ADJUSTMENTS IN BUSINESS OPERATIONS DURING THE COVID-19 PANDEMIC: AN ANALYSIS

OF NATURAL AND CULTURAL RESOURCE SITES IN TEXAS

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This research expands the theoretical concept of human adjustment to floods established by Gilbert F. White and incorporates his adjustment concept to examine the range of adjustments in business operations adopted by Texas' natural and/or cultural resources sites during the first year of the COVID-19 pandemic. This mixed-methods study consisted of an online survey with a follow-up semi-structured phone interview. The survey data was analyzed using descriptive statistics and the interview data was inductively coded for thematic analysis as well as quantitative and qualitative content analyses. Specifically, this study identifies the adjustment measures undertaken by these entities to maintain business operations while reducing the virus spread; analyses the direct and indirect factors influencing adjustment measures; examines new business opportunities that emerged from these adjustments; and evaluates whether the impact of COVID-19 on these entities varied in terms of entity characteristics. Findings indicate that cultural and/or natural resource sites implemented adjustments to maintain their fiscal stability and/or to protect human health; these serve as direct underlying motivating factors for these entities. To support these direct measures, indirect factors influenced the operations thus required adjustments such as staffing, volunteers, technology, funding, and donations. Additionally, new opportunities in business practices emerged while implementing these adjustments such as networking, maintenance, and virtual options. Across all entity types, virtual programs was a key adjustment addressing

both fiscal and health concerns. From these adjustments, this study provides recommendations

for cultural and/or natural resource sites to implement to improve resilience to future extreme

events.

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CHAPTER 1

INTRODUCTION AND THEORETICAL FRAMEWORK

The COVID-19 pandemic created many disruptions to businesses and public services, including many natural and/or cultural resources sites. These sites include parks and museums as well as heritage and historical sites whose missions seek to either preserve or conserve a focal resource. The aim of conservation is to protect natural resources, whereas the goal of preservation is to protect objects, landscapes, and buildings (National Park Service, 2019). Conservation sites include publicly-managed parks (local, state, and federal), nature centers, conservation lands, and other similarly protected areas. Preservation sites include museums, heritage sites, and historical sites. In Texas, these sites are both publicly managed through state and local agencies, such as Texas Parks & Wildlife Department (TPWD) and the Institute of Museum and Library Services (IMLS), and privately managed by nonprofits, and other organizations, such as the Texas Parks & Wildlife Foundation (TPWF), and Texas Recreation and Park Society (TRAPS).

These natural and cultural resource sites were significantly affected by the COVID-19 pandemic and the associated risk reduction measures implemented by government entities. On April 7, 2020, Texas state officials announced the temporary shutdown of all the historic sites and state parks in the state due to the significant rise of COVID-19 cases in Texas (Osbourne, 2020; Gibbons, 2020; Figure 1.1). Simultaneously, city and county governments across the state implemented local ordinances, such as mask mandates, to help curb the spread of the disease. For example, a mask mandate was in effect in the City of Galveston starting on June 23, 2020 (galvestontx.gov, 2020). Travis County issued face-covering requirement starting

on April 13, 2020 (traviscountytx.gov, 2020). The timeline of the mask mandates varied in

different counties. Because of the state-mandated closure, variances in local public health

ordinances, and evolving nature of the pandemic, natural and cultural resource sites in Texas

experienced various challenges related to operations, staffing, visitor management, and

revenue generation. Approximately two weeks after the initial closure, as part of the plan to

slowly restore the economy of Texas, Governor Greg Abbott reopened Texas state parks and

historic sites on April 20, 2020, while maintaining COVID-19 related restrictions (Buchanan,

2020). Governor Abbott issued a mask requirement in Texas for the public on July 2, 2020,

(Svitek, 2020). Nearly one year later, on March 10, 2021, the governor ended the statewide

mask mandate, reopened all the businesses to full occupancy capacity, and lifted all related

COVID-19 restrictions (Sullivan, Montgomery, & Pietsch, 2021). Texas was one of the first states

that reopened to 100% capacity for businesses making it a compelling case study.
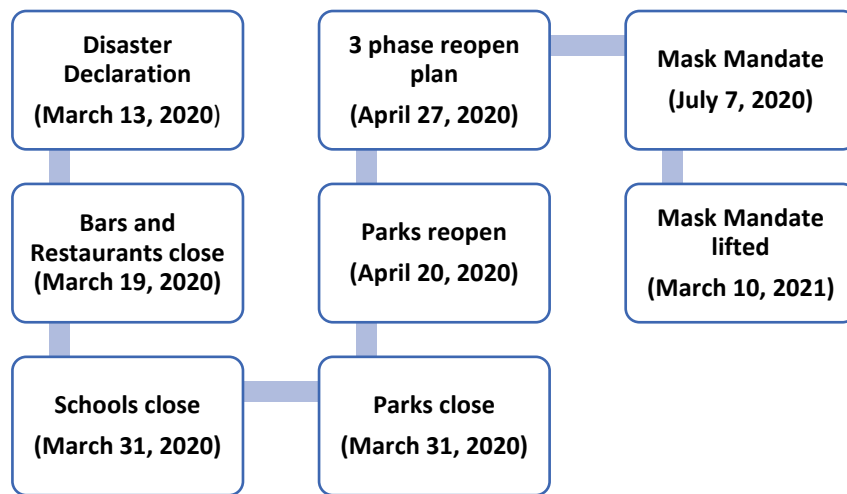
Figure 1.1: Timeline of COVID-19 related restrictions in Texas.

The natural and cultural resources is one of the six recovery support functions (RSF),

included in the National Disaster Recovery Framework, which focuses on supporting the

recovery actions taken to protect the natural and cultural resources and historic sites (Federal

Emergency Management Agency, 2016). During the first year after the pandemic, Texas natural

and cultural resource sites experienced a range of challenges, and many had to adjust their

business operation plans. At the same time, the COVID-19 pandemic afforded new business

opportunities to these same entities such as new practices, new streams of revenue, new

markets. It supports the findings of Lindell (2013) where the author found that there is an

uneven recovery among business entities in post-disaster contexts. Recovery can be defined in

a variety of ways. However, as a part of my study I am taking the concept of Alesch et al. (2001)

where he considers recovery as at least surviving and effectively adapting to the new

circumstances after a disaster. Yet, recovery is defined differently by those who experience it;

for some, recovery is a return to pre-crisis activities while others define recovery as a new

normal that may better mitigate against future events (Stevenson, Brown, Seville, & Vargo,

2017; Johnson & Hayashi, 2012; Platt, Brown, & Hughes, 2016). Some businesses recover more

easily than other businesses based on the business characteristics and local/regional

economies. For instance, businesses that serve national or international markets are more

resilient than small businesses that serve local markets (Webb, Tierney, & Dahlhamer, 2002).

After a disaster event, small businesses tend to encounter higher level of losses and failure, and

they struggle more to recover than other businesses (Alesch, 2001). To revive the local

economy, business survival and return is essential and key to long-term community recovery

(Lee, 2019; 2020). Most of the businesses try to reopen as they expect to earn a profit (Lee,

2020). However, not all businesses experience difficulties since disasters create windows of

economic opportunity (Webb et al., 2002). Some businesses become entrepreneurial during

crises (Schindehutte, Morris, & Kuratko, 2000) and demonstrate opportunity-seeking behavior (Morrish & Jones, 2020). Policy makers and other officials can disrupt businesses' efforts at recovery and growth, yet businesses tend to overcome the adversities (Morrish & Jones, 2020). However, the benefits are uneven across communities. Moreover, Pais and Elliott (2008) identified that, in a disaster context, those who possess social and cultural power and wealth tend to receive more benefits during disasters, whereas marginalized people continue to bear large amounts of losses. Just as Klein (2008) found that some business entities benefit from disasters, while others suffer losses. Therefore, experiences may vary among business entities including natural and cultural resource sites, which to date are not well represented in studies on business return following disasters.

To identify how Texas cultural and natural resource sites responded to the COVID-19 pandemic, this study expands upon the work of prominent geographer Dr. Gilbert F. White. Dr. White contributed notable work on floodplain management through his comprehensive theory on flood mitigation (Calef, 1942). Specifically, in his dissertation, he first introduced the idea of human adjustment to floods. Dr. White described the concept of adjustment to floods as "an ordering of occupance to floods and to the flood hazard" (White, 1942, p. 46) and used the term to describe how communities responded to flood risk through mitigation activities, many tied to land use. He described the term occupance as "the human process of occupying or living in an area, and the transformations of the initial landscape" (White, 1942, p. 46).

There exists a range of adjustment measures that society and/or individuals undertake when coping with extreme natural events (Burton et al, 1993). To Dr. White, the concept of human adjustments to floods involved how people transform the landscape by implementing

risk reduction actions to lessen the damaging consequences of floods thus enabling more development of the floodplain. Just as today, flood problems during the 1940s impacted both the economic and political life of many communities (Calef, 1942). According to White, taking all possible adjustment measures to flood hazard is a sound approach to reducing flood loss (Macdonald et al, 2011). He divided adjustment to floods into eight major categories which are: land elevation, flood abatement, flood protection, emergency measures, structural, land use, relief, and insurance. The combination of two or more adjustments is present in most U.S. floodplains (White, 1942).

