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Information Technology Service Continuity Practices in Disadvantaged Business Enterprises

Allen Edward Raub
Walden University

Walden University

College of Management and Technology

This is to certify that the doctoral study by

Allen Edward Raub

has been found to be complete and satisfactory in all respects,
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Review Committee
Dr. Habib Khan, Committee Chairperson, Information Technology Faculty
Dr. Charlie Shao, Committee Member, Information Technology Faculty
Dr. Gail Miles, University Reviewer, Information Technology Faculty

Chief Academic Officer and Provost
Sue Subocz, Ph.D.

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Abstract

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Allen E. Raub

MSIT, Walden University, 2018

PhD, Capella University, 2013

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BS, State University of New York, 1999

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Abstract

Disadvantaged business enterprises (DBEs) not using cloud solutions to ensure information technology (IT) service continuity may not withstand the impacts of IT disruption caused by human-made and natural disasters. The loss of critical IT resources leads to business closure and a resource loss for the community, employees, and families. Grounded in the technology acceptance model, the purpose of this qualitative multiple case study was to explore strategies IT leaders in DBEs use to implement cloud solutions to minimize IT disruption. Participants included 16 IT leaders in DBEs in the U.S. state of Maryland. Data were generated through semi-structured interviews and reviews of 10 organizational documents. Data were analyzed using inductive analysis, and three themes were identified: alignment with business requirements, sustaining business growth, and trust in cloud services. One recommendation is for IT leaders in DBEs to ensure cloud-based IT service continuity practices are built into all aspects of small business operation. The implications for positive social change include the potential for economic stability for families and environments that rely on the DBEs for continuing business and employment.

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Dedication

This study is dedicated to my wife, Kristin, who continued to motivate me throughout the journey. She encouraged me by telling me just to get this done already. I also dedicate this study to our five children and their spouses, Patrick and Beth, Alec and Frankie, Zack and Suzie, Hannah and Kody, and Heidi. Their constant support and understanding, as well as the sacrifice of time, have encouraged me to finish this amazing milestone. You all sacrificed more than you should have. Know that it is because of this faith that I was able to succeed. Lastly, I dedicate this study to my parents and sister and brother-in-law, Jeannie Raub, Paul Raub, and Paulie and Mike Phoenix, who continue to inspire me never to give up. I dedicate this to all of you.

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Section 1: Foundation of the Study

Information technology (IT) service continuity, which is a subset of business continuity, is a determinant of whether businesses persevere through human-made or natural disasters (Cervone, 2017). IT service continuity ensures the delivery of an organization's critical IT services when these services would otherwise be interrupted (IT Disaster Recovery Plan, n.d.), yet few businesses spend the time to prepare appropriate IT service continuity strategies (Frenkel, 2016; Stair, 1983; Sullivan, 2017). In this section, I will provide the background of the problem, problem statement, and purpose of the study. The nature of the study; research and interview questions; conceptual framework; definitions of key terms; and assumptions, limitations, delimitations, and significance of the study are also included. In addition, I review relevant professional and academic literature.

Background of the Problem

IT service continuity is a critical element of business continuity and requires a sound strategy (Cook, 2015). The Information Technology Infrastructure Library (ITIL) recommends that formal processes be in place for IT service continuity, such as IT service continuity management (ITSCM), posed cost barriers, and often presented skill gaps, particularly for small businesses (Klems et al., 2010). In most cases, small businesses have fewer IT capabilities and resources at their disposal, leaving the IT decisions to the business leaders, thereby resulting in fewer strategies focused on IT service continuity (Kemp, 2016; Raikov, 2018). For businesses relying on IT service continuity, a lengthy recovery from IT failure is often the ultimate cost to businesses when a disaster occurs (Stair, 1983). Although several cloud-based IT service continuity services are available across the internet, Kemp (2016) noted that only 15% of small businesses had incorporated adequate strategies to persevere through human-made or natural disasters.

Kemp (2016) further identified the need to understand the strategies selected by successful small companies, while Marshall et al. (2015) identified the need to understand the decisions made by disadvantaged business enterprises (DBEs). Given the ready availability of cloud-based solutions to IT decision-makers, exploring this topic was worthy of an IT doctoral study designed to understand the choices made by DBE IT leaders when designing and implementing IT service continuity solutions. There are over 28.2 million small businesses in the United States, which account for the creation of 46% of all private-sector jobs (Small Business Administration [SBA], n.d.). With such a large percentage of the U.S. population relying on these continued IT services, sharing positive and productive experiences with IT service continuity may help promote positive social change by helping business leaders to identify IT service continuity strategies and ultimately provide continued services and employment opportunities for their personnel.

