

Empirical examination of societal, financial and technology-related challenges amid COVID-19 in service supply chains: evidence from emerging market

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Abstract

Purpose – This paper reports an empirical examination of the societal, financial and technology-related challenges amid the ongoing pandemic (COVID-19) in the service supply chain network.

Design/methodology/approach – A combination of qualitative approach (for items generation pertinent to the constructs involved) and quantitative approach (self-administered questionnaires from the top and middle management of the sampled companies) was used for data collection. In total, 272 complete responses were received and analyzed through structural equation modeling.

Findings – The results provided empirical evidence that social and physical distancing, travel restrictions, work from home and lockdown practices have two conflicting effects: On one hand, these practices have contributed to the reduction of economic activities, including the low economic outlook, low productivity, high unemployment, poverty, fall in customer demands, dissatisfaction and mental health, that ultimately impacts rise financial and societal issues. On the other hand, the results revealed an insignificant influence of COVID-19 on creating technology-related challenges in the service sector. It shows that the organizations are doing well in combating the technology-related challenges amidst the current pandemic.

Research limitations/implications – Findings of the inquiry recommend implications for the services industry to harmonize a comprehensive strategy and revisit the global norms in sustainable supply chain management activities that have been the backdrop in their operations for a long time.

Practical implications – Findings of the inquiry recommend implications for the services industry to harmonize a comprehensive strategy and revisit the global norms in supply chain management activities that have been the backdrop in their operations for a long time.

Originality/value – Prior studies in the context of the COVID-19 outbreak and its implications have given more attention to the exploratory and theoretical discussion than to empirical evidence. This paper contributes to filling this knowledge gap by empirically exploring the societal, financial and technology-related challenges created by COVID-19. The analysis in this paper covers three dimensions of the PEST model, namely economic, societal and technological factors. This study also helps in laying out a platform for investigating the PEST (political, economic, social and technological) model for guiding the services industry in strategic decision-making in a new era due to COVID-19.

Keywords COVID-19, Pandemic, Financial, Societal, Technological, Challenges, Services, Supply chain, Emerging market

Paper type Research paper



1. Introduction

Coronavirus disease has become a global challenge requiring attention from governments, policymakers, academicians and researchers to address its multiple dimensions (Thakur, 2021; Lambert *et al.*, 2020). The recent literature indicates that the COVID-19 is causing a lot of fear, uncertainty and anxiety worldwide (Shakibaei *et al.*, 2021; Rajesh, 2021). People's mental health is suffering, work and family routines are disrupted, triggered by economic instability, and still, there is significant uncertainty of its severity and length. On 11 March 2020, the World Health Organization (WHO) declared it a pandemic (Abdel-Basset *et al.*, 2021; Sigala, 2020; Liu *et al.*, 2020), which continues its spread to over 205 countries, with 212.5 million people tested positive corona and more than 4.6 million deaths reported to the WHO as on 10 September 2021. The increasing number of COVID positive cases led to the closure of schools, non-essential services, international travels, quarantine, social distancing and recursive national lockdowns (Mbunge *et al.*, 2021). These precautionary measures are exerting an exceptional burden on daily life and on commercial businesses, which is having a profound impact on all industries, including manufacturing, agriculture, construction and healthcare industry (Chhabra *et al.*, 2021; Jiang *et al.*, 2021; Nicola *et al.*, 2020; Paul and Chowdhury, 2020). Other industries, including the service industry, resist this pandemic (Nicola *et al.*, 2020). Chhabra *et al.* (2021) stated that hospitality and tourism businesses are among the worst-affected businesses, while other sectors, such as healthcare and the digital services industry, have been less affected but have encountered pressure due to the situation. McKinsey and Company (2020) indicated that COVID-19 is exceptionally challenging for industries that extensively depend on in-person contacts, such as tourism, telecom, banking, insurance, hospitality and IT-related companies.

In the services sector, the entire value chain has been impacted by COVID-19, creating societal and financial challenges (Alonazi, 2020; Majumdar *et al.*, 2020). Ivanov (2020) postulates that this pandemic has affected supply chain agility, resilience and sustainability. Moreover, employees are being forced to work from home, which has introduced a disruptive level of emotional stress, resulting in a reduction in productivity and, ultimately, employees' income (Suau-Sanchez *et al.*, 2020). Physical and social distancing, lockdowns, travel restrictions and work-from-home activities pose a primary challenge about how service-oriented organizations can operate and reach customers. Most service companies, especially those in the tourism and hospitality sectors, struggle to keep their services running, while others are closing down, posing significant risks to their employees' well-being (Kabadayi *et al.*, 2020). Kaushal and Srivastava (2021) postulated that COVID-19 continues to unfold and has been associated with some of the most significant socio-economic and technological challenges in the current era. Parveen (2020) stated that the global economy has been prone to the most significant challenges, especially for the services sector. This pandemic has created a series of societal and financial challenges.

This research is motivated precisely by the ongoing debate on the challenges undertaken in the current setting by the services industry's supply and demand network. The research is limited in examining the impact of lockdown practices during pandemics on the services sector's societal, financial and technology-related activities (Tuzovic and Kabadayi, 2021). In this study, the extant literature and semi-structured group interviews were performed to briefly articulate the services sector's unique societal, financial and technology-related challenges resulting from COVID-19. A path forward is then discussed, highlighting new areas for discovery and potential new normal activities amid the pandemic. Sarkis (2021) stated that new social and economic sustainability norms are emerged due to the current pandemic as people started living differently. It may be that the COVID-19 pandemic has prompted changes in social interaction, economic activities and technological areas that have long been needed in businesses (Parveen, 2020). With this regard, this paper aims to;

- (1) Explore the most urgent societal, financial and technology-related challenges created in the services sector (tourism, telecom, banking, insurance and IT-related business) amidst COVID-19.
- (2) Empirically investigate the impact of COVID-19 on the societal, financial and technology-related challenges in the services sector and suggest future research directions, recommendations and policy issues that need dynamic attention.

The novelty of this paper lies in an attempt to identify and empirically analyze the challenges in the services sector based on the perspective of top and middle-level management. The paper first apprises readers of the challenges created by the ongoing pandemic and summarizes the literature in the services industry context. The viewpoints of key individuals such as top and middle management are investigated to guide others engaged in managing and observing this critical event. Hence, this paper will positively contribute to the limited empirical evidence on the societal, financial and technology-related implications of the COVID-19 in services supply chains. Moreover, it will give social science and management researchers a path-breaking idea to deal with these challenges during this pandemic and make a contingency plan to control and adopt new-normal to revamp in such future events. The analysis of the challenges created due to COVID-19 will provide insights to industry stakeholders on what to do and which action plans to prioritize. Thus, this research holds relevance for the top management of the service industry and policymakers as they face difficulty reviving and sustaining the service provider companies and industry.

