



Concept Paper

Sustaining Enterprise Operations and Productivity during the COVID-19 Pandemic: “Enterprise Effectiveness and Sustainability Model”

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Received: 28 May 2020; Accepted: 11 July 2020; Published: 24 July 2020



Abstract: The research explores key factors impacting enterprise operational sustainability and the ability to transcend adversity during different stages of a crisis, such as the COVID-19 pandemic. The current study draws from the Theory of Crisis Management Teams, the Stakeholder Theory, and the Distributed Cognition Theory to build an “Enterprise Effectiveness and Sustainability Model during Pandemic.” Existing theoretical background joint with contemporary success case studies helped to identify the essential aspects and strategies enterprises should employ to survive and thrive during crisis and post-crisis. We have conceptualized an innovative approach to COVID-19 from the perspective of organizational characteristics, operations, digital transformation, and financial planning. The findings suggest that enterprises having distributed leadership, workforce and adaptive culture sustain business operations during a pandemic. Furthermore, resilient enterprises allow for more informed and decentralized decision-making. Prosperous organizations leverage Internet and Communication Technology (ICT) and integrate Intranet, social media, and online communication platforms into their daily business routines, as this helps to establish trust and build bonds with employees, stakeholders, and customers during and post-crisis. Finally, balancing between the stockpiling of resources and resiliency is crucial in anticipation of a crisis. Therefore, we conclude that enterprises with financial contingency plans sustain their business operations during a pandemic.

Keywords: COVID-19 business implications; sustainability in crisis; COVID-19 management; sustainable enterprise; enterprise effectiveness; pandemic sustainability model; enterprise sustainability; COVID-19

1. Introduction

There is a noticeable rise in the number of annihilative crises all over the world: from natural disasters to disease eruptions. The severity trajectory caused by COVID-19 varies across countries and economies, with the most serious effects reported in Italy observed on March 28. Spain reports the second-highest incidence rate recorded on March 30, while the U.S., rejecting the lock-down policy and continuing with business as usual, counted to 484 death cases on 28 March. Severity is determined by the level of health care system capacity, population age, and density. As noted by Wang et al. (2020), population density and contagion degree are determinants of speed and severity [1]. The dynamic trajectory was found to be homogenous within and heterogeneous across continents. For instance, China, Japan, and South Korea were found to have a similar trajectory, as did Taiwan and Iran, while

adverse dynamics were recorded in Germany. Furthermore, France and the U.K. had similar death cases dynamics, while it significantly differed from Iran [2].

The current global pandemic of the COVID-19 virus has adversely impacted the economy in countries around the world, with the most massive negative implications to follow. The forecast of the World Trade Organization predicts global trade volume could plummet from 12.9% to 31.9%, while the International Monetary Fund (IMF) predicts that the global economy is expected to shrink by 3% in 2020 [3]. According to the fund's chief economist, the cumulative loss to GDP over 2020 and 2021 due to the COVID-19 pandemic could be around 9 trillion dollars, which is more than the size of the Japanese and German economies combined [4]. The United Nations Department of Economic and Social Affairs (DESA) predicts that GDP growth in 2020 in developing countries will decrease by 0.7 per cent, whereas in the developed countries, GDP will drop to −5.0 percent [5]. Around the world, stock markets lost approximately one-third of their values between February 20 and the end of March [4]. The International Monetary Fond (IMF) described the decline as the worst since the Great Depression of the 1930s [3]. The cornerstones of the economy that are private and public enterprises have been severely affected. The enterprise revenues have dropped drastically, putting their sustainability in question, with many left on the brink of survival. According to the estimations of the China National Bureau of Statistics on 24 April 2020, circumstances have severely affected corporate giants such as JCB and carmaker Nissan, with car sales in China dropping by 48% per cent in March [4]. "IHS Markit PMIs index for the United States show a moderate contraction in manufacturing (48.5) and a historic fall in services, to 39.1 (from 49.5 in February). A similar pattern is observed in Europe, with the manufacturing PMI retreating from 49.2 in February to 44.5 in March and the services PMI falling disastrously, from 52.6 in February to a never-before-seen 28.4 in March" [6]. In China, over 240,000 enterprises declared bankruptcy [7]. Enterprises are suspending operations and laying off employees, leading the economy into a downward spiral towards a new crisis with severe socioeconomic implications [8]. In the United States, more than 26 million jobs were lost, making the unemployment rate of 4.4% in March the highest since August 2017 [9]. To sustain the economy and enterprise operations the demand for products and service should also be stable. The multitude of interests and the progressively multidisciplinary nature of disaster control present niche challenges to academics and practitioners alike. Empirical research examines crises in business contexts and develops an observational way to tackle the issue [10–12].

At the pre-event and prodromal stage of a crisis, measures can be taken by enterprises and managers to establish schemes to prevent or curb the effects of a crisis or disaster (epidemics, terrorist attacks, economic crises). Firms are generally incapable of stopping the crisis from occurring but can detect the crises on time and apply coping strategies to lower the risks [13]. The integration of well-established Crisis Management theories allows us to draw valuable insights and develop a suitable conceptual framework that has its application in enterprise management during COVID-19. A theoretical review focusing on detecting the crisis, mitigating risks, and guiding the group dynamics during disruptions allows us to identify essential tenets for the novel conceptual model. Existing theoretical frameworks of the Theory of Crisis Management Teams (CMT), the Stakeholder Theory, and the Distributed Cognition Theory provide a perspective on vital organizational functions that are building blocks when designing a successful response plan. Hermann (1963) defined the crisis as an unexpected threat to high-priority values of the organizations, providing a limited response time [14]. The Theory of Crisis Management Teams was developed by Mitroff (1988) with the initial idea that "organizations confronted with unstable and unforeseeable environments should have permanent CMT's" [15,16]. The main merits of this theory may be summarized in that it stresses the vital role of establishing teams consisting of all business units across the organization that can adjust to severe challenges. These teams are responsible for creating an adequate yet flexible response plan [17]. The theory supports the value of networked organizational structure and distributed leadership, as well as the importance of an emergent leadership team, the so-called nerve center assigned with the task of stress-testing of several simulation-driven scenarios [16]. To associate our conceptual model

with supply chain diversity, we used the underlying assumptions of the Stakeholder theory [18]. Stakeholders are all interested parties claiming ownership or involvement with the organization, such as clients, employees, and suppliers upon which the organization's survival depends. Therefore, according to Freeman and Reed [19], each strategy or activity exercised by the management team must be taken with regards to the welfare of crucial stakeholders. Some studies suggest that considering the well-being of critical stakeholders during a crisis may accelerate organizational recovery [20]. Finally, we have incorporated maxims derived from the prominent psychological Distributed Cognition Theory in the model [21]. The theory lays on the assumption that knowledge is not restricted to a person but also relies upon the social and environmental domains [21]. Rather than static, information exchange is a dynamic process involving different components, such as one's mental space or external environment, therefore calling for the coordination between internal and external. To survive the crisis, an organization needs to ensure information flow between all business units, thus creating a shared knowledge model upon which team coordination is made possible [22]. This may include the exchange of skills, tacit knowledge, interpersonal trust, team planning, and inter-organizational decision-making facilitated by external resources, such as IT and a variety of communication tools. An effective plan supported by effective communication techniques during crisis enhances shared mental models and improves performance even when catastrophic events occur. Furthermore, emergent leadership responsible for team coordination has to take into account the scope of individual and team performance along the lines of shared knowledge in Distributed Cognition Theory [23]. This notion helped to shape the assumption that sustainability is more likely to be achieved with distributive leadership. Individuals' roles in the organization should not be rigid, but flexible, and a certain amount of autonomy in decision-making should be present. This way, one can step out of their usual activities and redirect their actions or assume another employee's role to meet the emerging requirement.