Problem Statement

Most businesses will experience some form of IT disruption, which can create cascading failures (Cook, 2015). According to Fisher et al. (2017), more than 77% of organizations cannot operate core operations without IT services, which, for DBEs, often leads to closure during or following disasters (Marshall et al., 2015). The general IT problem is that there is inadequate knowledge of the strategies to use when selecting among IT service continuity options designed to endure IT disruption following a human-made or natural disaster. The specific IT problem is that some IT leaders in DBEs lack strategies to implement cloud solutions to reduce IT disruption resulting from human-made and natural disasters.

Purpose Statement

The purpose of this qualitative multiple case study was to explore the strategies IT leaders in DBEs use to implement cloud solutions to minimize IT disruption resulting from human-made and natural disasters. The target population consisted of the IT leaders of DBEs within the U.S. state of Maryland that had experienced a disaster. The results of this multiple case study may promote positive social change by helping organizations to identify IT service continuity strategies, which may ultimately result in continued employment opportunities for personnel.

Nature of the Study

Qualitative, quantitative, and mixed methods are the three main research methodologies (Leppink, 2017). I used the qualitative research methodology for this study. Qualitative research is most often used to explore and understand the meaning assigned by individuals or groups to their experiences (Christenson & Gutierrez, 2016). In this way, the use of qualitative methodology can help researchers to understand participants' experiences and attitudes (McCusker & Gunaydin, 2015). Thus, using the qualitative method allowed me to explore and understand how and why service continuity practices are employed by IT leaders for DBEs that have survived a natural or human-made disaster. Additionally, use of the qualitative method provided an understanding of how the implemented practices have helped DBEs survive natural or human-made disasters.

The quantitative approach emphasizes measurement, the testing of hypotheses, and causal relationships among variables (Leppink, 2017; McCusker & Gunaydin, 2015), which were not the focus of this study. The mixed-methods approach, which blends the exploratory methods used in qualitative studies with the numeric measurements used in quantitative studies, is the research design to employ when neither qualitative nor quantitative methodology alone answers the research question (Leppink, 2017). Because quantitative research was not required to answer the research question, the mixed-methods design was not selected. The purpose of this study was to explore what can be learned from current practices and how implementation of these practices may ensure IT service continuity through disasters. Because qualitative research deals minimally with numbers and instead focuses on words to answer questions such as the "what," "how," or "why" of a situation (Leppink, 2017; McCusker & Gunaydin, 2015), a qualitative methodology was selected over quantitative or mixed methods.

My goal was to explore and understand the practices used by DBEs' IT leaders in their perceived solutions to ensure the continuity of infrastructure and IT resources to withstand and recover from disasters. The qualitative conceptualization emphasizes processes and meanings that are not measured under controlled conditions. The phenomenological, social-constructivist, intersubjectivist, and interpretive philosophies drive the qualitative type of research, underscoring the socially constructed nature of reality, holism, exploration, flexibility, and understanding of a problem (Makrakis & Kostoulas-Makrakis, 2016).

Case study researchers focus on a situation that occurred within a real-life setting and offers the flexibility needed to handle research questions that are not readily available with other designs (Hyett et al., 2014). Yin (2017) suggested that case study research is favored when the main research question is a “how” or “why” question, when there is little control over behavioral events, and when the research focus is on a contemporary phenomenon, which is also known as the case. Because the research question was a “how” or “why” question and the emphasis of this study was on contemporary real-life situations caused by human-made or natural disasters, this design was the most suitable. Other research designs, such as narrative, ethnographic, and phenomenological designs, were less applicable. A phenomenological design focuses on examining an individual’s experience as impacted by a distinct phenomenon (Adams & van Manen, 2017); this type of design did not fit the aim of the current research. An ethnographic design, which is appropriate for understanding the culture within organizations (Makrakis & Kostoulas-Makrakis, 2016), was also not appropriate because the study focused on organizational culture.