2. Conceptual background and hypothesis development

The COVID-19 pandemic is a global shock that has affected the lives and livelihood of everyone and triggered a whole new realm of challenges, particularly for the business organizations' supply and demand side (Brem *et al.*, 2021; Buheji *et al.*, 2020). On the supply side, this pandemic has disrupted the supply of goods and services and decreased worker availability, productivity and efficiency (Chudik *et al.*, 2020). On the demand side, consumer demand, household consumption and organizational investments are badly affected due to layoffs and wage reduction (as a result of morbidity, quarantines and unemployment) (Yacoub and ElHajjar, 2021). Countries worldwide applied different measures from simply advising on personal hygiene and progressive measures to social and physical distancing, work from home, travel restrictions and total lockdown (Shakibaei *et al.*, 2021). The evolution and implications of the COVID-19 crisis are still unfolding; therefore, this study aims to propose a preliminary conceptual framework and empirically validate it by utilizing contingency theory to determine the societal, financial and technology-related challenges that are direct consequences of COVID-19. Contingency theory posits that there is probably no best way to solve management problems in all organizations in various situations. In other words, leaders or management must develop different plans to deal with different situations (Arifah *et al.*, 2018; Craighead *et al.*, 2020). This theory presents the dynamics of interaction between influential leaders and groups of workers in facing any situation. The occurrence of any crisis affects the demand and supply chain of products and services, which can damage the entire economy at both micro and macro levels and can pose a threat to the global economic system (Yan *et al.*, 2021). Past studies on harsh conditions (e.g. Bradley *et al.*, 2011; Shad *et al.*, 2019) indicated that organizations need to develop a contingency plan that can help them to sustain their vital resources during a crisis. Ineffective business-continuity planning, along with poor risk management, can lead to business failure and bankruptcy. According to Obrenovic *et al.* (2020), organizations without adequate contingency and business-continuity plans will suffer significant post-crisis financial losses. Therefore, successful organizations have to put contingency and risk management plans in place at the onset.

The coronavirus outbreak represents unprecedented health and subsequent economic crisis, for which global organizations were unprepared (Vo and Tran, 2021). Management and leaders need to focus their attention on understanding the magnitude of such crises in the future and carefully evaluate the societal, financial and technology-related implications. A more comprehensive understanding of the dangers and consequences of a potential crisis may help organizations to formulate various strategies to cope with the challenges caused by such events. According to Ivanov (2020), the COVID-19 pandemic demonstrates that, in unexpected events, supply chain resistance to disruption must be considered at the scale of survivability or viability to avoid supply chain and market downfalls to ensure the provision of goods and services. Understanding the consequences, and formulating effective tactics and strategies, could help organizations reduce the impact of any potential crisis (Yacoub and ElHajjar, 2021). Physical and social distancing, lockdown, travel restrictions and work from home measures constitute the core component of efforts to contain the virus. However, the research is limited in examining the impact of these measures during pandemics on the societal, financial and technology-related activities in the services sector (Tuzovic and Kabadayi, 2021). Hence, this study revisits the literature on the challenges created by the pandemic, focusing on the most urgent areas such as societal activities, financial activities and technology-related activities among the services industry's supply chain management activities. The subsequent section develops the relevant hypotheses regarding the impact of COVID-19 on societal, financial and technology-related activities.

2.1 Impact of COVID-19 on financial activities

The COVID-19 pandemic has wreaked havoc on the global economic system (Yan *et al.*, 2021; Carlsson-Szlezak *et al.*, 2020). According to Ivanov (2020), the current global pandemic has immensely affected economic and social activities, raising unique decision-making settings. Global Economic Prospects, by World Bank, stated that the pandemic had affected international travel and global value chains, which caused global trade to decline by 13% in 2020, which is more than that it did during the 2008 global financial crisis and Second World War (Abodunrin *et al.*, 2020). An unprecedented freefall is observed in every component of the global gross domestic product (GDP), including consumption, investment, capital spending and exports of goods and services made domestically and purchased by foreigners. Congressional Research Service Report presented by Jackson *et al.* (2020) indicated that exports from the US of goods and services had fallen by 17.5% compared with July 2019. The imports of goods and services had fallen by 13.8%, reflecting the overall decline in global demand and supply. Cepal (2020) indicated that global demand and supply have collapsed, and the volume of goods trade in the global economy fell by 17.7% in May 2020 compared with the same month in 2019. Arezki and Nguyen (2020) discussed four channels that upset the economies of North Africa and the Middle East. These channels include disruptions in oil prices, value chains, tourism and travel. Meninno and Wolff (2020) looked at the economic consequences of closing borders of the European Union (EU). They suggested that stopping cross-border travel to a significant disruption of economic activities in the EU. Other researchers, such as Abiad *et al.* (2020), argued that financial activities in developing Asia, including China, are being affected through several channels. These include a temporary decline in domestic consumption and investments in business activities, declines in tourism and business travel, a decrease in production and trade activities, disruptions in the demand and supply side, and effects on health such as increased disease and mortality as well as shifts in healthcare spending. Inevitably, service-oriented organizations, including banks, the hospitality industry and the tourism industry, are badly affected, as more jobs are at risk (Verma and Gustafsson, 2020; Yan *et al.*, 2021). According to Fernandes (2020), social distancing, travel restrictions and quarantine practices caused heavy losses to all significant

economies reliant on the tourism industry, including the US, Greece, Portugal, Spain, Malaysia, the Philippines and Saudi Arabia. United Nations World Tourism Organization (UNTWO) indicated that the COVID-19 outbreak had caused a likely loss of 30–50 billion dollars to the travel and tourism industry (UNWTO, 2020). Baldwin and di Mauro (2020a) postulated that COVID-19 had affected many countries, including the G7 countries, which jointly contribute 60% of world supply and demand, 65% of world manufacturing and 41% of world exports. This pandemic has jeopardized overall economies, including large-small, developed and developing economies (Barua, 2021). Ivanov (2020) posits that due to the current pandemic, the agility, resilience and sustainability of the supply chain network are immensely affected, which has changed the decision-making for supply chain managers. Thus, based on these arguments, this study formulates the following hypothesis.

H1. COVID-19 has a significant effect on creating financial challenges.

2.2 Impact of COVID-19 on societal activities

Social and physical distancing, work from home, travel restrictions and lockdown practices due to the COVID-19 pandemic offer lessons for sustainable supply chain activities (Sarkis, 2021). On one hand lockdown, travel restrictions and closure of business operations have reduced carbon footprints, contributing to environmental sustainability, but on the other hand it has created inevitable mental, emotional and societal impacts on individuals and businesses (Yezli and Khan, 2020; Laato *et al.*, 2020). COVID-19 has worsened the global economy with no predictable end; individual and collective helplessness, pessimism and other societal challenges are flourishing worldwide (Rajkumar, 2020; Sharma *et al.*, 2021a, b). A recent body of the literature explores the impact of COVID-19 on the social capital of organizations, including structural, relational and cognitive social capital. For instance, Alonazi (2020) and Majumdar *et al.* (2020) indicated that the factories, retail outlets and services are shutting down due to the global pandemic, affecting people's economic and social life. Haleem *et al.* (2020) stated that COVID-19 had affected people's lives and livelihood and day-to-day lives worldwide. The social cost borne by people is due to the travel restrictions such as international travel, domestic tourism, day visits and segments as diverse as air transport, cruises, public transport, accommodation, cafes and restaurants, conventions, festivals, meetings, or sports events (Haleem *et al.*, 2020; Talwar *et al.*, 2021a). Rodela *et al.* (2020) indicated that lockdown practices and social distancing had decreased social gatherings and connectedness, affecting people's mental health and well-being. The organizations are less concerned about social capital development as most organizations are struggling to prevent the spread of COVID-19 (Rodela *et al.*, 2020).