Moreover, according to White (1942), there are some factors that influence the human decisions whether to live in the floodplain or not. He argued that these are the factors that affect how people adjust to floods. He divided these factors into two categories, disadvantages (also termed as liabilities) and advantages (also termed as assets). Disadvantages included the factors of the hazard, which contributed to social losses, such as agricultural and livestock, urban residential, commercial, manufactural, public utility, transportation, among others. Advantages bring about social benefits through mitigation efforts, such as channel cleansing, slope and contour, drainage and ground water, surface water, corridor facilities, social institutions, and other factors. White recognized that most of the factors fall under the disadvantage category, and only a few factors contribute to the advantages. He also recognized that not every factor is present in all locations, and they are not permanently advantageous or disadvantageous. White's work has been fundamental in understanding floodplain mitigation and has influenced how hazard geographers study flood risk reduction.

In this study, I seek to extend White's adjustment theory to understand adjustments

made during the COVID-19 pandemic specifically by natural and/or cultural resource sites. During the COVID-19 pandemic, these entities undertook many measures to mitigate the spread of the disease while maintaining business operations. I conceptualize these measures as adjustments to COVID-19. In addition, I consider the factors affecting adjustments to COVID-19 just as White explored the factors that influenced human adjustments to floods.

The purpose of this research project is to examine the range of adjustments undertaken by Texas natural and cultural resource sites and specifically seeks to understand how the entities adjusted their capacity and business operations to recover from the emerging nature of the pandemic and analyze if their experiences varied in terms of how they are funded. This project hypothesizes that the impacts of the COVID-19 pandemic are uneven not only across entity type (e.g. park, museum, heritage site) but also across funding source (e.g. publicly, privately funded). For example, many private entities depend on donations, visitor revenues, and private events to sustain operations, whereas government-supported, public entities have budgets covered by public funds and are more likely to be able to maintain business operations. In many cases, these public entities use donations to supplement their annual budgets. In this study, I will empirically examine the adjustment measures taken by the Texas parks, museums, nature centers, heritage sites, and other protected places to maintain business operations during the first year of the pandemic and the factors influencing these adjustments.

This study specifically asks:

RQ 1: How did the impacts of publicly-funded versus privately-funded entities vary?

RQ 2: In what ways did cultural and/or natural resource sites adjust their business operations in response to COVID-19 pandemic?

RQ 3: What factors influenced these adjustments?

RQ 4: What, if any, opportunities for business expansion and/or innovation arose from these adjustments?

CHAPTER 2

LITERATURE REVIEW

This literature review contains three sections. It focuses on the impacts COVID-19 had

on natural and cultural resource sites; the adjustment measures taken by the entities to

survive, and the factors affecting those adjustments. The literature review identifies the

effective measures, existing gaps in the literature and other key elements that enabled these

entities to survive through the first year of the COVID-19 pandemic.

2.1   COVID-19 Impacts on Natural and Cultural Resource Sites

The COVID-19 pandemic was unexpected and therefore created new challenges for

parks, museums, heritage sites and other protected places. To limit the virus spread during the

COVID-19 pandemic, government agencies around the world imposed varying levels of

restrictions and social distancing regulations (Rogers et al., 2020). Due to such restrictions,

people started suffering from various kinds of physical and mental health issues, which made

them seek outdoor activities (Liu & Wang, 2021). As people had to isolate themselves and

maintain social distancing (High Country News, 2020), their demand for parks and other

conservation sites gradually increased as the pandemic continued months after the first cases

(Geng, Innes, Wu & Wang, 2020; Ugolini et al., 2020). Many countries, including the United

States, closed public spaces and parks during the first few months of the pandemic (Geng et al.,

2020; Slater, Christiana & Gustat, 2020). Due to the increased demand for these spaces among

residents, some U.S. cities decided to reopen parks at the end of April 2020 (Sadiq, Kapucu &

Hu, 2020). Templeton, Goonan, and Fyall (2021) identified that although, initially after

reopening, the number of visitors to national parks in Southern Utah was much lower than pre-

COVID levels, the visitation soon increased at a rate that exceeded pre-pandemic levels, and

reports on overcrowded parks became normal (Liu & Wang, 2021). The trend was similar in

Texas. Visitor numbers in Big Bend National Park in Texas dropped to all-time lows; however,

within a few months, visitor numbers had increased so much that previous attendance records

were broken. There were traffic jams on the trails (Morales, 2021). After reopening, the

number of visitors increased greatly in Texas parks (McElroy, 2021). Some entities, however,

continued to experience sharp declines in visitation (Rice et al., 2020). During this time, the

main challenge was to ensure health and safety for park staff, volunteers, and visitors, thus

requiring some sites to reduce their maximum visitor capacity. In addition, managers faced

many difficulties while implementing new strategies to maintain business operations while

minimizing exposure to COVID. One major challenge was to cope with the continuously

changing nature of the pandemic and associated government response. This made marketing

and management decisions difficult due to rapid and unpredictable changes. The changes

required new decision-making almost every week. It was hard for site managers to decide if

they should market their site given concerns about the safety and health risks to potential

visitors (Templeton et al., 2021).

Changes in visitation not only affected parks and conservation sites, but also the

communities that surround them. In tourism-dependent local economies, post-disaster

decreases in visitation can indirectly impact surrounding businesses by decreasing the demand

for many goods and services (Webb et al., 2000). Parks and gateway communities are always

interconnected (Templeton et al., 2021). Gateway community refers to the localities that are

the entry point and border of national parks and public lands (Frauman & Banks, 2011). When

the parks closed in the early phases of the pandemic, the economy of the outlying areas was affected. On the one hand, local visitation was increasing; on the other hand, international visitation to parks was decreasing (Templeton et al., 2021).

When the parks reopened after the initial closure, though local visitors increased in these sites, the parks could not maintain their regular operations. Miller-Rushing et al. (2021) state that because of safety concerns, staff shortages, or state and federal guidelines, some park facilities and roads were closed, which disrupted park operations. Park administrators also suspended, reduced, or delayed many management-related activities to maintain safety protocols. In addition, to maintain social distancing, many park managers reduced the number of volunteers in their sites. The pandemic also disrupted long-term monitoring and research of park ecosystems and wildlife. Water and air quality improved in and around parks, and site managers noticed behavioral changes in local wildlife due to decreased visitor numbers at conservation sites (Corlett et al., 2020; Rutz et al., 2020).

Due to the COVID-19 pandemic, almost all organizations including parks, museums and galleries restricted visitation and temporarily closed their services for some period (Samaroudi, Echavarria & Perry, 2020). Many museums and similar heritage sites posted postponed or canceled projects, exhibitions, and education programs due to the crisis, which created immediate negative impacts on their finances and workforce. Some sites that were facing financial crisis due to the pandemic feared permanent closure (Samaroudi et al., 2020). The American Alliance of Museums (AAM) estimated that, because of the impact of COVID-19, the U.S. museums were losing around $33 million per day (Durkee, 2020). Due to the closure and restrictions, many entities shifted full-time staff to part-time services in an attempt to balance

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budgets while also offering some services (Ennes, 2021).

2.2   Range of Adjustments

The literature identifies a range of adjustments made during the first year of the COVID-19 pandemic. In Texas, after parks and other nature centers reopened at the end of April 2020, the influx of visitors to these sites forced authorities to take additional safety measures, such as social distancing, wearing masks to reduce the virus spread, limiting the use of their facilities (Richard & WCPO staff, 2020), and reducing operation hours (Kummer, 2020). The adjustments included installing plexiglass, increased cleansing and disinfecting of touch points, limiting the offerings of food service, offering flexible cancelation policies and, where possible, moving indoor events to outdoors (Templeton et al., 2021). Moreover, throughout the parks, hand washing and sanitization stations were ubiquitous. At many points, COVID related personal responsibility guidelines were communicated through signage. The messages contained guidelines, such as to cover the mouth while coughing, to visit another day if the visitor was feeling sick, and to avoid touching mouth, eyes, and nose (Miller, Freimund, Dalenberg, & Vega, 2021). To communicate with visitors, entities used technology and social media to a great extent. For instance, entities posted infographics on social distancing, updates on park operation, status of trails and campsites on different social media platforms, such as Facebook or Twitter (Templeton et al., 2021). A heritage site in South Carolina offered virtual programming such as online summer school, concerts, virtual tour, and traveling film festival (Schumann et al., 2021)

While undertaking these measures, some unique adjustments emerged during the pandemic. Templeton et al. (2021) discuss some of the opportunities created by the pandemic,

such as the growing number of reservations for single-unit properties and RV parks, which

might increase revenue. In addition, authorities found that scenic-drive routes could be used in

marketing materials to promote a positive destination image, and they discovered that the

drive-market has the potential to earn revenue in future. Because of the pandemic, people

wanted to engage in recreational activities, so they rushed to the parks and other conservation

sites generating many first-time visitors to these places. Attracting new visitors to their sites, in

turn, created opportunities for return visitation and expanded operations. In addition, local and

regional travelers increased at these sites. These new visitors have the potential to positively

affect revenue streams. Another opportunity that emerged from the pandemic was the

development of creative outreach strategies (Schumann et al., 2021) among management and

marketing professionals, which will aid future work to introduce and implement new strategies.