Even though contingency and risk management plans exist in enterprises, the immediate effects of crisis and failure in performance indicate that the implementation of the current programs is inappropriate, or that the plans do not have practical value. Companies are underprepared for a crisis of immense magnitude, and the economic implications that stem from the crisis. Consequently, there is a need to carefully evaluate economic actors and business processes in times of severe crisis. Current theories do not accurately assess enterprises' operations, effectiveness, and actions during disease outbreaks. A more in-depth insight into the catastrophes and disasters, and possible hazards may help in the formation of schemes by firms to cope with such events. By comprehending these circumstances, more productive tactics could be created to lower the impact of the shock to enterprises, regardless of their complexity. Enterprises characterized by a networked structure, distributed workforce and leadership, flexible and straightforward guidelines and less interdependence are more adaptable and can deal with the disastrous situation more effectively [24].

To explore the application of a new pandemic sustainability model, a conceptual research methodology was applied. The conceptual research methodology is justified given that empirical development of pre-crisis contingency planning effectiveness has been questionable. Risk management studies are lacking the integrated sustainability model that is applicable in the face of internal and external crisis. Our framework is substantiated by prior research and case studies. Literature was examined to find out if there is sufficient evidence to support suggested relationships of the model. We chose the descriptive and interpretative approach for its immense explanatory strength and ability to challenge outdated assumptions regarding rigid and hierarchical organizational structure and culture. We draw our hypotheses by observing the current progress of the pandemic and by analyzing existing knowledge in disaster management sphere. For this purpose, we reviewed relevant studies on catastrophes and epidemics management, IMF reports, and carefully obtained data from case studies on the economic impact of disasters, as well as the most recent reports on the progression of COVID-19.

The main contribution of the study is the conceptualization of a novel sustainability model for enterprises during the COVID-19 crisis, i.e., an "Enterprise effectiveness and sustainability model." In the process of conceptual framework development, we have identified main actions, processes,

and innovations conducive to enterprise resilience and prosperity in adverse circumstances. Time of crisis is in large characterized by scarcity of resources; thus, we point to practices and manners, enabling companies to wisely allocate their resources, indicating which operations they should support, implement, or suspend. We provide recommendations for business scholars and managers for examining the novel ways of adaptation to the turbulent socioeconomic environment and emerging business landscape. Implications stemming from successful sustainability practices research are of great theoretical and practical value for business risk management research field. Furthermore, this paper contributes to the study of a pandemic economy and provides essential information regarding the management of COVID-19. This study adds to the existing literature by integrating key features successful enterprises have previously applied to not only maintain their activities but prosper post-crisis.

The crisis economy is a field with many research challenges. As a result, a new area within the crisis economy called “Pandemic economy” should be conceptualized. The current study focuses on ensuring the sustainable economy through the continuous operations of enterprises during the COVID-19 virus pandemic. According to the Corporate Social Responsibility Theory (CSR), organizations unify to mitigate the damage and improve community welfare during crisis, such as the current COVID-19 pandemic [25,26]. The problems that this study is aiming to address pertain to organizational governance, operations management, and sustainability of enterprises.

The scarcity of knowledge in the context of epidemics and pandemics justifies the study. To create a truly sustainable economy and adaptable society, it is crucial to develop and manage novel constructs on the enterprise level, which are increasingly complex and uncertain in times of pandemics and epidemics. To the author’s knowledge, there is a lack of systematic discussion in the existing literature on the ways to manage the businesses and economy during pandemics and epidemics. Filling in this gap presents a strong rationale for undertaking the study. Management science factors, such as leadership, workforce, technology and digitalization, organizational processes, organizational nature, change management, and enterprise success have not been investigated in the context of a pandemic such as COVID-19. Therefore, the current study identifies key managerial and organizational factors and conceptualizes a framework that helps enterprises navigate through adverse times, such as the COVID-19 virus pandemic.

By examining the behaviour of economic actors and identifying factors conducive to the success of enterprises, we built a conceptual model that supports sustainability for companies during severe and widespread disease outbreaks. Establishing and validating the credibility of the “pandemic economy” is being sought by suggesting that economic actors do not behave in standard manner during the pandemic crisis. Consequently, they need to develop new ways of thinking and acting. This study addresses the need to develop a conceptual framework, which will be used to sustain enterprise operations and a market economy during the time of crisis, more specifically, disease outbreaks where the movement of people and commodities are limited. Furthermore, the possibility of the findings being valid and applicable in various other contexts is considered.

2. Crisis Management and Enterprise Sustainability

Management theory views disasters as political and organizational issues. Some of the vulnerabilities which exist in the society can be rectified by efficient leadership and strategic plans. Employing strategic planning, enterprises may eliminate some of the hazards, mitigate consequences of adverse incidents, and be more in control of its fate.

Apart from establishing various phases of crisis management, such as detection, prevention/preparation, containment, recovery, and learning, these models have also given corresponding crisis-response strategies for sustainable development [27–29]. The term sustainable development is used to defend the reduction of vulnerability and the mitigation of disaster impacts [30,31]. However, it is rarely acknowledged that mitigation does not necessarily require a focus on the relation between the environment and a disaster. Therefore, in a very reasonable

exposition, Anderson (2000) established the patterns of development that affect the environment and raise exposure to a crisis [32]. Previous literature differentiates between inter-organizational networks and whole networks. While in the era of stability inter-organizational networks may or may not exist, it is vital that they are in place during the crisis [33,34]. Complexity and chaos theory provide an insight into crisis and disaster management for tourism business agencies. Disasters and crises demonstrate turbulent situations and point out the manifold interrelations between humans and natural systems [35]. The lifecycle model unfolded the initial tourism-oriented disaster management framework and ultimately put this framework into practice during the Katherine Floods in Australia, making several amendments built on the application to the case study [35,36]. Faulkner's (2001) disaster model was also used in the 2001 Foot and Mouth Outbreak in the U.K., which began as a farming catastrophe that turned into a crisis in the tourism field due to the way it was mishandled [37]. Many previous large-scale disasters sprout out from the interaction of anthropological and biological structure. Causes of global economic crisis may be sought in the climate changes or animal contagion, as well as the international practice of profiteering on ecosystems to foster the national development. The argument was further advanced by van Staden, who points to the destructive association between nature and development in well-known cases of Severe Acute Respiratory Syndrome (SARS), donkey and wildlife extinction crisis due to "eijao" traditional Chinese medicine made from donkey skin gelatin, and other instances of global capitalism turning ecosystems into national assets [38].

In the same way, the COVID-19 virus and its expansion across the globe manifest the intricate connection between humanity and the natural system. Due to the extending complexity, the interrelation between human activity/inactivity, including business operations, and the appearance of a disaster phenomenon is getting progressively challenging to differentiate. Further enhancement and application of conceptual models for emergent management are needed across industries.

While the economic downturn has adversely impacted many enterprises, certain enterprises have been able to continue business operations and even prosper during the COVID-19 virus pandemic. The capability of emergency managers to influence general opinion and actively follow goals increases the effect of mitigating measures. Moreover, it enhances the readiness degree of the jurisdiction and reduces vulnerabilities. Companies that respond and adapt quickly to unpredictable threats are characterized by networked structure, flexible and straightforward guidelines, distributed workforce and leadership, and less interdependence [24]. The key to the successful recovery of many companies in China was looking ahead and being ready for changes. For instance, Master Kong, a prominent noodle, and beverage manufacturer in China, reconsidered its priorities, re-evaluating supply chain from the early stages of the COVID-19 epidemic. Being aware of possible hoarding, the organization moved its focus from offline and substantial retail stores to e-trading and smaller shops. Another case in point is Huazhu, in charge of 6000 hotels in 400 regions throughout China, which formed a crisis task crew, meeting daily, to go through the COVID-19 guidelines and procedures. When many companies have been laying off workers, Pizza Hut and Papa John's have been hiring tens of thousands of employees. Furthermore, gyms and fitness companies such as YMCA and Planet Fitness have entirely transitioned to an online environment, offering online classes, workouts, and nutrition services. Nike is waiving fees for a monthly online subscription to nutritional guidance and training workshops during the COVID-19 pandemic. Other uplifting cases include cooperation and coalition directed towards information sharing and innovating of crucial resources. For instance, the COVID-19 Healthcare Coalition, a private-sector coalition, gathered tech companies, pharmaceutical manufacturers, and hospitals, with the aim to increase resources to fight the pandemic. Ford, General Electric, and 3M are partnering to produce protective medical equipment, such as respirators and ventilators. Abbott and Biometrica shifted their efforts into developing COVID-19 tests. Liquor manufacturers and breweries are using their distilleries, while cosmetics manufacturers such as L'Oreal are using their manufacturing plants for making hand sanitizers.

