMEs in Cameroon. This entails a sample size of 300 observations, but unfortunately, 268 responses were received and analyzed. The survey was distributed in hand to three-fourths of the respondents; meanwhile, Google forms and emails were used to gather the remaining one-fourth for the study. The study targeted the managers of each SME since they are the most informed stakeholders. The owner is most often the manager. Businesses from the most likely

to be affected industries (Nakat, 2020; Guido, 2020; Yaya, 2020; UNECA, 2020) were selected (tourism, restaurants, transportation, fresh food, manufacturing and entertainment); these were chosen to be able to capture the actual effect of the pandemic on small firms who are at the forefront. Sampling was stratified to ensure representativeness. At least 20 SMEs were sampled from each of the ten regions of Cameroon. Once the territory was grouped into the ten data collection areas, randomness was applied per region to achieve the required observation.

The study is crafted to follow a dependent-independent research model style. The dependent model was confirmed to be the change in the business model of SMEs. This change could probably originate from a logistic standpoint, channel, budgeting (cost and revenue) approach or operations (De Sousa, 2020). Yet to be tested but from experience, most of these enterprises alter their model in this dimension significantly as lockdowns and social distancing place a burden on them. If this holds, then the pandemic challenge drives the change in today's business model. These challenges may go beyond lockdown and social distance to drop in sales, profitability and others. These are indicators to obstructions in the operation of these institutions. The independent variables were considered the business model change (dependent variable) driven forces (challenges, technology and sector).

The Measurement Instrument, Analytical Techniques and Econometrics Model

The measurement instrument is split into three sections. The first section collects the participants' demographic information, the second raised questions on the dependent variable, while the last area focused on the independent variables. The questions were asked using the 5-point Likert scaling system with responses ranging from strongly disagree, disagree, neutral, agree, strongly agree.

Three main analytical techniques were adopted to study the problem under investigation. They were descriptive, correlation, multiple regression (ordinary least squares, OLS) and paired T-test. Descriptively, the study wished to know which challenges were so pressing and place a high burden on these SMEs' survival during the pandemic. It also attempted

to inform the operation line that was an easy path to business model change during COVID-19. The T-test was implored to check for any difference in sector performance, especially the restaurants, travel agencies and health sectors.

The econometric model is specified as follows:

$BM_Ci = \beta_0 i + \beta_1 C_C i + \beta_2 TE_C i + \beta_3 SPD_C i + ei$

$BM_{CC}i$ = Business Model due to COVID at point i

C_Ci = Challenges brought forth by COVID at point i

ET_Ci = Technological Efforts due to COVID at point i

SPD_Ci = Sector Performance Difference due to COVID at point i

$\beta_{0,}\ \beta_{1,}\ \beta_{2,}\ \beta_3$ = Sensitivity Coefficients

A standard error value that is near-zero confirmed that limited errors were made in the overall research process. Care was taken to ensure the right participants were selected for the process. A pilot test was also initiated to ensure a vivid understanding of the research instrument by the participants. These initial steps were put in place to support consistency in the observations and the data point. The pearson correlation coefficient was used to check for the accuracy of the measurement instrument and the research model. The study confirmed validity via the multicollinearity check.

12.4 Presentation and Analysis of Findings

Though scientific, descriptive statistics are far from explaining changes in SMEs' business model due to the pandemic. It shows to what extent these institutions have faced challenges and used technology to alter drawbacks and feel discrepancies in COVID-19 across sectors (Priya, 2020). Before the econometric findings, we carry out a validity check to establish the relationship between the study variables (Table 12.1).

The result acknowledges that though not significant, low technological firms face more challenges (negative relationship). Businesses which adapt to current social media explosion wildly tilted towards mobile technology will suffer less from the challenges posed by COVID-19. The observed positive significant relationship between sectoral differences and challenges is equally a concern of simple reasoning. During the pandemic, the most affected SME sectors faced the most severe difficulties,

Table 12.1 Correlation Analysis (multicollinearity)

	Challenges	Technology	Sector Differentials	Business Model
Challenges	1			
Technology	−.076	1		
Sector Differentials	.251**	−.123*	1	
Business Model	.102	.182**	.070	1

**. Correlation is significant at the 0.01 level (2-tailed). *. Correlation is significant at the 0.05 level (2-tailed).

Source: Author`s formulation

Table 12.2 Estimation (Regression Result)

Metric	Variable	T-value	Std Error	Beta	P-value	VIF	Comments
Changes In Business Model	Challenges	1.500	.055	.094	.135	1.070	Insignificant
	Technology	6.563	.032	.460	.000	1.018	Significant
	Sector differential	.926	.051	.059	.355	1.080	Insignificant
	R Square = 15.3 Alpha = 3.55 Significant level = 5 %						

Source: Author`s Computation

thus justifying the positive and significant coefficient (0.251) between sectors and challenges. Restaurants and travel agencies have suffered more than other industries which have instead woken up to a better opportunity. Furthermore, low adaptive technological sectors are incredibly touched as the need to adapt quickly is vital.

