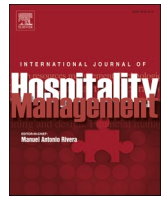




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Impact of COVID-19 on the hospitality industry: A supply chain resilience perspective

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ABSTRACT

The COVID-19 pandemic continues to have significant negative impact on people around the globe. In this paper, a mixed-methods approach is used to study the impact of the pandemic on the hospitality industry and its associated supply chain – with specific emphasis on the Accommodation and Food Services sector. Using available data from the United States Bureau of Labor Statistics, among other things, comparison is made between its impact and that of the global financial crises in 2008–2009. One finding is that the impact on unemployment levels exceeds those of 2008–2009 and also exceeds those from some comparative industry sectors such as Manufacturing and Hospitals. Furthermore, the developed conceptual framework on resilience provides better understanding on how companies can operate successfully during a pandemic. The results of the study have implications for hospitality managers and for governments that are providing financial aid to businesses affected by a catastrophe or pandemic.

1. Introduction

There is an inherent desire by all organizations to be successful. Achievement of success can be measured by several possible metrics including profitability, revenue growth, customer satisfaction and market share growth, among others (e.g., Aggarwal, 2001; Han and Goetz, 2015; Torres et al., 2019). Sometimes, however, many companies – including hospitality companies – are unable to achieve such laudable goals for several reasons which include problems resulting from risks to which they are exposed. While some of these risks are idiosyncratic, specifically affecting a particular company, others are general and systematic, affecting a broader range of companies (e.g., Hueng, 2014).

COVID-19, which is an airborne virus, has affected people all over the world. This has led to severe direct consequences such as serious illnesses, hospitalizations, and even deaths. The pandemic has also created several indirect impacts which include job losses, school closings or remote learning, drug abuse, violence and even suicide, arising from isolation and despair (e.g., Flores, 2020; Wahlberg, 2020; Watkins, 2020). As of early June 2021, the Johns Hopkins Coronavirus Resource Center reports a total of about 173.10 million confirmed cases of COVID-19 infection worldwide and global deaths of about 3.73 million people (Hopkins, 2021). The United States, which leads the entire world in these grim numbers, stands at about 33.4 million cases and about 598,000 deaths (Hopkins, 2021).

A lot of effort has gone into the development of vaccines and therapeutics to control the spread of the virus. It was only during the latter part of 2020 that some safe and effective vaccines were developed in several countries. In spite of this welcomed development, there are still many challenges, which include new strains of the virus being discovered in different parts of the world (Duarte, 2021; WHO, 2021) as well as problems with production and distribution of the vaccines (e.g., Cassidy, 2021). Prior to the development of these vaccines, there were mixed messages, especially in the United States, as to how best to control this scourge. Health experts believe that following social distancing guidelines (staying at least 6 feet apart from others when in public places), wearing a mask, and washing hands frequently can significantly reduce infection rates and their attendant consequences (e.g., Knotek et al., 2020). On the other hand, there are those – especially in political circles – who believe otherwise and were indirectly leaning towards herd immunity, where the rate of infection would naturally decrease as a very large percentage of the population (say 60%–70%) become infected. As most health experts have warned, such herd immunity would lead to tremendous loss of lives (e.g., Stacey, 2020; Toy and Hernandez, 2020).

A key question then is this – how can businesses that have been decimated by the coronavirus pandemic recover and regain their positions? This is especially true of the hospitality industry which is one of the industries that has been the most hardly hit by the pandemic (e.g., Havercroft, 2020). Domino's Pizza and Popeye are two fast food

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businesses in the United States that have continued to do well even during the pandemic. For example, Domino's introduced contactless delivery as a way to assure customers of their safety and by doing so, it increased same-store sales by about 16% (Ludwig, 2020).

There are several other hospitality businesses, including hotels such as Roosevelt Hotel, New Orleans, that have been thriving during the crises. This has resulted from business models innovation, use of technology, and adherence to proper safety protocols (please refer to Hoteligia, 2020; Schoenig and Shapiro 2021). Furthermore, Mendez (2021) discusses how hotels such as the Wyndham hotels resorted to using outdoor spaces more than they did before and how others such as the Hilton hotel chain moved to provide guests with only the essentials and doing away with items such as magazines and notepads as a way to minimize contamination. Itzkowitz (2020) describes how some hotels are adopting new operational frameworks such as offering bonds under a "Buy-Now Stay-Later" arrangement (this would cost the guest less if paid for now as compared to if they did so later). Itzkowitz (2020) also notes that with a forward-looking mindset, hotels such as Four Seasons and Marriott are building customer and societal goodwill by making donations worth millions of dollars to vulnerable groups that have been affected by the pandemic.

What risks do companies in the hospitality industry face and how quickly can they recover and start operating again after they have experienced some disruptions? Companies are subjected to various types of shocks – some of them are direct while others are indirect (e.g., resulting from downturn in the economy); some are instantaneous (e.g., earthquakes and hurricanes) while others occur over long periods of time (e.g., pandemics). Furthermore, the impact of such shocks can be long-lasting, taking months and sometimes years before the effects dissipate. Unemployment is a key outcome of such shocks and its impact can linger on for a very long time. When a company or supply chain is resilient, then this negative impact can be mitigated within a relatively shorter period of time. Furthermore, employment level as well as revenues, profitability, customer satisfaction, etc., have been considered as metrics for resilience (e.g. Davies, 2011; Han and Goetz, 2015; Torres et al., 2019; Han and Goetz, 2019). Thus, in this study, we focus on unemployment as a part of our discussion on resilience.

In particular, we examine risks and resilience for the hospitality industry and supply chains specifically within the context of the COVID-19 pandemic. Our rationale for taking a supply chain perspective is that an organization's success is closely tied to how well it manages its supply chain (e.g., Ferry et al., 2013; Datta, 2017). We adopt a mixed-methods approach that comprises of conceptual development combined with analysis of data from the United States Bureau of Labor Statistics. The paper contributes to an understanding of the current state of the hospitality industry with regards to COVID-19 as well as the mechanism for enabling successful recovery. Aside from the conceptual framework development, the specific research questions that are examined in this study are as follows:

- (1) To what extent has the COVID-19 pandemic impacted unemployment levels in the hospitality industry?
- (2) How does the impact of COVID-19 in the hospitality industry compare with other industries – specifically, manufacturing and healthcare (hospitals)?
- (3) How does the impact of COVID-19 on the hospitality industry compare with the impact of the 2008–2009 economic recession on the same industry?