Due to the COVID-19 pandemic, many heritage sites across the United States started

closing around mid-March 2020 (McGivern & Kenney, 2020). During that time, some of the

large heritage associations decided to address this issue and began developing and embracing

principles to adapt to possible closures while supporting their members. For example, the

American Alliance of Museums showed three sample scenarios indicating the levels of impacts

(low, medium, high) the museums might face in the future and gave them directions on how

they could prepare themselves to plan their response according to those scenarios (Merritt,

2020). This guidance aided heritage sites when they had to restrict physical access to their site

and/or cancel or postpone projects, education programs, exhibitions, and performances. For

example, to adjust to the ongoing restriction, National Civil Rights Museum at Tennessee

limited their visitor access to the museum, introduced time-ticketed entry and protocol for

maintaining social distancing, and closed some of their exhibits (Schumann et al., 2021). To

adjust to the evolving pandemic, most of the museums, galleries, and other heritage sites

decided to provide their services online since the online activity could meet the various needs

of the audience and improve the mental health of the online visitors during the pandemic

(Samaroudi et al., 2020). Moving programs online enabled the heritage sector to showcase

various levels of creativity and diversity. These institutions shared their collections with their

audience through a variety of platforms, but social media was the most popular tool (Burke,

Jogensen, & Jogensen, 2020).

As the entities moved to online platforms and started offering their programs virtually,

it created a new dimension for both the entities and their visitors. Through the virtual offerings,

visitors could engage with museums and other cultural institutions whenever they wanted from

any location. This helped cultural and natural resource entities survive when their buildings

were closed t. It promoted their collection in a way that will produce public attention to these

institutions when they open their doors again (Burke et al., 2020). After moving to the virtual

option, many entities received public support. For example, in some cases, the public supported

the online program initiatives of these heritage institutions through donations (Ennes, 2021).

Some of the entities, however, used the transition to virtual programming as an experiment.

For instance, in some cases, managers used the transition to online programs as an experiment

so that they could develop best practices moving forward (Ennes, 2021). Virtual forms of the

museums and other institutions enabled the entities to focus on offerings for vulnerable

audiences, identifying best practices to monetize their offerings, and establishing effective

collaborative strategies to build trust and enhance and the resilience among the audience and

the institutions (Samaroudi et al., 2020).

2.3   Factors Affecting Adjustments

There were a variety of factors that influenced cultural and/or natural resource entities'
adjustments to the pandemic. According to Miller-Rushing et al. (2021), reduced staffing was
one of them. Sometimes the number of staff decreased because they had to quarantine due to
suspected COVID-19 infection. To keep up with the rapidly growing number of visitors, even if
staff were assigned to other activities, they had to put their focus on visitor management. They
were also experiencing mental stress because of the pandemic. Therefore, it impacted the
adjustment in a negative way. Conversely, Schumann et al. (2021) identifies how large, full-time
staffing increased the adjustment capability of a museum and shows staffing capacity is an
important factor to consider.

As many institutions went online, some factors affected this adjustment, such as lack of
technology, staff skill levels, resources, and time. Therefore, some entities used social media as
a ready-made platform to resolve these issues. There was difficulty, however, in merging the
ideas of digital marketing teams with learning/education-based programs to expand online
engagement. The efforts of different departments were not coordinated. In some cases, online
programs could not maintain the same quality as their in-person programs. Some museums
were confused whether they should charge for their program or ask for donations (Ennes,
2021). Some museums felt that they were left behind in terms of offering online programs
(Samaroudi et al., 2020). However, some museums received great outcome from online option,
such as, online fundraiser came as a success for some entities to collect donation (Schumann et
al., 2021).

CHAPTER 3

METHODS

This is a mixed-methods study focusing on the range of adjustments undertaken by natural resource and cultural resource sites during the first year of the COVID-19 pandemic. According to Creswell & Creswell (2018), a mixed methods study is a combination of qualitative and quantitative research data. Generally, qualitative research elicits the experiences, emotions, and beliefs of the participants through textual or visual data, whereas quantitative research measures factors of interest using numerical data. This mixed-method study integrated a semi-structured survey (quantitative component) with a semi-structured interview (qualitative component) in a two-step process. We first conducted an online survey distributed through Qualtrics in March 2021 with an option for respondents to participate in a follow-up semi-structured phone interview. We surveyed directors, managers, and senior personnel at natural and cultural resource sites. Respondents who agreed to participate in the follow-up interviews were interviewed in June and July 2021.

3.1   Data Collection

Due to the on-going pandemic, we used remote data collection techniques. As a first step, our team developed the survey and deployed it in Qualtrics on March 24, 2021. Survey recipients included public, private and non-profit entities who operated natural and/or cultural resource sites in Texas. Recipients were identified through governmental, tourism, and conversation websites; email addresses were collected from the websites. The survey topics included how the COVID-19 pandemic impacted daily operation, visitation, revenue, donations, funding, reopening, and programmatic offerings in different natural and cultural resource sites.
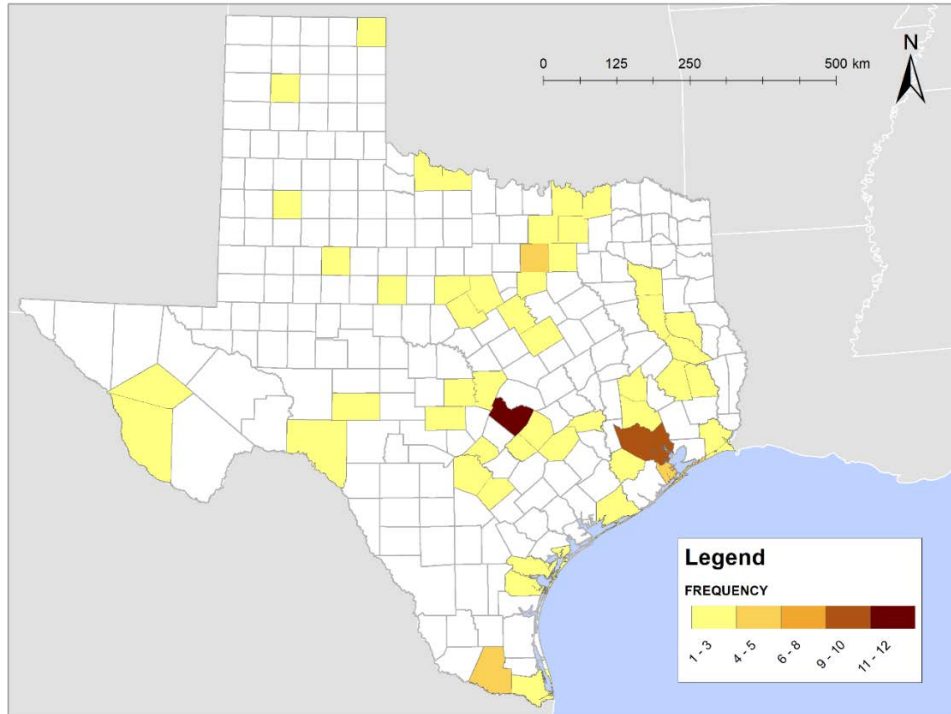
Figure 3.1: Survey participants location by county. Source: Dr. Brendan Lavy.

Table 3.1: Survey participant characteristics (*N* = 98)

Entity Type	*n*	%
Cultural heritage site	3	3.06
Museum	46	46.94
Nature center, refuge, park, or protected place	39	39.8
Other	10	10.2

Table 3.2: Entity type in terms of funding sources (*N* = 102).

Type	n	%
Public	40	39.22
Private and non-profit	56	54.9
Other	6	5.88

The survey consisted of mostly closed responses, producing quantitative data, along with a couple of open-ended responses, which yielded qualitative data. The Association of Nature Center Administrators (ANCA) advertised the survey for us through their Texas members' email

distribution. Reminders were sent via direct email and via ANCA listservs in April and June 2021 before closing the survey. In total, we had about a 13.3% response rate (Figure 3.1). Of the survey participants, approximately 47% identified as museums (Table 3.1) and nearly 55% of participants were privately funded or nonprofits (Table 3.2). The "other" category of survey participants characteristics (Table 3.1) includes heritage site including museum and living history farm, wildlife rehabilitation education center, higher education collection, art gallery, public library with museum and archival collections, land trust, library and museum, university museum & aquarium. However, the other category of the entity type in terms of funding sources (Table 3.2) includes multiple jurisdictional, utility & non-profit, and county and non-profit. Among the survey participants, 35.8% responses came from the ANCA email link while the others came from direct email. A total of 36.8% of participants self-identified in the surveys as willing to participate in a follow-up phone interview.

