



# Fast, furious and focused approach to Covid-19 response: an examination of the financial and business resilience of the UAE logistics industry

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## Abstract

While many other countries around the world were struggling to mitigate the immense health and economic effects of the global Covid-19 pandemic, the UAE Government ensured that no shortage of the supplies of goods and services affected the country. This has been attributed to the government's robust *financial support* to the supply chain and logistics industry during the pandemic (Atayah et al. 2021). The UAE imports over 90% of its commodities from overseas—including foods, drinks, pharmaceuticals, automobiles, clothing, electronics, building materials, logs, paper, plants, machinery, tools, and raw materials. All these products pass through the operations of the country's supply chain industry, which depends heavily on the financial institutions. Due to the above assertion, we found it necessary to empirically examine the challenges, threats and successes of the country's supply chain operators in order to ascertain their *financial and business resilience* during the pandemic based on the *survival strategies* and *financial resources* they received and employed during the unrelenting pandemic. Accordingly, this research has examined the *financial and operational resilience* of the country's supply chain organizations as reflected in their ability to maintain *efficient financial strategies* and *stable business operations* despite the scourging pandemic. Our initial findings indicate that Covid-19 pandemic interruptions on the nationwide distribution of goods and services in the UAE have been very minimal due to the government's robust *financial support* to the logistics industry, and consequently the *business* resilience developed by the industry operators.

**Keywords** Covid-19 pandemic · Financial resilience · Business resilience · Financial bailout · Emergency response strategies · Supply chain and logistics operations

## Introduction

Catastrophes or tragedies are unavoidable elements of human history (Haddow et al. 2008). Developed countries and international organizations are usually proactive in formulating strategies and taking initiatives to forestall or contain fatalities and economic effects of emergencies such as natural disasters, epidemics, and pandemics. (Perrow 2007). Handling the aftermath of such catastrophic events is very challenging for every government; and so ineffective or lack

of mitigation strategies by government agencies can cause grave disruptions in economic activities, financial services, business operations, and healthcare delivery. It is true that measuring the scope and extent of the unforeseen disasters such as pandemics beforehand is a difficult task. However, government and the disaster management agencies must take adequate steps to predict impacts of such disasters and be well prepared to handle all eventualities as efficiently as possible in order to minimize the attendant social and economic disruptions (AlShamsi and Pathirage 2015).

The world has encountered numerous challenges in the past, but in the last thirty years, the issues of natural disasters, epidemics, and wars have hindered the developmental operations and economic activities in many countries. The current global pandemic, Covid-19, also nicknamed the “Black Swan Risk,” has been estimated to have caused a decline of about 6.5% in the world's economic growth between 2019 and 2020. The cumulative global GDP loss

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from 2020 to 2025 has also been projected to a massive \$US35 trillion (McKibbin and Vines 2020). The financial sector is seen as the most severely affected by this global pandemic among all economic sectors.

In addition, the global logistics and supply chain industry has also received a high degree of volatility due to the demand uncertainty, supply uncertainty and distribution uncertainty associated with the Covid-19 pandemic (Ivanov and Dolgui 2020; Ivanov 2021). As a result, most firms operating in the industry need a *bailout (financial assistance)* and *concerted strategies* to cope with the many uncertainties occasioned by the Covid-19 pandemic and maintain sustainable business performance. When demand of goods and services increases, the supply needs to match the demand accordingly; and when demand drops, suppliers, manufacturers and logistics providers need to quickly stimulate the demand and thus reduce the cash outlays on the inventory assets (Houston et al. 2016). However, these responsive mechanisms have become more difficult to achieve in the global supply chain eco-system plagued by the Covid-19 pandemic (Dolgui and Ivanov 2021). Traditional cash-flow cycles between inventory turnover, account receivables, and account payables have also become dire and longer due to the disrupting uncertainties occasioned by the pandemic.

Since the pandemic started, many firms have been unable to liquidate their inventory assets, while payments have been delayed from 60 to 90 days or sometimes even up to 180 days in various countries. These unplanned disruptions in the global logistics environment are cogent problems that warrant the need for further investigation into the dynamics of applied *financial resilience* and *business recovery strategies* in the supply chain industry. The UAE provides a good research location for investigating how a national supply chain and logistics industry has been able to deal with such problems successfully. This study has therefore investigated the *financial and business resilience* of the country's supply chain organizations as reflected in their ability to maintain *efficient financial strategies* and *stable business operations* despite the scourging effects of the global Covid-19 pandemic.

We synthesized our research design as an extension of the “*anticipatory (intervention) and coping capacities*” model proposed by Barbera et al. (2017). To refine those *capacities*, we adopted seven (7) variables from various sources in the related literature in the development of our extended conceptual model of *business and financial resilience* in the face of Covid-19 pandemic disruption (see Fig. 2). The seven variables include—Government support, Financial resources (funding) availability, Technology application, Innovative value addition, Service-delivery efficiency, Customer satisfaction, and Customer retention. Detailed discussions of these variables have been presented as the deconstruction

of our analytical nodes in the methodology section of this paper.

## Research background

In order to overcome the turbulent healthcare and business environment occasioned by the Covid-19 pandemic in early 2020, the governments of many countries around the world, including the UAE, implemented emergency measures and policies to ensure the continued safety and economic sustenance of their citizens and residents. The UAE appears to have done a much better job in dealing with the Covid-19 disruptions compared to other countries in the Middle East, Asia and Africa regions (Atayah et al. 2021). For example, to ensure complete safety and security of the people, the UAE government imposed some drastic measures such as a complete lockdown of the entire country and temporary cessation of all inbound and outbound flights in the country during the first half of 2020. It was an emergency situation efficiently managed by the country's National Emergency Crisis and Disaster Management Authority (NCEMA 2019). Established on May 14, 2007, based on Federal Law No.2 (2011), the NCEMA is directly supervised by the UAE Government's central administration. The organization is charged with efficiently handling all emergency and disaster situations in the country. Given that NCEMA was formed as a result of the UAE Government's determination to provide safety and security to all citizens, residents and structural assets of the country, the Government ensures that its staff are regularly trained by efficient emergency management organizations from the USA and UK (Alteneiji et al. 2021).

According to a recent study published by the Dubai Future Foundation (2020), the prompt coordinating actions of NCEMA, the Ministry of Economy, and the Ministry of Transport helped to avert the grave disruptions that the Covid-19 pandemic would have caused in the logistics and supply chain sector of the country's economy. However, significant medium-to-long-term economic risks remain to be fully addressed, especially in helping various other industries in the country to bounce back to their pre-Covid years. This situation is not peculiar to the UAE alone because the pandemic has already strained the 2020–2021 global economy with a staggering financial loss estimated to the tune of \$5.5 trillion (MEED 2020). During the lockdown months in 2020, while very many supermarket-shelves in most developed economies were empty without stock, the situation in the UAE was very well managed by the UAE supply chain industry with full stock of consumer goods in all the stores around the country (Gulfnews 2020a). No store in the UAE ran out of goods even for a minute. The swift actions of the Government and logistics



industry leaders have helped to avert any bullwhip-effect in the system (Gulfnews 2017, 2002b). Nonetheless, given the continued challenges occasioned by the protraction of the global pandemic, which has lasted more than a year now, it is necessary to examine all the existing and potential *recovery strategies* that have helped or would help the UAE supply chain industry to continue coping with the economic impacts of Covid-19 until full recovery is attained (Gulfnews 2020a).

## Literature review

Many researchers have attempted to describe the term “*disaster*.” According to McEntire (2015), a *disaster* is unpredictable situation that occurs when a deadly mass-hazard confronts human beings. Shaluf (2007) also delineates a *disaster* as a social calamity that causes sickness and/or death as well as economic damages. Based on the above two characterizations, it can be seen that the impact of a *disaster* is usually two-pronged. One is the possible harmful impact on the health and lives of the affected human beings, while the other is the damaging impact on the economy of the place where the disaster has hit.

Disasters may also be man-made or natural disasters. Examples of the two categories of disaster can be deduced from the above two scholarly definitions. Firstly, a wildfire disaster (in the bush) or a domestic-fire disaster (in buildings) can be linked to McEntire’s (2015) definition, and is often advertently or inadvertently ignited by human beings. Secondly, a tornado, a tsunami, an earthquake, a volcanic eruption, or an epidemic/pandemic such as the current Covid-19 pandemic can be associated with Shaluf’s (2007) definition. These are, in most cases, natural calamities. This second category corresponds to the WHO’s depiction of *disasters* as catastrophes that cause environmental destruction, human or animal casualties, and overwhelming economic instability (Nia and Kulatunga 2017). Some other terms used interchangeably with *disaster* are “emergency,” “crisis,” “catastrophe,” “devastation,” and “cataclysm” (Alteneiji et al. 2021). However, what really matters is that both categories are potential threats to human existence, for which every country needs to be prepared and equipped to effectively tackle the disruptive impacts of the disaster.