Success stories show how adopting a novel and agile approach of conducting business may help organizations to adapt quickly to a change in demand and purchase habits and, not only sustain their

business, but also reposition themselves and lead the market. What all mentioned examples have in common is that, instead of slowing down or shutting activities, they kept investing in human resources and technology. Since social distancing is advised, services should be accessible for customers whose daily routine is cut. This includes shifting to an online product and service customization. Therefore, we build on this premise and the McKinsey report [39] and argue that companies of networked and virtual structure, with a shorter and diversified supply chain, flexible and adaptive culture, distributed leadership and workforce, advanced digitalization and internet technologies, and financial contingency plan can sustain their business during the pandemic crisis, as can be seen in Table 1.

Table 1. Company responses in 5 sets of actions.

Workforce Protection	
Policy and management 2-way communication Personnel and contractors Facility and on-site norms Health and government engagement	<ul style="list-style-type: none"> • Portfolio of policies and actions, including prevention and incident response • Multichannel communications; confidential reporting mechanisms; source of truth • Tiering (e.g., all, some, or no work from home); infrastructure setup (e.g. Virtual private Network (VPN), laptops, desktops); broadband availability • Staggered work shifts; spread prevention (e.g., social distancing); closures • Engagement with local and federal regulators and public-health officials • Cross-tier risk transparency; supplier restart; order management; new supplier
Use of Technology for Prevention	
Application of personal-oriented technology in preventing transmission	<ul style="list-style-type: none"> • Web-based surveillance tools • Epidemic intelligence methods • Application of health status code • A query of the Same Itinerary with Patient application • The Application of Diagnosed Cases in Community
Supply-chain Stabilization	
Supplier engagement Inventory management Production and operations Demand management Logistics	<ul style="list-style-type: none"> • Critical-part identification; parts rationing; location optimization • Operational-impact assessment; production-capacity optimization • Sales and operations Stock Keeping Unit (SKU) level demand-signal estimates by microscenario; production and sourcing plans • Ports; logistics-capacity prebooking; route optimization
Customer Engagement	
B2B transparency Customer protection Customer outreach	<ul style="list-style-type: none"> • Communications to B2B customers (e.g., by microsite); scenario-based risk communications • Spread-prevention interventions across customer journeys: customer-team training; execution monitoring • Customer communications on COVID-19 practices: fact-based reports on issues; situation communications
Financial Stress-testing	
Scenario definition Financial stress tests	<ul style="list-style-type: none"> • Relevant scenarios, based on the latest epidemiological and economic outlooks • Financials, especially working-capital requirements, in different scenarios
Nerve-centre Integration	
Issue map and management Portfolio of actions Leadership alignment	<ul style="list-style-type: none"> • Single source of truth for issue resolution, tapping surge resources when needed • Trigger-based portfolio of actions (across all workstreams) • Alignment of leaders on scenarios; roundtable exercises

Source: [39].

3. Methodology

To explore the application of new sustainability model during a pandemic, a conceptual study was performed. The conceptual research methodology was found to be the most suitable in the present circumstances since the COVID-19 virus pandemic is a new phenomenon with no precedent, and all empirical evidence will be available only in the aftermath. Our main objective was to provide managers with recommendations for understanding the sustainability indicators in the disruptive climate, how their processes change, and which moderating conditions affect their operations. Existing emergency management theories are used to develop a novel theory that may later be applied as an analytical tool to solve real business problems and provide a useful starting point for future research. Furthermore, it has been a challenge to empirically assess specific indicators of sustainability, such as networked structure and organizational culture. Previous work on disaster management was able to capture economic losses post-crisis. Yet, the exact impact of successful strategies proved to be challenging to measure due to the aid from government funding, especially considering the difference in available resources and public aid in high- and low-income countries. Combining valuable insights from prominent theories on the crisis management joint with contemporary case study examples and best practices enabled us to develop a new “Enterprise Effectiveness and Sustainability Model during Pandemic.” We draw from the Theory of Crisis Management Teams, the Stakeholder Theory and the Distributed Cognition Theory to detect the essential organizational strategies and processes to be taken into account during the crisis. Further elaboration gave rise to the idea that emergent response team, supply chain management, communication and distributed leadership, together with flexible and networked structure sustain business not only in times of stability but also during the crises, such as the COVID-19 pandemic. Pre-crisis contingency planning based on empirical studies proved to be insufficient, and there is an evident lack of integrated sustainability practical strategies. This calls for a shift in perspective, and we have investigated new associations among constructs to account for the explanation of why certain misaligned tactics or outdated organizational structures may lead to enterprise detriment.

We draw our hypotheses by observing the current progress of pandemic, and by analyzing literature on disaster management. For this purpose, we have obtained relevant information from previous work on catastrophes and epidemics management, IMF reports, and carefully obtained data from case studies on the economic impact of disasters such as the 2017 hurricane season, Katherine floods, Foot and Mouth disease, SARS, Zika virus epidemic, and 9/11 as well as the most recent reports on the progression of COVID-19. The abovementioned case studies were chosen due to their nature; namely, they were all large-scale catastrophes resulting from external forces and factors, and the risk management strategy of enterprises affected by these disasters widely differs from the crisis caused by internal factors, such as operational or human faults that would damage a company's brand, and consequently, require a different recovery strategy.

4. Enterprise Effectiveness and Sustainability Model during Pandemic

4.1. Networked Structure

In the traditional management literature, an archetypical business model was of a hierarchical structure, where Chief Executive Officers are the top-notch managers responsible for driving sustainability and improving the social, environmental, and economic value of an organization. The decision-making process was implemented from the top-down. Such a frame no longer fits in the turbulent and dynamic economy subject to frequent changes that occur during natural disasters and pandemic outbursts. To achieve lasting sustainability and thrive in the era of uncertainty, a new system network structure needs to be introduced to improve coordination, distribution of complex decision-making and exploration of different resources and opportunities. Conversely to a traditional view of an organization, O'Toole (1997) characterized network as a structure of interconnection of a manifold of organizational agencies, where a business unit is much more than mere subsidiary,

subject to greater others in a ranked system [40]. Modern business models take up modular and fractal approaches and a network-orientation, i.e., enterprises are progressively adopting the growing trend of authority delegation to a finite group of leaders from different organizational departments [41].

Sustainability network thus functions as a representative body informing all levels of the institution, as information flow is even more crucial during a crisis [42]. This type of constitution is recommendable for all modern enterprises due to its many benefits; for instance, it saves time spent on decision-making, speeds up the process of cross-selling within business units, and ensures general familiarity of key persons with all critical business activities on which they are briefed during regular meetings [43]. Coordination is achieved by simultaneous exercising of multiple small-scale actions, experimenting in accordance with simulations conceptualized during crisis brainstorming sessions, and exploration of the effectiveness of different strategic options. For instance, groups such as the Port Coordination Team in Houston meet on a regular basis during normal operations to maintain relationships, and then shift to problem-specific mode during disasters, with the advantage that they have already navigated a team-building process so that employees may rapidly focus on collaborative work and address the issues of the current emergency [44].

Furthermore, the distinction should be made with respect to the external and internal networks. The former refers to the economy, industry, and culture within which enterprises operate, while the latter refers to the structure and culture at the organizational level. While considering the antecedents of organizational sustainability, it is essential to consider relevant variables influencing the network, such as ownership, location, and industry.

Crisis impact will differ with respect to company ownership. For instance, in state-owned enterprises, unsuccessful scenarios and courses of action may be salvaged by government accessing the taxpayers' money, where authorities are accountable for preventing the bankruptcy, whereas private enterprises are expected to be more self-sufficient. The idea that governments are responsible for mitigating risks and providing efficient solutions given specific probabilities and impacts of risk [45].