Moreover, employees are forced to work from home, which has reduced the organizations' productivity and, ultimately, the employee's income (Suau-Sanchez *et al.*, 2020). Wren (2020) posits that the COVID-19 crisis badly damages organizational performance due to higher production costs, low labor supply and reduction in people's consumption. According to Nicola *et al.* (2020), the quarantine and social distancing practices reduced industrial manufacturing, people's consumption, demand and utilization of goods and services in China. The immediate and direct impact of the COVID-19 outbreak was felt on the shutdown of factories and businesses, resulting in a sharp and immediate decline in workforce earnings (Talwar *et al.*, 2021b). The crisis then amplified simultaneous supply chain disruptions of necessary production inputs and an immediate drop in demand (Belhadi *et al.*, 2021; Baldwin and di Mauro, 2020a). Also, as COVID-19 spreads worldwide, the international demand for goods and services slumped significantly, driving unemployment (Barua, 2021; Bofinger *et al.*, 2020). The International Labor Organization (ILO) says we could lose up to 25 million jobs worldwide and depend on the timeframe, and it could be worse than that. From the above

discussion, it is observed that COVID-19 has a significant impact on the social capital as most of the organizations lost their skilled and experienced workers, caused a reduction in the supply of labor, poverty through the loss of life of breadwinner and reduced productivity and ultimately the employee's income (Suau-Sanchez *et al.*, 2020; Abodunrin *et al.*, 2020). Thus, based on these arguments, this study sought to investigate the effect of COVID-19 on societal challenges empirically by testing the following hypothesis.

H2. COVID-19 has a significant effect on creating societal challenges.

2.3 Impact of COVID-19 on technology-related activities

Technology-related activities involve information technology (IT) infrastructure, technology incentives and technological paradigms that may affect the external environment (Deshmukh and Haleem, 2020; Ho, 2014). The modern manufacturing and services industry is increasingly automated and technology-driven (Aboal and Garda, 2016). It relies on modern technology to improve the efficiency and productivity of the business, reduce cost and gain a competitive advantage (Deshmukh and Haleem, 2020; Cichosz *et al.*, 2020). COVID-19 has forced businesses towards digitization and more work-from-home practices. Brem *et al.* (2021) stated that spending on digital transformation is no exception. Hence, organizations worldwide are utilizing more financial resources to acquire up-to-date technology. According to Kumar *et al.* (2020), technology will play a significant role in the current scenario. The use of digital technology can enable the workforce to work from their homes and handle their professional tasks from their smartphone, tablets, laptops and computer to keep businesses afloat during the current crisis.

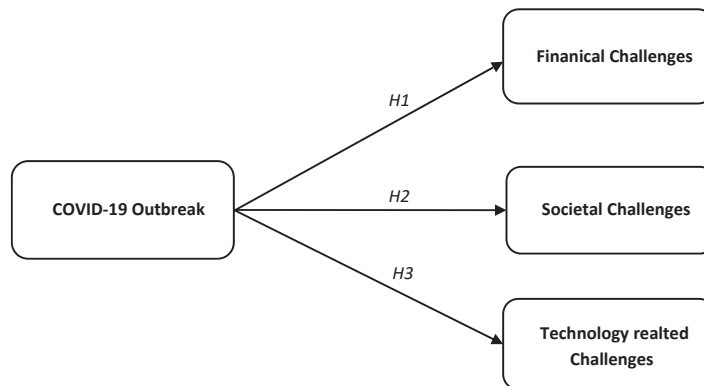
Moreover, the businesses that have designed their solutions to use the full potential of the latest technology such as cloud computing, access to digital payment methods, virtual meetings and video conferencing, can create resilience to future threats by applying future work concepts and practices that are already under exploration (Brem *et al.*, 2021). Service organizations can use digital technologies for handling customer services. According to Kumar *et al.* (2020), the digital technologies implementation in the service industry can help to reduce the chances of the contagion of the COVID-19.

Nonetheless, the recent restrictions due to the pandemic have forced workers to work from home, which has made workers and organizations more dependent on technology (Kniffin *et al.*, 2020). The sudden increase in online activities has increased economic costs and cybersecurity risks due to more people working remotely (Buil-Gil *et al.*, 2021). Furthermore, training for staff with less knowledge and urgent adoption of technology, disruption in strategic IT planning, data integration problems and strained IT departments' relationships are also significant technical issues that appear in organizations worldwide. The organizations are also losing their business development opportunities due to the cancellation of their mass events, restricting capacity in a social setting and meeting stakeholder expectations (Majumdar *et al.*, 2020). Moreover, privacy and security issues and difficulty in communications with customers, suppliers and employees are also at the forefront issues that emerged due to COVID-19 (Talwar *et al.*, 2021c). Thus, organizations require acting rapidly to ensure sufficient systems and supporting staff to keep their businesses functioning (Belhadi *et al.*, 2021). Based on these arguments, this study formulates the following hypothesis.

H3. COVID-19 has a significant effect on creating technology-related challenges.

Figure 1 outlines a conceptual model linking societal, financial and technology-related challenges amid the ongoing pandemic (COVID-19) in the service sector supply chain network.

Figure 1.
The conceptual
framework of the study



3. Research methodology

3.1 Instrument development

Since the COVID-19 pandemic is a novel infectious disease caused by a newly discovered coronavirus, no existing instrument is available to measure its implications for organizations' societal, financial and technology-related activities. Hence, a new survey instrument was developed to measure COVID-19's societal, financial and technology-related implications. The process of instrument development for this article is depicted in Figure 2 below. First, a qualitative study focused on the services sector of the emerging economies and drew data from 28 semi-structured group interviews with the top and middle-level management of the companies operating in tourism, telecom, banking, insurance and IT-related business. The purpose of choosing a top and middle-level management was to know their perspective on the newly discovered societal, financial and technology-related challenges due to the current pandemic. Experts were selected from the procurement, operations, administration, human resources and customer relations departments to cover the entire supply network. The interviewees were asked to report their remarks on the societal, financial and technology-related challenges in the supply chain network of the service industry during COVID-19. The interviews were self-transcribed and then analyzed through the deductive coding method using the thematic analysis approach. Thematic analysis is the process of analyzing data derived from the set of texts obtained through interviews. The interview-protocol questions included:

- (1) Please explain what you have learned from the current pandemic?
- (2) Based on your general understanding, please explain what kind of societal, financial and technology-related challenges have arisen in your organization amid the COVID-19 outbreak?
- (3) What are some of the strategies and supports you have used to overcome the encountered challenges?
- (4) How are employees and customers reacting to the new rules and guidelines amid the COVID-19 outbreak?
- (5) What measures and action plans have been adopted to ensure greater resilience in the supply chain network?