## Impact of Covid-19 pandemic on the supply chain and logistics industry

Right from its onset in February 2020, the Covid-19 pandemic affected the global logistics and supply chain industry drastically. Most countries locked down and shut their borders for most parts of 2020, and majority of the people worked from home throughout that year. This global

disruption has forced logistics providers around the world to redefine their business model and adopt some coping and survival strategies that would enable them continue serving their global customers despite the pandemic. As explained by North et al. (2020), the pandemic has forced logistics service providers and their corporate customers to adopt drastic measures aimed at diminishing the risk of supply chain disruptions in various countries. Resellers have also had to seek alternative and back-up suppliers and logistics service providers in a desperate bid to fulfill their orders (North et al. 2020). This has led to increased competition among logistics service providers as they rushed to adopt strategies that would showcase their coping capacities.

## The UAE supply chain and logistics industry

As a vital connection point between the eastern and western parts of the world, the UAE has become a leading air and sea shipment/logistics hub for the world. As a result, most of the global trading companies have opened up offices in the UAE to take advantage of the UAE’s advanced logistics capabilities and bureaucratic flexibility. The UAE invested hugely in developing the logistics hub to allow businesses easily ship and store cargo in transit through the country by air or sea. Logistics and supply chain businesses in the UAE are also providing quality services to their local and international customers (Atayah et al. 2021). The UAE government made this possible by simplifying the country’s import and export regulations along with providing the necessary structural and technological infrastructure. Thus, the UAE has become a great example for the world, by gearing its logistics industry toward full customer-centric participation in the global economy. Indeed, the UAE prides itself as a champion of customer service, making customers the number one priority of all service providers at all levels of the national economy.

However, due to the fact that most countries closed their borders and travel bans were imposed in many parts of the world during the first half of 2020, logistics service providers based in various partner-countries found it extremely difficult to provide the necessary international logistics services. This led to an increase in the lead-time of cargo deliveries, difficulties of tracking and inaccuracy of cargo information, as well as limited transparency and visibility of cargo to customers in many countries (North et al. 2020). The result was a direct negative impact on the businesses of manufacturers who depend on imported raw materials, and re-sellers who depend on imported finished goods in the various countries. The end-users of the everyday goods were, in turn, hit with “out-of-stock” notices and empty shelves in most retail stores in several countries, big and small, developed and developing (Xu et al. 2020; Suresh et al. 2020; Belhadi et al. 2021).



Since March 2020, the Covid-19 pandemic has also caused logistics service providers to limit their capacity to accept new consignment orders from both existing and new customers. As a result, fulfilling large orders in the midst of the pandemic has continued to be extremely challenging even until date, because of the high potential risk of failure to deliver. The possibility of financial loss by all parties involved has also increased dramatically, leading to a serious disruption in customer–supplier relationships (North et al. 2020). Presently, logistics service providers are still renegotiating some of their existing contracts, as they have not been able to fulfill all the pre-Covid KPIs developed before the pandemic. In some cases, it has even become unrealistic and untenable to continue the execution of the pre-Covid contracts due to high uncertainties and cargo movements disrupted by the continued lockdowns in many countries caused by the outbreaks of new variants of the Covid-19 virus (North et al. 2020; Belhadi et al. 2021).

Going forward, the logistics service providers and their customers will have to continue developing and adopting new *business models* that incorporate *coping and recovery strategies* for dealing with the risks and disruptions caused by the still ongoing Covid-19 pandemic now and in the future. “*The Impact of Covid-19 on Logistics*” (Twinn et al. 2020) is a study recently released by the International Finance Corporation (IFC). In it, the authors recommend that for logistics providers to retain their customers and provide successful customer service, they will have to adapt to the *new business environment* and develop *new safety protocols* for ensuring the safety of cargo and the transport personnel (Twinn et al. 2020).

The adaptive changes they make must also ensure safety in cross-border cargo movements in recognition of the new boarder protocols introduced by different countries since the global pandemic started in early 2020. These protocols by various countries have increased the costs of logistics, with new implications for service providers’ cost negotiations with their customers. It is imperative to handle these new modes of operations transparently in order to maintain healthy global supplier–customer relationships. Customers of the logistics industry, being manufacturers, distributors, and retailers, must also review their own order-management strategies in order to cope with any supply disruption caused by the Covid-19 pandemic in the logistics industry.

In addition, banks and non-bank financial institutions must continue to render a helping hand by providing flexible *financial resources* to the logistics operators to enable them cope with, and adapt to, the uncertainty in the business environment (Atayah et al. 2021). Their financial intermediary role between the logistics providers and their corporate customers means that the financial institutions help in creating more mutually beneficial outcomes in contract negotiations and business relationships between the logistics

providers and their customers. New contracts should contain contingency and risk-mitigation terms that would help all parties involved to cope with present and future crises, so as to avoid any major disruption in the supply of goods and services, and also to ensure that no stakeholder is adversely affected in the national or global logistics industry.

The UAE Government deserves international commendation for pumping additional bailout funding into the systems, which has enabled the financial institutions to speedily provide such assistance to the supply chain and logistics operators in the country. The final result has been that throughout 2020 and until date, no distributor or retailer in the country has lacked goods to sell; the store shelves have remained fully stocked; and there has not been a single “out-of-stock” notice anywhere in the country since the pandemic started.

### **Business resilience during a major crisis such as the Covid-19 pandemic**

“*Business resilience*” has been conceptualized as an organization’s “ability to prevent and absorb changes and regain the initial performance level after an unexpected disturbance” (Hendry et al. 2019). In the supply chain business, Soni et al. (2014: p13) explain the concept as a supply chain/logistics company’s “adaptive capability to deal with temporary disruptive events.” While reviewing the *business resilience* strategies in the international supply chain industry, majority of the extant studies published so far focus on the different critical situations and the immediate disruptions they caused within the first half of 2020. Not many scholars were patient enough to wait and study the protracted impacts of the yet-ongoing pandemic in the supply chain and logistics industry. In contrast, this study has examined the first full year of Covid-19 and the impacts it has caused in the industry until date.

As a result of the initial rush by various scholars to publish papers on the impacts of Covid-19 global pandemic, the facts and figures regarding the economic impacts of the pandemic on the global supply chain and logistics industry have been quite scanty and not really significant. The general consensus, however, is that supply chain businesses in many countries were significantly affected by the global pandemic. Consequently, new studies to better understand the impacts of the pandemic in various countries and to discover and share novel best practices in risk-management post Covid-19 remain absolutely essential (Xu et al. 2020). In exploring the lessons so far learnt from the disruptions caused by Covid-19 in various industries, existing studies focusing on manufacturing, services, and ICT industries were examined, and the vital adoption of *new technologies* and *Industry 4.0 capabilities* was prominent (Belhadi et al. 2021). While the existing studies lack depth in revealing the *financial implications* of applying the *Industry 4.0* strategy in supply-chain



business recovery, highlighting its potential importance in the industry is worthwhile nonetheless.

It is therefore pertinent to explore more possible *business resilience* strategies, based on various frameworks, which can be used for localized industrial-sector survival, recovery and development efforts. In addition, identifying various types of collaborative strategies within and between supply chain networks is significantly necessary (Azadegan and Dooley 2021). Such network collaborations can explore the incorporation of *Business Continuity Management* (BCM) and *Supply Chain Risk Management* (SCRM) initiatives (Suresh et al. 2020). As a result, many more studies are needed even to investigate the *credit-risk and liquidity-risk* implications of introducing such collaborative survival, recovery and development strategies that would lead to the wholesome *business resilience* of the supply chain and logistics industry in the face of national, regional or global catastrophes (Gornall and Strebulaev 2018).

In Table 1, this study presents a summary of some of the most recent existing studies we reviewed in the area of the *business resilience* in the supply chain industry in times of crisis such as the Covid-19 pandemic. We identified some gaps in these and other reviewed studies, including the following:

- The new *survival, coping, and/or recovery strategies* employed by the industry operators in tackling the emergency disruptions occasioned by the crises.
- The *roles of government agencies* in helping to mitigate the business disruptions.
- The *financial bailout* of the industry by the government of the specific country involved if any.
- The *added-value in service efficiency* resulting from the new *financial and business resilience* developed by the operators.
- Changes in *customer satisfaction and retention levels* achieved as a result of the new *business and financial resilience* attained in the course of tackling the crisis.