Classical microeconomics theory did not take ownership to be a relevant performance determinant, albeit in real market conditions the assumption that the internal network is somehow isolated and independent from external, more extensive networks is not plausible. Additionally, with regards to the structure, the stakeholders' relationship in private enterprises is considered a contract relationship among private owners, employees, and other agencies, whereas in state-owned enterprises, a state is the majority shareholder and citizens are minor shareholders [46]. Therefore, structure plasticity and dynamics will differ depending on the ownership, as well as the country's economy, as these functions pertain to the broader networks within which an internal network resides. Structure facilitating the information flow among agencies is more typical of private enterprises, where the central assumption is information symmetry among stakeholders. In contrast, the regular phenomenon in state-owned enterprises is an asymmetry of information, where politically well-connected managers often manipulate and intentionally leverage on the public lacking information. Efficient decision-making relies on a continuous flow of information among all shareholders, and in state-owned enterprises, common citizens are the source of intelligence necessary for effective operating. Yet lack of disclosure and transparency hinders the process of strategic business intelligence, and citizens with limited access to critical data cannot provide adequate feedback, which exposes the enterprise to vulnerability and inability to make informed decisions. In addition, the bureaucratic-like structure of state-owned enterprises prolongs the decision-making process, thus delaying the response to volatile pandemic circumstances.

Further, firms are embedded in more extensive networks such as industry, and their structure is dependent on the actions of competitors within the industry. Enterprises may choose to compete or cooperate depending on the external environmental changes, such as crisis and emergency or change in demand. Thus, changes in competitors' decisions often stimulate managers to redesign their activities, usually by adopting, experimenting, and learning. Due to the turbulent environment, deficient information, and resource divergence, there is bounded rationality where enterprises do

not instantly know the optimal performance strategy, which forces them to replicate, try out, explore, thus continually enhancing their programs and approach. This process requires agility, adaptability, and flexibility.

As a result, when granted freedom, with the emergence of challenges, independent business units can quickly adapt, devise fresh and unorthodox solutions, and develop new business ventures [47]. Enterprises are urged to integrate Intranet into daily business routines. While different teams autonomously practice self-organization, managers can better align their processes and keep track of results even without sharing a physical environment by utilizing diverse platforms and staying connected. Thus, Internet-based interaction advances networked operating and inter-organizational control of the supply chain [48–50]. To develop innovative products and services, all employees must engage in team activities of knowledge sharing, spreading, and acquisition [51], and this is by and large made possible with the integration of virtual offices, dropboxes, cloud solutions, and company-owned servers. Available organizational studies have already stressed the importance of flexible relationships built of autonomous but interdependent fragments linked via ICT systems [52–54]. Moreover, during a pandemic crisis, sustainability network teams can hold frequent online meetings, where they can provide reports, check the status of set goals, intervene and adjust them accordingly, discuss uprising circumstances, and lay target objectives for the next 48 hours or the following week [55]. Additionally, having IT infrastructure allows for much more than mere continuity of business operations; it is especially easy for such organizations to re-orient to online sales when physical branches are temporarily closed during a pandemic. Companies that can adjust quickly and function better when unpredictable threats occur are characterized by networked structure, flexible and straightforward guidelines, distributed workforce and leadership, and less interdependence [24].

Therefore, we conclude the following:

Proposition 1. *Enterprises with a networked structure and high level of virtuality sustain their business operations in times of a pandemic.*

4.2. Supply Chain Resilience

The COVID-19 virus outbreak generated multiple problem points for organizations and tasked them with a vital sustainability challenge. A pandemic disrupts preexisting supply and demand networks by causing damage to infrastructure, welfare, health, and economy. In such cases, it may be necessary to redirect preexisting supply flows, align and cooperate with competing agencies [56] and, when possible, shift production to meet new demands, often concerning life-preserving resources. Resilience entails establishing inventory buffers by acquiring a stock of low-cost but crucial components, therefore ensuring resource availability during the scarcity of supply in the face of crisis [57]. The index of supply chain volatility of socioeconomic indicators designed by Christopher and Holweg [58] suggests we have entered the era of turbulence where old-fashioned supply chain models invented at the time of stability are becoming obsolete. Conventional mindset regarding supply chain management proved to be deficient in the face of setbacks caused by the COVID-19 virus outbreak. This calls for radical re-examining of key business parameters to ensure organizational sustainability in the time of uncertainty [58,59].

Multiple distribution points may help steer suppliers to other distribution centers during the pandemic crisis. Determining priorities is crucial. In most cases, restoring communication, power, technology, and trained personnel is the primary step, as these are pillars of resilience. Furthermore, when devising an emergent leadership plan, managers shall have to consider legal constraints influencing the supply chain, such as procurement restraints, transportation restrictions, temporary or even long-term manufacturing plant closures, and licensing for delivery of goods and services. To survive and thrive, organizations are required to build resilient and robust supply chains that can resist geographical, transportation, infrastructural, and physical confinements. When an organization operates on a global level, mapping out key suppliers for specific geographical regions and states is crucial. As manufacturing plants and office branches close, there is a production deficit, and only a

limited number of goods may be attained. Therefore, successful organizations build a multitude of ties and as many diverse streamlines as possible to ensure sufficient distribution quantity for each region by concentrating on both supply and demand nodes. To avoid transfer and import restrictions, delivery delays, and inflations that may hinder the distribution, cooperation with many alternative local, state-level, and regional suppliers should be established. Consequently, emergency managers are assigned to foster cooperation among supply chain partners, prioritize resilience, and draw suppliers' attention to supply chain vulnerabilities, analyze their weaknesses and transform evaluation results into an efficient contingency response and recovery plan [60]. Emergency managers are also advised to conduct stress-testing of their systems regularly in times of stability, and prior to each strategy implementation during a crisis. Supply chain stress tests may be customized with regard to different types of risks [61]. For instance, Nike regularly stress-tests its production and distribution facilities [62].

Risk managers may ensure the agility of supply chains by making them flexible and adaptive, potentially through the diversification of sources. Contrary to the traditional organizational single-sourcing centralization model designed to reduce costs, modern enterprises should find alternative sources whenever possible, thus keeping multiple options open, and reducing the number of activities involved by conducting them in parallel rather than in series. This was traditionally considered to be costly, but it is one of the leading strategies for building resilience, decreasing vulnerabilities, and mitigating damage when a crisis arises. Amidst havoc, such as the COVID-19 pandemic, an increasing number of organizations are disclosing company-related and general crisis information [63] and forming collaboration schemes to ensure mobility, agility, and adaptability, increase speed, thus reducing the response time to demand changes. Proponents of the agile approach propose building resilience by balancing the optimal amount of inventory to deal with contingencies [64,65]. Except for alternative sourcing and information sharing, organizations also cooperate via asset sharing, e.g., sharing of plants, warehousing, distribution centres or transportation, and logistics companies. Emergency leaders should have appropriate knowledge of base and surge demand before the crisis, meaning that they should know the products' base level of anticipated demand. In contrast, demand above this degree shall be managed through ad hoc techniques. Supply chain resilience during extreme conditions of disruption reduces the loss of sales, recovery costs, increases brand reputation and share price. Literature suggests that organizations' share price drops after announcing the disruption in the supply chain [66–68]. Inventory centralization enables the exploitation of the square root law of inventory, lessening the safety stocks and sustaining the availability [69]. Albeit, as demonstrated by the example of U.K. clothing retailer Primark, this is extremely risky. To shrink inventory base and facilitate product flow, initiatives such as Efficiency Consumer Response and Collaborative Planning Forecasting were designed [69,70].

Therefore, we conclude:

Proposition 2. *Enterprises with a shorter and more diversified supply chain sustain their business operations in times of a pandemic.*

4.3. Organizational Culture

Unlike outdated organizational structures relying heavily on machine-like metaphors, contemporary enterprises recognize their versed and networked-like landscape, which makes them more resilient in times of catastrophes. Steering away from the hierarchical and rigid structure, modern teams diverge from such notions as precise roles, responsibilities, and job descriptions. Viable organizations make sure all of their employees are educated and well-trained, as well as flexible to quickly respond to changes in times of emergency, as maintaining the same strategy in a time of stability and rapid change may result in detrimental outcomes [71]. When disaster strikes, all employees should be ready to assume leadership responsibility and take on different job position in case of obstruction. Coordination among employees, business units, and the nerve centre is at times more relevant than response time. When rushing to react to a situation, people tend to disregard

cooperative attempts, which makes organizations vulnerable, thus leading to the lack of coordination between different actions and hampering efforts to mitigate risks [72].