The interview results indicated that COVID-19 had prompted a series of societal, financial and technology-related challenges among services organizations. The first aggregated

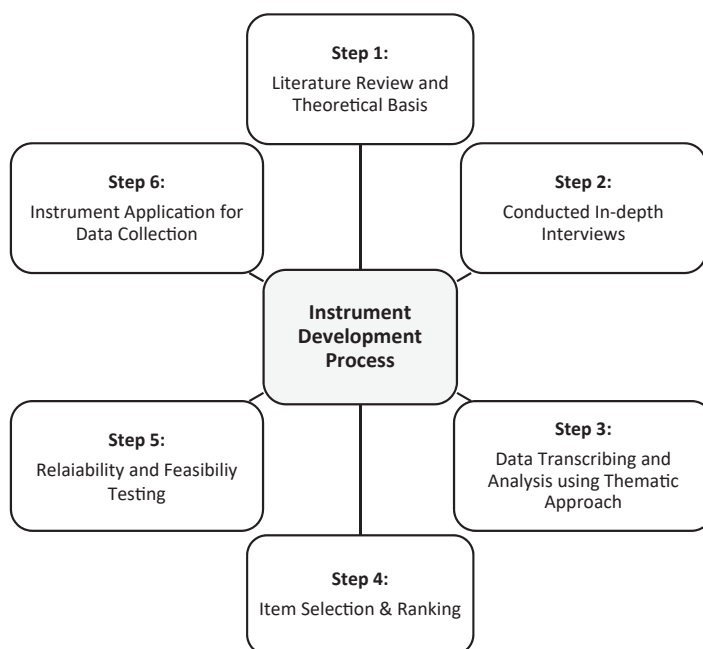


Figure 2.
Instrument
development steps

dimension of societal challenges comprised three second-order themes: connectivity and communication issues, employees' economic and health issues, and keeping up with legislation. The second aggregated financial challenges dimension comprised four second-order themes: fall in sales/revenue, a slump in manufacturing; customer issues; and a decline in global trade. The third aggregated technology-related challenges dimension comprised three second-order themes: unfamiliarity with online applications, insufficient infrastructure and difficulty communicating with customers or suppliers.

The output of the qualitative study is shown in [Appendix 2](#). Consequently, three latent variables based on the results of the interviews were designed ([Kaur et al., 2016](#)). The first latent variable (hereafter named Societal Challenges) covered the aggregated societal factors (3 second-order themes), including connectivity and communication issues, employees' economic and health issues, and keeping up with legislation. The second latent variable (Financial Challenges) covered the aggregated financial factors (4 second-order themes): fall in sales/revenue, a slump in manufacturing, customer issues and a decline in global trade. The third latent variable (hereafter named Technology-related Challenges) covered the technological factors that comprised (3 second-order themes): unfamiliarity with online applications, insufficient infrastructure and difficulty communicating with customers or suppliers. There were 62 items (First order elements/items) obtained through interviews representing three latent variables. Their responses were filtered, in the second phase, into a compiled list of valid indicators. The validity and feasibility of all items were tested with informal interviews conducted with experts from academia (two Associate Professors, one Ph.D. researcher and two Ph.D. students). The items recommended by at least three experts were retained ([Shamim et al., 2017](#)). Five items were dropped in this process, and 57 items were retained: 19 items for societal challenges, 19 items for financial challenges and 19 items for technology-related challenges verifying content validity and face validity and used for data collection from the sampled companies.

Finally, the obtained 57 items were reworded in the form of questions and presented to the respondents to get their opinion about societal, financial and technology-related challenges. The questions in the questionnaire were kept as concise as possible, with care taken on the actual wordings and phrasing of the questions. The questionnaire of this study consists of two sections, Section A and B. Section A comprised both dichotomous and multiple-choice questions that extracted the background information related to the designation of the respondents, the business sector in which the company operates, number of employees and total revenue of their organization. On the other hand, section B encloses five-point Likert scale-type questions. All items used a 5 point Likert scale ranging from 1 to 5 from “strongly disagree” to “strongly agree.” The questions were queried on the impacts resulting from the current pandemic. The survey questionnaire sample is exhibited in [Appendix 1](#).

3.2 Data collection

This research used a quantitative approach. The data were collected from middle and top management of the 15 companies involved in the tourism, telecom, banking, insurance and IT sector of UAE. The questionnaire was sent to the respondent through Google form by sharing links with the respondents. A cross-sectional survey method was employed using the convenience sampling technique. This mode of the questionnaire is best administered to cover broad geographical areas for a survey ([Sekaran, 2003](#)). In total, 400 respondents were approached. After data screening, with missing values identification and outliers' exclusions, a total of 272 responses were retained. The total response rate was 68% which is acceptable for further analysis ([Sekaran, 2003](#)).

Regarding the descriptive statistics of the participant companies' profiles, business sector, number of employees and total revenue are shown in [Table 1](#) below. The sample comprised of companies operating in the banking sector (33.33%), followed by 26.66% in tourism, 13.33% in the insurance sector, 20% involved in IT-related services, whereby only 6.66% in the telecom sector. Of the 272 respondents, 31.3% served in the organization as part of top management, and 68.7% served as middle management employees. The number of employees in our sampled companies (34.9%) had employees less than 500, 30.9% respondents were from the organization having 500 to 1,000 employees, and 34.2% were from the organizations having more than 1,000 employees. The descriptive results also revealed

Characteristics	Category	N	%
Responding companies operating in (n = 15)	Tourism	4	26.66%
	Banks	5	33.33%
	Insurance	2	13.33%
	IT-related	3	20.0%
	Telecom	1	6.66%
Serving in organization as part of (n = 272)	Top management	85	31.3%
	Middle management	187	68.7%
Number of employees in organization (n = 272)	x < 500	95	34.9%
	500 < 100	84	30.9%
	x > 1,000	93	34.2%
Revenue of the organization (Millions) (n = 272)	x < 10	68	25.0%
	10 < x < 50	78	28.7%
	x > 50	126	46.3%
Ownership of the organization (n = 272)	Local	201	73.9%
	Foreign body	13	4.8%
	Mix	58	21.3%

Table 1.
Descriptive statistics

that the most significant proportion of the respondents (46.3%) were part of the organization having a revenue of more than 50 millions, followed by 28.7%, having revenue of more than 10 millions and less than 50 millions, and 25.0% respondents were from the organization that had revenue of less than 10 millions. Organizations from different ownership structures also represented the respondents. For instance, 73.9% respondents were from domestically owned organizations; 4.8% were from foreign-owned bodies, and 21.3% respondents were from the organization that was owned by both local and foreign bodies.

3.3 Data analysis

The data analysis consisted of exploratory factor analysis (EFA) and confirmatory factor analysis (CFA). It is a rigorous process that enables the researchers to explore and confirm the factorial structure of the constructs (de Morais Watanabe *et al.*, 2020). AMOS-21.0 was employed to evaluate the measurement and structural models for testing the causal relationship among the variables. The choice to conduct a structural model is justified as the study tests the formulated hypotheses grounded by a theoretical underpinning (Kaur *et al.*, 2021). First, sampling adequacy using the Kaiser-Meyer-Olkin (KMO) test was checked, suggesting a minimum acceptable value of 0.5 (Malhotra *et al.*, 2003). The results indicated that the KMO value is 0.851, acceptable for EFA (Kaiser and Rice, 1974). Second, the measure of sampling adequacy (MSA) was checked, indicating how strongly each item or element in the matrix correlates with others (Hair *et al.*, 2016). MSA values were above 0.70 for all items found by the anti-image correlation matrix, suggesting a high degree of inter-correlation between the items (Kaiser and Rice, 1974). These results indicated that EFA could be performed.