This study therefore contributes to the existing body of knowledge in the area by examining all the above gaps we found in the literature in the context of the impacts of the ongoing Covid-19 pandemic on supply chain and logistics operations in the UAE.

### The role of technologies in times of crisis

Over the years, logistics service providers have had to adopt advanced technologies to facilitate their logistics management (Mathauer and Hofmann 2019). Advanced technologies allow companies to obtain and analyze desired data in order to develop and implement business strategies. Because

of the availability of assorted computer-related technologies today, it is easier now to control and manage logistics right from customer sourcing, service ordering, order processing, inventory management, goods movement, down to goods and service delivery (Kamran et al. 2021). Data collection by means of these technologies plays a great role in enhancing the logistics operators' predictive and proactive capabilities in anticipating, processing and fulfilling existing and potential customers' orders (da Silveira Batista et al. 2019).

There has been a rapid rise in major technological innovations in the global logistics industry, including *artificial intelligence* (AI), *machine learning* (ML), and *blockchain technologies* (BT) (Younis et al. 2021; Sundarakani et al. 2021). Within the last twenty years, international logistics service providers have invested large amounts of financial resources in automating most of their processes to inject more efficiency and effectiveness in serving their customers' shipments around the world. These innovative modernizations also introduce greater visibility and security to global logistics operations (Sundarakani et al. 2019). The result is that the logistics service providers are able to provide faster, more secure and higher-quality services to their customers, thereby attaining greater competitive advantage among competitors. In their study, Mesjasz-Lech and Włodarczyk (2020) opine that "Customer knowledge management with IT application is positively related to value delivery in business model innovation through increasing knowledge accessibility for both firms and customers." This indicates that logistics companies who invest in updating their IT systems are more likely to gain greater competitive advantage by better understanding and serving their customers more efficiently and effectively (Sundarakani et al. 2019). There has also been significant development in the hardware technology, whereby electronic seal, RFID technology and robotics are now being used in handling freights more safely and efficiently.

Across the globe, the concept of digitalization or digital transformation has been evolving as a process for fusing digital technologies with already existing traditional operational methods. This is leading to a major paradigm shift in most industries (Belhadi et al. 2021; Kamran et al. 2021). Evidently, this upgrade in systems application in the industry is also helping in the development of *novel business models* and *unprecedented rapidity* in the dissemination of goods around the world. However, this swift rise in the infusion of digital technologies into the industry is also posing some big challenges, such as *incompatibility of technologies* across various parts of the world. Organizations need to learn how to cope with *incompatible technologies* in foreign countries, as well as the proper way to adapt to new *disruptive technologies* while trying to remain competitive in the global market (Kouvelis and Zhao 2018). Overall, the need for supply chain and logistics operators to adopt transformative



**Table 1** An analysis of some very recent studies on logistics business resilience in times of crisis

No.	Authors	Literature title	Research summary	Research gaps
1	Suresh et al. (2020)	Business Continuity Management for Supply Chains facing Catastrophic Events	<p>Summary of the BCM methods is provided</p> <p>Description of disparate risk management attempts of supply chain professionals</p> <p>Framework for business continuity management for supply chain risk management is developed</p> <p>Suggests a pathway for closing the gap between supply chain resilience research and efforts in industry to develop a more resilient supply chain</p> <p>Focus areas where research-based resilience approaches can be implemented are identified</p>	<p>Focused majorly on two supply chains—grocery and medical devices supply chains</p> <p>Challenges of implementing the proposed framework is not discussed</p> <p>Business continuity, supply chain risks, Credit risks and liquidity risks need further investigation</p> <p>Decision models for supply chain designs that avoid over-focusing on costs only</p> <p>Evaluation models to reduce a focus on savings and payment terms only</p> <p>How does Covid-19 impact current and non-current supply chain financing?</p> <p>Consider the value of flexibility, short response times and multiple sources as well as methods for enriching supplier segmentation</p> <p>1. Only a high-level overview of the impact on various sectors and commodities provided</p>
2	Remko (2020)	Research opportunities for a more resilient post-Covid-19 supply chain: closing the gap between research findings and industry	<p>Article investigates the Covid-19 impacts on effectiveness and responsiveness of Global Supply Chains (GSCs) and proposes a set of managerial insights to mitigate their risks and enhance their resilience in various industrial sectors</p> <p>Analysis indicated that post Covid-19, GSCs will tend to be shorter through revamped strategies focusing more on relocations and back-shoring</p>	<p>Causes behind delayed responsiveness and reduced visibility not studied</p> <p>Effectiveness of the proposed initiatives and contingency plans not investigated</p> <p>Has financial catalysts any role in counterfeiting the supply chain risks that appear due to Covid-19?</p> <p>How can supply-chain managers repurpose their supply-chain to integrate corporate social responsibility and resilience?</p> <p>How can supply-chain managers integrate industry 4.0 capabilities to strategize and achieve business resilience against supply-chain disruption in highly uncertain and complex scenarios?</p> <p>Can a collaborative financial risk-management strategy be deployed at all supply-chain levels in order to proactively develop a standard contingency plan to deal with major crises?</p> <p>How can financial support affect the supply chain business-resilience strategies?</p>
3	Xu et al. (2020)	Impacts of Covid-19 on global supply chains: Facts and Perspectives	<p>Integrated time-to-recovery and financial impact analysis, empirical survey and semi-structured interviews were used</p> <p>Localized supply sources and industry 4.0 technologies identified as significant strategies by automobile industry</p> <p>Business continuity by defining operations at the airport and flights perceived significant strategy by airline industry</p>	
4	Belhadi et al. (2021)	Manufacturing and service supply chain resilience to Covid-19 outbreak: Lessons learned from the automobile and airline industries		



Table 1 (continued)

No.	Authors	Literature title	Research summary	Research gaps
5	Chen et al. (2019, 2020)	Building resilience and managing post-disruption supply chain recovery: Lessons from the information and communication technology industry	<p>Real-time information sharing and cooperation among supply chain stakeholders is critical</p> <p>This study investigates the post-disruption stage, and its management</p> <p>This study analyses six companies in the ICT industry in Taiwan</p> <p>Clustering effect has been discovered and explained</p> <p>An integrated framework to establish an effective post-disruption management process</p>	<p>Research conducted only in the supply chain of six companies in the ICT industry in Taiwan</p> <p>Research into Pre-disruption process could be conducted</p> <p>Qualitative and quantitative methodologies need to be investigated</p> <p>Impact of IT systems and tools on disruption and management of information disruption could be explored more thoroughly</p> <p>How can network resilience be measured in absence of network data?</p>
6	Azadegan and Dooley (2021)	A Typology of Supply Network Resilience Strategies: Complex Collaborations in a Complex World	<p>In the essay, a typology of resilience strategies linked to different types of collaboration within and between supply networks is explained</p> <p>Existing literature focuses on micro and macro level supply network resilience</p> <p>This essay identifies a third type: Meso-level resilience</p>	<p>What are the impacts of organization/stakeholder type and diversity on resilience?</p> <p>Consider networks beyond that of the industry sector. Possible research questions are:</p> <p>How do meso-level resilience networks achieve complex adaptive behavior?</p> <p>How do macro-level networks achieve effectiveness as institutions?</p> <p>Consider the solitary and combinatory effects of resilience network types. Possible research questions are:</p> <p>How can different forms of network resilient strategies be theoretically distinguished?</p> <p>How do all levels of resilience interact with each other?</p>



digital innovations and proper financial strategies to deal with emergencies cannot be overemphasized (Jing and Seidmann 2014).

### Financial resilience in the face of a major disaster

Although the *financial frameworks* identified in the related literature were limited to small-scale networks, the influence of *financial frameworks* on *business resilience* and the trade-offs between *firm robustness* and the *recovery time* were some of the findings in the extant literature (Teece et al. 2017; Li et al. 2020). Cam and Ramiah (2014) studied the influence of *systematic risk factors* and *econometric adjustments* during catastrophic events, and established a positive *ripple-effect* relationship between *financial resilience* and *economic stability*. However, studies that focus on the influence of *ripple effect* in the context of supply-chain *business performance* are quite limited in number (Sharma and Naude 2021; Ivanov and Dolgui 2021). Some other studies also indicate that a supply-chain design level that incorporates the dynamic role of *financial sustainability* leads to a more effective *business resilience* (Fahimnia and Jabbarzadeh 2016). More recently, Gerth et al. (2021) assessed the effectiveness of *financial product innovations* in the UAE during the Covid-19 pandemic and found that availability and innovative usage of *financial resources* during the crisis was pivotal to the *survival and recovery* of various firms in the country that were *financially distressed* as a result of the Covid-19 pandemic.