One of the key tasks of a leader is to create organizational architecture [73]. In fact, emerging leadership requires a behaviour which constantly tries to make use of informal frameworks while forming the most appropriate organizational reactions in novel environmental states. Although the results of new leadership engagements might sometimes be erratic and unpredictable, if they succeed, the outcome is a phenomenal emergence, such as a new company able to function efficiently in the ambience distinctive from that which influenced the structure of the initial formal framework. There are some indicators showing how effectively an entity can adapt and react to marked alteration; these measures are organizational flexibility and business landscape fitness, which differ from the conventional criteria like market share trends and financial activity. The traditional criteria work best in times of stability, whereas the new leadership measures are essential in the changing periods or times of crisis. In addition, leaders should bring together the entire system in one place and engage the participants in a dialogue, collect various viewpoints, experiences, and visions regarding the events before reaching clear consensus [74]. In the conventional pyramid depiction of an organizational power structure, system agents make up the component parts of the company as a whole network. This happens by engaging them in the information exchange, which takes the form of a "conversation-for-action" formula [75,76]. Such an initiative must be the first step of leaders while forming a more resilient organization.

Resilient organizations are better equipped to deal with severe operational disruptions and economic shocks, as they are more capable of managing their activities while cutting down losses [59,77]; due to the very nature of their versatile organizational culture. Modern organizations utilize enterprise risk management strategically to detect potential risk. They are vigilant to threats and perceived vulnerabilities, and therefore design effective contingency plans based on lessons learned from previous catastrophic effects [78]. Disaster preparedness of flexible organizations depends on achieving a perfect balance between acquiring key resources and working through extreme vulnerabilities to improve organizational viability [59,79]. Practitioners exert efforts to develop research methodologies that may help organizations in evaluating the resilience and performance [80,81].

To ensure sustainability during the COVID-19 pandemic, emergent leadership should engage the entire organization in communication, brainstorming, and exchange of perspectives. Some studies emphasize the importance of soundness and the organization's capacity to manage unexpected events. Such managerial mindfulness [82] helps organizations avoid crises by introducing mechanisms supporting the modification of formal structures, improvisation capacity, and improved sense-making [83].

With its feature of rapid adaptation to changes, the informal system earns more popularity in comparison with the formal structure. When the environment is dynamic but consistent and rather foreseeable, the designed formal frameworks function in the structure of traditional leadership. However, as soon as the outside shifts emerge rapidly in the particular time, surpassing the strategic point of inflection [76], the used-to-be strategies of the previous times cannot be applied any more within the formal structure. Consequently, the mismatch of a business model or strategy with the new business ambience occurs. Also, the emerging informal structures begin to show regression from the pre-designed formal framework, that is slower towards the external changes. Consequently, the gap between the two widens and the tension increases, resulting in the failure or total bankruptcy of the company [84].

Some organizations are unable to adapt rapidly to changing demand and environmental conditions, because they were designed with regards to efficiency and not sensation and responsiveness. When exposing a traditional efficient structure to stress-testing, moving from its deficiencies towards adaptability seems to be a natural transition. Yet, it requires a complete framework shift concerning organizational quality. Outsourcing to external providers and third parties helps to acquire volume when necessary and transform fixed costs into fluctuating costs. To improve resilience, organizations

are recommended to use diverse distribution channels. In addition to traditional retail, online sales contribute to the sales volume.

Such extraordinary conditions call for testing of different scenarios to improve further agility, which can be done through simulations [80,85]. Consequentially, a variety of options are assessed for their flexible capacity, and the choice is based on the evaluation of expenses for supply chain, e.g., stock-induced costs [84]. Ramifications of each decision are measured, namely, to justify investment in flexibility by considering the source of variability and then mitigating it [86]. Literature provides examples of research on scenario-based approaches and methods of testing and improving business activities during disasters. For instance, Duran, Gutierrez and Keskinocak (2011) investigated intuitive scenario-based strategies to decision-making, while Doroudi et al. (2018) developed an integrated simulation framework capable of predicting how disruptions cascade through supply chains, integrated supply chain models with computationally tractable models of decision-making [87,88].

Therefore, we posit:

Proposition 3. *Enterprises with an adaptive and flexible culture sustain their business operations in times of a pandemic.*

4.4. Distributed Leadership

As the COVID-19 virus spreads globally, it is impossible to predict who will be affected and how it may obstruct organizational leadership. Chief Executive Officers around the world are being quarantined, and for organizations to sustain their business, alternative emergent leaders should be appointed and ready to step in during unforeseen predicaments [89]. Emergent leaders, coordination teams, or 'the nerve centre' and 'nodes' are established concepts in the risk management literature and in the social network theory, respectively. The primary goal of such teams is resource allocation and risk mitigation by carefully implementing the organization's strategic contingency plan and abiding by the pre-crisis established rules, but with enough flexibility and agility to allow for rapid adaptation to unexpected changes in the environment. In this way, it is possible to realize positive outcomes by performing highly complex tasks and merging all entrepreneurial functions of the integrated organization [90], which would not be achieved by individual participants acting independently [91]. Emergent leaders are tasked with integrating informal structures in communication and adaptation of organizational response to emerging circumstances. Literature suggests corporate communication and engaging in meaningful and proactive interaction with employees helps to mitigate undesired effects after disastrous events [92–94]. Communication also helps to make sense of crisis-related information, thus creating a perception of stability during the time of uncertainty [95]. Lee (2004) stresses the importance of agility in his 'triple-A supply chain', where he characterizes it as cooperation and enhanced information flows where the circulation of relevant information is considered to be one of the key features [57].

According to Elsubbaugh et al.'s (2004) empirical results, a crisis management team is crucial in preparing for disasters [72]. Emergent leaders are characterized as highly trained and skilled individuals with the capacity and competency to take on different responsibilities, assignments, and initiatives, able to cope with stressful situations and react rapidly by combining all the relevant information from all the organizational key nodes and transforming them into the most optimal actions. They must master the detection of attainable objectives, set the agenda, and communicate it competently to teams [96]. Often at times of crisis, different groupations emerge offering aid, and emergent leadership should be aware of these formations to harness the benefits, thus helping organizations meet challenges [97].

The shared leadership is a form of delegation of authority, i.e., transferring certain activities and jurisdiction to selected members of different organizational units, especially in the domains where top managers do not possess specialized expertise. One of the most significant vulnerabilities amid unexpected events comes from the old-fashioned traditional hierarchical view of organizational structure, with centralized decision-making. Such way of operating is extremely risky as it

paralyzes business by postponing the implementation of urgent initiatives. In a turbulent landscape, resilient enterprises have a more flexible and decentralized organizational culture and dispersed division of labour, which allows for more informed decision-making at different organizational levels. Since emergent leaders require intelligence from various functional domains and external resources, network-like structure facilitates data flows. Information is gathered and disseminated by connecting employees from multiple spheres and branches. Valuable insight into the company's strengths and weaknesses is generated and timely capacity improvement is achieved. Such culture is backed by various research evidence [82,98,99]. For instance, Dowell et al. (2011) found that smaller and dispersed boards improve organizational response to environmental and economic change and alleviate consequences post-disaster [100]. Crisis leadership styles may vary with regards to the nature, duration, and cause of crises [101,102]. Efficiency will likewise depend on the way the chosen leadership style fits to the organizational contingency plan, since a response to crisis relies on preparation for different scenarios and different stakeholders' crisis perceptions.