Several articles in the extant literature have studied the impact of catastrophes and pandemics on the hospitality industry (e.g., Henderson, 2005; Lamanna et al., 2012), but only very few have done so within the context of resilience (Sydnor-Bouso et al., 2011; Jones and Wynn, 2019). Aside from the Sydnor-Bouso et al.'s study, which addressed unemployment issues for the Hurricane Katrina disaster, ours is the only study of which we are aware, that examines unemployment issues

through the lens of resilience. Furthermore, ours is the only study that does so by examining the impact of COVID-19 on unemployment in the United States hospitality industry and supply chain. Discussion of the impact of shocks such as COVID-19 within the context of supply chains is very important because the focal firm and its associated supply chain are intricately interconnected. Thus, what happens to one entity affects the others as it is very easily propagated through the chain. Among other things, we find that unemployment rates for the Accommodation and Food Services sector exceed those of the Manufacturing and Hospital sectors. Furthermore, the impact of COVID-19 on unemployment rates, especially for the Accommodation and Food Services sector by far exceed the levels during the 2008–2009 economic crises.

The remaining part of the paper is structured as follows. In the next section, we describe the hospitality supply chain and also discuss its vulnerability to COVID-19. Thereafter, we discuss related extant literature and provide the theoretical foundation for the paper. Following this, the data and methodology are described. We then present the conceptual framework for understanding the resilience mechanisms and then move on to present and discuss the results of the data portion of the research. Next, we describe the limitations of our study, present some propositions, and provide some areas for future research. Finally, we conclude by summarizing the main results from the study and also describe managerial and policy implications of the results from the study.

2. The hospitality supply chain and the COVID-19 pandemic

2.1. Hospitality industry

The hospitality industry is composed of a wide range of organizational operations and activities that include hotels, motels, lodging places, restaurants and bars. In a broader sense, it is sometimes considered to include theme parks and event planning. The United States Bureau of Labor Statistics (BLS) classifies it under the composite name of Leisure and Hospitality supersector (Bureau of Labor Statistics, 2020), with two sectors: (1) Arts, Entertainment, and Recreation (North American Industry Classification System, NAICS code of 71) and (2) Accommodation and Food Services (NAICS code of 72). For the purposes of this study, our focus would be on the latter sector.

While Accommodation on the one hand and Food Services on the other as separate sub-sectors have some things in common, there are areas and issues that are different. For example, many large hotels have restaurants within them, so they would need to address issues that are common with most traditional restaurants or food services organizations. However, hotels and lodging places need to deal with other matters that do not relate to food services organizations. This includes housekeeping and room service. On the other hand, many food services organizations can operate in ways that hotels would typically not. This includes take out and drive-through arrangements that are common with fast food places. Fig. 1 below illustrates the intersection and distinction described here.

2.2. The hospitality supply chain

Hospitality organizations provide some services to their customers through the transformation of several inputs, some of which are tangible

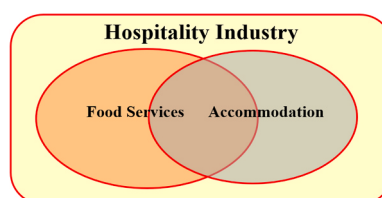


Fig. 1. Interrelationship between food services and accommodation.

while others are intangible. It is clear that these services cannot be provided without the relevant inputs. Oftentimes, most of these inputs come from independent external organizations, which have their own goals and objectives, and that are under different management. In order for a focal organization (within the Food Service or Accommodation sector, in this case) to be effective and successful, it needs to be able to work well with these external organizations. This goes beyond the direct suppliers of goods and services, as these organizations in turn have their own suppliers. This leads to a multi-tier structure that is described as a supply chain. The supply chain for a typical restaurant (part of the Food Services arm) is illustrated in Fig. 2 below. It is important to emphasize that such chains are very complex and thus what is depicted in this diagram is by no means exhaustive.

The solid arrows in the diagram represent the flow of goods primarily (but sometimes services) while money flows would occur in the opposite direction since each player needs to pay in order to be able to receive the good (service). The ultimate recipient is the final consumer or the restaurant's customers or patrons, which is right above the restaurants in the diagram. Aside from the goods/services and money flows which typically go in opposite directions as explained, information flow occurs both ways. For example, the restaurant has to place orders from the Food Service Suppliers such as the bakery and food aggregator firms (e.g., Gordon Food Service). On the other hand, the bakery, among other things, needs to inform the restaurant about their varied offerings and how those may change with time.

The representative supply chain in Fig. 2 helps us to see how the ability of the restaurant to respond to unanticipated events or recover from a pandemic, for example, is impacted by what happens at the various tiers.

2.3. Origin, mechanism, and guidelines for the COVID-19 pandemic in the hospitality industry

The COVID-19 pandemic arose due to the spread of the novel coronavirus which originated in the Wuhan Province of China (Mancini, 2020). It quickly spread to other parts of the world as people traveled from one place to another. The virus is spread through respiratory droplets and leads to severe complications and even death, especially for people with underlying medical conditions such as obesity and heart disease. Since work environments and schools, among others, involve close contact with other people, it became easier for the disease to spread in the population.

The United States Occupational Safety and Health Administration (OSHA), a division of the United States Department of Labor, recently issued a guideline (OSHA, 2020) that describes the risks of contracting COVID-19 pandemic on the basis of the nature of the work environment. They are classified into: Lower Risk, Medium Risk, High Risk and Very High Risk groups. Those classified in the High Risk category are healthcare workers, including doctors, nurses, who come directly in contact with those who may be infected with the disease. Although the

document does not specifically classify workers in the Accommodation and Food Services sector, it is reasonable to put them in the medium risk category. OSHA describes Medium Risk jobs as “those that require frequent and/or close contact with (i.e., within 6 feet of) people who may be infected with SARS-CoV-2 (COVID-19), but who are not known or suspected COVID-19 patients.”