4. Results

4.1 Exploratory factor analysis (EFA) results

SPSS 21.0 was used to run EFA. Consistent with Shamim *et al.* (2017), this study used principal component analysis (PCA) extraction method for EFA. PCA is the suggested method for identifying the minimum number of factors while representing the top portion of the total variance in a set of variables (Hair *et al.*, 2017). The rotation process of EFA followed the Promax rotation technique with the Kappa value at 4. In EFA analysis, the cut-off value of 0.50 for factor loading is considered acceptable. Shamim *et al.* (2017) stated that the item with factor loading (>0.50) is considered satisfactory while proposing a new scale. It was determined to keep only those items with no cross-loading. Initially, seven factors were produced in a pattern matrix based on 57 items of the questionnaire on an Eigenvalue of one (1). The items that were cross-loaded and having a factor loadings value of less than 0.50 were deleted. Altogether 42 items were deleted. The recent study by Grace *et al.* (2020) retained 20 items out of 57 items representing four brand fidelity factors in data reduction and dimensions identification procedures. After deleting the items, the remaining 15 items loaded on four factors (factor 1, *financial challenges* six items; factor 2, *societal challenges* three items; factor 3, *technology-related challenges* also three items, and factor 4, *COVID outbreak*, three items). The results of EFA analysis are depicted in Table 2, indicating factor loading above 0.60 of all items in the four factors matrix. The Cronbach's alpha value of all factors was more than 0.80, which is acceptable for further analysis.

4.2 Confirmatory factor analysis (CFA) results

To achieve the objectives in this article, CFA was executed among the constructs of the COVID-19 outbreak, societal, financial and technology-related challenges. A measurement model was developed (see Figure 3) to test the validity and reliability of the involved constructs. Hair *et al.* (2017) indicated that a value of 0.60 or above is acceptable for factor

Variables	Items	Four-factors extracted based on Eigenvalues			
		1	2	3	4
Financial challenges	FC1	0.899			
	FC2	0.832			
	FC3	0.830			
	FC4	0.827			
	FC5	0.820			
	FC6	0.802			
Societal challenges	SC1		0.894		
	SC2		0.865		
	SC3		0.835		
Technology-related challenges	TC1			0.879	
	TC2			0.825	
	TC3			0.808	
COVID-19 outbreak	COV1				0.915
	COV2				0.704
	COV3				0.667

Table 2.
Exploratory factor
analysis (*N* = 272)

Note(s): Extraction Method: Principal component analysis
Rotation Method: Promax with Kaiser normalization
^aRotation converged in 5 iterations

loading. Having said that, if the overall factor loading of one construct’s average standardized value is above 0.60, then the items having factor loading standardized value close to 0.60 can be retained (Hair *et al.*, 2017). This study indicated that the exogenous variable, namely the COVID-19 outbreak’s factor loading, ranged from 0.56 to 0.91. The first endogenous construct, namely, financial challenges, indicated the factor loading ranging from 0.74 to 0.84. The second endogenous construct, namely societal challenges, indicated factor loading ranging from 0.80 to 0.81. Also, the third endogenous construct, such as technology-related challenges, indicated factor loading ranging from 0.67 to 0.89.

Next, the adjustment indexes of the measurement model were extracted (see Table 3). The model fit indices showed a good fit between the constructs. Absolute fit indices measured through CMIN/DF are 3.63, near the threshold value of 3 and considered acceptable. The comparative fit index (CFI) index value is 0.90, equal to the cut-off value of 0.90, indicating a good fit (Hu and Bentler, 1999). Standardized root mean square residual (SRMR) that shows the difference between the observed correlation and the model implied correlation matrix indicated the value of 0.090, which is also interpreted as a good model fit (Hu and Bentler, 1999). The RMSEA (root mean square error of approximation) index, a value lower than 0.10, indicates a good model fit (de Morais Watanabe *et al.*, 2020). Prior studies such as Jöreskog and Sörbom (1993) suggested that an RMSEA value of less than 0.06 indicates a “close fit,” and the value less than 0.09 suggests a good model-data fit. The RMSEA value of our model is 0.091, which indicates a good model fit. Hence this model meets the conditions of model fit.

Afterward, these constructs were checked for validity issues. Convergent and discriminant validity were tested. Table 4 presents the results of the model’s validity. The results indicated that the composite reliability (CR) of all four constructs is above 0.70, for instance, *COVID outbreak* 0.79, *financial challenges* 0.91, *societal challenges* 0.85 and *technology-related challenges* 0.80 confirming the scale’s reliability. Thus, considering the results, it is possible to affirm that the model constructs have convergent validity. Moreover, the average variance extracted (AVE) for the factors was more than the threshold level of 0.50, *COVID outbreak* 0.57, *financial challenges* 0.647, *societal challenges* 0.655 and *technology-related challenges* 0.580 (Hair *et al.*, 2017). The values of AVE are higher than inter-construct correlations that affirm the discriminant validity of the scale.

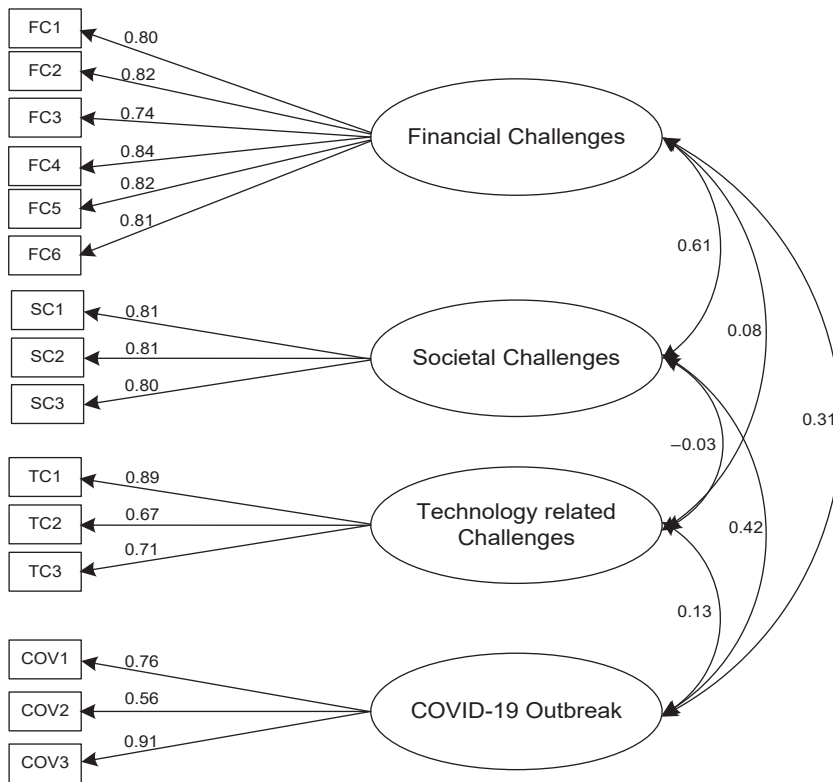


Figure 3.
Confirmatory factor
analysis

Measure	Estimate	Threshold	Interpretation
CMIN	305.092	—	—
DF	84	—	—
CMIN/DF	3.632	Between 1 and 3	Acceptable
CFI	0.901	>0.90	Acceptable
SRMR	0.090	<0.08	Acceptable
RMSEA	0.091	<0.09	Acceptable

Table 3.
Model fit measures

The study results confirmed the model's credibility and evidenced the model fit, reliability and validity of the constructs. The factor loading, CR, AVE of all the items are presented in [Table 5](#) below.