Therefore, we conclude:

Proposition 4. *Enterprises with distributed leadership and workforce sustain their business operations in times of a pandemic.*

4.5. Digitalization and ICT

When a crisis strikes, "business as usual" is rarely an option. Instead, an emergency mode of operating must be set. For continuity to be ensured, it is paramount that cyber structure and ICT tools are readily available and access to Internet and complementary hardware are attained. Internal communication and coordination of enterprises impacts the performance of its emergency actions [89]. Besides, ICT can serve as a strong means for a supply chain in making crisis response more versatile and agile, through the crisis, by deploying suitable information systems [103]. Usluel et al. (2008) believe that the use of ICT can be the measure of acceptance, adoption, and application of innovation. IT is used to bolster the collection, sharing, and processing of data, which consists of several parts: hardware, software, communication technology, and data [104]. In times of unprecedented disasters, collaborative enterprises face the necessity to communicate efficiently, to reach reasonable decisions under uncertain conditions, as well as call for stakeholders to act together in mitigating, responding to, and recuperating from the calamities [105–107].

Due to the rising need for resource sharing and coordination among stakeholders, it is crucial to understand organizational ICT utilization patterns in emergency management. Enterprises that utilize information systems by which they can mobilize crucial resources, crisis management specialists, consult emergency leaders, track evolving situations and process real-time information, and coordinate their operations [108–110] are best equipped to sustain the financial liquidity and survive during COVID-19 pandemic (Figure 1). Enterprises need to rely on IT infrastructure, enterprise resource planning systems, digital libraries, Knowledge Management systems (KMS), inventory report systems, as well as know-how, software, tools and apparatus, applications, computational logarithms, hardware, technological and cognitive capital [111]. All relevant personnel should be technologically proficient and trained in performing operations in an online setting. The exploitation of ICT-related possibilities depends on the technological attributes, human factors, organizational culture, structure and institutional factors [112–114]. Furthermore, it is essential to stress the value of geographic information systems (GIS) and global positioning systems (GPS), timely informing organizations on the accurate location of affected areas during outbreaks [115,116]. Such systems of crisis management may reach emergency response teams with actual data on the disaster and ready resources as well as assisting the collaborative efforts of emergency management institutions [117]. For instance, enterprises can evaluate their sustainability and retrieve information using the Dow Jones Sustainability Index, the Global Report Initiative and Global sustainability index. In this way, they compare their performance at an organizational or national level according to the basic economic, environmental, societal, workplace, and external sustainability indicators. Grecu et al. (2020) developed

a software application and online platform for tracking company sustainability performance using an algorithm for a multicriteria decision support system, where managers incorporate heterogeneous indicators into a global index to acquire a quantitative organizational assessment report [118]. Via this system and tools like E-Team, WebOEC, and Sharepoint, it is by and large possible to gather, process, and share information, improve communication quality, reduce costs, and coordinate collaborative efforts of the nerve centre [62,117,119].

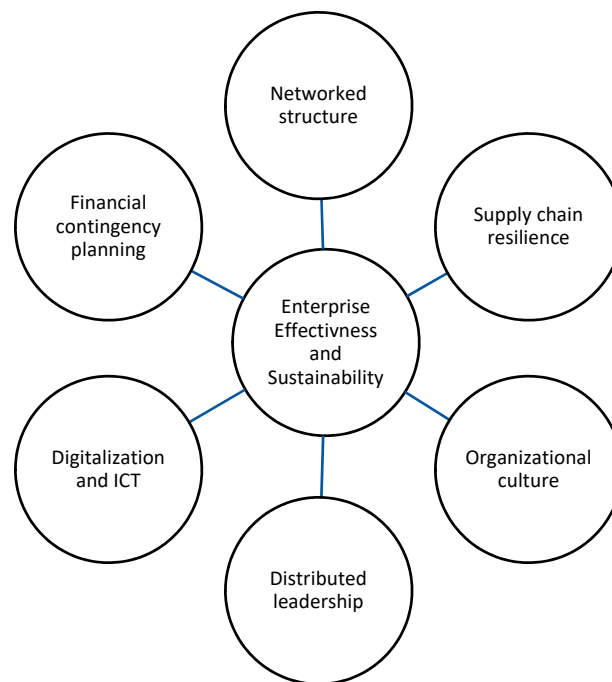


Figure 1. Enterprise Effectiveness and Sustainability Model during Pandemic. Source: (Author).

A vast amount of research suggests that ICT tools are crucial for establishing trust and sustaining business relationships with partner organizations before and after crisis [120–122]. According to Brooks, Bodeau, and Fedrowicz (2012), ICT advances the evolutionary changes in emergency response [123]. This technology-mediated knowledge sharing is a common characteristic of modern business due to accessibility and flexibility [124], which makes it different from face-to-face interaction [125,126]. Virtual channels improve employees' knowledge-processing capability [127].

Some studies found that it may be beneficial for organizations to create a unique crisis informational web site section to inform stakeholders, key clients, and employees on new policies and novel ways of conducting business activities [128]. Employees and particular stakeholders can access such sites while they are online. With this in mind, the crisis team should be aware of what adversities an enterprise might come across as well as the key information to be uploaded to the website. When applied together with mass notification systems, internet sites grow in value and enable main stakeholders and workers to act [129]. American Airlines deploying the Internet to communicate with its members after the events of 9/11 is a positive example of such practice [130].

Organizations have to adapt rapidly to unexpected changes, and since forecasting in these cases is not possible, they may learn to adopt best practices from prior experiences. For instance, during the 2017 hurricane season, key platforms consisted of the sector- and industry-specific phone conferences, in-person and virtual meeting methods, person-to-person conversations via text, e-mail and phone, social media platforms, websites dedicated to sharing business status and problem-specific task forces to focus on challenges affecting particular business segment. Crisis management greatly relies on the Enterprise Resource Planning (ERP) system, which provides quick access to statistics based on homogenized data. ERP functions as a business application and a platform for extracting

data on organization business developments, and as such, may be used in a daily business routine in knowledge-intensive industries. But it may also be useful as an effective tool for knowledge management during outbreaks [131]. Organizations may also benefit from shifting to online sales of critical supplies and using app-based delivery services, including transportation and freight services, such as Uber, Lyft and Go. Furthermore, IoT, cloud computing, 5G, AI, 3D printing and robotics are crucial for enabling the digital supply network [89].

From the following, we posit:

Proposition 5. *Enterprises with advanced digitalization and internet technology sustain their business operations in times of a pandemic.*

4.6. Financial Contingency Planning

When crisis strikes, with the drops in demand and sales of products and services, damages to enterprise liquidity occur. Financial disruption is present at both micro and macro levels, e.g., it poses a threat to organizational financial certainty and the viability of entire sectors [132,133]. Standard financial regime becomes inadequate and gives rise to emergent complex financial decision-making [134]. Prior research on emergency risk management already pointed out the relevance for organizations to develop a financial contingency plan that will help sustain key resources in an emergent crisis [135,136]. Auditors' and CFOs' integrative reporting allows devising of the metrics modelled on past performance, previous disaster financial management case studies, and prospective development [137,138]. The viability of the company's managing major risks should be subject to audit planning [139,140]. Ineffective risk management combined with breakdowns in financial reporting accounts for business breakdown and/or bankruptcy. Financial certainty does not merely ensure assets' sustainability and mitigation of crisis risks, but the thoughtful investment may lead to profit and value increase when financial planning enters the strategic management arena [141]. Capital structure dynamics vary among organizations, and thus rely on attributes of asset volatility, tax and growth rate, transaction, and liquidity [142,143]. Without financial risk management, all organizational efforts to survive crisis will be ineffective [144,145].

For instance, organizations that have not allocated their responsibilities adequately will suffer major post-crisis financial losses. Successful organizations have to put contingency plans in place ahead of the onset, and there should be no room for ambiguity with regards to who is in charge for risk finance preparation and financing arrangements [146]. Financial contingency plans must have a clearly defined budgeting and funding model for mobilization of financial resources, as this will play a major role during disasters and help to navigate through hardship [147]. Financial leaders are assigned to explain risks and opportunities to key decision-makers. As nobody can foresee the exact effects of a disaster, many enterprises have altogether given up on investing time to devise a strategic plan that may be overwritten when unexpected events occur. Ex ante and ex post protection is only effective if a crisis preparedness plan already exists [148]. Yet, for years scientists have studied the impact of diverse disasters, such as earthquakes, floods, hurricanes and epidemics. They have devised risk models to fit each hazard, and estimations can now be made of approximately how much losses a certain shock may inflict [149]. These probabilistic system models are based on unambiguous rules and grounded in careful observation, history case studies, and advanced statistical and economic analysis [150]. Drawing on the scientific progress, organizations now have available tools and directions to prepare and implement a priori financial pre-crisis and post-crisis recovery plans, defining who bears the risk, how to respond and what to fund [149]. Organizations may use financial leverage to improve their businesses. They accomplish this by drawing from the potential uncertainty to transforming this risk into certainty.