The United States Centers for Disease Control (CDC) continues to issue guidelines for Americans as well as those that pertain to certain industry sectors (CDC, 2020). More specifically, for Restaurants and Bars, the CDC groups activities and settings in this industry into 4 classes: Lowest Risk, More Risk, Even More Risk, and the Highest Risk. The Lowest Risk group of activities are “Food service limited to drive-through, delivery, take-out, and curbside pick up” while the Highest Risk group are: “On-site dining with both indoor and outdoor seating. Seating capacity *not* reduced and tables *not* spaced at least 6 feet apart”. Without specifically classifying risk levels as has been done for restaurants and bars, the CDC has also provided some guidance for hotels, resorts, and lodges (CDC, 2020). These are more general guidelines, but they include some specifics on restrooms, guest rooms, and handling of items such as key cards, etc. Service Hospitality, which “is a non-profit safety association funded by employers in the hotel, restaurant, laundry and community services industries” has also detailed guidelines specifically for the hospitality industry (Service Hospitality, 2020). These include cleanliness of guest rooms, how to handle food, what to do for hotel lobbies, and how to handle waste materials that have been used by guests.

McKinsey has been providing executive briefings on the state of COVID-19 and how it impacts businesses globally. In its June 18, 2020 Briefing Notes (McKinsey, 2020), it discusses the plans for action for German Industrial sectors, including the hospitality sector. It maps each of the 23 industrial sectors on a matrix (with 0%–100% scales on each axis). The vertical axis represents the extent of the impact of COVID-19 on the sector while the horizontal axis describes the structural challenges inherent in these sectors before COVID-19. The hospitality sector in Germany (along with 2 other sectors – Airline and Arts and Entertainment) are mapped around the middle on the horizontal axis but very close to the top (100%) on the vertical axis. Furthermore, these sectors are identified in terms of what specific paths they are taking to navigate the challenges: Straying, Consolidating, Recovering Slowly, Rebounding, Continuing, and Seizing (Using the Opportunity). Hospitality as well as the Airline and Arts and Entertainment sectors are identified as Straying.

3. Literature review and theoretical foundation

Merriam-Webster Online Dictionary defines resilience as follows: “(1) the capability of a strained body to recover its size and shape after deformation caused especially by compressive stress, (2) an ability to recover from or adjust easily to *misfortune* or change”. The second definition here is the one that relates to our discussion in this paper. Clearly, COVID-19 is a misfortune that has negatively impacted businesses globally. Using several examples, including the terrorist attack in the United States in September 2001, Sheffi and Rice (2005) describe resilience as “the ability to bounce back from a disruption”. Resilience within the supply chain context has been defined in various ways in the literature. For example, Scholten et al. (2019) define it as “the adaptive capability of an organization to prepare for, respond to and recover from any type of supply chain disruption”. Also, in their systematic review of the literature on supply chain resilience, Kochan and Nowicki (2018) summarize 5 other definitions, which include: “The adaptive capability of a supply chain to reduce the probability of facing sudden disturbances, resist the spread of disturbances by maintaining control over structures and functions, and recover and respond by immediate and effective reactive plans to transcend the disturbance and restore the supply chain to a robust state of operations”.

While there had been indications that some businesses impacted by

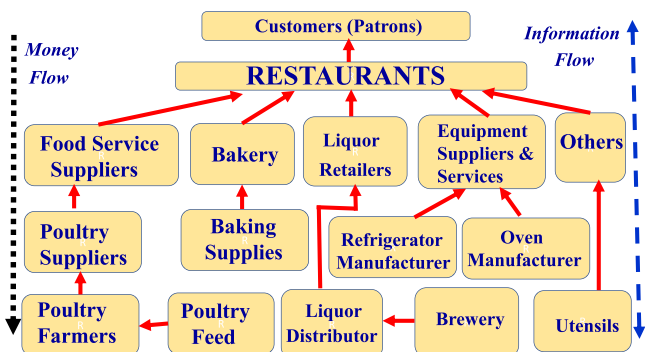


Fig. 2. Schematic representation of the restaurant supply chain.

COVID-19 would never recover, the fact is that many of them can recover and are indeed recovering (e.g., Ludwig, 2020; Hoteligia, 2020; Schoenig and Shapiro, 2021). This may require that these companies reinvent themselves in terms of their operations as well as their offerings to their customers. Resilience for a given organization is crucial for success, but it is also important to recognize that it is interdependent on resilience of the organization's supply chain.

Several research papers have examined resilience within the context of a given organization. For example, using the case of Hurricane Katrina that occurred in the Louisiana area in the United States in August 2005, Torres et al. (2019) draw upon the Sustainable Family Business Theory (SFBT), to assess resilience for small businesses. The central question they address is whether social capital can facilitate resilience; where social capital is defined as 'the institutions, relationships, attitudes and values governing interactions amongst people and contributing to economic and social development (see Iyer et al., 2005). Using a probit regression framework, they find, among other things, that social capital does indeed have positive impact on resilience. Several other papers examine resilience for a given organization within different contexts (e.g., Campos, 2016; Salvato et al., 2020). Some research papers have examined resilience in relation to the hospitality industry (e.g., Jones and Wynn, 2019). However, only very few of them have done so by relating it to employment levels, which is our focus in this study. Sydnor-Bousso et al. (2011) note as follows: "job continuity and resilience refer to the organizational capacity to preserve jobs in order that service and support by and for its employees continues after a disruptive event." Along this line, their study primarily assessed the impact of community capital (comprising human, social, economic, and physical components) on restaurants jobs and hotels jobs before and after a disaster. They find that community capital is positively associated with resilience, where resilience is measured as the change in employment in the accommodation and food services sector between 1998 and 2000.

McGhan et al. (2020) is one of a few papers that have studied unemployment resulting from the COVID-19 pandemic. Using unemployment data for Ireland (across all industry sectors) the authors find, among other things, that the unemployment impact of COVID-19 exceeds those from the financial and banking crises that the country had experienced in 2008. Davahli et al. (2020) provides a review of the literature for articles (including those available on websites) that relate to COVID-19 and the hospitality industry. They summarize the segment of the industry, geographic location, and the approach used. Only one of those articles (Cajner et al., 2020) pertain to job losses in the United States. Theirs was a preliminary study that used ADP unemployment data to track and report on job losses in the US over a 2-month period (February 2020 to April 2020).