4.3 Structural model and hypothesis testing

After CFA, a structural model was developed to test the causal relationship between the COVID-19 outbreak and societal, financial and technology-related challenges, as discussed in [section 2](#). The path coefficients of the structural model and estimates of prediction ratios were used for testing the hypotheses, as shown in [Figure 4](#) and [Table 6](#). [H1](#) suggests that the COVID-19 outbreak has a significant effect on creating financial challenges. The results of [H1](#)

found that the standardized path coefficient (β) between the relationship of *COVID-19* and *Financial Challenges* is ($\beta = 0.36, p < 0.05$). Hence, [H1](#) is supported. [H2](#) suggests that the COVID-19 outbreak has a significant effect on creating societal challenges. The results of [H2](#) indicated the standardized path coefficient (β) between the relationship of *COVID-19* and *Societal Challenges* is ($\beta = 0.52, p < 0.05$). Hence, *P*-value confirms that [H2](#) is also supported. Similarly, [H3](#) suggests that the COVID-19 outbreak has an insignificant effect on creating technology-related challenges. The results of [H3](#) indicated that the path coefficient (β) between the relationship of *COVID-19* and *technology-related Challenges* is an insignificant impact with ($\beta = 0.13, p > 0.05$), leading to the rejection of [H3](#).

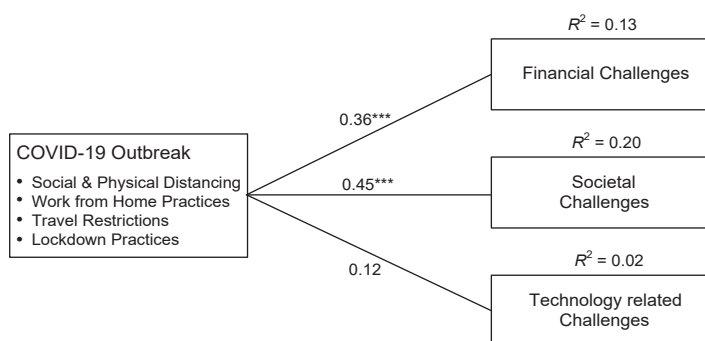
Based on the structural model results presented in [Figure 4](#), the coefficient of determination (R^2) for the dependent variable financial challenges was 0.13 and for the dependent variable societal challenges was 0.20. This shows that thirteen percent of the financial challenges are predicted by the COVID-19 outbreak (β 0.36) and that twenty percent of the societal challenges are explained by the COVID-19 outbreak (β 0.45). Thus, for these two dependent variables in the structural model, namely financial and societal challenges, medium effects were detected, with R^2 less than 26 percent ([Shamim et al., 2017](#); [Cohen et al., 2013](#)). On the other hand, the coefficient of determination for the dependent variable, namely

Table 4.
Convergent and
discriminant validity

Dimensions	CR	AVE	Financial challenges	Societal challenges	Technology- related challenges	COVID- 19
Financial_Challenges	0.91	0.67	0.804			
Societal_challenges	0.85	0.65	0.609	0.809		
Technology-related_ challenges	0.80	0.58	0.081	0.352	0.761	
COVID-19	0.79	0.57	0.127	0.416	0.127	0.755

Table 5.
Complete model of
the study

Variables	Item code	Items Please show the extent to which you believe the societal, financial and technology-related challenges triggered amid COVID-19 have the feature described by the statements	Factor loading	CR	AVE
Financial challenges	FC1	Low productivity and revenue generation	0.899	0.917	0.647
	FC2	Disruption in world supply chains	0.832		
	FC3	Additional cost on maintaining the safety of employees	0.830		
	FC4	The increased cost of transportation	0.827		
	FC5	Suppliers related threats	0.820		
	FC6	Credit and liquidity issues	0.802		
Societal challenges	SC1	Communication among employees, management and clients	0.894	0.851	0.655
	SC2	Health and safety concerns	0.865		
	SC3	Changes in customer purchasing behavior	0.835		
Technology- related challenges	TC1	Security breaches and threats	0.879	0.803	0.580
	TC2	Training for staffs with less knowledge of technology	0.825		
COVID-19	TC3	Lack of communication with customers	0.808	0.793	0.570
	COV1	New regulations	0.915		
	COV2	Management of social distancing norms	0.704		
	COV3	Work from home	0.667		

Figure 4.
The structural model
(hypothesis testing
results)

Hypotheses	Endogenous	Path	Exogeneous	Estimate	S.E	C.R	<i>p</i>	Remarks
H1	COVID-19	→	Financial challenges	0.362	0.071	5.083	0.001	Supported
H2	COVID-19	→	Societal challenges	0.522	0.085	6.156	0.001	Supported
H3	COVID-19	→	Technology-related challenges	0.130	0.075	1.731	0.084	Not supported

Table 6.
Results of hypothesis
testing

technology-related challenges, was 0.02, which shows a common effect as the R^2 value is found less than 13 percent (Cohen *et al.*, 2013). This indicates that two percent of technology-related challenges are explained by the COVID-19 outbreak (β 0.12). Hence, based on the obtained results, it can be concluded that COVID-19 has created financial and societal challenges, whereby technology-related activities are not affected by this pandemic. In a nutshell, the results indicate that the services sector emphasized digital transformation, particularly developing digital platforms for ease of working, improved consumer services and activating social media to communicate with potential customers (Belhadi *et al.*, 2021).

5. Discussion

This paper provides substantial insights into the current literature on the societal, financial and technology-related consequences of the COVID-19 outbreak by providing empirical evidence on the challenges created in the services industry. Prior studies in the context of the COVID-19 outbreak and its implications have given more attention towards exploratory and theoretical discussion rather than to empirical evidence; see, for instance, the recent studies by Kaushal and Srivastava (2021), Varona and Gonzales (2021) and Sharma *et al.* (2021a, b). The empirical results of the study indicated that social and physical distancing, work from home measures, travel restrictions and lockdown practices have two conflicting effects:

On the one hand, these practices have contributed to the reduction of economic activities, including the low economic outlook, low productivity, high unemployment, poverty, fall in customer demands, dissatisfaction and mental health, which ultimately impacts a rise in financial and societal challenges. Baldwin and di Mauro (2020b) posit that keeping the employees out of jobs and customers out of shops has decreased the economic activities worldwide, which has flattened the infection curve but escalated the macroeconomic recession curve. The findings of this study are consistent with Sharma *et al.* (2021a, b), who stated that the

COVID-19 pandemic has crippled all the economic activities and seized off the operations of the services sector, which has escalated the financial, societal concerns in the supply chain network of the organizations. [Asahi et al. \(2021\)](#) used a rich data set of localized lockdowns in Chile to measure their effect on economic activities. The results indicated that lockdowns and social distancing norms were associated with a 10–15% drop in economic activities in Chile, which is twice the reduction in local economic activity suffered by metropolises that were not under lockdown. In the past three to four months, the current lockdown had a similar effect on economic activity than a year of the 2008/2009 great recession. These findings are also in line with the study by [Varona and Gonzales \(2021\)](#), who found a statistically negative and significant impact of COVID-19 on Peru's level of economic activities. The author further stated that COVID-19 has behaved as a systematic shock to the aggregate demand and supply at micro and macroeconomic levels, affecting socio-economic activities. Notably, the results revealed that the impact of the current ongoing pandemic on societal and financial activities has been severe, with significant adverse effects on the economic outlook, unemployment, poverty, life comfort and mental health ([Straka et al., 2021](#)).