The phone interviews were conducted in June and July 2021. Thirty-nine prospective participants were contacted by email and/or phone depending on their stated preference on the survey during May 21-28. Reminders were sent via the preferred contact method(s) after two weeks if the participant did not initially respond. In total, our research team conducted 20 semi-structured phone interviews with each conversation lasting for 30-60 minutes. At minimum, at least two members of the research team were present for each interview. We audio-recorded the interviews with their permission and transcribed those interviews using an established transcription protocol designed by McLellan, Macqueen and Neidig (2003). For those interviewees who did not agree to be audio-recorded, we took hand notes; only one person among the 20 phone interview participants did not agree to audio-recording of the

conversation. The interview questions were crafted based on the survey responses provided by each participant as well as responses that came up during the interviews.

3.2   Data Analysis

The survey data was analyzed using descriptive statistics for the closed-response questions. Open response questions were analyzed using both quantitative and qualitative content analyses to identify patterns and their frequencies (Krippendorff, 2013). During the follow-up interview, we audio-recorded the interviews with the participants permission and we transcribed those interviews verbatim. The interview data was inductively coded in NVivo to identify several types of themes (Saldana, 2009). I used an iterative coding approach to identify adjustment types, the factors influencing adjustments, and other emergent data relevant to business operations (e.g., opportunities, innovations). During the first phase of coding, I went through each transcript and coded for adjustments. During the second phase, I coded the factors influencing the adjustments. After identifying the adjustments and related concepts, I categorized these codes under different themes such as technology or fiscal health. I repeated the same process across all the interviews then synthesized interview and survey data to gain a holistic understanding of the entities' adjustments to the COVID-19 pandemic.

3.3   Reliability and Validity

Given that this is a mixed-method study, I incorporated both survey and interview data and triangulated the results from both sources as well as across participants to increase the reliability and validity of the findings. Additionally, we used two different data collection methods that complement each other to increase the validity of the study design (Creswell &

Creswell, 2018). The survey provided content and background information for each entity while the interview data provided more details and context about their experiences. Further increasing the reliability of the findings, our team consisted of three people conducting this research, which decreases potential for bias. Moreover, the coding structure was tested among different team members before applying across the dataset to improve the validity of the data analysis and findings.

CHAPTER 4

RESULTS

To examine the adjustments made in response to the COVID-19 pandemic by natural

and/or cultural resource sites in Texas, I first examine the impacts of the pandemic on sites'

visitation, revenue, and donation. I explored these impacts through the lens of public versus

private entities. Next, using White (1942)'s adjustment to floods theoretical concept, I identify

the range of adjustments adapted by these entities to maintain their business operations while

maintaining public health protocols to reduce the spread of the pandemic. This section is

followed by an analysis of the direct and indirect factors that affected these adjustments.

Finally, I explored the opportunities that emerged while implementing these adjustment

measures and the timelines associated with them.

4.1   Impact of COVID-19 on the Natural and Cultural Resource Sites

The COVID-19 pandemic influenced the number of visitors and annual revenue of

natural and/or cultural resource sites. Private and non-profit entities experienced a decrease in

their number of visitors (Table 4.1) as compared to the number of visitors of the public entities.

Very few participants (around 8%) from the private and non-profit entities said their visitation

increased or stayed the same. In contrast, around 42% of public entities indicated that their

visitation stayed the same or increased during the pandemic. This shows the difference in

visitation among the public versus private and non-profit entities during the first year of the

pandemic.

Consequently, private and non-profit entities experienced a higher loss in annual

revenue than public entities during the COVID-19 pandemic when compared to the previous

pre-pandemic fiscal year (Table 4.2). However, not all sites reported losses. Approximately 25%

of survey respondents representing public entities reported an increase in revenue and around

20% of the survey respondents from the public entities indicated that their revenue stayed the

same.

Table 4.1: Impact of COVID-19 on visitation at natural and/or cultural resource sites.

Number of Visitors	Public Entity (n = 33)	Private & Non-profit Entity (n = 50)
Decreased greatly	39.39%	78%
Decreased slightly	18.18%	14%
Stayed the same	6.06%	0%
Increased slightly	18.18%	4%
Increased greatly	18.18%	4%

Table 4.2: Impact of COVID-19 on revenue.

Impact on Revenue	Public Entity (n = 39)	Private & Non-profit Entity (n = 50)
Decreased	53.85%	83.93%
Stayed the same	20.51%	7.14%
Increased	25.64%	8.93%

Table 4.3: Impact of COVID-19 on donations.

Impact on Donations	Public Entity (n = 39)	Private & Non-profit Entity (n = 56)
Decreased	46.15%	51.78%
Stayed the same	25.64%	17.85%
Increased	12.82%	25%
Unsure	15.38%	5.37%

In terms of impact of the pandemic on donations, approximately half of the survey

participants from both types of entities, public and private and non-profit, indicated a decrease

in donations (Table 4.3). The other participants identified that their donation increased or

stayed the same. Some entities were unsure about the impact of donations on their entities.

Yet, 25% of the private and non-profit entities indicated that their donation increased, whereas

only approximately 12% of public entities reported an increase in their donations.

4.2   Range of Adjustments Taken in Response to COVID-19 Pandemic

Research participants identified a range of adjustments they made in response to the

COVID-19 pandemic. White (1942) introduced and used the concept of adjustments for the

floodplain to illustrate how the communities undertaken mitigation activities to reduce the

flood risks. This study expands the concept of Dr. White to reflect adjustments to the COVID-19

pandemic undertaken by Texas natural and/or cultural resources entities. Many of the

adjustments identified in this study occurred after reopening businesses from the initial closure

(April 2020) and then after all restrictions were lifted (March 2021) to quickly recover visitors

and resume more normal operations (Buchanan, 2020). This study identified two major types of

adjustments, but recognizes there is overlap between priorities (Figure 4.1). T
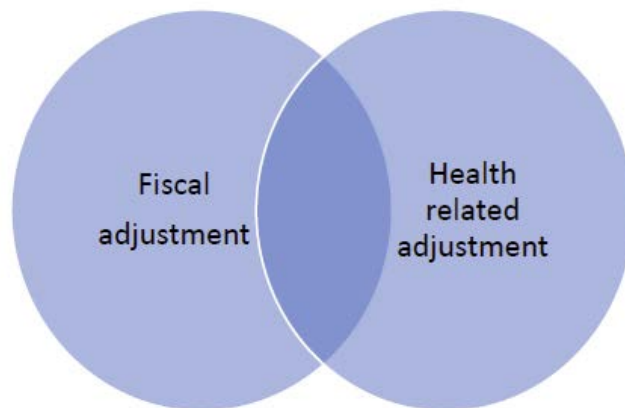
Figure 4.1: The underlying motivation for the range of adjustments

The first type of adjustments was made to maintain business operations and preserve fiscal

stability. The second type of adjustments focused on reducing the risk to human health and

mitigating the spread of COVID-19. Together, these adjustment practices helped entities to both keep their business running while protecting staff, volunteers, and visitors.

4.2.1   Adjustments in Operation Practices to Maintain Fiscal Stability

All the participating sites implemented various types of adjustment measures during the pandemic to maintain operations and stay in business. The adjustments described in this section reflect activities implemented to address fiscal concerns. Due to COVID-19, there were many restrictions supported by local/state governments and/or the U.S. Center for Disease Control (CDC), such as social distancing and mask mandates (galvestontx.gov, 2020; Svitek, 2020; traviscountytx.gov, 2020). Natural and cultural resource sites, however, had to maintain operations while implementing restrictions. Therefore, participating sites implemented adjustment measures such as undertaking new fundraising methods, reliance on new different revenue/funding streams, and seeking new grants. For example, one participant said, "[we] applied for some of the COVID grants, and we were able to receive those. So they helped…to pay my intern, and you know different things like that." It indicates that some entities' grant seeking behavior to maintain business operations and fiscal stability. Some entities were trying new fundraising methods to address their fiscal concern. For instance, one participant reported that, "[we] did a COVID funding drive late June. It was a campaign and it helped us a lot." Thus, by undertaking these adjustment measures the entities could maintain their fiscal stability and stay in operation.

4.2.2   Adjustment Made to Mitigate Disease Spread

Along with maintaining business operations to preserve fiscal health, human health

concerns were the most important issue identified by study participants. To mitigate the spread

of COVID-19, all the entities participating in this study started taking health-safety measures by

following COVID-19 safety protocols and guidance introduced by government organizations like

the CDC. For example, many entities reported that they installed hand-sanitizing stations

throughout the sites and added plexiglass shields at the checkout areas for a barrier between

staff and visitors. Participants also reported intensified cleaning, bleaching, and sanitizing of the

facilities to adhere to the COVID-19 protocols. One participant elaborated,

> We did of course change our cleaning protocols during COVID. We were much more
> thorough about wiping down all services, including the light switches and doorknobs
> and all the things that you were supposed to be cleaning. Anything that somebody
> touched.