For the reasons outlined above, there has been a lot of studies in extant literature that examine resilience within the context of supply chains. Marcelo Martins et al. (2019) uses a multiple case study approach with 41 in-depth interviews to analyze supply chain resilience and to answer several research questions that pertain to companies based in Brazil. Among other things, they point out that it is critically important for individual firms in a supply chain to examine their position in their supply chain and the level of inter-relationship with their partners. They note that this would enable them to craft the best supply chain resilience strategy. Li et al. (2017) study supply chain resilience from the perspective of information sharing. In particular, they study and model a 3-echelon supply chain system and subject it to shocks based on ordering policies adopted. They find that information sharing plays a very crucial role in facilitating supply chain resilience.

Constructs that have been used in the literature to study supply chain resilience include: efficiency, redundancy, collaboration, flexibility, velocity, visibility and robustness (Scholten and Schilder, 2015). In their study, Scholten and Schilder (2015) answer the question of how resilience in the supply chain can be built through engagement in collaborative activities. They used 16 semi-structured interviews to address this research question. Among other things, they find that "Supply Chain

Collaboration is an antecedent of visibility, flexibility, and velocity" and that collaborating with competitors can facilitate supply chain resilience. Recently, Ivanov and Dolgui (2020), motivated by the COVID-19 pandemic, study supply chain resilience within the context of intertwined supply networks. They use a game-theoretic approach to assess how this framework can be used to enhance the performance of supply chains.

Roy et al. (2016) uses a dynamic capability lens to study resilience in the tourism supply chain. Their discussion also includes hotels, which they note, is part of the tourism supply chain. This is the only paper which we know that examines resilience in the hospitality industry within the context of the supply chains. Alonso et al. (2020) use survey methodology to examine various facets of the impact of COVID-19 on small hospitality businesses. Among other things, they find that some of these companies engaged in other business ventures in order to maintain profitability. Other studies that address various issues relating to supply chain resilience or COVID-19 include: Hendry et al. (2019), Jones and Wynn (2019), Adobor (2020), Filimonau et al. (2020), Huang et al. (2020), Ji et al. (2020), Shashi et al. (2020).

Several theories have been used to study supply chain resilience. For example, Brandon-Jones et al. (2014) use the Contingent Resource Based View, a modified version of the classical Resource Based View (RBV) in their study that involved a survey of manufacturing plants in the United Kingdom. Among other things, they find that connectivity and the sharing of resources among supply chain partners enhances supply chain resilience. The Cultural Value Framework (CVF) or theory which derives from the cultural characteristics of the firm have also been used to study supply chain resilience (e.g., Cameron and Robert, 2011; Mandal, 2017; Murphy et al., 2020). In their systematic literature review of supply chain resilience, Kochan and Nowicki (2018) provide a listing of 20 theoretical lenses that have been used to study the phenomenon, including Systems Theory, Transaction Cost Analysis, Relational View Theory and some of those described above. The Dynamic Capabilities Theory (DCT) and the Resource Based View (RBV) were by far the most widely used lenses in the literature they surveyed. Barney (1991) discusses the Resource Based View and its crucial role in providing competitive advantage for firms. In their study of the relationships between restaurants and their suppliers, Ku et al. (2020) note as follows: "The resource-based theory is useful for describing the role of strategic resources and capabilities within the companies and its supply network". Employees within the focal firm and the associated supply chains are no doubt strategic resources in the supply chain. Mechanisms put in place by the organizations within the restaurant and hotel supply chains to be resilient protect the jobs of the workers (as there is less unemployment), which in line with the Resource-Based View enhances the supply chain performance. This would in turn lead to competitive advantage over other firms that are subjected to similar circumstances. Therefore, considering employees as important assets for restaurants and hotels, we draw upon RBV to address the research questions in this study.

4. Data and methodology

We adopt a mixed-methods framework for this paper. It is a combination of conceptual development and analysis of some data on the impact of COVID-19 in the Accommodation and Food Services sector. Mixed-methods approaches are commonly used in business research as a way to provide a multi-dimensional view of the phenomenon that is being studied. For example, Brunk and de Boer (2020) use a combination of qualitative interviews and field experiments to assess how consumers use information to establish their perception about whether or not a brand is ethical. Other works that adopt or describe mixed-methods approaches – including those whose focus is on the hospitality industry – are: Kwok (2012), Kamali (2014), Galanti and Cortini (2019), Marzi et al. (2020), Mehran et al. (2020).

Meredith (1993) discusses different stages in research which include

description, explanation and testing and he specifically distinguishes between theory building and theory testing. He describes the key role which conceptual research methods play in the theory building process as it helps us to understand phenomena, which can then become a basis for data collection and testing. In particular, he notes that “short-circuiting any one of these stages results in dysfunctional research ...”. Other papers that describe the importance of conceptual research for building theory and fostering the scientific inquiry process include: Wacker (1998) and Choi and Wacker (2011).

The data used for the data analysis portion of this study was obtained from the United States Bureau of Labor Statistics. In assessing the impact of COVID-19 pandemic on the hospitality industry, we use data on unemployment rates in particular for the Accommodation and Food Services sector. For purpose of comparison, we examine the unemployment rates for this sector for 10 months of 2020 (March through December) and compare them with data for the same period of 2019. To provide some context in relation to how the hospitality industry is affected by disruptions, it is compared with similar data for the exact same months in both 2008 and 2009 (separately), the onset of the global financial crises that had significant impact on almost all industry sectors. The reason for also using 2009 information is because that is the period when the effect on unemployment started to be more pronounced. Furthermore, comparison is made between this specific industry sector under investigation with two other sectors: one service (Hospital sector) which is a subsector under the Healthcare and Social Assistance sector (NAICS code of 62) and the other one is the manufacturing sector. The manufacturing sector combines companies with NAICS codes 31–33. This comprises several sub-sectors such as Food Manufacturing (NAICS code 311), Chemical Manufacturing (NAICS 325), Plastics and Metal Product Manufacturing (NAICS code 326) and Computer and Electronic Product Manufacturing (NAICS code 334). The rationale for the choice of sectors to use in this comparison is for several reasons. First, we wanted to also examine one very important service sector, since our focal sector is in the service industry and Hospitals is no doubt a key sector – this sector is a particularly important sector, considering the fact that the shock here is due to a pandemic. Furthermore, we saw it as appropriate to make comparison with a goods-producing industry, thus we chose the manufacturing sector.