Despite the foregoing, it is worthy of note that the impact of *financial sustainability* has still not been fully investigated in the logistics and supply chain domain. As a result, there is a lot of room for further investigation into the impacts of *financial sustainability* on supply chain survival in times of national or global catastrophes. Other emerging themes, such as the relationships between *solvency capital requirement (SCR)*, *resource-based view (RBV)* framework, *financial risk management*, *firm agility*, and *firm performance*, have also been discussed in some existing studies, while the *resource-based view (RBV)* framework particularly has been shown to have positive effects on *business reliance* (Monaghan et al. 2017; Liu et al. 2018).

However, further studies with deeper conceptual and analytical investigations are still necessary in order to establish the universal applicability of these evolving trends (Albishri et al. 2020; Sundarakani et al. 2021), especially in the context of incorporating parallel memetic algorithms for managing disruptions and coping with uncertainties (Hasani and Khisrojerdi 2016). Some of the studies in the area have used the *Grey Prediction Model (GPM)* in a simulation to identify trends and forecast values of *financial performance indicators* along with error estimations (Rajesh 2017), but the model lacks extendibility in

terms of incorporating other sustainability measures and indicators (Zhen et al. 2020).

A common limitation in many of the studies reviewed is that they were based on *resilience simulations and modeling* in company-specific contexts. Implementation of findings from such studies is also likely to be company-specific. Principally, many of the studies lack the comprehensive exploration of the concepts and variables that would robustly determine *financial resilience* in the context of supply chain networks across various industries. As a result, there is a strong need to investigate the *financial-resilience frameworks* that can trigger industry-wide *recovery* in times of national or global crisis (Teece and Linden 2017; Srivastava and Vishnani 2021). Without such robust financial frameworks, the industry-wide *recovery time* from a major crisis, such as the Covid-19 pandemic, would be very long, leading to potential business losses if the disruptive crisis continues. This study has addressed this research gap by adapting and extending the “*financial resilience framework*” of Barbera et al. (2017) into a *business resilience* model, which we have tested in the context of tackling the impacts of the Covid-19 pandemic in the UAE logistics and supply-chain industry (see Fig. 2).

### Modern emergency management: the 4-phase approach

The 4-phase approach is widely used in various countries for the management of emergencies and disasters. This approach is essential in identifying the steps that must be taken by emergency management agency leaders to guarantee the safety of the society. The 4-phase approach acts as a guideline for the international principles of emergency management standards. The approach comprises the following activities (as depicted in Fig. 1):



Fig. 1 The 4-phase approach emergency management. (Source Compiled by the authors from the extant literature reviewed)





*Mitigation:* The first phase involves eradicating either or both the *probability* and/or the *consequences* of a particular hazard. The primary objective of this phase is to analyze, in both structural and non-structural ways, the critical issue at hand, and ensure it does not have a significant negative effect on the society, (Parsons 2008).

*Preparedness:* This is a result-driven phase, which increases the chance of survival of the individuals within a community whose lives have been disrupted because of the disaster. It also aims to minimize the financial loss facing the people, by appropriately equipping them with means of coping with the emergency (Alexander 2005). Due to the critical role of this phase in the community, ample research resources and time need to be devoted to studies on this phase in order to ensure that emergency organizations retain the best technical and procedural knowledge and skills for accomplishing the goals of the stage (Dillon et al. 2009). Rapid emergency response is of utmost importance, and is usually considered a failure if the actions carried out during this *preparedness* phase is inadequate or ineffective (Waugh and Tierney 2007).

*Response:* The *response* phase includes taking all necessary actions and precautions to ensure the possible arrest of the emergency situation in very little time, to minimize its negative impact, and to avoid any additional suffering and loss of life and property. One very important component of the response phase is “relief,” which is widely used within international emergency management circles; and the estimated degree of danger and risk involved in the emergency determines the level of skills and expertise required to handle it occurrence (Brito 2007).

*Recovery:* The last phase focuses on normalizing the lives of the individuals and groups affected by the disaster. This step can only be taken after the *response* phase has been completed, and can take months or even years to conclude (Coppola 2015).

The above four phases provide guidelines for specifying the duties of all emergency responders. They also help the administrators to analyze the situation and prepare appropriate levels of response to minimize the casualty and effectively manage the situation. The framework helps to ensure that all the plans and actions are implemented among all agencies collaboratively, for effective risk reduction and maximum safety for the stakeholders.

## Research model development—the business resilience framework

### Synthesizing our business resilience constructs into a research model

In developing a conceptual model that would characterize our major construct of interest—*business resilience in the face of Covid-19*—we adopted the “*engineering perspective on resilience*” in line with Barbera et al. (2017). This perspective emphasizes the employment of an organization’s “*capacities*” to repel and diminish (or eliminate) the negative impacts (shocks) of a crisis on its business operations. At the onset of the crisis, the organization promptly mobilizes certain “*capacities*,” especially additional *financial resources*, in order to cope with, recover from, and/or adapt to the new critical environment. By so doing, the organization assumes a *robust and resilient attitude* that enables it to swiftly recover from the negative impacts of the crisis and ensure its long-term survival and operational continuity in the face of the crisis.

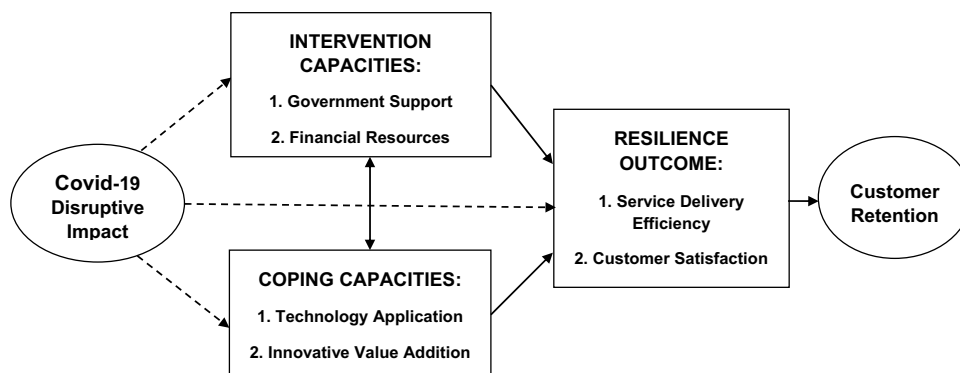
Using the following seven (7) variables culled from our literature review, we synthesized both the “*anticipatory (intervention) and coping capacities*” in our research model in line with Barbera et al. (2017). We argue that employing these “*capacities*” would enhance the *business resilience* of supply chain and logistics operators in the UAE by helping them to mitigate the disruptive shocks of the Covid-19 pandemic on their business operations. In addition, conceptualizing the model has also enabled us to measure the operators’ *resilience outcome* in the context of how robustly they have continued to deliver *efficient services*, maintain *customer satisfaction*, and increase, decrease or sustain their *customer retention* levels despite the unrelenting pandemic. The seven variables that constitute the main constructs of our conceptual research model include:

1. Government support
2. Financial resource (Funding)
3. Technology application
4. Innovative value addition (new processes)
5. Service delivery efficiency
6. Customer satisfaction
7. Customer retention

With the above variables, we synthesized the research model as a novel dimension that extends the “*financial resilience framework*” developed by Barbera et al. (2017)



**Fig. 2** The conceptual model of the research—business resilience in the face of Covid-19 pandemic (model construction based on the “financial resilience framework” of Barbera et al. (2017))



in the context of the UAE supply chain and logistics industry’s *business resilience* in the face of the ongoing Covid-19 global pandemic (see Fig. 2).

## Research methodology and data collection

### Sampling method

This qualitative study is focused on examining the *financial and business resilience* of the supply chain industry in the UAE as empowered by the *financial support* of the UAE Government in the face of the global Covid-19 pandemic. The strategic measures taken by some of the industry operators to mitigate the risks and disruptions of the pandemic, with the *financial assistance* of the Government, were investigated to determine their *resilient effectiveness*. Due to the nation-wide lockdown in the country almost throughout the first year of the pandemic, our data collection had to be done online as *videoconference in-depth interviews* of top executives of the five (5) largest supply chain/logistics companies in the country using the Zoom videoconference platform. For ethical purposes, the identities of both our sample subjects and their organizations have been kept anonymous, but the business focus of their organizations has been identified (see Table 3). Qualitative studies enable the collection of in-depth data directly from individuals (one by one, face to face), the analysis of which afford the researcher the ability to gain deeper longitudinal insights into the issue being investigated and into each respondent’s attitudinal dispositions concerning the issue (Mohajan 2018).