Similarly, narrative design was not selected because it typically focuses on biographical and historical information (Makrakis & Kostoulas-Makrakis, 2016). In qualitative research, the goal is to understand how an individual or community perceives an issue (McCusker & Gunaydin, 2015). As recommended by Christenson and Gutierrez (2016), I leveraged various personal data collection methods, such as observations, interviews, and a review of written material, to understand the IT service continuity practices of participants.

I focused on the processes used by IT leaders in DBEs to select IT service continuity solutions. Interview questions were used in this qualitative multiple case study to gain detailed, open-ended responses. In addition to being interviewed, I asked the participants to provide copies of their current IT service continuity plans, if existent. This protocol allowed the participants more freedom to express their story (Morse, 2015). Furthermore, I was able to code these detailed data to reveal emergent themes and patterns (Christenson & Gutierrez, 2016).

Research Question

What strategies do IT leaders in DBEs use to implement cloud solutions to minimize IT disruption resulting from human-made and natural disasters?

Interview Questions

1 What strategies do you use to implement cloud solutions that minimize IT disruption?

2 What did you think were the deciding factors for implementing the current cloud solution ensure IT service continuity over other solutions there are available?

3 Why did you consider cloud solutions to minimize IT disruption over other available solutions that do not leverage cloud technology?

4 What concerns did you have, if any, regarding the implementation of cloud solutions to minimize IT disruption?

5 What training did you receive to aid in your decision to select the current cloud solution that is in place?

6 How did you identify potential barriers to implementing the cloud solution?

7 How do you think the cloud solution is more or less free of effort than other solutions?

8 How does the cloud technology improve your performance?

9 Do you have anything else to add that I have not asked about cloud solutions to minimize IT disruption resulting from human-made and natural disasters?

Conceptual Framework

The technology acceptance model (TAM) presented by Davis (1986) formed the foundation of the conceptual framework used in this research. According to Davis, the main principles of the TAM are that a user's approval of technology is reliant on the apparent effectiveness and professed effortlessness of the use of the technology. The TAM indicates that multiple factors, such as external variables, alleged usefulness, ease of use, behavioral intention, and usage behavior, influence a user's decision about how and when the user will implement the technology.

My intention was to explore the practices IT leaders in DBEs employ to select IT continuity solutions. These solutions include the use of tools, technologies, and associated methods. The TAM provided a theoretical basis to study the adoption and effectiveness of the processes directed at ensuring IT continuity during and following disasters (see Kwee-Meier et al., 2016; Teeroovengadum et al., 2017). The TAM framework provided a lens through which to scrutinize the perceived importance and perceived use of the available solutions that can improve IT continuity for the studied organizations.

Definition of Terms

The content of this study centers on IT continuity for DBEs; as such, there may be terms that are unfamiliar to readers. Many of the terms are used interchangeably, and therefore the following definitions are provided for clarity and to establish the research context:

Business continuity plan: A methodology used to create and validate a practiced logistical plan for how organizations recover and restore critical functions within a predetermined time following a disaster (Fernando, 2017).

Disaster: An uncertain situation or incident that can occur in any organization, leading to a major, unpredictable event that threatens to harm an organization and its stakeholders (Alawanthan et al., 2017). Disasters may be natural (earthquakes, floods, hurricanes, and tornados) or human-made (IT bugs, infrastructure failure, terrorism, or similar factors).

Disaster recovery plan: A documented process or set of procedures developed by an organization to assist in the recovery or protection of the organization from a disaster (Cervone, 2017).

Disadvantaged business enterprise (DBE): A for-profit small business whose owners consist of at least 51% socially and economically disadvantaged individuals who control management and daily business operations (U.S. Department of Transportation, n.d.). Women, people with disabilities, African Americans, Hispanics, Native Americans, and Asian-Pacific and Subcontinent Asian Americans are presumed to be socially and economically disadvantaged (U.S. Department of Transportation, n.d.).

IT service continuity: A strategic dependency on the supporting IT services focused on ensuring that IT assets and configurations that support critical business processes remain available and functional during disaster situations (ITIL, n.d.)

Small business: Business size is determined by the number of employees, average annual receipts, and industry type as classified by the North American Industry Classification System codes (SBA, n.d.). For technical service industries, such as computer programming, data processing, and systems design, the common revenue standard is under $25 million.