Since the monthly data provided for these sectors only covers 10 months, we were limited in the analysis that could be carried out. In order to augment the analysis, we also used estimates of unemployment data for these industry sectors based on the following available data from the US BLS: actual unemployment data for each month across all industry sectors, actual unemployment data for each month for the respective sectors (Accommodation and Food Services, Manufacturing, and Hospitals), and actual unemployment data for the various States across all industry sectors. The Bureau does not have data for the States for each of the industry sectors (this was confirmed through an email exchange with a staff who works for the Bureau). The estimates for the unemployment data for the 3 industry sectors for the States were obtained as follows. First, for each of the three sectors assessed here, we computed a factor for each month, which is the ratio of the unemployment rate for that sector for a given month for the US divided by the corresponding unemployment rate for the entire US across all industry sectors for the same month. Each of these factors is then multiplied by the corresponding unemployment rate for a given State for a given month in order to obtain an estimate of the unemployment rate for the said State for the sector. Let us consider the following example to illustrate the procedure. For example, let the unemployment rate of the Accommodation and Food Services Sector for a given month (say June) for the US be 1.2 times the unemployment rate for the US across all sectors for June. We multiply the unemployment rate for a given State (say, the State of Nevada) and month (June) by 1.2 to obtain the unemployment rate for the Accommodation and Food Services sector for June for the State of Nevada. Data was available for 52 States (the classical 50 States in the US and two territories, Washington D.C. and

Puerto Rico). The total expected data points would have been (52 = 52 States x 10 months, between March 2020 and December 2020). Lock-downs in the US started from around March 2020. Due to some missing data, the total available data was 491 and that is what was used for this part of the analysis. We had sought to also use projected unemployment data for 2021 and 2022 for the analysis, but an economist – who is an employee of the Bureau of Labor Statistics – noted in an email response that they do not yet have such projections. SPSS Version 26 software was used for the data analysis.

5. Conceptual framework on resilience in the era of the COVID-19 pandemic

In this section, we use a conceptual framework to describe the challenges companies in general and hospitality businesses, in particular, have faced and how they can successfully navigate the COVID-19 Pandemic landscape to become successful. Building resilience for an organization or its associated supply chain goes along with the risks to which it can be exposed. As noted earlier in this paper, risks are largely grouped into two classes: systematic risks and idiosyncratic risks. The former are risks that cut across many organizations including those of competing firms while idiosyncratic risks are those that are unique to a firm or a limited group of firms. More specifically, war and terror such as world war, pestilence and disease such as COVID-19 and global economic crises such as the one that occurred around 2008–2009 are examples of systematic risks. On the other hand, more localized risks such as supplier bankruptcy, workers strike are examples of idiosyncratic risks. The types of mechanisms needed would be different, depending on the nature of the risk.

Fig. 3 depicts in general this notion of mechanisms that can be deployed depending on the extent to which the organization has control over the landscape in the event that there are risks. We conceptualize it as a continuum ranging from scenarios where the company has absolutely no control and cannot take actions to be restored back to normal operations to the other extreme where companies have full control and are in a position to take all the concrete steps to be restored back to normal operations.

Firstly, when there are government mandates such as lockdowns during the pandemic, the ability of the organization to return back to normal operations becomes severely hampered. Unless there is a complete global lockdown (which is hardly ever the case) companies still have some opportunities to restore part, if not all of their operations. This would, of course, depend on how their resources are distributed. Let us put this in perspective by looking at the response to COVID-19 in the United States. There are those who have argued that the country would have been better off in terms of COVID-19 cases, hospitalizations, and deaths if there was an initial lockdown in the entire country. The US never implemented a universal country-wide lockdown whereas New Zealand and some countries in Europe did that and it has been credited with helping stem the spread and negative impact of the pandemic in those countries. However, on the other hand, organizations can exploit the lack of a universal lockdown to deploy resources and operations to

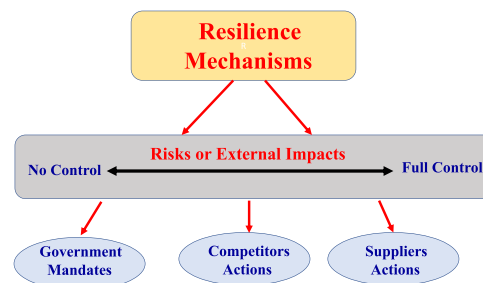


Fig. 3. Resilience mechanisms for navigating the COVID-19 pandemic landscape.

Table 1
Summary of results for the main tests.