> For the visitors, entities introduced signage that said to wear masks and abide by the

health protocols to remind them to be conscious of everyone's safety. These adjustment

trends, which sought to reduce the spread of the disease, were similar amongst the national

parks of Utah (Templeton et al., 2021; Miller et al., 2021). Some entities were trying to run their

operation in a way so that no touching was involved between visitors. For example, a museum

in Texas arranged their annual Smokey the Bear birthday party to provide bear shaped cookies

and cakes that were individually packaged, unlike in previous years. In addition, some entities

introduced online reservations to reduce the spread of COVID-19. One participant explained,

> for a while, we literally were not even taking cash, we were not taking checks, nothing
> that we had to touch…that the other person would have touched, and so for a while,
> literally the only way to get into the park was to go online and make a reservation in
> advance.

4.2.3   Combination of Both Adjustments

Many of the adjustments implemented by cultural and/or natural resource sites both

maintained business operations and protected human health. For example, changing their methods of programming; limiting their capacity for visitors; and reducing number/size of program offerings. One participant described their site's reduced programming, "summer camp [was] not in full version this year. We usually have 11 camps, but we are going to have 3." Study participants also explained that their sites introduced other measures to reduce the number of people onsite, including establishing timed entry, limiting the number of people per hour, closing overnight facilities, and setting a daily quota for the number of vehicles allowed entry. Many sites also offered a new reimbursement policy for the people who could not come because of exposure to or symptoms of COVID-19. These adjustment strategies which sought to maintain business operations were observed amongst similar businesses during the COVID-19 pandemic in other states such as New Jersey, Ohio, Tennessee, and South Carolina (Kummer, 2020; Richard & WCPO staff, 2020; Schumann et al., 2021). One museum created a drive-through program where visitors could collect materials to still participate in an activity yet remain socially distanced. The entity also benefited by not losing the revenue from program participants. The study participant illustrated, "they have a circle parking lot people can circle in, pick up their stuff and circle right back out." This measure was taken not only as the health concern but also as an adjustment to their business operations. One participant said they created a COVID-19 reopening team, which made plans on how to reopen keeping both operation and risk reduction in mind. Study participants described not only taking measures for visitors but also how they tried to help their staff stay healthy to maintain operations. Sites introduced teleworking options for some of their team members. Those in management positions tried to keep themselves updated with the new COVID-19 policies. For instance, one

study participant said, "we recently updated our COVID policies. We've been updating them all along the way from the CDC guidelines." Some started doing more outdoor activities to limit staff exposure. To maintain social distancing, one participant said they introduced audiovisual tours "where we are able to let people come in and walk through at their own pace. They don't have to be in [our staff's] company." By introducing new technology, which is discussed in more depth in section 4.2.3.2, study participants explained that they were able to reduce risk to both staff and volunteers. Though none of the participants in this study implemented/narrated scenic drive routes as a new form of recreational activity where people can maintain social distancing (Templeton et al., 2021), the audiovisual tour shows the creative thinking of the natural and/or cultural resource entity to adjust to pandemic conditions. Both adjustments (Table 4.4) serve the same purpose of attracting visitors through their operation and maintaining health related adjustment thus increasing revenues of the entities.

Table 4.4: Range of adjustments.

Adjustment – Operation	Adjustment - Mitigation	Adjustment - Combination
• New fundraising method • Reliance on new different revenue/funding streams • New grant search	• Hand sanitizing stations • Plexiglass shields • Intensified cleaning, bleaching, and sanitizing • Signage • Online reservation option	• Reduced programming number and size • Changed program methods • Limited visitors/Limited people per hour/fixed number of vehicles per day • Time entry • Limited capacity • Closed overnight facility • Reimbursement policy • Drive- through program • Remote work option for employees • COVID-19 reopening team • Virtual programming

4.2.4   Adjusting to a Virtual World

The most frequently reported adjustment was the transition to virtual programming. Interview and survey participants both reported an increased use of virtual programs and technology during the first year of the COVID-19 pandemic to maintain business operations and reduce the risk of disease spread. One participant powerfully described why the entities were adapting business practices with virtual adjustments: "When the whole thing first went down, I told the staff that we had to do something to be in front of people or they would forget about us, and we die. And so, we became very active with our social media." To stay in business, entities had to adapt and evolve. The entities were trying to survive keeping the safety concern in mind. While talking about safety concern, a study participant from a nature center said, "so the city as a whole was taking a pretty restrictive stance because they wanted to…try to keep as many people safe as possible and move forward." This quote indicates why it was important for the entities to move to virtual programming so that they could keep the audiences safe and still run the business operations. This study identified that virtual options dominated across all entity types; almost all the entities (e.g. museums, parks, and nature centers) were offering some range of virtual options. Previous literature identified that only heritage sites or museums deployed virtual options (Samaroudi et al., 2020), but this study shows that not only heritage sites and museums used virtual options but also parks, nature centers, gardens and other natural resource sites relied on virtual platforms to reach their audiences.

4.2.4.1   Virtual Programs

During the pandemic, most of the study participants offered various types of programs virtually. For example, virtual camps aimed at youth audiences were offered across summer,

spring and winter sessions. Virtual camps spanned topics such as wildlife and animals. One participant from a nature center described one virtual camp as "where the kids got to meet animals virtually…and talk about life." Some entities offered virtual school programs, which included pre-schools, educational programing, and field trips. These types of programs helped young audiences learn from home or their schools even during the pandemic. In the virtual school programs, the children did many activities such as reading a book with their teachers, talking about different activities, and sharing knowledge on the sites. Study participants described these programs as popular with one participant saying, "there has been a significant increase [in the number of people] in social media, like the virtual field trips we offered." This statement shows that virtual programs offered by different entities were well received by their audiences and these offerings may have a future beyond the COVID-19 pandemic. Virtual programs offer an opportunity for people to virtually visit these entities who may not have the resources to visit in person, such as school districts that cannot afford to bus large groups of kids to these sites.

Other virtual programs aimed at all age levels included a variety of interactive activities where the audience engaged directly with the program leader and/or other participants, such as: online yoga, painting, coloring contest, model contest, cooking class, container gardening, quizzes, and trivia. While talking about different engaging activities, a study participant explained that "participants registered so they could come to this virtual place and do different activities with their instructors and then they would often do activities, that their instructors have talked about, at home on their own and then come back and talk about them." The variety of activities kept the audiences engaged from home during a time when people could not

publicly gather. A participant from a nature center indicated that in some cases people were more comfortable doing the activities online than doing them in-person. They said: "People actually like them [online cooking classes] better because they could be in their own kitchen and do their own cooking with natural resources like beautyberry." In this instance, the virtual programming was preferable to in-person classes and the nature center suggested that they may continue these classes virtually since the response was so positive. This is one example of a positive permanent change in business operations resulting from adjustments made during the pandemic. These examples show that entities who started these virtual programs, with a purpose of meeting the various needs of the audience, were successful (Samaroudi et al., 2020).

Virtual programs expanded beyond educational content as reported by study participants. For instance, there were workshops, landscape lecture programs, art shows and online birthday parties hosted by these entities where people could join together virtually. One study participant said that before the pandemic they used to have fundraiser events in-person, but during the pandemic they started conducting the fundraisers both online and in-person so that people could participate at their convenience and named it a "hybrid fundraiser." Since many people were seeking out activities, both local and international audiences were attending virtual programs, such as live garden tours and virtual walks in nature centers. While talking about these programs, a participant from a nature center said before COVID-19 they used to have an in-person morning walk on every Wednesday where less than 50 people joined the walk every week. The participant said: "we then went to the virtual Wednesday walk and all of a sudden we were having hundreds of people attend that at no charge." Many interview

participants indicated that the audiences were increasing in the virtual platforms compared to

in-person experiences. Even some programs received new international audiences too. A

participant from a historical center explained how they suddenly realized they were reaching

international audiences,

> We had started doing remote classroom visits by…staff members…and [for] the first few
> of them [visits] we expected we were going to go to rural school districts in Texas.
> Instead, they [staff members] were going to places [virtually] like school systems very
> close to the Arctic Circle in Canada. Next one was a request from New Zealand. And
> before we knew it, we realized we really had a worldwide audience instead of just [a]
> Texas audience.

> Sites were very creative in offering unique types of virtual options to attract audiences.

One site offered a digital book signing program where audience members could virtually chat

with the book author. One of the interview participants illustrated,

> we have a local author, and he released a book about the town and they [the entity] are
> using an in-person book signing with half protocols on that one. But I wanted to offer a
> digital option for people. You know, people may not have been entirely comfortable
> coming out to the book signing. And so, we offered virtual author chat.

> According to Burke et al. (2020), as the programs were moving to virtual options, it

enabled the heritage sectors to apply creativity and diversity to promote the heritage in a way

that would produce public attention. Yet, not only heritage sectors but also the other entities

like parks, nature centers, and gardens also showcased various levels of creativity and diversity

in their online programs, and all of them were successful in terms of receiving public attention.

While talking about how receiving public attention increased the visitors in their nature center,

one participant described,

> how they [new visitors/public] found us I think a lot of that is because during COVID, like
> everybody else, we went highly virtual. And I think a lot of people stumbled across this
> [entity] through our Facebook live presentations and things like that and…they're just
> chomping at the bit to get a chance to come out and actually see the place, so we have

seen our organizational memberships go up, as well as visitation. And I truly believe that is just people finally discovering us. You know, we may have to change our whole marketing plan. Also, that what we've done for 20 years of being the hidden jewel and we got found [laughs].