Assumptions, Limitations, and Delimitations

In this section, I will address the assumptions, limitations, and delimitations of this qualitative study. According to Barnham (2015), individuals see the world from their own perspectives; therefore, documenting and recognizing these factors is part of establishing the credibility of the study.

Assumptions

Assumptions can occur when researchers initiate a study and when their expectations lead to a conclusion. Walsh (2015) defined assumptions as the unconscious beliefs that can produce a bias of perception. Therefore, to ensure that credibility was maintained, I am making my assumptions available. I assumed that enough participants would be available to reach saturation to ensure the quality of the research conducted and also to ensure that content validity would not be affected (see Fusch & Ness, 2015). I also assumed that these participants would have sufficient knowledge of IT service continuity to answer the questions adequately during their interviews. I believed that the participants would fully understand the questions and relate these questions to their own experiences.

To mitigate any assumptions, I began the interview sessions by posing some screening questions to potential participants to verify that they had the knowledge and experience required to answer the questions. In addition, I confirmed that the potential participants were IT leaders within the DBEs. Because these questions and the interview would follow a structured format, I asked open-ended questions to minimize “yes” or “no” responses.

Limitations

As with any study, there are certain inherent limitations. In this section, I will address several of the potential limitations that I recognized. Busse et al. (2016) noted that limitations include the theoretical or methodological imperfections of a study that would not cause the researcher to question the validity of the study. For example, the participants may have all been from the same team within the organization and hence may have followed the same practices. The studied organizations may have had differing perspectives of IT service continuity than the definition from the ITIL (n.d.) or other industry experts. The studied organizations may have provided outsourced IT leadership support, thereby also causing a deviation in answers based on customers they support. Additionally, some participants may have been unwilling to share organizational documents because of their proprietary nature.

Delimitations

Delimitations are the constraints I became aware of while conducting the study and analyzing the findings; they are the factors within my control that purposefully limited the scope of the study and created a boundary within which to work (see Rosenberg & Koehler, 2015). I established boundaries, such as business size and type, as well as location, for my study population. Therefore, the collected data may not be generalizable to other populations. Another possible delimitation was that the practices used by DBEs in more advanced technology organizations may differ from the practices used in less advanced firms. The existing practices may differ based on the levels of technical expertise, the products available based on the time of the case study, or the potential to integrate available options because of other constraints.

Significance of the Study

Contribution to Information Technology Practice

The aim of this study was to increase awareness of how vulnerable populations of small businesses can remain operational during crisis situations and continue providing the services expected by their stakeholders. Some of the challenges faced by small business leaders during a crisis may include gaining access to financial resources or having a dedicated IT infrastructure (Frenkel, 2016). Today, many alternative strategies may be in use at other DBEs and may be leveraged by peers.

Implications for Social Change

DBEs are more susceptible to closure during or following disasters (Marshall et al., 2015). Thus, the goal of this study was to provide a potential understanding of the rationale and choices made by the IT leadership of what the SBA (n.d.) and U.S. Department of Transportation (n.d.) have declared a vulnerable population of companies. The goal was to help companies survive through and beyond disaster, therefore enabling social stability for families and environments impacted by the success or failure of this population of companies.

This research promotes positive social change by providing knowledge that leaders of DBEs can use to identify and implement potential disaster mitigation strategies. Implementation of these strategies may result in the continued business and employment of personnel within the company. Further extending this positive impact includes the economic stability the company's employees will have regarding follow-on services or contributions based on the sustained revenue gained throughout a disaster.

A Review of the Professional and Academic Literature

The literature review conducted in this study provides a review and critical assessment of the sources found to be relevant to my central research question: What strategies do IT leaders in DBEs use to implement cloud solutions to minimize IT disruption resulting from human-made and natural disasters? Intended as a critical engagement with the literature, the review includes a summary of the data, illustration of where differing viewpoints existed, and identification of the gaps and themes that emerged from the research. Because I explored the strategies IT leaders in DBEs use to implement cloud solutions to minimize IT disruption resulting from human-made and natural disasters, I have divided the literature review into three key areas.

The literature review focuses on (a) the TAM, (b) IT service continuity, and (c) cloud computing. The review of the literature on the TAM focuse on perceived usefulness (PU) and perceived ease of use (PEU), while also examining the multiple competing frameworks and why TAM was selected as the lens through which to explore this topic. My review of IT service continuity includes the concepts of business continuity planning, as well as the IT-specific subsets of IT service continuity, IT disaster recovery, and IT resilience. Finally, in my review of cloud computing I determine the applicability and availability of IT resilience solutions.