Unemployment rates comparisons	Tests and results	Conclusion
<p>Case 1 Unemployment rates of Accommodation and Food Services Sector for 2020 Versus the same for 2019</p>	<p>[US Monthly data] t-test: ($\mu=16.46$, $\sigma = 9.26$, $t(9) = 5.622$, $p\text{-value} = 0.0000$ (< 0.0005) [States Monthly Data] t-test: ($\mu=14.98$, $\sigma = 10.54$, $t(490) = 31.51$, $p\text{-value} = 0.0000$ (< 0.0005) Wilcoxon-Signed Rank test $\mu^+=246$, $\mu^-=0$, $Z = -19.20$, $p\text{-value} = 0.0000$ (< 0.0005) Sign test $\tau_1 = 18.07$, $\tau_2 = 4.86$, $Z = -22.11$, $p\text{-value} = 0.0000$ (< 0.0005)</p>	Higher unemployment rates in the Accommodation and Food Services sector for 2020 compared to 2019. Thus the pandemic can be said to have led to increased unemployment in this sector.
<p>Case 2 Unemployment rates of Accommodation and Food Services Sector for 2020 Versus the same for 2009</p>	<p>[US Monthly data] t-test: ($\mu=9.71$, $\sigma = 9.35$, $t(9) = 3.28$, $p\text{-value} = 0.009$ [States Monthly Data] t-test: ($\mu = 9.24$, $\sigma = 10.43$, $t(490) = 19.62$, $p\text{-value} = 0.0000$ (< 0.0005) Wilcoxon-Signed Rank test $\mu^+=269.5$, $\mu^-=113.58$, $Z = -16.53$, $p\text{-value} = 0.0000$ (< 0.0005) Sign test $\tau_1 = 18.07$, $\tau_2 = 10.46$, $Z = -15.43$, $p\text{-value} = 0.0000$ (< 0.0005)</p>	Higher unemployment rates in the Accommodation and Food Services sector for 2020 compared to the levels for the same industry in 2009.
<p>Case 3 Unemployment rates of Accommodation and Food Services Sector for 2020 Versus the same for 2008</p>	<p>[US Monthly data] t-test: ($\mu=12.83$, $\sigma = 9.28$, $t(9) = 4.37$, $p\text{-value} = 0.002$ [States Monthly Data] t-test: ($\mu=11.96$, $\sigma = 10.42$, $t(490) = 25.43$, $p\text{-value} = 0.0000$ (< 0.0005) Wilcoxon-Signed Rank test $\mu^+=261.49$, $\mu^-=37.79$, $Z = -18.79$, $p\text{-value} = 0.0000$ (< 0.0005) Sign test $\tau_1 = 18.07$, $\tau_2 = 7.96$, $Z = -19.05$, $p\text{-value} = 0.0000$ (< 0.0005)</p>	Higher unemployment rates in the Accommodation and Food Services sector for 2020 compared to the levels for the same industry in 2008.
<p>Case 4 Unemployment rates of Accommodation and Food Services Sector for 2020 Versus the same for the Manufacturing sector for 2020</p>	<p>[US Monthly data] t-test: ($\mu=14.16$, $\sigma = 6.01$, $t(9) = 7.45$, $p\text{-value} = 0.0000$ (< 0.0005) [States Monthly Data] t-test: ($\mu=13.95$, $\sigma = 6.14$, $t(490) = 42.01$, $p\text{-value} = 0.0000$ (< 0.0005) Wilcoxon-Signed Rank test $\mu^+=246$, $\mu^-=0$, $Z = -19.20$, $p\text{-value} = 0.0000$ (< 0.0005) Sign test $\tau_1 = 18.07$, $\tau_2 = 5.99$, $Z = -22.11$, $p\text{-value} = 0.0000$ (< 0.0005)</p>	Higher unemployment rates in the Accommodation and Food Services sector for 2020 compared to the levels for the Manufacturing industry in 2020.
<p>Case 5 Unemployment rates of Accommodation and Food Services Sector for 2020 Versus the same for the Hospital Sector for 2020</p>	<p>[US Monthly data] t-test: ($\mu=18.81$, $\sigma = 8.22$, $t(9) = 7.24$, $p\text{-value} = 0.0000$ (< 0.00005) [States Monthly Data] t-test: ($\mu=17.56$, $\sigma = 9.41$, $t(490) = 41.33$, $p\text{-value} = 0.0000$ (< 0.0005) Wilcoxon-Signed Rank test $\mu^+=246$, $\mu^-=0$, $Z = -19.20$, $p\text{-value} = 0.0000$ (< 0.0005) Sign test $\tau_1 = 18.07$, $\tau_2 = 2.33$, $Z = -22.13$, $p\text{-value} = 0.0000$ (< 0.0005)</p>	Higher unemployment rates in the Accommodation and Food Services sector for 2020 compared to the levels for the Hospital sector in 2020.

Notes: μ (mean), σ (standard deviation), μ^+ (mean positive rank), μ^- (mean negative rank), τ_1 (median, 1st variable), τ_2 (median, 2nd variable), $n = 10$ (US data), $n = 491$ (States data). US Data satisfy Kolmogorov-Smirnov and Shapiro-Wilks normality criteria, but States data does not, but in several cases States data appear approximately normal from Histograms and Quantile-Quantile plots.

areas where such regulations are absent and thus restore some of their operations. Therefore, spatial diversification to other parts of the country or other parts of the world can be a mechanism for restoration or maintaining resilience.

Secondly, what happens with competitors? Can organizations be restored back to their normal operations regardless of what competitor firms do? While this is possible, it can be difficult. Assuming the landscape is favorable and there are no overall government regulations such as lockdowns, a restaurant or hotel may still look for ways to operate differently from how current direct competitors operate. For example, food services organizations that traditionally operated dine-in services could resort to curbside pick-up or even offering to deliver the meals to their customers' homes for a minimal fee. Also, the example of contactless delivery that Domino's Pizza now uses (as described in the Introduction section) led to increased revenues for the company. However, there are times when competitors actions can make things a lot more difficult. For example, in the State of Georgia and many other states in the southern part of the US, there was no statewide mandate for wearing a face mask. Thus, a restaurant owner who requires a patron to wear a face mask before entering the restaurant runs the risk of losing customers who do not want to wear face masks while dining inside the restaurant. One of such cases that was reported in the news in July 2020 was when Mayor Van Johnson of the City of Savannah, Georgia, instituted local ordinance that would require everyone to wear face masks. However, Brian Kemp, the governor of Georgia, threatened to take him to court, stating that the mayor does not have the right to mandate the wearing of face masks. The mayor, on the other hand, was concerned about the physical and economic health of his constituents, as many tourists who used to come to Savannah from other states began to renege, due to concerns about contracting COVID-19 (NPR, 2020). Such a scenario only ends up harming the local economy, given that Savannah is a major tourist location.

Thirdly, assuming that a supplier was to go bankrupt or there is worker strike at the plant of a supplier of tangible goods (for example) to a hotel or a restaurant, which could severely impact the supplier's operations. This is a case where, with proper planning, a company can have better control of the situation and be resilient. Having more than one supplier is a sure way to avoid running into such a situation. There are obvious reasons why a company would like to keep only one supplier. For example, it allows them to be able to consolidate volumes, build better relationship, and thus reduce their prices or get better payment terms. Even under such arrangements, it is prudent for the company to have alternative sources of supply as back-up just in case something goes wrong. This mechanism allows the restaurant or hotel to be resilient.