On the other hand, the results revealed an insignificant influence of COVID-19 on creating technology-related challenges among services organizations. This shows that the organizations are doing well in combating the technological challenges amidst the current pandemic. [Sparato \(2020\)](#) postulated that in 2020, Microsoft predicted that due to the COVID-19 outbreak, two years' worth of digitization in the operations has occurred in just two months. The organizations took various initiatives such as improved remote working capabilities and digitization. Specifically, the organizations have started training and simulation programs, enhanced cybersecurity, implementation of digital management systems, optimized production and distribution channels, reliability and efficiency of automated services, cloud computing and artificial intelligence, using i-procurement in purchasing and mobile payments systems ([Brem et al., 2021](#)). Besides that, the organizations have developed digital platforms for ease in working, improved consumer services, anti-cyber-crimes programs, online exchange of documents, activated social media to communicate, electronic monitoring of online violation, fraud-detecting tools and business intelligence systems. According to [Kumar et al. \(2020\)](#), the digital technologies implementation in the service industry helped reduce the contagion of the COVID-19. The current pandemic has forced the technological innovation that would previously have been incremental and taken years to move to a more radical model, where significant technological changes can be achieved in days ([Brem et al., 2021](#)). Most of the current technological innovations were already in place before the pandemic. Still, early adopters mainly used them, and the COVID-19 crisis has pushed their forced adoption by most users or consumers ([Heidenreich and Talke, 2020](#)). Thus, the adaptation to the digitization and modern technology including technology 4.0 would help organizations to satisfy customer needs and demands which will lead to improve sales and turnover ([Kumar and Ayedee, 2021](#); [Tandon et al., 2021](#)). Now is the time to avail full advantages of technological developments and innovation to react to positive change. The adoption of digital technology and innovation will also contribute to supply chain sustainability and resilience in improving demand anticipation by data analytics and supply chain visibility using digital twins ([Ivanov, 2020](#); [Khanra et al., 2021](#); [Tønnessen et al., 2021](#)).

5.1 Theoretical implications

Theoretically, the conceptual framework of this study was grounded on the postulation of contingency theory. Organizations always need to build contingency plans for their business operations. They should know the challenges they can face and new opportunities arising in the market. According to contingency theory, businesses that focus on the principle of adaptability and flexibility and have designed their solutions to use the full potential of

technology, such as cloud computing, automation and artificial intelligence, will not buckle under pressure. For instance, the cloud gives businesses easy access to digital payment methods, enabling companies to continue working by rapidly and securely providing their employees working from home with access to business applications, providing financial flexibility and enhancing the resilience of their supply chains. Therefore, based on the notion of contingency theory, this study suggests that organizations should continue developing financial and managerial responses and other safety plans to mitigate the effects of the COVID-19 pandemic and safely return to normal business operations. [Maher et al. \(2020\)](#) proposed a “resilience, intention, sustain, endurance” (RISE) framework that aims to help public and non-profit entities to navigate the economic effects of COVID-19. Based on the RISE framework, organizational actions can be classified into four stages: resilience or flexibility to react to the uncertainty; intention to take immediate actions to mitigate negative financial impacts; sustain actions to be taken for organizations’ survival and stability; and endurance of their operation against future fiscal emergencies and seizing new opportunities. Most organizations have already reinforced their online activities or found alternative markets. What is most important for organizations in a chaotic situation is to learn from their worst experiences. They should be flexible and constantly update their strategies to deal with the chaotic environment. Further, organizations need to generate self-renewal and agility by updating their strengths and developing resources to cope with the new demands of the environment ([Santacroce et al., 2020](#)). Agility, scalability and automation will be the watchwords for this new era of business, and those that already have these capabilities will be the ultimate winners.

5.2 Practical implications

This is the first study that attempted to empirically examine the societal, financial and technology-related challenges created by COVID-19 in the context of the services industry’s supply chains. Discussion on the empirical results has multiple implications and benefits for several stakeholders. Specifically, the management of the services industry, including companies involved in tourism, telecom, banking, insurance and IT-related companies, can use the insights of this research to improve shortcomings in combating the challenges they face in their operations caused due to the current pandemic. The findings will be further helpful for top management executives and industrial representatives to prepare strategic action plans and the full potential of technology adoption to salvage the losses and bring up the industry’s working potential. Administrative bodies can use the findings of this research to assess the nature of challenges incurred in the services industry that hinders the overall organizational performance. The findings of this study further imply that on the societal and economic front, the COVID-19 is turning into disrupting social capital and a financial knockout globally. The world economy is nose-diving with intensifying adverse effects on the economic outlook, jobs, incomes and livelihoods, exacerbating inequalities, poverty and hardships. While on the technological front, this pandemic has encouraged the adoption of automation and value-added technology which is in line with the Fourth Industrial Revolution. The impact of this pandemic has undoubtedly made a review of the technology adoption even more necessary and urgent in the services industry to reach a considerable number of individuals swiftly ([Yacoub and ElHajjar, 2021](#)). Hence, the COVID-19 crisis provides prominent lessons to world leaders, businesses, economists, policymakers and academic researchers about the effects of global change. The results of this study will provide strategic insights to practitioners and policy insights to policymakers to design the strategic responses to combat the challenges that appeared amid COVID-19 in the services sector. It could also assist researchers and scholars in identifying other challenges such as political,

6. Conclusion, limitations and future research directions

6.1 Conclusion

COVID-19 pandemic has severely impacted the economic outlook and health and well-being of people globally. It has been associated with some of the most significant societal, financial and technology-related challenges. In line with that, this paper aimed to empirically investigate the challenges that appeared amid the current pandemic, particularly societal, financial and technology-related challenges among the services industry's supply chains. The data were collected from the top and middle-level management of the fifteen companies operating in tourism, telecom, banking, insurance and IT-related companies of UAE. The data were analyzed using both EFA and CFA to explore and confirm the factorial structure of the constructs. The results through hypothesis testing indicated that social and physical distancing, work from home measures, travel restrictions and lockdown practices have contributed to the reduction of economic activities, including low productivity, high unemployment, poverty, fall in customer demands, dissatisfaction and mental health, that ultimately impacts rise in societal and financial social challenges. The results further revealed that social and physical distancing, work from home measures, travel restrictions and lockdown practices have an insignificant influence on creating technology-related challenges among services organizations. This shows that the organizations are doing well in combating the technological challenges amidst the current pandemic. The challenges and experiences of the pandemic in the services industry are not yet over; hence this industry needs to harmonize a comprehensive strategy and revisit the global norms that have been the backdrop in their operations for a long time. In a nutshell, COVID-19 would transform entire global and strategic processes due to innovations, socio-demographic changes and political and economic instability.

6.2 Limitations and future research directions

This study has its limitations as well. First, the sample size used for this study was small (272 responses), though it was adequate to test the current research model, which can be increased. Second, the data were collected using an online survey method from the services industry; hence the role of other industries, including manufacturing, construction, retail and other industries, becomes more crucial. Therefore, the data from the top management of other industries could provide more insights. Hence, it opens avenues for future researchers to conduct similar research by taking multiple industries in emerging economies and other countries in different contexts to deepen the body of knowledge. Third, the empirical results obtained in this research are inherently non-generalizable. Only top and middle management of fifteen companies operating in tourism, telecom, banking, insurance and IT-related companies of UAE were included in this research.