The findings confirm a positive correlation between challenges, technology, sector differentials and changes in the firms' business model. Though positive, only the relationship between technology and changes in the business model is significant. No multicollinearity among the variables was noted with all the correlation coefficients far off the threshold (0.8). The noted correlation analysis among the study variables cannot establish a cause-effect relationship; thus, causality is carried out via the multiple regression analysis (ordinary least squares) (Table 12.2).

$BM_C i = 3.55 + 0.094 C_C + 0.460 TE_C + 0.059\ SPD_C$ ……………………………………….....................................eq2

The OLS results deny a significant role in the challenges of COVID-19 to changes in the business model of SMEs. Though positive, the estimation coefficient (beta 0.94, t 1.5) acknowledged an insignificant causal relationship between business model change and challenges. The alteration of operations, with regard to distribution channels, cost and revenue allocation, available operating system during the pandemic, is not envisaged by the participants to be caused by the ongoing drawbacks of COVID-19. The pandemic came a year ago and added to existing SME drawbacks like lack of incentives, liquidity issues (Jean, 2016), high taxes and already existing lockdowns resulting from civil disruptions. The protagonist of this finding accepts the null hypothesis, that is, COVID-19 channels do not significantly affect SMEs' business model changes.

The econometric result confirms a positive (beta 0.460 and t 6.563) and significant causal relationship between technological adaptability and operation change for SMEs. Thus, we reject the null hypothesis: Technology does not significantly affect SMEs' business model in Cameroon. With many Cameroonians moving closer to technology more than ever, E-learning, E-banking, mobile cash apps and online businesses have taken the lead. Deliveries have seen an all-time high in the nation during the pandemic as food, books, clothes, shoes, gym equipment and lotions are supplied on demand at doorsteps. Physical lectures have been replaced with online classes, online banking has become the norm, business meetings and conferences have turned to Google or zoom sessions, and visiting doctors have turned to online sessions. Almost every aspect of life has tilted in one way or the other to technology to limit physical contact, deviating a little from the normal as physical presence has moved to remoteness. Teller payments are now being carried out through Mobile money or Orange money, an MTN and Orange telecommunication service.

The study indicates an insignificant (p 0.355) but positive (beta 0.059 and t 0.926) effect of sector differentials on the changing business model of SMEs amidst COVID-19. The research seeks to identify whether or not different business lines within SMEs may be the force altering the business model during the ongoing pandemic. Despite several respondents confirming that the health sector will gain more as they are solicited and considered an essential industry, it is still not enough to reject the

Table 12.3 Paired Samples Test

	Mean	Std Dev	Std Error	t	df	Significant
Opportunities (health sector)—Drawbacks (restaurants and travel agencies)	0.623	1.291	0.79	7.902	267	.000

Source: Authors Computation

null hypothesis. Thus, the null hypothesis is accepted since statistical evidence supports an insignificant role of sector activities differential on the business model's possibility of change. This piece takes a step further to envisage if there is a significant difference in the health sector's benefits and the drawbacks noted in the restaurant and transport agencies due to COVID. The paired samples test statistics are used to check (Table 12.3).

There is a significant difference in the health sector's opportunities and the setbacks in the restaurant and travel agencies. This entails not all SMEs suffered during the crisis. Many clinics and community health centers witnessed a rise in the number of patients (customers) who may have just been there to check signs and symptoms of COVID-19. Pharmacies equally experienced surging sales as persons who realized a high temperature rushed to get medication. On the other hand, travel agencies saw the number of passengers cut down and some means of transportation abolished by the government to permit social distancing and curb spreading. Restaurants are deserted out of fear since proximity is high in restaurant venues. SMEs in the restaurants and travel agencies instead noted a decrease in sales.

12.5 Conclusion and Recommendations

The coronavirus that first broke out in Wuhan, China, has reached Cameroon in less than no time (Hameni, 2020). With rising infection rates, uncertainty has set in for individuals and businesses. With several speculations to its ending, failing, preparing enterprises to survive post-pandemic is vital (Chen, 2020). Several businesses have been forced to transform their business model to suit the current time while other

businesses may go back to their usual models. A good number may not stay the same (Davison, 2020), even after the wave due to valuable discoveries.

Taking the business model of small businesses as dependent and challenges, technology and sector as independent, the study sorts to ascertain whether COVID-19 has led to a change in SMEs' business model in Cameroon. After gathering and analyzing field data gotten from 268 SMEs, the result proved that the challenges and sectoral differences are positively related to business model changes in SMEs located in Cameroon's ten regions but do not suffice (not significant) to be the reason behind such transformation. On the other hand, technology is seen to be positive and significantly related to the change in SMEs' business model in Cameroon. Thus, COVID-19, while sending people out of work, will also go a long way in changing the business model of small firms who struggle to stay alive amidst the pandemic.

Spanning from connecting patients to doctors (Hoffman, 2020; Elishiah, 2021), students to teachers (Papouli, 2020), workers to employers and many others (Ahir, 2020), technology has influenced the scope of organizational operations (Priyono, 2020; Baurina, 2020). Although this shift to Technology is not fully observed in Cameroon because of some high-tech lapses, future businesses will rely on developing this technology to be more flexible and resilient (Tronvoll, 2020). Therefore, technological advancement should be given priority as it can help sustain businesses.

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