What we describe above are just some possibilities along the continuum between absolute lack of control and total control in the institution of mechanisms to maintain resilience.

6. Results and discussion

The main results from the study based on the use of the overall US unemployment data, the US unemployment data by industry sectors, and the unemployment data for the States are provided in Table 1. The analysis of the monthly data (differences in the various variables) showed that they satisfied the normality criteria based on both the Kolmogorov-Smirnov (KS) and Shapiro-Wilks (SW) tests. The KS and the SW values for the comparison between 2020 unemployment rates and 2019 unemployment rates for the Accommodation and Food Services sector were respectively 0.755 and 0.200, both values far exceeding the 0.05 minimum threshold for satisfying the normality criteria. This is instructive, especially given the fact that the SW test is known to be very conservative in establishing normality. Due to space limitation all the normality test results are not included in the paper, but can be provided upon request. In view of the small sample size (10) for the US monthly data, we also assessed the same questions by using estimates of state level data (the procedure for determining these values are explained in

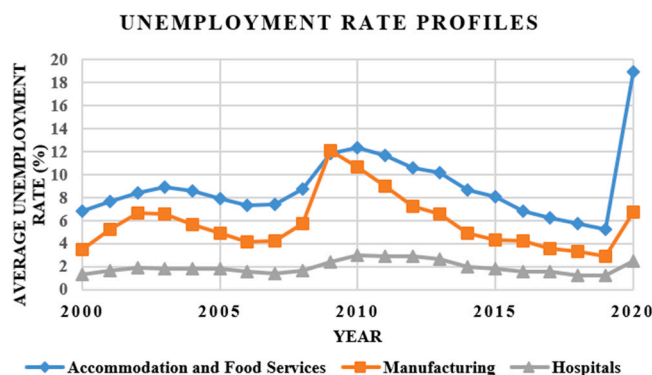


Fig. 4. Comparison of average yearly unemployment rates for accommodation and food services sector with the manufacturing and hospitals sectors.

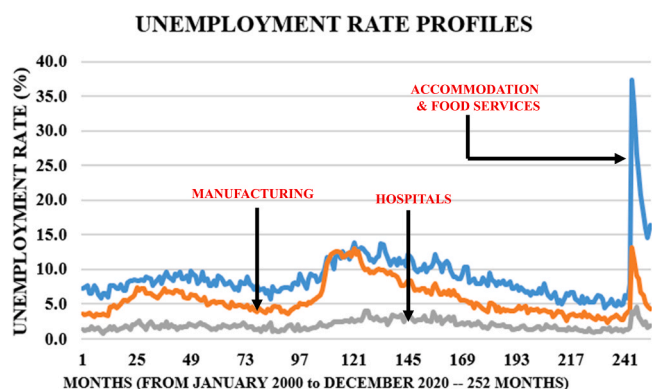


Fig. 5. Comparison of monthly unemployment rates for the accommodation and food services sector with the manufacturing and hospitals sectors.

the Data and Methodology section of this paper). Anderson et al. (2006) note as follows (page 385). "In most applications of interval estimation and hypothesis testing ... samples with $n1$ and $n2$ greater than or equal to 30 are adequate with smaller sample sizes, it is more important for the analyst be satisfied that the distributions of the two populations are at least approximately normal." We used paired sample t -test – as expected, it is the differences in the values of the variables that are appropriate and were thus used for the normality assessments. The authors also suggest that larger samples tend to be robust even if the normality requirement is not satisfied (as long as the data is not severely skewed). The state level unemployment data did not satisfy the KS and SW tests, but several of them appeared to be fairly normally distributed (based on Histogram and Quantile-Quantile plots). For this reason, t -tests were also carried out, which turned out to show statistical significance. In view of the limitations of not satisfying the KS and SW normality tests, we also applied Non-Parametric procedures, which do not require the satisfaction of the normality requirement. We carried out Wilcoxon Signed Rank test and Sign test and report the results.

As you can see from Table 1, all the tests show that COVID-19 did indeed increase unemployment rates in the Accommodation and Food Services sector. Furthermore, it shows that unemployment rates in this sector exceeds those in Manufacturing and Hospitals sectors and that the differences are statistically significant. Figs. 4 and 5 show profiles of the unemployment rates information from 2000 to 2020 and they corroborate what we describe from the statistical tests. Another observation from the two figures is that after the onset of recovery for Accommodation and Food Services and Manufacturing sectors following their peaks (around month 100 to month 130 in Fig. 5 – i.e., during the 2008–2009 economic crises), the Manufacturing sector recovered better with lower unemployment rates all the way to around month 241 (around the beginning of the year 2020). It is from that point that we see

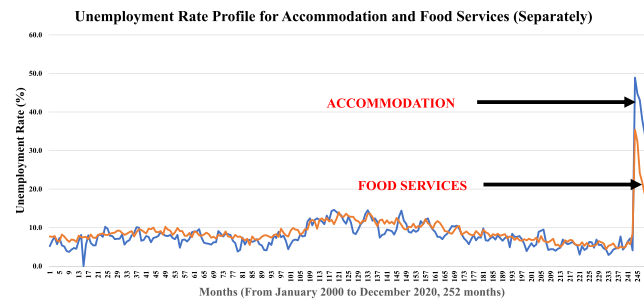


Fig. 6. Comparison of monthly unemployment rates for the accommodation sub-sector with the food services sub-sector.

a huge spike in unemployment rates for both sectors, the one for Accommodation and Food Services (A & FS) being far higher than for Manufacturing (M). COVID-19's impact on A & FS is clearly dramatically higher than its impact on the other sectors. It would seem that A & FS experiences a greater impact than the other 2 sectors even for other shocks such as the economic recession of 2008–2009. Test results based only on data for the months of January 2008 to December 2013 (which includes the after-shock effects after the recession was officially over) confirm this fact, as the differences were seen to be statistically significant as well. These results are not included in the paper due to space limitations.