To identify academic and professional articles, I primarily used the EBSCO Discovery Service provided by the Walden University Library. I also queried the ACM Digital Library, IEEE Xplore Digital Library, Google Scholar, ProQuest, and Science Direct to locate articles. The review of academic literature consisted of 170 relevant journal articles on TAM, IT service continuity, and cloud computing. I concentrated on articles with a publication date less than 5 years from my anticipated graduation date, although some seminal sources were included that were outside of this time frame. The search terms included *technology acceptance model*, *cloud computing*, *cloud solutions*, *IT disruption*, and *IT service continuity*.

As outlined in Table 1, of the 170 relevant sources identified, 165 were peer reviewed, 159 of which were also published within the past 5 years. I verified the peer-review status of these articles by using Ulrich's Periodicals Directory. The percentage of peer-reviewed references in the literature review was 97.06%, and the percentage of peer-reviewed references in the literature published within the past 5 years was 93.53%.

Table 1

Summary of Research Articles Consulted in the Literature Review

Sources from review of the professional and academic literature	Number
Total references in the literature review	170
Total peer-reviewed references in the literature review	165
Total peer-reviewed in the literature review within the 5-year-span	159
% peer-reviewed references in the literature review:	97.06%
% peer-reviewed references in the literature review within the 5-year span	93.53%

The review of the literature on the TAM focuses on PE and PEU, while also recognizing key external factors, such as attitude toward use, behavioral intention to use, and the actual use of the system. Within the literature review of the TAM, I discussed multiple competing conceptual frameworks to illustrate the applicability of the TAM to this study. Throughout the literature review, the central thread began with the TAM to illustrate the conceptual framework, which was ultimately the lens through which I viewed the problem.

The review of IT service continuity included the overarching concept of business continuity planning and the subsets of IT service continuity, namely IT disaster recovery and IT resilience. The IT service continuity has several interwoven aspects that I articulated before discussing how IT resilience applies to DBEs. To further describe how IT service continuity can be viewed through the TAM, I discuss IT service continuity frameworks and provide examples of the application of IT service continuity.

In my review of the literature on cloud computing, I explore the applicability and availability of alternate IT resilience solutions. Thus, in the section on cloud computing, I was able to expand the discussion of the main components of the TAM, specifically the use of service models, the application of cloud technologies for resilience, and criticisms of cloud computing. I conclude the literature review with a critical evaluation of the themes found in the literature.

Technology Acceptance Model

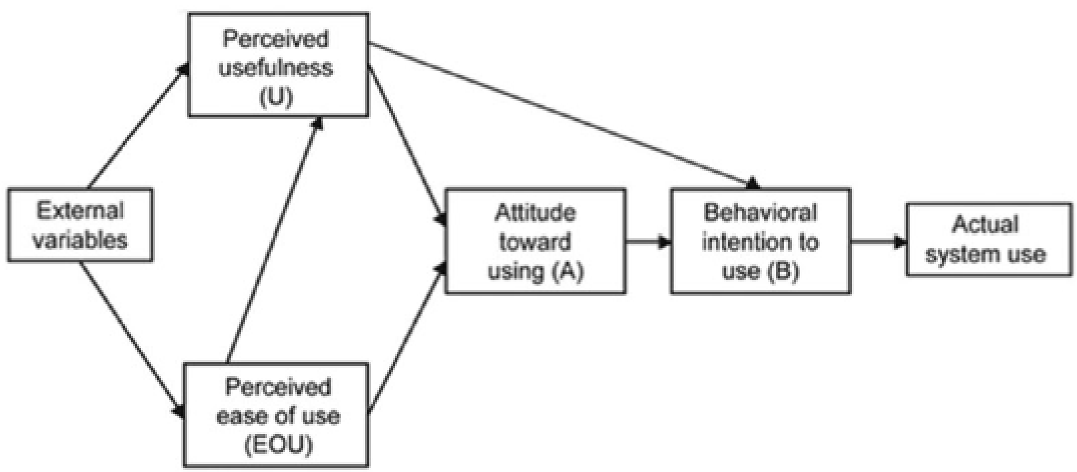
Although based on previous theories, the TAM stands as a conceptual framework, and has also evolved into new frameworks. In this section, I will define and describe the TAM, describe the use of the TAM, explain the foundation and evolution of the TAM, and describe the competing theories to the TAM. The goal of this section is to present the conceptual framework used to explore the topic and provide justification for selecting it over others.