Many of the virtual program adjustments described by interview participants were not reported in the existing literature.

4.2.4.2   Technology

During the first year of the pandemic, when the entities were temporarily closed or reduced their in-person programs, they started introducing virtual options. At first, many interview participants identified that they were very concerned whether the virtual transition would work or not. One participant explained how their concerns about moving to virtual platforms turned into relief,

> We have a three-week series [of classes]. I wasn't quite sure if it would work, 'cause it's six hours for three Saturdays in a row. And I was like are people gonna be able to sit in Zoom for six hours [total class time in three weeks] for 2-3 hour [duration of each class] classes? And they did.

This shows that people were enjoying these programs and investing their time in these virtual offerings.

To meet the virtual demands, the entities reported using a variety of platforms such as social media, YouTube, Zoom, websites, and cable channels. Social media emerged as a very popular platform to reach a greater number of people including new audiences. One participant indicated, "we definitely had a large uptick in our social media interactions." Not only where more people visiting the social media pages of the natural and/or cultural resource sites but the sites were creating more content to post to these pages. As they were reaching more people through social media, the entities made their social media presence stronger than before. A

study participant from a Texas park explained how they were increasing their social media

presence,

> we did increase our social media presence and put things like cameras out and videoed different parts of the park and put those video footage from the cameras up on our social media page. I have several staff members that just like to take pictures of stuff 'cause they're very passionate about their park so we would take their pictures that they found and put them up on social media.

Likewise, social media was a popular tool for museums around the world (Burke et al. 2020).

To reach the vast audience that exists on the internet, study participants used these

platforms to deliver their messages and content via live sessions (e.g. Facebook live),

presentations, pre-taped videos (e.g. historical video series, wildlife video series, plant animal

videos), and pre-recorded sessions. Facebook live sessions were popular among entities and

their audiences. One study participant said, "The one thing that we started to do that became

very popular, and we're continuing to do now, is doing Facebook live sessions." Another study

participant echoed similar results, "[Facebook live] proved very popular. So, we take them

[down] after they're [on] Facebook… and we convert them and upload on YouTube." Other

participants mentioned that they bought recording equipment, such as microphones and high-

quality cameras, to make video content for their social media sites. These examples show how

the entities were expanding technology that they had not used prior to the pandemic. Before

COVID-19, almost all the interview participants reported having little to no experience in virtual

programs; nevertheless, during the pandemic they discovered that with these new technologies

and new virtual platforms they were reaching more audiences. However, there was mixed

responses from the participants about continuing these offerings post-pandemic. On one hand,

some sites were very enthusiastic about keeping the virtual options post-pandemic as they

could reach more people. For example, a participant from a park said, "yes [we would continue offering virtual option post-COVID]. You know, part of our goal is outreach, and we are avid and very sincere about trying to reach people that aren't already coming to parks... So it's not just the COVID thing, it's part of our outreach." On the other hand, some entities did not want to continue it after the pandemic ends because they did not have enough skills and resources. For instance, a participant from a wildlife rehab center illustrated,

> no, I will not continue to do them [program offerings] virtually. It does not come across as effectively as of course, seeing things in person. And I'm just not techno savvy [laughs] enough to be very good at it. And I'd rather not put something out there that's not quality [content]. You know, I'm 64 years old and so it's [laughs] a little trickier for me.

It shows that, some entities took these adjustment measures as only as temporary option and for them recovery meant going to pre-pandemic condition. Some entities, however, wanted to adapt to the new normal keeping the virtual offerings post pandemic. There concept of recovery aligned with the concept of recovery considered by Alesch et al. (2001).

4.3   Indirect Factors Affecting adjustments

The study identified several factors that affected the adjustments made by natural and cultural resource sites. The fiscal concern and health-related concerns were the two direct underlying motivating factors which influenced the entities to take various adjustments measures. However, there are some indirect factors those also influenced the adjustments. Following White (1942), I divided these indirect factors into two categories: 1) disadvantages, where the factors affected the adjustment in a negative way and 2) advantages, where the factors influenced the adjustments of the entities in a positive way.

4.3.1   Disadvantages

Disadvantageous factors reflect challenges that arose from the COVID-19 pandemic that cultural and/or natural resource sites had to adjust to maintain business operations. These factors can be subdivided into three sectors: 1) staff and volunteer shortages; 2) lack of technology; and 3) reduced funding/budget.

4.3.1.1   Staff and Volunteer Shortage

Staffing was one of the most important factors that influenced adjustments. There were some ongoing staffing related tensions among the participating entities. A study participant reported that, though they did not lose any staff during the pandemic, they had a hiring freeze. Therefore, the vacant positions they had before COVID-19 were not filled, including retirements, meaning they operated without a full staff. Others had to lay off staff members or reduce volunteer hours. For example, one participant from a nature center said, "I laid off two people COVID wise. I had a director of education who was 45 years here. She retired. I didn't replace her. My conservation director moved back to…[another city] in August [2020], I didn't replace her until February this year [2021]." Another nature center commented that three part-time employees left because they found full time jobs in other organizations. Therefore, staff attrition influenced the adjustments as some entities could not fully staff all their operations during the pandemic. Staff shortages even created challenges for virtual formats. One participant illustrated,

> Online in a way is easier, but in a way it takes more staffing. It takes more educated staffing to run, but onsite takes more facility staffing to run 'cause they have to set the room up. So, it's give and take on both sides. So, we're trying to figure that out.

Another participant said, "When COVID first hit, we only had one staff person going in to work …[at the] center…and it was too large of a task for one person to do because normally there would be six people doing it." Because all staff members could not go to the site because of health concerns, these shortages created difficulty running the operations. It implies that entities needed appropriate numbers of staff with the necessary training to meet the needs of the natural and/or cultural resource entity whether virtual or in person. Reduced staffing was observed in the literature as a vital factor that influenced adjustments in other entities too (Miller-Rushing et al., 2021). With the lack of staff and frequently reported volunteer shortages, study participants reported the need to make adjustments to maintain business operations and keep revenue incoming.

Volunteer availability played an important role during these adjustments. As many entities depended on volunteers, volunteer unavailability negatively affected their operations causing entities to adjust their practices. Some entities experienced decreases in volunteers during the pandemic. For example, a study participant from a nature center reported, "we have one program that relies pretty much solely on volunteers…we tried to engage volunteers in doing it virtually. But overall, that just wasn't the experience they were looking for, so we did see a significant decrease." This statement clearly shows that entities were struggling while implementing adjustments due to the lack of volunteers. For some entities, volunteers were extremely important to stay in business. For instance, a study participant from a museum reported that,

> We are continuing to look for opportunities to open. It's based more on availability of volunteers than anything…I was just gonna say what we are seeing plenty of visitor interest…but…waiting until our volunteers come back where a lot of our volunteers are senior staff.

That entity also reported that 98% of their operations depend on their volunteers, and they have only one paid employee. The entity was struggling to open fully as their volunteers did not return to full capacity. In addition, they were looking forward to more volunteers coming back to fully reopen. This indicates that volunteer availability played an important role to stay in operation for some entities. Other participants reported that they were continuously seeking opportunities to bring their volunteers back to run business operations like tours, customer service, and ground beautification. One participant reported that, "volunteers of course were shut down for multiple months. We brought them back in phases." This indicates how vital volunteers were for maintaining business operations and without their help, many natural and/or cultural resource centers had to adjust by limiting their operations.

4.3.1.2   Lack of Technology

As reported by study participants, almost all the entities moved to virtual platforms, but this opportunity also created challenges. Inadequate equipment, insufficient technology, and lack of technological skill negatively affected operations thus requiring adjustments. For example, one participant reported, "[we were] ill prepared on the technological side…to jump full board into doing those kind of programs [virtually]." Despite lacking technological skills and adequate equipment, the entities tried to adjust. For instance, another participant said, "we don't have the equipment, but we're trying to make do [for virtual programming] with what we have." Therefore, this study identifies that for many entities, transitioning to virtual programming was challenging because of the lack of technology, skills, and proper equipment; however, all entities indicated that they tried to adjust with what they had or sought to acquire new equipment or skills. Sometimes this meant expanding responsibilities of existing staff. One

study participant described that their intern was more experienced using social media than the

manager. So the intern's job responsibilities evolved to include posting material on the entities'

social pages,

> we had an intern at the time, and she did a few extra things. She tried to get the
> Instagram going and did some livestreams and things like that to kind of encourage
> people…they [interns] were usually really great about picking up and enhancing
> whatever they could with the social media, working on things like twitter for a whole
> day, or whatever.

4.3.1.3 Reduced Funding/Budget

Lack of funding and reduced budgets also influenced the adjustments made to

operations. Many entities were struggling to maintain their business operations due to reduced

budgets because of the pandemic. While talking about budget reductions, one study participant

reported, "for 2020 we were fully funded for this next fiscal year, fall 20-spring 21. Ironically, on

this next fiscal year our budget is reduced." As their budget was reduced, they had to plan

accordingly to adjust. Some entities tried to seek funding from different sources so that they

could increase their programs while adjusting. For example, one of the participants mentioned

that "Our leadership is looking at trying to find funding…for extending [a certain] program."