Our in-depth interviewees were selected because they are experts in the field of supply chain and logistics management. They are top-level decision-makers within their respective organizations, and have therefore been involved in handling their companies’ business activities for many years. Due to their vast industrial knowledge and experience, they have also been representing their organizations

in the industry’s collaborations with the UAE Government regarding the country’s “fast and furious response” to the disruptive effects of the Covid-19 pandemic. In addition, they are also involved in the industry’s self-directed collaborative efforts to achieve a rapid *recovery* of that sector of the economy. The identified experts were contacted to participate in our in-depth interviews, and they gave their consent before the interviews were conducted in the months between December 2020 and February 2021. The *in-depth interview* method of qualitative data collection has been shown to be a sound approach for mining data that would enable thorough exploration of all longitudinal dimensions of any problem or task in any field of study under complex situations (Yin 2003). Our qualitative data have been analyzed with appropriate rigor in line with the suggestions of Locke (2002), Locke et al. (2020), and Shah and Corley (2006).

### Operationalizing the research constructs

To operationalize the central construct in our research—*business resilience in the face of Covid-19*—the gaps we discovered in our literature review were pulled together as our study variables. The variables were then used to configure the conceptual model of our research as an extension of the “*financial resilience framework*” developed by Barbera et al. (2017). The model afforded us the ability to examine the *business and financial resilience* of the UAE logistics and supply-chain service providers in the face of the disruptions caused by the ongoing Covid-19 pandemic during its first year (2020). Below is a summary of the conceptual meanings of the seven variables, which also constitute the analytical nodes in our qualitative data analysis using the NVivo 12 software:

1. Efficient service delivery—The ability to provide complete and uninterrupted customer-service deliveries despite the destructive impacts of the crisis.



2. Innovative value addition—Innovative processes and strategies introduced in the service operations to retain or increase patronage despite the crisis.
3. Technology application—Novel technologies introduced in the service-delivery operations to overcome the negative impacts of the crisis.
4. Government support—Non-monetary, organizational and motivational interventions and operative guidelines issued by the government as part of the collaborative management of the situation to mitigate the disruption of economic activities during the crisis.
5. Financial resource (funding)—Continued availability and effective utilization of additional financial resource provided as a bailout by the government or any other organization for combating the destructive effects of the crisis.
6. Customer satisfaction—The rate and level of satisfaction attained among new existing and existing customers due to continued service efficiency despite the crisis.
7. Customer retention—The number of current customers retained or lost, and new customers gained or failed to gain, due to the level of customer satisfaction attained during the crisis.

To collect and analyze our data in order to determine the *business and financial resilience* of supply chain and logistics operators in the UAE, we designed the in-depth interview questions to cover all the seven (7) variables in our conceptual model as explained above. An extra question (the first question) to confirm if the respondents' companies actually felt any impact of the crisis was also added, making eight (8) interview questions in total (see Table 4). The variables have enabled us assess the overall *service delivery efficiency* of the operators in the face of any business interruptions caused by Covid-19 during its first full year (Shen et al. 2020; Atayah et al. 2021). In Table 2, we present the in-depth interview questions addressing the variables that define our central construct of interest as used during our data collection. Also provided in Table 2 are the rationales further explaining each question and the contributory role it plays as a variable in helping to determine the *business and financial resilience* of the supply chain and logistics operators in the country.

### Data collection by in-depth interviews of experts

Data collection in qualitative research involves obtaining non-numerical data, mostly consisting of discussions, opinions and explanations of the phenomena of interest by the respondents, who are usually very knowledgeable about the issues involved or the object of the investigation. It involves the interviewer asking the respondents pertinent questions that allow them to share their expert-knowledge,

perspectives, opinions and experiences about the subject matter of the investigation. The data collection technique is usually a semi-structured method that requires the willful consent of the sampled respondents to be involved in the open-ended interviews (Gopaldas 2016).

In this research, the data collection technique used is *in-depth interview*, which is a qualitative method that may include data mining instruments such as observations, focus group discussions, or one-to-one interviews. In *in-depth interviews*, the interviewees answer the interviewer's questions either face-to-face or via a remote medium such as a telephone, email, or a videoconference platform (Bonevski et al. 2014). Through this personal interaction, it is easier to gain a thorough subjective understanding of the phenomenon of interest—in this case, the *business resilience* of supply chain and logistics operators in the UAE. In this study, we have employed *online one-to-one in-depth interviews*, conducted via the *Zoom Videoconference* platform between December 2020 and February 2021.

As earlier stated, five very senior-executive experts from the top five (5) logistics and supply-chain service providers in the country were interviewed for the study (Table 3). The choice of these top executives was based on their expertise, their years of experience in the logistics and supply chain industry, and the large sizes of their companies as the top five in the country. In addition, the business operations of their companies cover various types of logistics services—including bulk distribution, haulage, cargo handling, local and international freighting, shipping, clearing and forwarding, and logistics solutions.

## Data presentation, analysis, and discussion of findings

### Data presentation

In Table 4, we present the *transcribed verbatim responses* to our eight (8) questions as provided by the top UAE supply-chain and logistics experts during the in-depth interviews variously held between the months of December 2020 and February 2021.

### Confirming data reliability and objectivity using the CTDC framework

In order to ensure *reliability* and *objectivity* of qualitative research data, various methodology scholars have advised that qualitative data should be collected in such a way that another researcher can replicate the same study elsewhere with respondents of similar characteristics under the same conditions and obtain similar results (Yin 2003; Shah and Corley 2006). It has also been suggested that collecting



**Table 2** Operationalizing the research constructs—rationales of transforming the variables into in-depth interview questions

Variables defining the 'Business resilience' construct	Interview questions	Rationales
1. Efficient, uninterrupted <i>customer-service delivery</i>	Did your company implement any new strategic plan to overcome any Covid-19 disruption and continue uninterrupted customer-service delivery since the pandemic started?	To understand the level of importance given by the logistics/supply chain companies to providing <i>efficient and uninterrupted services</i> during (and despite) the Covid-19 pandemic
2. Innovative <i>value addition</i> in customer service to retain or increase patronage	Are there any innovative extra value-added services you have introduced to retain and/or increase your customer-base since Covid-19 started?	To understand the extent to which the service providers go in <i>providing added value</i> so as to fulfill customer satisfaction, retain existing customers, and possibly gain new customers despite the Covid-19 pandemic
3. <i>Novel technologies</i> and/or <i>updates</i> introduced in the service-delivery to mitigate/hinder the adverse effect of the pandemic on business operations	Did your company invest in new technologies introduction (and/or existing technology updates) to ensure uninterrupted/improved customer-service processes during the pandemic?	To understand the priority of the logistics/supply-chain operators in maintaining business resilience by increasing operational efficiency through <i>novel technologies</i> and <i>system updates</i>
4. Non-monetary government motivational intervention and support to mitigate the disruption of economic activities	Has the UAE government offered your industry any operational support/guidelines for tackling and minimizing trade disruptions in the country during Covid-19?	To understand the level of importance attached by the Government to <i>ensuring/supporting</i> uninterrupted logistics operations in the country during the pandemic
5. Continued availability and effective utilization of additional <i>financial resources</i> due to government bailout funds pumped into the industry in the face of the crisis	Has the UAE government injected more money into the logistics sector as a financial bailout to ease the trade and promote rapid business recovery in the face of the pandemic?	To understand the level of support provided by the government and financial institutions in the country as bailout and soft loans has helped to cushion the effects of business disruptions and stimulate rapid recovery. This would indicate a boost of <i>financial resilience</i> in the logistics sector of the country's economy
6. Customer <i>satisfaction</i> rate due to continued service efficiency	Have the UAE financial institutions made the sourcing of this funding more accessible and to easier to repay, without too much burden? Have your customer satisfaction rates become lower, remained the same, or increased due to continued operational efficiency since the pandemic started?	To understand whether the business resilience strategies put in place by logistics operators during the pandemic have led to increase in <i>customer satisfaction</i> or not
7. Customer <i>retention</i> rate due to continued customer satisfaction	Have your customer retention rates become lower, remained the same, or increased due to your level of customer satisfaction during this pandemic period?	To understand whether the level of customer satisfaction yielded by the <i>business resilience</i> attained by the industry has also resulted in increased <i>customer retention</i> , or not



**Table 3** Interview sample subjects—top 5 supply chain/logistics experts in the UAE

Company	Nature of company business	Respondent's position	Years of industry experience	Contact with customers
Company A	Air freight	Executive director, export services	18 years	Yes
Company B	Break bulk cargo	Customer care group head	12 years	Yes
Company C	E-Logistics	Founder & CEO	15 year	Yes
Company D	Tech-road transporter	Snr. customer services manager	10+ years	Yes
Company E	International freight forwarder	Head of pricing and sales	13 years	Yes

qualitative data in a “*formal and systematic manner*,” with the same interview questions asked similarly across all the respondents, will equally enhance the “*trustworthiness*” and “*generalizability*” of findings from the qualitative data (Locke et al. 2002; Locke et al. 2020).