Politically, this pandemic is causing the scrutinization of some governments and may also impact international trade. Nevertheless, this pandemic is a global issue that has affected every sector of the global economy. Hence, this research urges future researchers to consider the respondents at different positions in different organizations from various countries as a sample to reduce this study's geographic specificity. Furthermore, the participants were chosen based on their availability and ease of sampling; future researchers should use a more deliberate sampling method for data collection. Future researchers may also investigate the political challenges such as protecting the safety and integrity of elections, finding the right place for expertise, coping with resurgent populism and nationalism, countering domestic

and foreign disinformation and defending the democratic model. The inclusion of political challenges will strengthen the PEST (political, economic, social and technological) model and call for careful management to minimize the political, economic, sociocultural distress and technological issues that arose from the current circumstances.

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Appendix 1 Survey questionnaire of the study

Challenges in
service supply
chain amid
Covid19

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Societal, financial and technology-related challenges amid COVID-19

The current (COVID-19) pandemic is unpredictable and evolving quickly and businesses worldwide are scrambling to manage the impact not only on people but also on their economic and technological systems. The following set of statements relate to your feeling about “Societal, Financial and Technology-related Challenges”. For each statement, please show the extent to which you believe Societal, Financial and Technology-related Challenges has the feature described by the statement. You may select any of the response that shows how strong your perceptions are. There is no right or wrong answers.

A.	GENERAL INFORMATION			
1	You are serving in this organization as a part of	Middle Management		Top Management
2	Total number of employees in your organization	$x < 500$	$500 < x < 1000$	$x > 1000$
3	Total revenue of the organization in million AED	$x < 10$	$10 < x < 50$	$x > 50$
4	Ownership of your organization is	Local	Foreign Body	Mixed

Please select “one” response to each of the following questions

B.	INDICATORS OF SOCIETAL CHALLENGES	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1	Communication among Employees, Management and Clients					
2	Employees Engagement					
3	Health and safety concerns					
4	Lockdown restrictions from the government					
5	Changes in customer purchasing behavior					
6	Changes in Customer Needs					
7	Meeting stakeholder expectations					
8	Mental Pressure of Potential job loss to employees					
9	Obligation to safety protocols					
10	Operational challenges					
11	Logistical challenges					
12	Decreased clients' satisfaction					
13	Cancellation of Mass Events					
14	Restricting Capacity in Social Setting					
15	The emergence of fines and other penalties					
16	Extreme Poverty					
17	Unemployment					
18	Job insecurity					
19	Pessimism					
C.	INDICATORS OF FINANCIAL CHALLENGES					
1	Low productivity and revenue generation					
2	Rise in operations and manufacturing cost					
3	Disruption in world supply chains					
4	Uncertainty in Oil and Gas Markets					
5	Lack of workforce					
6	SME Survival Issues					
7	Inventory shortages					
8	Additional cost on maintaining safety of employees					
9	Lack of Investments					
10	Low demand					

11	Low imports and exports					
12	unexpected demand of certain products (sanitizers, face masks, and so on)					
13	Overall firm output/performance					
14	The increased cost of raw materials					
15	The increased cost of transportation					
16	Suppliers related threats					
17	Balance of payments deficits					
18	Credit issues					
19	Liquidity issues					
D. INDICATORS OF TECHNOLOGY RELATED CHALLENGES						
1	Cost of working remotely					
2	Sudden increase in telecommuting usage					
3	Issues of remote conferencing					
4	Huge Internet traffic					
5	Privacy and security issues					
6	Additional cost for hardware/software maintenance					
7	Cyberattacks					
8	Training for Staffs with less knowledge of technology					
9	Disruption in strategic IT planning					
10	Lack of knowledge in mobile payments among customers					
11	Poor training for systems in urgent adoption					
12	Technology and equipment failure					
13	Software license restrictions					
14	Strained IT departments relationships					
15	Lack of communication with customers					
16	The necessity to move all essential services online					
17	Security breaches and threats					
18	Lack of availability of online payment systems					
19	Unexpected and hidden expenses of going offline					

Your cooperation is highly appreciated. Without your support, this research could not be carried out successfully

Appendix 2

Proposed items, themes and aggregate dimensions obtained from group interviews

Challenges in
service supply
chain amid
Covid19

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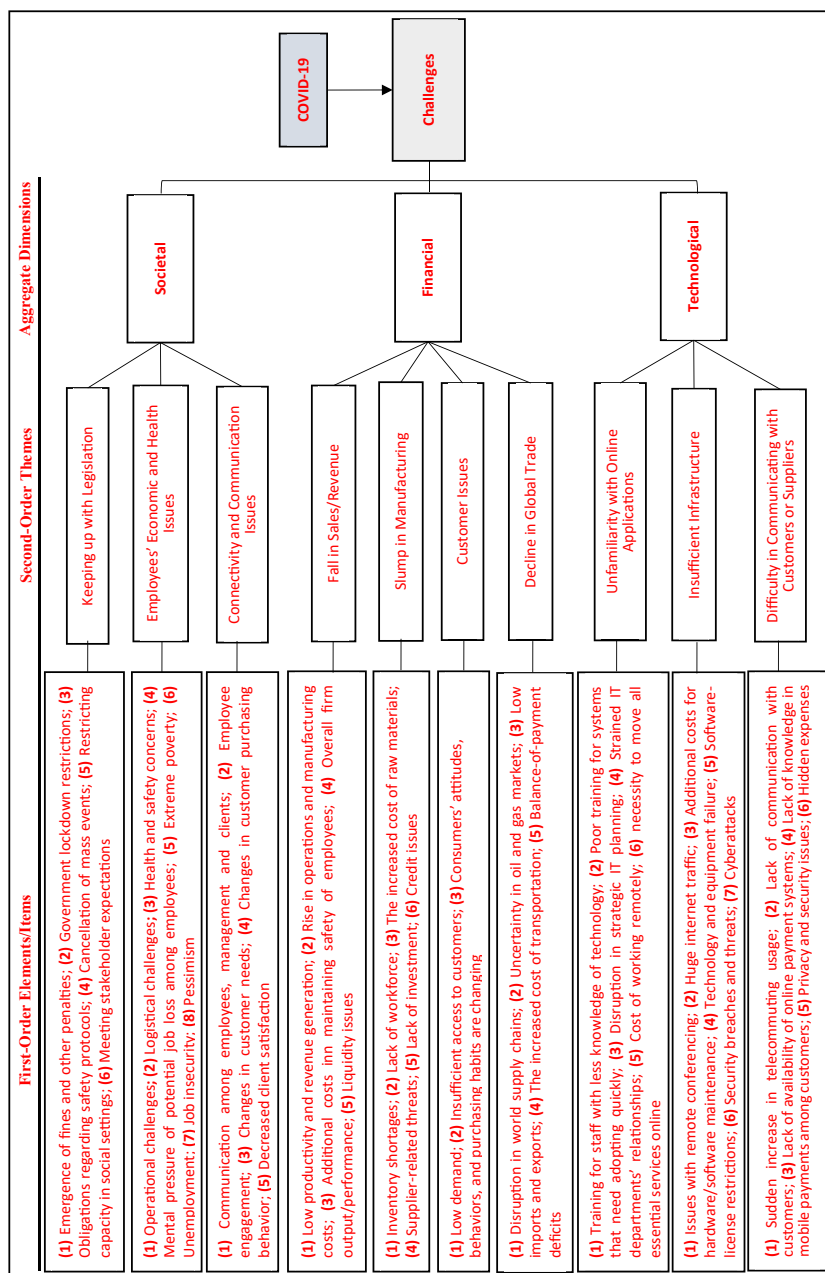


Figure A1.
Interviews results