Therefore, decreased funding and budget reductions served as factors that produced

disadvantages for entities' adjustments to the COVID-19 pandemic.

4.3.2 Advantages: Funding and Donation

In this following section, I discuss the factors that produced advantages for entities'

adjustments to the pandemic in a positive way. This study identified more factors under the

disadvantage category than the advantage category, which is consistent with the findings of

White (1942) where the author identified the same issue with the factors influencing

adjustments to floods. Specially, donation and funding from various sources comprised the

advantage category of factors.

   Interview participants identified changes in funding and donations as catalysts for

adjustments; lack of funding were negative factors but increases in funding and/or donations

were advantages. Participants identified their primary sources of funding before COVID-19

started and the sources of funding during the first fiscal year of the COVID -19 pandemic (Table

4.5).

Table 4.5: Primary sources of funding before March 2020 and during March 2021.

Primary Source of Funding	Public (n= 36)		Private and non-profit (n=56)	
	Pre-March 2020	March 2021	Pre-March 2020	March 2021
Federal funding	11.1%	7.1%	7.1%	**26.5%**
State funding	**19.4%**	**14.3%**	0%	0%
Municipal funding	**33.3%**	**35.7%**	8.9%	2.9%
Programming revenue	2.8%	0%	7.1%	2.9%
Visitor revenue	**16.7%**	**21.4%**	**21.4%**	5.9%
Foundation funding	0%	0%	**25%**	**20.6%**
Corporate partner	0%	0%	1.8%	0%
Donations	2.8%	**14.3%**	**23.2%**	**35.3%**
Private events	0%	0%	1.8%	0%
Other	13.9%	7.1%	3.6%	5.9%

Note. Yellow highlight indicates top 3 sources.

Before March 2020, for public entities, the top three primary sources of funding were state

funding, municipal funding, and visitor revenue (highlighted in yellow on the table). Whereas, in

March 2021, for public entities, the top primary sources of funding were municipal funding,

state funding, visitor revenue, and donations. Here, donation emerged as a new top funding

source for the public entities. Whereas, for the private and non-profit entities, before March 2020, the top three primary sources of funding were from foundations, visitor revenue, and donations. In March 2021, the primary sources of funding were donations, federal funding, and foundation funding noting a dramatic decrease in visitor revenue. For public entities, the top sources of funding were consistent, and donations came as an additional funding source. However, for private/non-profit entities, the top sources of funding changed; visitor revenue was no longer a primary source of funding, whereas federal funding emerged as a top funding source for them.

For both public and private/non-profit entities, donations played an important role allowing them to stay in operation. Therefore, donations influenced the adjustments that sites made. One participant said that they received donations not only from their long-term supporters, but from new people, too. "There are people out there who have been supporters of us. Our supporters, and in some cases, we got donations from people we've never gotten donations from before." A study participant illustrated how the donations helped them their adjustment in a positive way,

> then we did live garden tours. It was rough at the beginning…we had an iPad and just quickly got a hotspot…worked in the garden and you just never know who's in your class. Like I said in the class…we are doing the best we can to this to this online programming. I said we are quickly adjusting and trying to learn this online format as quick as possible and trying to gather up these online materials and equipment as quick as possible, but we don't have this equipment, but we're trying to make do with what we have. And there was a woman in the class, afterwards she emailed me and said, "do you have a budget?" and I said yes, and she said, "send it to me." and I sent it to her, and she cut us a check for five thousand. Sold the whole budget…So you [laughs] never know who's listening or who's watching and that saved us. So, with that we were able to buy microphones, and a nice DSLR camera [with] which we've done a lot of our videos.

> This was an example of how donation from people acted as an advantage to adjust for

the entities because it shows how the entity could expand their adjustment measure with the donation. Moreover, funding from different sources, which came in various forms such as the COVID-19 grants, SBA funds, federal funding through the CARES Act, influenced the entities' ability to run their operation while undertaking their adjustment measures. For example, one participant from a museum illustrated how they kept their business running and were encouraged to expand their operations, "along with the support of the board to go ahead and use the SBA funds like that to expand the museum and expand the collection." Another participant said how they were doing really well, "so financially this last year, even though a lot of it was gifting [donations] and SBA support and things like that, we did extremely well]." Therefore, both donations and funding from new and diverse sources helped some of the participating entities to be successful while adjusting to the COVID-19 pandemic and these factors helped them to keep their operation running.

4.4   New Opportunities from COVID-19 Adjustments

Though all the entities identified challenges related to the COVID-19 pandemic, there were some opportunities interview participants identified. The most significant opportunities, and those most likely to last beyond the pandemic, included networking, maintenance, and virtual programming.

4.4.1   Networking

Almost all entities participating in the study reported some range of formal and informal networking during the COVID-19 pandemic with both established and new partners. They collaborated with other entities to collect and share information to maintain operations and

reduce risk. One participant from a nature center elaborated: "Every other Friday since the pandemic, we get on a call in Houston, all the great leaders, and we compare notes." Another museum described, "It was very, very extensive communication with the other local area museum directors." These show how the pandemic brought entities together to learn from each other and maintain business operations. For some entities, existing networks got stronger during the pandemic. This was reflected while talking to a participant,

> we have always networked with other rehab centers and nature centers and that kind of intensified during the past year. Because we wanted to make sure that we were following some of the same protocols as per COVID safety, as some of the other organizations and also to see how they were handling their staff and their um their volunteers. Also, what types of programs that they were offering.

Therefore, networking became a significant source of sharing and learning about the successful measures and enabled the execution of new plans in response to the pandemic. Sharing information and resources, enabled entities to overcome some of the COVID-induced challenges such as staff/volunteer shortages and limited access to technology. By engaging with practices proven successful by other entities, natural and cultural resource sites could focus their limited resources on these best practices thus maximizing chances for success and profit. These collaborative environments can help the natural and/or cultural resource entities in future to execute successful plans and mitigate the effects of extreme events.

4.4.2   Maintenance

Many of the parks, nature centers, museums and other entities were temporarily closed during the pandemic; yet almost all of them undertook maintenance projects, which they could not have done when they were open to the public. Therefore, the COVID-19 pandemic afforded the entities an opportunity to repair and renovate their centers. One participant explained, "So

we were closed, and my intern and I were like this is a good time to work on exhibits that we just haven't had time to do." Another described that, "[we] painted some of our infrastructure of our buildings on the outside that would have been hard to take care of when we were open." Participants identified that the COVID-19 pandemic provided an opportunity to do these projects as they were closed to the public. Both indoor and outdoor, and practical facility maintenance as well as more beautification and landscaping were done by these entities. Study participants identified specific projects, such as improvements to parking lots, installing restrooms, and performing building maintenance that were previously deferred due to frequent visitors. Moreover, these maintenance projects will benefit the entities, and their visitors, far beyond the COVID-19 pandemic. This insight was not previously identified in the literature.

4.4.3   Virtual Option

During the first year of the pandemic when most of the entities had to temporarily close their sites or offer limited services, they started trying out the virtual options to reach audiences remotely (Ennes, 2021). Most of the interviewed participants agreed that they were able to reach a larger audience virtually, which was an opportunity for them to connect with many new audiences. Because they were operating virtually, many new people learned about them. As almost all the entities were successful reaching new audiences through remote programming, it came out as a tremendous opportunity to connect with people beyond their local area or those with mobility limitations. A participant from a nature center explained,

> we recognize that this has allowed people who maybe are in different parts of the city who couldn't come to an in-person program because of transportation, or physical

limitations that they had. They could come and participate virtually. So, our goal would be to offer some programs virtually in the future [post-COVID].

The pandemic identified an opportunity to expand virtual programming, reach a more diverse audience, and monetize those programs to earn additional revenue from this adjustment. Therefore, almost all the entities agreed that they would keep up their virtual options post-pandemic.

4.5   Timeline for Adjustments

Due to the rise of COVID-19 cases in Texas, Governor Abbott issued a mask mandate on 2 July, 2020 (Svitek, 2020). During the statewide mask mandate in Texas (2 July 2020- 10 March 2021), we observed that the entities took many adjustment measures to maintain business operations while reducing exposure to COVID-19 (discussed fully in section 4.2). After the mask mandate was lifted by the Texas government on 10 March, 2021 and businesses were reopened to 100% capacity and full operations, entities started to go back to normal practices and the adjustment trends started changing. Interview participants described their entities removing COVID-related signage, increasing their capacity for visitors, restarting programs, and returning to their regular hours. The state government's lifting of COVID-related restrictions created some anxiety and frustration for parks, museums, and other protected entities. One study participant explained,

> when the governor put his executive order in place, we were not allowed to require…
> [masks] inside, and that has caused some anxiety, definitely with staff…[staff] just feel
> nervous because we know some staff have not been vaccinated, but you know obviously
> we can't ask who's vaccinated, who's not vaccinated, and we can't tell them to wear a
> mask.