To achieve this, the above scholars suggest that qualitative researchers should use data-collection methods such as *in-depth interviews* and/or direct *observations* of the “people directly experiencing the phenomenon” of interest (Shah and Corley 2006:1928; Locke et al. 2002). It is therefore understood that collecting qualitative data in the above ways would confirm the “*Credibility, Transferability, Dependability and Confirmability (CTDC)*” of the data (Shah and Corley 2006:1830, citing Lincoln and Guba 1985).

In this study, we have conducted *in-depth interviews* with experts who are directly operating in the logistics and supply chain industry at very senior management levels. Their companies are also directly grappling with the impacts of the Covid-19 pandemic. They have numerous years of first-hand knowledge and experience of management in the industry, and are also directly involved in managing the Covid-19 disruptions within their organizations. Moreover, the same set of *in-depth interview questions* was used for all the expert-respondents in a formal data-collection manner, all in line with the above suggestions of Locke et al. (2002) and Shah and Corley (2006).

In terms of analysis of qualitative data, *content analysis* and *keyword frequency* of the constructs of interest are some of the qualitative analysis methods suggested in the extant literature (Denzin et al. 2006; Locke 2002; Locke et al. 2020; and Yin 2003). These two analytical methods establish and confirm the *reliability* of the associations between and across the data received from all the qualitative research respondents (ibid). In line with the *CTDC framework* for ensuring “*trustworthiness*” of qualitative research data (Shah and Corley 2006:1830—citing Lincoln and Guba 1985), we ensured that our interview respondents also possess the required “*extended engagement in the field*” (ibid:1830) as they are all experts in the area of this study, which meets the “*Credibility*” dimension (C) of the framework. We have also presented in this paper a detailed description of the

“*concepts, categories, and structures related to the processes revealed in the data*” (ibid), and our data therefore comply with the “*Transferability*” dimension (T) of the framework. In addition, we employed the “*purposive and theoretical sampling*” (ibid) method suggested by the authors, in the sense that we were *judgmental and selective* in deciding to sample only experts in the logistics and supply chain industry who have had more than 10 years of experience in this same industry.

Moreover, as also suggested by the methodology scholars, we ensured that our “*informants’ confidentiality (was) protected*,” thereby complying with the “*Dependability*” dimension (D) of the framework (ibid). Lastly, we were meticulous in recording and managing the data we collected from the respondents, and have presented a “*verbatim transcription of the interview*” (ibid) in this paper (Table 4) as required by the fourth/last dimension of the “*Trustworthiness*” (CTDC) framework, which is the “*Confirmability*” dimension (C). Based on the foregoing, we are confident that we have complied with all requirements for ensuring the *reliability* and *objectivity* of our qualitative research data as contained in the existing literature.

## Data analysis and discussion of findings

### Analysis of the verbatim responses

Answering our first interview question, two of our five respondents (40%) agreed that Covid-19 had affected their businesses by slowing down their operations during the pandemic lockdown. The other three (60%) asserted that it did not do much but they were forced to downsize their manpower due to the lockdown and the *Government’s* safety protocols during the first few months of the global pandemic. However, we consider even the downsizing of the number of their employees during the pandemic as an impact of the Covid-19 pandemic.

For the second question, all five experts (100%) confirmed that their companies implemented various *strategies* in order to keep up their *efficient and uninterrupted operations*, such



**Table 4** Supply chain/logistics industry expert responses to the interview questions

Questions	Expert-interviewees' verbatim responses				
	Company A respondent	Company B respondent	Company C respondent	Company D respondent	Company E respondent
What has been the impact of the Covid-19 pandemic restrictions on your company's performance in handling goods?	Human resources downsizing with less workers; but not much impact on our services and results	Our business activities slowed down because we were forced to reduce the number of handling workers	The lockdown and quarantine policy has slowed down our business. Not as busy as before Covid-19	We have not sustained too much impact because our handling staff are now working on shifts	Covid-19 has not affected our operations too much, although we had to reduce workforce
Did your firm implement any new strategic plan to overcome any disruption and continue efficient uninterrupted service delivery since the Covid-19 pandemic?	Yes, we had to downsize the workforce to keep the operation going, while conforming to the Government's restrictions	Yes, we placed our focus the most essential workers and updated our systems for uninterrupted and efficient service delivery	Yes, we had to respect the quarantine policies while focusing on the satisfying only our existing customers with uninterrupted services	Yes, we updated our systems and implemented the shift system for our goods-handling workers, and so retained our efficient services	Yes, we had to reduce our workforce to only the most essential workers, and increased the workload of those remaining in order to retain uninterrupted services
Are there any innovative extra value-added services you have provided to customers since Covid-19 started?	No. Our services have remained the same. Nothing else was added to our services	Yes, we updated our processes to lessen both paperwork and processing time for our customers	No, we had to suspend some of our after-sales customer services due to the movement restrictions	Yes, we now offer one-stop, total-service solutions to our customers via our new interactive systems	Yes, most of our documentation processing is now done 100% online due to the Covid-19 restrictions
Did your company invest in any new technologies and/or updates to ensure uninterrupted/ improved customer-service processes during the pandemic?	No, but we have mostly maintained our existing systems very well	Yes, we updated our current hardware and software systems to accommodate more online operations and lessen processing time	Yes, we increased the capacity of all our automated systems	Yes, we updated our computer systems and acquired new telecom technologies to provide one-stop, total-service solutions to our customers	Yes, we updated all our systems to enable 100% online interactive processing of all documentations for our customers
Has the UAE government offered your industry any business environmental support to avoid or minimize trade disruptions in the country during Covid-19?	Yes, through the NCEMA, the Government provided new safety protocols and working patterns that have helped us at this time	Yes. The UAE Government's NRF has provided good emergency policies and guidelines to ensure safe and continued operations	Yes, the NCEMA's guidelines and enlightenment programs have been quite helpful and the Government has been very supportive	Yes, thanks for the clear policies and protocols laid down by the UAE Government, we have seen very little trade disruption in the supply industry	Yes, we have followed all the safety protocols and guidelines provide by the Government through NCEMA, and so we have not had any major business interruption
Has the UAE government injected funds into the logistics sector as a financial incentive to ease the trade and promote rapid business recovery following the pandemic?	Yes, the Government pumped some extra funds into the Supply Chain industry and made sure that the banks are making it easier to source financing	Yes. The Government provided a potential bailout funding for the industry to avoid disruption of the supply and distribution of goods in the country. The banks have also been very helpful in facilitating the easy sourcing of funds to update our systems	Yes. The UAE Government never jokes with the import and distribution of good in the country and so funds were provided to ensure no disruption in the supply chain system. Banks have also helped us with financing our capacity increase	Yes. As you know most commodities, farm produce, and consumer goods consumed in the UAE are imported from other countries. The Government provided adequate funding to avoid any major disruption by Covid-19	Yes, the UAE Government injected huge funds in the logistics sector and this ensured that wholesale and retail stores in country continue to be fully supplied despite the pandemic, while many developed countries experienced low inventory in their stores during the lockdowns



Table 4 (continued)

Expert-interviewees' verbatim responses					
Questions	Company A respondent	Company B respondent	Company C respondent	Company D respondent	Company E respondent
Have the UAE financial institutions made this funding more accessible and easier to repay?	No. I think we have remained at the same level. Since our operations have remained fundamentally the same, our customers have been as satisfied as before and we have retained all of them	Yes, we became more resilient and robust due to our updated systems. We have therefore been able to increase our existing customers' satisfaction while accommodating new customers despite the pandemic	Yes, with increased funding, we were able, not only to increase our systems capacity, but also to automate most of our operations. Therefore, yes, I would say that our customer satisfaction is higher	Yes. Thanks to the funds injected by Government, we were able to update our computer systems and acquire new telecom technologies, which enabled us to increase turn-around time for our customers. This in turn increased their satisfaction	Yes, with the extra funding, we were able to update all our systems to enable 100% online interactive processing of all operational documentations. This means 100% online customer service, which has led to higher customersatisfaction for us
Has your customer satisfaction level become lower, remained the same, or increased due to your resilient operational efficiency since the pandemic started?					
Finally, what of your customer retention rates? Have they increased or reduced since the Covid-19 outbreak due to your level of customer satisfaction?	Although we have not been able to increase our customer base, we have been able to retain all existing customers	Yes, we have been able to increase the retention of our existing customers. We have not lost any existing customer, but have not added new ones either	Our customer retention rates have increased too, although we have not increased our customer base	We have increased both our existing customer retention and acquisition of new customers	Our higher customer satisfaction has also led to increased customer retention and even addition of new customers for us



as focusing on the most important parts of their business operations, updating their IT systems, downsizing the operational staff, and boosting online *customer services*. These measures ensured that their companies remained fully operational and profitable despite the pandemic.