For instance, Miller and Keipi (2005) recommend integration of risk mitigation in the design of all projects in risk-vulnerable domains [150,151]. Successful organizations take prevention, conduct cost-benefit analyses of different scenarios, and seek further protection through insurance with decreased premiums. Insurance decreases problems by allowing organizations resource allocation to

proactive activities such as mitigation. Reducing the impact of shocks by employing quantification of risks, allocation of resources, and consideration of alternative ways for mitigation contribute to effective organizational performance [152].

From the following, we suggest:

Proposition 6. *Enterprises with a financial contingency plan sustain their business operations in times of a pandemic.*

5. Discussion of Enterprise Actions during the COVID-19 Pandemic

Organizations promoting global governance may eventually contribute to the effective government of societies [153–156] by assuming new societal and civic responsibilities in the face of hazards [156]. The COVID-19 pandemic caused a massive system change, uniting customers, businesses, associations, and government in a complex interactive set of relationships, a new ecosystem, wherein it becomes evident that no single actor can control the aftermath of the pandemic [157]. With this in mind, networked governance operates collaboratively to develop structures to support yet more cooperative mindsets [153,158]. Amid the pandemic, new networked business models are embedded in sociotechnical systems where environmental, communal, technical, and economic values ought to be balanced [158]. As an example, Chinese universities have united their capacities in order to jointly combat the challenges posed by the new pandemic. In order to exercise their social responsibility, they made significant advancement in emergency management, providing psychological consulting, placing restrictions on staff mobility, and developing new online support and educational programs. They mobilized medical experts from a number of medical schools and universities to conduct emergency research, provide technical support, and advance the development of a COVID-19 screening and detection kit. To avoid any delays in education, universities have launched a free online education network platform with thousands of courses as a part of their attempt to embrace social responsibility. Researchers were invited to disseminate helpful information regarding the pandemic. A similar effort was reported in Europe, Croatia, where students now regularly attend webinar classes, while primary schools have turned to a daily TV schooling program curriculum.

During the COVID-19 pandemic, enterprises that do not have network structure could develop it or implement certain aspects of it. The networked organization is a counter-model to the administrative one. It is characterized by free communication flow, necessary technology, and shared entry to information, and therefore greater flexibility and adaptive capacity [159]. Networked organizations are found to be more resilient due to the faster diffusion of novel ideas and solutions and agility. Cooperation between employees, groups, and units with shared norms and values is facilitated in such organizations. When multiple departments work parallelly on different products and services, it is much easier for an organization to redirect its focus on the latest demand according to changes in the external environment when a prolonged crisis strikes. Enterprises with such structure suffer a lesser loss in comparison to specialized enterprises with large manufacturing plants and a vast stock of supplies that may be rendered redundant in the face of epidemics or customers' financial deficit.

In the case of the COVID-19 pandemic and similar disruptive instances, experts can apply a supply chain resilience model based on a few fundamental principles—assess, identify, define, deploy. Conducting a supply chain risk assessment can help prioritize critical focal points; afterwards, it is possible to locate changes in demand and examine inventory levels for deficiencies. Present-day supply chains consist of dynamic networks of intertwined organizations and industries governed by dyadic buyer–seller relationships. Outdated understanding takes supply chains to be linear structures, whereby products flow between organizations and towards the end user. Such an approach should be abandoned during the COVID-19 pandemic, and the supply network should resemble a dispersed chain of corporate entities and processes associated with a focal point. Christopher and Holweg (2011) defined centres of gravity as the nexus between the supply and chain system, i.e., centres of gravity are focal points where all forces—customers, material and component suppliers, and manufacturing plants—assimilate each other [58]. Enterprises should also encourage the development of emergent leaders and risk

managers that recommend actions by applying different theoretical frameworks to manage supply chain resilience in adverse situations. That can be done with regards to risk propensity based on contingency [160], dynamic capabilities [159], resources [161], and social capital [162]. Extreme events such as a pandemic or natural disasters can disrupt the supply chain by shifting demand, and causing capacity reduction, given the production or transportation process limitation, in the case of lack of plant, power, or human resources due to physical damage or health hazards [163,164]. Communication disruption causes a discrepancy between supply and demand, reducing capacity and resulting in prolonged delivery time. Crisis-generated shifts in demand for crucial products and a decrease in the demand for others create significant hindrances that warrant decision-making models prioritizing restoration operations to maximize supply flows [163].

Organizations that are increasingly departing from traditional management culture and sustainability models towards the culture of agility, flexibility, and resilience are able to sustain business operations during the COVID-19 pandemic. Meaning, rather than rigidly relying on obsolete disaster contingency plans, they are focusing on identifying, monitoring, and mapping indicators of change while reorganizing resources. This allows them to rapidly adjust their business models, reduce stressors, and navigate the uncertain environment accordingly. They intentionally nurture an organizational culture that anticipates dangers and leans towards diversity, cohesion, and manoeuvrability. Consequently, they can adapt to economic and environmental shifts caused by the COVID-19 pandemic, rearrange their priorities, and proceed with emergent activities.

For the purpose of risk mitigation, and post-disaster stabilization, an assessment protocol incorporating the SCRAMTM analytic tool (Supply Chain Resilience Assessment and Management tool) [165] for measuring the resilience by detecting the association between an organization's vulnerabilities and capabilities can be applied. Many research efforts were made to examine and improve crisis response strategies [166], by assessing organizations' vulnerability [167]. Agility includes timely monitoring of situational awareness variables of cost, adaptability, quality, delivery, collaboration, and quantity. Organizations may also use digital procurement technology to prosper from suppliers' social networks, thus strengthening sourcing capacity and supplier cooperation. Monitoring social media and user demand, as well as website visits, may help in picking demand indicators, which allows for rapid adjustment to changing circumstances and timely response. Additionally, enterprises may benefit from employing the Genuine Progress Indicator and triple bottom-line accounting to achieve sustainable capitalism.

The COVID-19 pandemic also requires an adjustment in a leadership function. Not every industry has been equally affected by COVID-19, so emergency leaders need to be aware of the repercussions the pandemic has on their enterprise and industry. The so-called nerve centre consisting of heads of key business units needs to shape the organizational structure and realign their activities as the pandemic evolves. Pre-existing contingency plans should clearly state emergency leaderships' responsibilities and assignments, and they should be granted freedom and autonomy in decision-making to shorten the response period. During the pandemic, companies must set up a cross-functional COVID-19 response team. CEOs should appoint members from every function within the organization and bring in experts from other disciplines to assist with the operation. Enterprises that implement those initiatives will be able to sustain their operations, and even prosper post-crises as they will learn to adjust, evolve, enhance flexibility, and stimulate innovation by implementing the out-of-the-box thinking. They will cooperate, interact, simultaneously performing divergent small-scale actions and master the art of cross-unit leadership. As different departments engage in brainstorming to enhance their current products, reroute sources, or find new streamlines, activities will be allocated, coordinated, and adapted daily, sometimes even hourly. Emergent leaders will step out of rigid formal structures to find new ways of benefiting on the utilization of informal ones. In the process, they may even create new and unexpected business models that will, later on, be integrated into the primary business model [168].

Digitalization and ICT utilization, which is an indicator of adoption, acceptance, and diffusion of innovation, is a key component for sustainable enterprise operations during the COVID-19 pandemic.

Organizations witness restrictions due to COVID-19 pandemic, such as remote work policies and flexible workforce arrangements; therefore, they should have set up and aligned IT systems in place to ensure smooth business operations [89]. The interactive nature of Intranet mechanisms facilitates business continuity and allows for effective communication between the crisis management team, employees, suppliers, and customers [169]. Crisis contributes to an atmosphere where different sector organizations coordinate voluntarily through technology-based channels to mitigate risks, reduce the damage and share responsibility [160]. Emergencies such as the COVID-19 pandemic require effective communication and consolidated decision-making of partner organizations, employees, risk managers, and other stakeholders. Such collaborative efforts are a foundation for an effective response and recovery from disasters [105–107].