The TAM originated as a combination of previous models. The TAM was first presented in 1986 by Davis and illustrates the development and testing of a "theoretical model of the effect of system characteristics on user acceptance of computer-based information systems" (p. 7). Davis derived the TAM from the theory of reasoned action (TRA) and the theory of planned behavior (TPB; Al-Azawei et al., 2017). The intention behind the model's design is to provide a methodology to assist system designers and implementers in evaluating proposed new systems.

The TAM, as shown in Figure 1, reprinted with permission from the authors (see Appendix A), demonstrates how external variables influence PU and PEU. These components ultimately impact the user's perceived attitude toward using a technology and the user's behavioral intention to use a technology (Brandon-Jones & Kauppi, 2018; Hsiu-Mei & Shu-Sheng, 2018; Hui-Fei & Chi-Hua, 2017). The TAM's characteristics (PU and PEU) determine the user's attitude toward using the new technology, and PU is a further determinant in the user's behavioral intention to use the technology (Hsiu-Mei & Shu-Sheng, 2018; Yoon, 2016).

Figure 1

Technology Acceptance Model

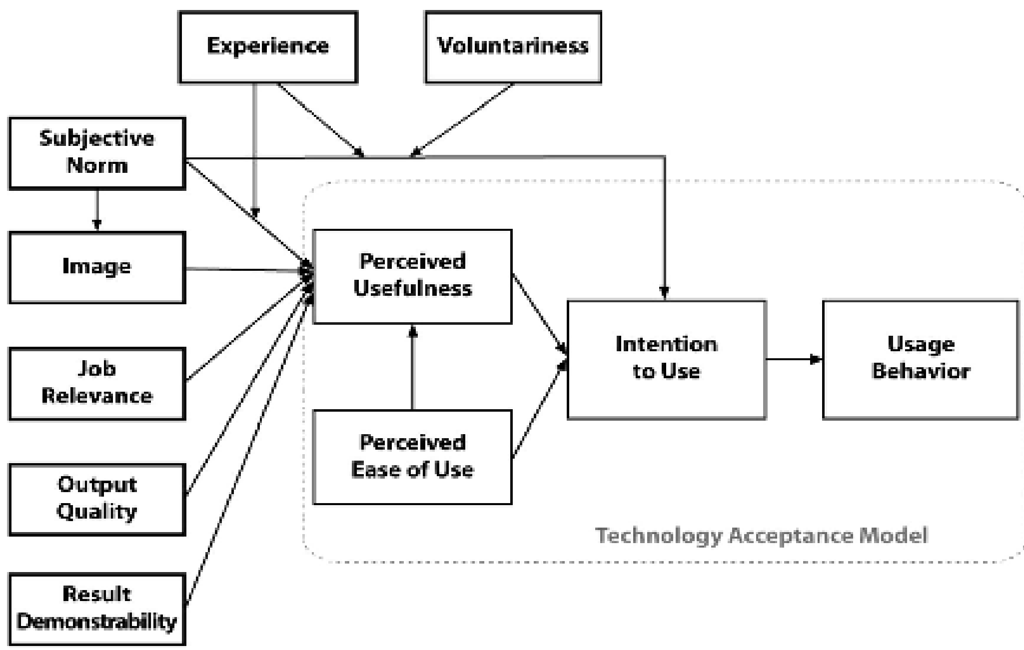


Note. From "Social Media Adoption in Business-to-Business: IT and Industrial Companies Compared," by C. Veldeman, E. Van Praet, and P. Mechant, 2017, *International Journal of Business Communication*, *54*(3), p. 286 (https://doi.org/10.1177/2329488415572785). Copyright SAGE Publications. Reprinted with permission (see Appendix A).

Although based on TRA and TPB, the TAM differs from both models. The original TAM drops the subjective norm variable and implements the use of two distinct constructs, PU and PEU (Marangunic & Granic, 2015). In 2000, Davis and Venkatesh extended the TAM to again include the subjective norm and additional factors impacting PU. Figure 2 illustrates the later version, which includes experience, the subjective norm, image, job relevance, output quality, and result demonstrability as the external predeterminants to PU and experience. This figure was reprinted with permission (see Appendices B and C). It also demonstrates the interaction of PEU, voluntariness, and PU as the predeterminants to a user's intention to use (Davis et al., 1989; Marangunic & Granic, 2015).