Another participant said,

with everything happening especially within the state [of Texas]…it's almost like we don't have a choice. I'll just be honest, it feels like that, if you want to protect yourself, go get a vaccine; if you don't, then wear a mask; and if you don't want to wear a mask, don't bother me…and it's frustrating!

These quotes from study participants indicate that though reopening to 100% capacity was an opportunity for them to get back to normal operations, the lifting of the mask mandates created tensions among the employees and they were not satisfied about it. Moreover, the removal of the Texas mask mandate was not in alignment with CDC recommendations and many other states still required masks and other risk reduction practices (Rogers et al., 2020). This added to the stress and frustration felt by many employees of the natural and cultural resource sites.

Conversely, some entities reported that there was not much change after the mask mandate was lifted because people did not follow the rule when it was required. One participant explained,

we didn't make any new specific rules or anything like that when the governor lifted the mask mandate. [sighs] We're in Southeast Texas and half the people around here weren't following [the mandate] anyway…I honestly…don't think that much has changed. I never even changed my sign from the front saying the masks are required or strongly suggested or whatever, so we didn't update anything else because here people are going to do what they want anyway…We live in a lawless area.

Still, other entities were trying to comfort visitors even after fully reopening and lifting COVID-related restrictions. One participant described, "we still have hand sanitizers out. We've talked about removing them, but we feel that they still give people comfort, so we do still have them out." This indicates that the removal of risk reduction adjustments varied amongst the entities and some risk reduction measures that were viewed positively by visitors were left in place longer than other adjustments. Visitor perceptions therefore seem like a key factor in

choice of adjustments. This indicates that as the entities were getting back to normal, they tried

to keep up/change their adjustment behaviors according to visitors' perception as visitor

revenue was important for their survival and growth. While adjustments were made by natural

and/or cultural resource sites immediately after the start of the COVID-19 pandemic in March

of 2020, many sites' adjustments evolved in response to local and national government policies.

After the mask mandates and other restrictions were lifted in Texas in April of 2021, the entities

participating in this study reported that they started to return to pre-COVID operations and

removed many of the adjustments they had instituted during the first year of the pandemic.

CHAPTER 5

CONCLUSION

The purpose of this study was to explore the range of adjustments in business

operations adopted by Texas' natural and cultural resources sites during the first year of the

COVID-19 pandemic. I examined their adjusted business practices to maintain operations and

recover from the pandemic. Specifically, I identified the factors influencing adjustment

measures, identified new business opportunities that emerged from these adjustments, and

analyzed whether the experiences of the entities varied in terms of their funding sources.

Moreover, using the theoretical concept of human adjustment to floods established by Gilbert

White, this study extends his work to the COVID-19 pandemic undertaken by natural and

cultural resource sites. Throughout my study, I observed that these entities implemented a

range of adjustments to mitigate the impacts of the pandemic thus expanding White's theory of

adjustments to floods to other hazards, namely pandemics. This mixed-method study contains

both survey and interview data. By analyzing the survey and interview data, I identified the key

factors and the adjustments made by these entities.

My survey data suggests that during the first year of the pandemic, revenue decreased

for both public and private/non-profit entities in Texas. The decrease in revenue, however, was

more widespread amongst private and non-profit entities, whereas for the public entities, some

participants indicated increased revenue. These differences were primarily linked to changes in

visitation and funding sources. For private and non-profit entities, the number of visitors

decreased greatly while some public entities, particularly parks and nature centers, reported

increased visitors. In terms of donations, approximately half the survey participants all types of

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participating entities, public, private and non-profit, experienced a decrease in donations with 25% of private and non-profit entities indicating that their donations increased.

To recover from the pandemic, natural and cultural resource sites in Texas implemented a range of adjustments. The first type of adjustment to business operations focused on maintaining fiscal stability. For example, they adjusted by undertaking new fundraising methods, relying on new different revenue/funding streams, and seeking new grants to maintain their operation. Whereas the second type of adjustment to business operations focused on reducing the spread of COVID-19. For instance, installing hand-sanitizing stations throughout the sites, adding plexiglass shields at the checkout areas, and intensified cleaning, bleaching, and sanitizing of the facilities. I also observed virtual adjustments, which sought to maintain both fiscal and human health. Almost all participating entities started to offer or expanded existing virtual programs, such as kid camps, art shows, adult workshops, and live tours of the facilities. They introduced many online interactive activities like yoga classes, cooking classes, painting contests, and quizzes. To deliver new virtual content, the entities used platforms like social media, websites, Zoom and cable channels; many participants commented that they had to tap into newly acquired skills, technology, and equipment to make these adjustments. For those that lacked access to these skills or technology, they became a barrier to sustaining operations. Many participants reported delivering content via Facebook live sessions, pre-taped videos, and presentations to reach a larger audience in the virtual world than previously captured during in-person programs. All entities of this study agreed that they were successful in reaching diverse audiences virtually. Some of the entities agreed that they

plan to continue the virtual offerings post-COVID. However, some entities did not want to continue the virtual offerings post-pandemic as they did not have enough skills and resources.

My study also identified that, the direct underlying motivating factors that influenced the adjustments are fiscal concern and health-related concern. However, there are some indirect factors that influenced the adjustments too. Following White (1942), I categorized the indirect factors as: 1. Disadvantages (Staff and volunteer shortage, lack of technology, and reduced funding/budget) where staff and volunteer shortages, lack of technology and technological skills, along with reduced budgets negatively affected the entities' operations thus influencing adjustment behaviors; and 2. Advantages (fundings and donations) where fundings from variety of sources and donations from donors positively affected the entities operations and influenced their adjustment behaviors. These adjustments, however, evolved over the first year of the pandemic and many were discontinued in March 2021 when the state of Texas government lifted the mask mandate and reopened business capacity to 100%. At this time many participating entities reported that they resumed normal business practices like returning to their regular hours, increasing their capacity for visitors, restarting in-person programs, and removing COVID-related signage.

Despite the challenges brought by the COVID-19 pandemic and the associated adjustments to maintain business operations, some participating entities reported new opportunities emerging from the pandemic. Almost all the interview participants implemented some maintenance work while their facilities were closed or reduced in operation. Networking, specifically the sharing of business practices related to the pandemic, emerged as another opportunity for the entities. Many expanded their formal and informal networks during the

COVID-19 pandemic with both existing and new partners. Relationships were strengthened and ideas shared that will outlast the pandemic. In addition, moving to virtual options brought new audiences, which may continue to visit and support these natural and/or cultural resource sites well into the future. This study also identified that for both public and private/non-profit entities donations played an important role in maintaining business operations.

From this novel research, several lessons and recommendations can be identified for cultural and/or natural resources sites to maintain operations during future extreme events. First, the role of networking played a vital role during the pandemic for all participating entities. The entities should keep extending their networks and share their resources with one another even post-COVID. By sharing resources, entities can learn from each other introduce new policies, and improve business practices. Second, virtual programs became a key component of pandemic business practices; however, many participating entities reported that they initially lacked the skills and/or technology to shift programs to virtual formats. Those with staff familiar with social media were able to move content online more efficiently and effectively than those without existing skillsets. As many entities want to keep the virtual options post-COVID, they should train their staff and volunteers to master online technology and help maintain that skillset.

Moreover, many participating entities reported that they had to acquire new technology to meet virtual programming demands. Whereas some entities reported that they did not have the budget or funding to acquire those technologies. Therefore, thirdly since most of the entities were affirmative that they wanted to keep virtual option post-pandemic, while planning for their future budget distribution sectors, the entities can separate a portion of their budget

for virtual options to buy equipment and other resources. Fourth, the willingness to be flexible in transition was the key to those adjustments and it helped the entities to stay in business. I have identified that some of the factors that allowed the entities to be flexible are: their fear of permanent closure, their positive attitude towards trying out new and/or changed methods, and receiving public support through donations. As all the entities wanted to survive, they were flexible towards new adjustments and most of the entities were successful adapting the adjustment measures. All the entities should keep up this attitude of being flexible according to future situations.

In my findings, I identified that before the COVID-19 pandemic, for private and non-profit entities, visitor revenue was one of the top sources of funding but after the pandemic it was no longer a top source of funding. Therefore, financial resources such as government grants and loans with low interest rates should be easily accessible during extreme events such as the COVID-19 pandemic not only for the public entities but also to the private/non-profit entities. Though there was some form of government support (e.g. state funding) available to all types of entities during this pandemic, it should be more widespread and easily accessible during future events. Therefore, the related stakeholders should include this topic in their planning for future extreme events.

This is an exploratory study, one of only a handful of studies that examine the impact of the COVID-19 pandemic on business operations adjustments of natural and cultural resource sites. Future work is needed to expand upon these findings. First, this research should be studied beyond the scope of Texas to understand overall impacts across the USA. Furthermore, future work should expand beyond the pandemic's first year to understand trends and changes

over time. Longitudinal research can offer new insights as to how adjustments made in the first

year of the pandemic influenced business practices as new variants of COVID-19 emerged and

altered business practices. Moreover, longitudinal work should examine how many of these

businesses stayed in operation in the near future. By expanding the geographic and temporal

scales, we can gain key insights as to how natural and/or culture sites can mitigate against

future events while protecting vital resources.

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