Responding to the third question, three of the respondents (60%) confirmed that the companies became more *innovative* by offering *added value* to their customers, including lessening paperwork volume and processing time, introducing new interactive systems, and now doing all document processing exclusively online. The other two companies (40%) did not add any new strategies apart from downsizing employees to cut cost and remain profitable.

For the fourth question, four of the five experts (80%) confirmed that their companies implemented new *ICT technology applications* with new and upgraded systems to shorten their processing time, automate their entire process, and make their operations more accessible and interactive for the customers. Only one of them (20%) confirmed that his company maintained their systems at the same existing technological level as before the pandemic.

Regarding the fifth question, all five industry-experts (100%) confirmed that the UAE Government gave the logistics and supply chain industry in the country adequate operational support and safety guidelines during the pandemic. Through the emergency guidelines of the NRF and the safety protocols of the NCEMA (2019), the Government provided new policies that ensured continued optimal and safe operations by all companies during the pandemic period.

Answering the sixth question, all the experts (100%) also confirmed that the UAE Government pumped *extra funds (financial bailout)* into the industry during the pandemic in order to enable banks and non-bank financial organizations provide additional *financial resources* to the logistics and supply chain companies in the country during the pandemic crisis. This sixth question could easily be classified as the most important factor in the study because it has to do with the very essential *financial bailout* of the industry by the UAE Government, and is pivotal to making all the other resources and strategies possible and effective (Atayah et al. 2021). All five experts (100%) confirmed that the government pumped in adequate extra funding into the industry in order to ensure that no logistics/supply chain company lacked any form of *financial assistance* during the pandemic period. This financial assistance enabled the entire industry to remain *financially resilient* in providing efficient, uninterrupted *business services* throughout the period of the pandemic (Huang et al. 2020; Atayah et al. 2021).

Based on the expert responses to the fourth, fifth and sixth questions above, it is obvious that the timely and extensive support provided by the UAE Government contributed immensely to the uninterrupted operations of all the companies in the logistics and supply chain industry. The result

was felt all over the country, to the effect that throughout the lockdown period, no retail store and no business in the country lacked any of their goods to sell. The entire population of the country was able to buy anything they wanted during the lockdown and afterward. There has not been a single day of “out-of-stock” notice for any product in any store anywhere in the country since the pandemic started. This has boosted consumer confidence in the country to a new high level of 118 points (tradingeconomics.com 2021).

In response to the seventh question, four of the five experts (80%) confirmed that the *satisfaction level of their customers* increased during and after the pandemic period due to the innovative and resilient strategies they implemented during the pandemic period to ensure efficient uninterrupted services. Only one of the experts (20%) responded that his company maintained the same level of *customer satisfaction* as before the Covid period, in such a way that although their customer satisfaction level did not increase, it also did not decrease.

In the same vein, for the last (eighth) question, the same four of the five respondent-experts (80%) affirmed that their companies were also able to increase their *customer retention rates* due to their operational resilience, service continuity, and increased efficiency during the pandemic period. The same one expert (20%) also stated that his company maintained the same level of *customer retention* as before the Covid-19 breakout.

#### NVivo “text search query” (word count) analysis

To analyze our qualitative data in this study, we applied two types of “query” analysis in the NVivo 12 analytical software to establish the trends of *occurrence* and *relationships* between the vital keywords across the expert opinions of all our study respondents. These two approaches are the *Text Search Query* and *Keyword Association* analyses in NVivo 12. They help to establish both the *keyword count (frequency)* and the *keyword relationships* across all the respondents’ expert-opinions about all the variables in the study (see Table 5 and Figs. 3 and 4).

After inputting the five industry experts’ verbatim responses into the NVivo 12 software, we ran the *Text Search Query* with the instruction for the software to identify the *top 25 most-recurrent keywords* across the five experts’ verbatim responses. Table 5 shows the 25 most-recurrent keywords identified across the dataset, as well as their total *frequencies and percentages*. In addition, Fig. 3 shows a pictorial representation (*keyword mapping*) of the same top 25 most-recurrent keywords in their comparative graphic sizes, relative to their counts (*frequencies*).

From the above table and figure, one can see that the top seven (7) most-recurrent keywords our NVivo 12 *text search query* are *Customer, Government, Systems, Retention,*





**Table 5** Keyword frequency—using the “text search query” (word-count) analysis in NVivo 12 (results show the 25 most-recurrent keywords across the respondents’ verbatim opinions). *Source* Data analysis with NVivo 12

Word	Length	Count	Percentage
Added value	5	7	3.535353535
Application	11	5	2.525252525
Availability	12	5	2.525252525
Company	7	5	2.525252525
Covid-19	5	8	4.04040404
Customer	8	21	10.60606061
Customers	9	12	6.060606061
Delivery	8	6	3.03030303
Existing	8	7	3.535353535
Finance	7	5	2.525252525
Funds	5	5	2.525252525
Government	10	17	8.585858586
Impact	6	7	3.535353535
Increase	8	6	3.03030303
Increased	9	9	4.545454545
Interview	9	5	2.525252525
Online	6	5	2.525252525
Operations	10	5	2.525252525
Processing	10	5	2.525252525
Retention	9	10	5.050505051
Satisfaction	12	7	3.535353535
Service	7	9	4.545454545
Services	8	7	3.535353535
Systems	7	13	6.565656566
Updated	7	7	3.535353535
		198	100



**Fig. 3** “Keyword mapping” analysis in NVivo 12: representing the 25 most recurrent keywords across the expert opinions in comparative graphic sizes

*Service, Covid increase, and Satisfaction.* These keywords aptly summarize the core *trend* in the study, and help to establish the *business resilience* of the UAE logistics and supply chain companies in the face of the Covid-19 pandemic during the months covered in the study. The impacts of *Government* support, and the companies’ updated *IT Systems*, helped the industry operators to improve *Customer Service*, increase *Customer Satisfaction*, and thereby increase *Customer Retention* despite the disruptive effects of the pandemic.

### NVivo keyword association analysis

We also ran a *keyword association* analysis in the *NVivo 12* software to establish the *relationships* between *Satisfaction*, *Retention*, and the *Customer*. The result, as presented in Fig. 4, shows direct *relationships* among the three keywords. *Satisfaction* is directly related to *Retention*, and both of them are also directly related to the *Customer*. We can therefore safely conclude, in agreement with the experts interviewed, that the increase in their companies’ *customer satisfaction* is what has led to increase in their *customer retention* even in the face of the Covid-19 pandemic (Harrison et al. 2014; Abu-Salim et al. 2017).

Lastly, observing all the above keywords (Table 5 and Figs. 3 and 4) extracted by the two NVivo 12 analyses of our dataset, one can clearly see that the variables that define our overarching research construct (*resilience*) are mostly the same ones also extracted by the qualitative-data analysis software across the responses of all the five experts. This is a confirmation that these keywords (variables) have truly contributed to establishing and confirming the *business resilience* accomplished by the logistics and supply chain companies in the UAE during the Covid-19 pandemic (Soni et al. 2014).