Other findings from the study that are not formally recorded in Table 1 are as follows:

- (1) The increase in unemployment rates for Manufacturing and the Hospital sectors as a result of COVID-19 were statistically significant even though they were smaller than for the Accommodation and Food Services sector.
- (2) Analysis of data that excludes the year 2020, showed that unemployment rates were still higher for the Accommodation and Food Services sector than the other two sectors.
- (3) Fig. 6 depicts unemployment profiles based on the separate data for the Accommodation sub-sector and the Food Services sub-sector. For most of the period between 2000 and 2020, the patterns for both sub-sectors are similar with values that are very close to each other. However, from the onset of the COVID-19 pandemic in 2020, the Accommodation sub-sector exhibited a higher spike in unemployment rates than the Food Services sub-sector. This disparity during 2020 could be due to limitations on the operations of Hotels whereas Food Service organizations were able to easily adapt by using various business models, such as carry-out and out-door dining during the warmer period of the year.

7. Limitations and extensions

This study provides some insights on the phenomenon of supply chain resilience for organizations in the Accommodation and Food Services sector and their associated supply chains. Nevertheless, we recognize that there are several limitations of the study. First and foremost, the COVID-19 pandemic is still continuing in many countries across the globe, especially with new and unpredictable variants of the virus being identified in Europe, the United States, and several other parts of the world. Thus, only so much data is currently available to be able to make completely definitive statements about the full impact of the pandemic on unemployment in all sectors in general and in the Accommodation and Food Services sector in particular. Nevertheless, we believe that the study provides some useful insights that could be built upon when more data becomes available. Secondly, even though the Accommodation subsector and the Food Services subsector have areas of similarities, there are inherent differences. Comparison between these two subsectors was based only on very limited data at the national

(US) level. Estimates and analysis based on State-level data were not conducted as was the case for the combined sector (Accommodation and Food Services) as well as for the Manufacturing and Hospital sectors.

In terms of areas of future research, it would be helpful to study the impact of COVID-19 on this sector in question for organizations across various countries. For example, to what extent, if any, do variables such as level of development, societal norms, cultural attitudes and diversity affect the spread of COVID-19 and consequently on the ability of companies to recover from the pandemic? One would expect that resilience would be more difficult to realize in countries or environments where there is too much emphasis on personal freedom at the expense of taking steps that have been recommended by health authorities (such as the CDC) to keep people safe. Unlike some other disruptions that have occurred in the past such as the global financial crises in 2008–2009, the COVID-19 pandemic is unique because it depends to a large extent on people's behaviors and how that can either facilitate or slow down the recovery process.

Furthermore, based on some of the points that have been discussed above, we provide the following propositions, which can be tested in future research.

P1: Organizational resilience would tend to be more difficult in countries (societies) where there is a stronger sense of individual freedom and rights.

P2: Larger organizations would tend to be more resilient than smaller ones partly because they are capable of diversifying their operations into different regions and parts of the world.

P3: Accommodation segments would tend to be more resilient to shocks than the Food Services segment because of the broader range of the offerings they provide (for the case of a pandemic, this may be different as the preliminary results for COVID-19 suggests).

P4: Organizational resilience would be positively associated with global spread (number of countries in which the company has operations).

P5: Organizational resilience would be impacted by the headquarter location of the business (norms in the headquarter country would inform policies that are adopted in all worldwide operations).

P6: Budget hotels would tend to do better than others (as their remote location could facilitate social distancing).

8. Conclusion

The COVID-19 pandemic has wreaked a great deal of havoc in countries across the globe, not only in terms of loss of lives, but also in terms of the negative impact it continues to have on the operations of companies in all industry sectors. In this study, we set out to assess the impact of COVID-19 on the Accommodation and Food Services sector within the Leisure and Hospitality supersector of the NAICS classification of industry sectors. We use a mixed-methods approach that comprised of conceptual development and analysis that is based on unemployment data from the United States Bureau of Labor Statistics.

Among other things, we find that the Accommodation and Food Services sector experienced a higher rate of unemployment during 2020

than it did during the global financial crises in 2008–2009. We also find that its unemployment rates far exceed those in the Manufacturing sector and the Hospital sub-sector which is within the Healthcare and Social Assistance sector. We developed and described a conceptual framework that provide a clear picture of the mechanisms by which firms in general and hospitality firms in particular can operate and be resilient under various levels of risk exposures. Finally, we discussed limitations of our study and provide propositions and areas that can be addressed in future research.

The results of the study have several implications for practice. First, given that shocks such as the one arising from the coronavirus has more severe impact on hospitality businesses, managers in this sector need to pay more attention by instituting processes that would make their firms more resilient. As described in the framework part of this paper, while it is true that not everything is under these managers' control, there are roles they can play. For example, diversification of their operations in different regions in a country and different parts of the world would be one way to deal with crises such as this one. The reason for this is that, in most cases, it is unlikely that all locations would be affected to the same degree at the same time. Thus, the company can still continue to operate at near full capacity in one area during the period operations have either seized or have been scaled down in other areas.

Second, aside from implications for businesses, the results have policy implications for governments. While it is true that hospitality businesses are private entities, governments have the responsibility to provide more support for the sectors that are the most (or more) highly impacted as is the case with the hospitality industry in general or Accommodation and Food Services organizations in particular. Such government support can help them maintain employment for some time while they seek ways to adapt in order to continue to be viable. This is consistent with the 2.2 trillion dollars CARES Act that was passed by the United States government in March 2020. The Department of the US Treasury states as follows: "By implementing the CARES Act, the Treasury Department is taking unprecedented steps to preserve jobs in industries adversely affected by the COVID-19 outbreak" (US Treasury Department, 2020). While it is known that the Department did follow through with its commitment by giving out forgivable loans as assistance for small employers with less than 500 employees per location (National Restaurants Association, 2020), it is unclear to what extent the program took into consideration the relative unemployment rates in the various industry sectors. Clearly, given the differential impact of COVID-19 by industry, the citizenry of the country would be better served if assistance is provided on the basis of the severity of the impact by industry. This would be better than providing all small businesses the same level of assistance, regardless of the industry to which they belong.

Data availability

Data will be made available on request.

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