The COVID-19 pandemic and subsequent financial shocks seriously jeopardized enterprise survival. Operations should, therefore, be kept sound and functional at minimum cost; assessing the key activities where capital should be invested is imperative. Financial plans and contingency plans should be set up prior to the pandemic. When risk emerges, the financial reporting process plays a central role as different case scenarios are evaluated. For instance, when the current emergent mode is ineffective, risks are detected and addressed. The strategy is oriented towards the continuous application of communication and management procedures. Management goals and a checklist of criteria to consider should be transparent and continually exchanged between Chief Financial Officers (CFOs) and Chief Executive Officers (CEOs.) The economic foundation of financial risk management should be used as a strategic tool for improving an organization's economic stability. An optimum is achieved by adequate balancing between stockpiling and resiliency.

6. Conclusions

Organizations with a networked structure are more responsive, agile, and resilient in the face of adversity. When granted freedom, self-reliant, self-organized, and autonomous business units rapidly adapt to emerging changes in the external environment and embrace challenges. When connected with smart digital solutions and communication platforms, they often engage in cross-organizational meaningful communication and brainstorming and can generate a variety of unorthodox solutions and business alternatives. Consequently, this paper finds that organizations with networked structure and a high level of virtuality, as opposed to hierarchical types, will more likely achieve sustainability. Furthermore, resilient enterprises often consider how a pandemic, disasters, and other shocks impact not just their performance, but the functioning of the entire industry. They often stress-test their business for strengths and weaknesses based on different case scenarios, have a contingency plan designed ahead and alternative supply options ready. Successful organizations leverage on additional networks of suppliers, favour local over global, assess the capacity of current supply chains and their dependence on external resources, such as power and infrastructure. During the pandemic, they monitor new procurement, transportation, and delivery restraints daily, and foster cooperation among supply chain partners. These organizations maintain balance by stocking inexpensive key components during the crisis. We find that organizations with a shorter and more diversified supply chain are more likely to sustain their operations during the pandemic. Organizations detached from a traditional, effective-based hierarchical model toward nurturing the culture of flexibility, agility, and resilience find it easier to adapt to changes and reorganize their resources in times of crisis. Enterprises with a more loose and adaptive business model are quick to reduce stressors and adjust. They are characterized by diversity and maneuverability, and this plasticity allows them to reshuffle their priorities and proceed with emergent activities during risks. This study finds that organizations favouring adaptive culture are more likely to sustain business operations during the pandemic. Furthermore, resilient organizations allow for more informed and decentralized decision-making. They gather heads of key business units, increase knowledge transfer and knowledge management during the crisis, delegating responsibilities, assignments, and initiatives. Shared leadership is fostered, and authority delegated to selected members of different organizational units, which allows for the

facilitated gathering of intelligence from all functional domains and accounts for faster response to stressful events. Consequently, the study concludes that companies with a distributed leadership and workforce are more likely to sustain business operations in times of COVID-19 and any future pandemic. Prosperous organizations leverage ICT and integrate Intranet, social media, and online communication platforms into their daily business routines, as this helps to establish trust and build bonds with employees, stakeholders, and customers prior to and post-crisis. These enterprises have a better emergency response since they can make use of technology-mediated knowledge, gather, process, and share information and coordinate collaboration in times of crisis. Therefore, the study finds that companies with advanced digitalization and internet technology sustain the business operations in times of a pandemic. Finally, balancing between the stockpiling of resources and resiliency is crucial in anticipation of a crisis. It is vital for organizations to maintain constant operations, and this is by and large accomplished by sustaining key resources, such as equipment, cognitive capital, and labour force. For an organization to survive a pandemic and quickly restore its activities, it should have a well-designed plan to manage operations with maximum efficiency, by assessing financial feasibility or by identifying alternative funding sources. Thus, we conclude that enterprises with financial contingency plans sustain their business operations in the time of the pandemic. Organizations that adopt these steps and combine them with lessons memorized from past experiences will not only sustain their business but re-invent themselves and benefit post-crisis, as they will evolve, adjust, learn to manage and embrace change, and innovate in the face of challenges.

The outcome of the current study is the conceptual model “Enterprise Effectiveness and Sustainability Model during Pandemic” that offers an innovative, new framework for enterprises to sustain business operations and ensure survival during a pandemic and other crisis. The different pandemic threat stages are characterized by more rigorous control and increased restrictions that push enterprises toward extinction. The study contributes to explaining the key factors that are conducive to enterprise effectiveness. These entail networked structure, supply chain resilience, distributed workforce and leadership, digitalization, ICT, and financial contingency planning. We have moved beyond the existing frameworks and used a novel approach to form an applicable framework for enterprises from various sectors, to be able to adapt during the time of a pandemic and other crises.

6.1. Limitation of the Study

The current study combines crisis management theories and literature review with best practice case studies on a similar crisis. As the COVID-19 outbreak is still in progress, the implications for the businesses and economy will be known only post-crisis. Thus, indicators and drivers of successful business and sustainability are yet to be empirically confirmed after the pandemic is contained. Empirical analysis should be conducted to address the limitation of the study. The current study does not take specific countries and the stages of the virus outbreak into consideration. Multiple countries need to be taken into consideration, given that not all economies have been equally affected by the COVID-19 virus pandemic. The People’s Republic of China is recovering economically, as corporations in China are already in the post-recovery stage, moving towards rebound. In other parts of the world, the economic hiatus caused by the COVID-19 virus outbreak has just started in March 2020. All the countries are characterized by different political and administrative systems but have introduced similar regulations to control the pandemic. In addition, this paper does not provide perspective on specific business sectors and industries which the current sustainability model cannot be applied to. Furthermore, a deeper investigation is warranted on the impacts of the pandemic on the state-owned versus private enterprises, especially regarding government risk mitigation. The results on curbing the risks and achieving sustainability in private and state enterprises will be evident in ex post case studies in different economies and industries. Future studies should adopt qualitative and quantitative methodology on the key indicators and describe the current state of enterprise operations during a pandemic slow-down and measure adverse effects on enterprise operations. Network structure effectiveness and advantage in achieving sustainability may prove difficult to measure against the

bureaucratic structure of state-owned enterprises, since the latter receive considerable aid from government funding.

6.2. Future Studies

Research of enterprise operations to determine the predictive value of economic success in the period of economic uncertainty is warranted. The current version of the conceptual model “Enterprise Effectiveness and Sustainability Model during Pandemic” aimed to sustain enterprise operations during the time of pandemic should be empirically tested. Such research study should take into consideration companies from different sectors of the economy. Furthermore, additional factors related to workforce, technology and digitalization, organizational processes, organizational nature, change management, and strategy could be explored as potentially conducive to enterprise success. Consequently, specific factors within the mentioned spheres should be identified and tested empirically. In future studies, other theories can be used to explain the sustainability of procedures and enterprise effectiveness in different stages of disease outbreaks characterized by the limited movement of people, goods, and services. Future studies should adopt a case study methodology and describe the current state of enterprise operations during pandemic slow-down, identify best practices, and adverse effects on enterprise operations. The lessons learned will provide empirical evidence upon which effective organizational policies can be developed.

Author Contributions: Conceptualization, B.O. and M.A.S.K.; methodology J.D. and I.J.; investigation, B.O., D.G., D.T. and M.A.S.K.; resources, J.D.; writing—original draft preparation, B.O., D.G., and D.T.; writing—review and editing, D.G. and I.J.; visualization, M.A.S.K.; supervision J.D.; project administration, B.O. and J.D.; funding acquisition, J.D. All authors have read and agreed to the published version of the manuscript.

Funding: This research was funded by the Special Funds of the National Social Science Fund of China (18VSJ038) and in part by the National Science Foundation of China, grant number 71974081, 71704066, and 71971100.

Conflicts of Interest: The authors declare no conflict of interest. The funders had no role in the design of the study; in the collection, analyses, or interpretation of data; in the writing of the manuscript, or in the decision to publish the results.

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