## Conclusion

### Theoretical implications

At times of national or global crisis (such as the Covid-19 pandemic period), *financial resources* suddenly become scarce in many organizations. It is therefore imperative for major industries to seek *government financial bailout*, and to use the *bailout funds* judiciously in revamping their *operational models* and *IT systems* as suggested by Teece and Linden (2017) and Teece (2018). This will ensure that they increase both their production and service-delivery *efficiencies* as an industry, and also collectively remain relevant as a major sector of the country’s economy. In addition, such an operational overhaul will equally help



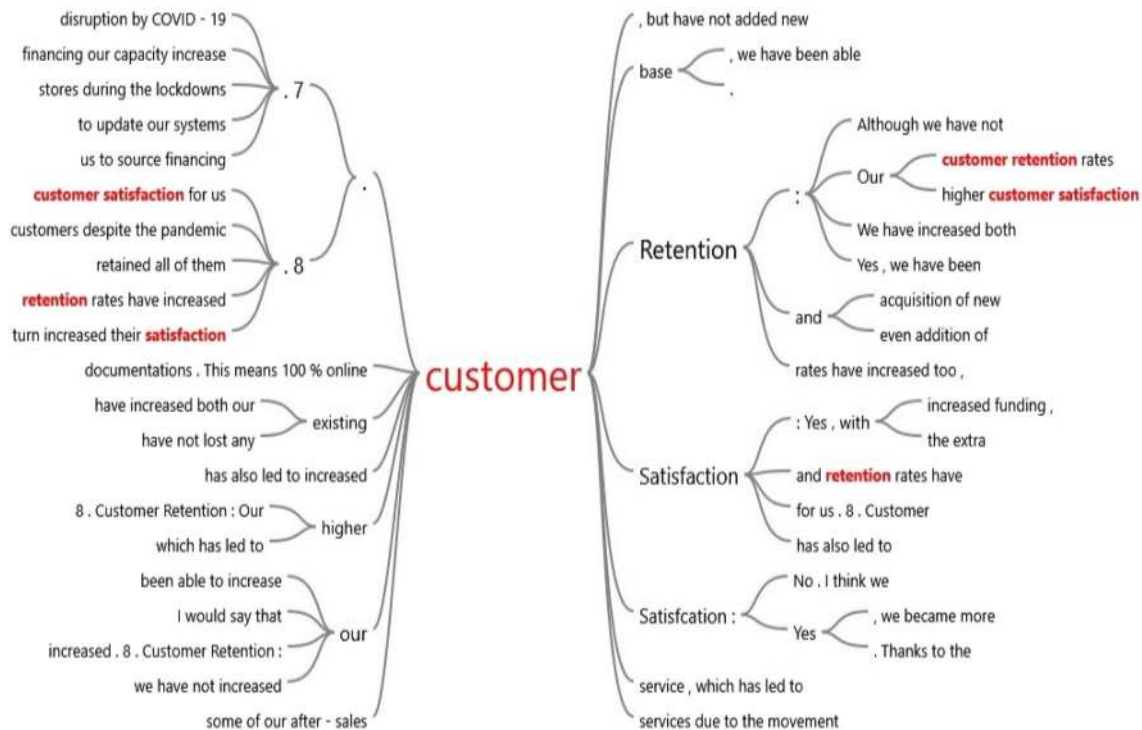


Fig. 4 “Keyword association” analysis in NVivo 12: association of “satisfaction” and “retention” to the “customer” in the experts’ opinions

certain member-organizations to attain/retain *competitive advantage* within their industry (Abu-Salim et al. 2020).

Our present study has revealed that the above assertion is not only true but also feasible. Thanks to the UAE Government’s *financial bailout*, the logistics and supply chain industry in the country was able to revamp its *digital capabilities* and *operational strategies* in a dynamic way that has demonstrated their *business resilience* in the face of the Covid-19 crisis (Atayah et al. 2021). Consequently, this study has contributed to verifying the *Dynamic Capability Theory (DCT)* proposed by Teece et al. (1997). The implication is that, in this twenty-first century, *digital transformation of operational processes* has become the most vital necessity consequent upon the injection of *additional financial resources* into any industry during a national or international crisis. As a result, the *DCT framework* has become even more relevant today for attaining *business resilience* in any major industry in times of major national or global emergencies (Kuuluvainen 2012).

### Managerial implications

As evidenced in our study, the *business resilience* accomplished by the UAE logistics and supply chain industry has led organizations within the industry to attain several *operational efficiencies* and *business benefits*. These include

faster production/delivery timing, shorter waiting time for customers, increased speed to the market, higher scope of operations, and higher levels of new customer acquisition, customer satisfaction, and customer retention (Onyia and Tagg 2011; Abu-Salim et al. 2017). Our study therefore indicates that emerging markets, such as the UAE, possess greater market opportunities and substantial business benefits in embracing *disruptive innovations* during major crises, especially if such innovations are enabled by a timely *government financial support*.

Existing literature seems to suggest that only the developed countries are technologically advanced enough to implement new data analytics and the latest digitization initiatives (Sundarakani et al. 2019), but this study has shown that a fast-developing country like the UAE can also successfully implement such initiatives. We therefore recommend that the logistics and supply chain industries of other fast-developing countries that are still straining under the Covid-19 pandemic should also adopt the *business and financial resilience strategies* discussed in this paper in order to sustain and improve their logistics operations. As we see a wave of digital transformations in the vertical logistics industry (Kamran et al. 2021), robust and resilient decision-making approaches and solutions have become more pertinent for logistics companies to maintain or surpass their pre-Covid output levels.



## General synopsis of the study

To conclude this study, the verbatim (expert-opinion) data and analyses presented in this paper affirm the *business and financial resilience* accomplished by the logistics and supply chain industry in the UAE in the face of the Covid-19 global pandemic. We have also demonstrated that the variables we examined were indeed able to define the ability of the industry to mitigate the disruptive impacts of the pandemic on their business operations in line with Li et al. (2020).

The UAE Government, through the NCEMA and NRF, provided robust *operational and financial support* to the logistics and supply chain industry in the country, which has helped them to employ and implement innovative strategies in tackling the disruptive business condition occasioned by the Covid-19 pandemic. To effectively mitigate the consequences of the pandemic, NCEMA ensured a good leadership framework and effective safety coordination among all the sub-agencies for effective management of the Covid-19 crisis in the country. Together with the robust *financial bailout* by the Government, this helped the logistics and supply chain companies to introduce new *ICT systems* and novel strategies that have enabled them to attain greater *business resilience* in the face of the crisis. This has translated into the countrywide industry being able to retain steady and uninterrupted distribution of goods and services throughout the period of the pandemic, much better than many developed and developing countries have done (Atayah et al. 2021).

Lastly, our findings reveal that the disruptive impact of Covid-19 in logistics and supply chain operations in the UAE has been quite minimal due to the UAE Government's *operational and financial support* to the industry. As a result, the logistics and supply chain companies were able to demonstrate optimal *business resilience* in their operations despite the global pandemic (Goldbeck 2020). It is therefore our avid assertion, in agreement with Shen et al. (2020), that *financial support* (especially from the government) is a highly indispensable factor in the *preparedness* of the logistics and supply chain industry toward effective *response, mitigation, and recovery* in the face of such a global disaster. Consequently, a *financial bailout*, such as the one implemented in the UAE is highly crucial for ensuring a steady supply and distribution of commodities in any country impacted by a major national or international crisis (Alexander 2005; Parsons 2008; and Coppola 2015) such as the Covid-19 pandemic.

## Limitations and further research

### Limitations

The major limitation in this research was the lockdown experienced in the entire country during first year of the

Covid-19 pandemic. As part of the safety precautions, the UAE Government imposed a no-movement curfew for 24 hours and that made it difficult to get in contact with other experts of the industry. As a result, we were only able to obtain consent from the five experts interviewed in this study. Fortunately, they happen to be industry-experts in the top five logistics companies operating in the country. Nonetheless, given our thorough analysis of their *verbatim expert opinions* in line with the *CTDC framework* for ensuring "trustworthiness" of qualitative research data (Shah and Corley, 2006:p.1830), we are confident that our findings can be applied in the logistics and supply-chain *resilience* context of any other country if similar critical conditions are maintained.

### Future research

There is a lot of scope for further research to understand more economic and financial impacts of the Covid-19 pandemic on different industries in many countries. While this study has focused on the intervention strategies of the government and logistics/supply chain industry in mitigating the impacts of Covid-19 on business operations, further studies could focus not only on the logistics/supply chain companies but also on the impacts of the pandemic on their customers, or on other very different industries. For example, the impact of Covid-19 on the buying power of retail customers could be studied, regarding how they have coped with the pay slashes by various employers during the pandemic, and whether or not they are willing to pay higher prices to get better services in times of such a crisis. Lastly, future researchers could also examine and possibly compare/contrast the pandemic impacts and mitigation/recovery strategies in the logistics industries (or other industries) across various other countries.

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