Figure 2

Extended Technology Acceptance Model



Note. From "Technology Acceptance Model: A Literature Review From 1986 to 2013," by N. Marangunic and A. Granic, 2015, *Universal Access in the Information Society, 14*(1), p. 86 (https://doi.org/10.1007/s10209-014-0348-1). Copyright Springer Nature. Reprinted with permission (see Appendices B and C).

Although the original TAM has been extended, the original model remains active as an academic lens. The extended TAM (TAM2) is less straightforward than the TAM because of the straightforward representation that TAM provides in understanding the impact PU and PEU have on the user's attitude toward use and intention to use the technology (Abdullah et al., 2016; Hui-Fei & Chi-Hua, 2017; Marangunic & Granic, 2015; Yoon, 2016). The user's PU and PEU are directly suited to determining why an IT leader within a DBE would choose, or not choose, cloud solutions to support IT service continuity to minimize IT disruption resulting from human-made and natural disasters.

Main Characteristics of the TAM

In Davis' (1986) original work, he defined PEU and PU. Davis defined PEU as the degree to which a person believes that the use of a system will be free of effort. This characteristic affects a user's attitude toward using the technology. Davis defined PU as the user's view that using a specific system will improve the user's performance. This characteristic affects a user's attitude and behavioral intention to use the technology.

Outside of a vacuum, external influences will always exist. In the same work, Davis (1986) also noted that external factors consist of any external influences that might positively or negatively affect PEU and PU. Veldeman et al. (2017) used the TAM to compare the difference in the social media adoption rate between IT and the business-to-business industrial sectors in Belgium, without further analyzing the external factors, such as in the extended model. The authors claimed that the TAM has proven to be a theoretical model that is both useful in helping to understand and explain the acceptance and implementation of IT solutions. Dumpit and Fernandez (2017) argued that external factors such as internet reliability and speed could provide an indirect impact on user's acceptance of a technology, and that it would be easily recognized which technology causes the impact. Hsiu-Mei and Shu-Sheng (2018) proposed that PEU and PU are subjective measures that may be attributed to the knowledge and skill of the intended user.

Remaining focused on the primary constructs, TAM accepts the external influencers, but does not shift the research focus from PEU and PU. Recognizing the vastness of potential influencers, the TAM is focused on understanding how free of effort a technology is and how users perceive that the technology will improve their performance (Davis, 1986). The acceptance of technology means that users will accept new technologies, start to use them, and continue using the accepted technologies (Ozsungur & Hazer, 2018). Researchers have employed the TAM across academia and industry to understand user acceptance of technology (Veldeman et al., 2017).

Evolution of TAM. Davis presented TAM as a conceptual framework in 1986 and revised it in 1989. TAM has been used as a powerful instrument to explain users' adoption of technologies (Akinde, 2016; Al-Azawei et al., 2017). TRA, which was proposed by Fishbein in 1967, and then further developed by Fishbein and Ajzen in 1975 and 1980, estimates the users' adoption of technologies by attempting to understand the individual's behavior based on the individual's attitude, subjective norms, or intention (Akinde, 2016). Ajzen developed the TPB in 1985 and extended it later in 1988, to develop a framework to understand external factors within and beyond users' control that might influence the users' intention to perform a behavior or use a technology (Akinde, 2016). Al-Azawei et al. (2017) noted that TAM is derived from the TRA and TPB theories and has further generated complementary theories such as unified theory of acceptance and use of technology (UTAUT). The TAM conceptual framework has been extended to TAM2 and TAM3, both of which will be discussed.

The TAM is used to study how users will accept a technology. As an offshoot of TRA and TPB, TAM attempts to understand users' attitudes towards using a technology based on PU and PEU and the users' intention to use based on the PU (Akinde, 2016). Akinde (2016) also noted that although TAM recognizes external factors, it remains more centrally focused on the technology's PU and PEU. TAM2, however, attempts to extend TAM's factors of PU and PEU by trying to understand the critical influence factors based on social influence and cognitive instrumental processes (Davis & Venkatesh, 2000). The social influence processes include subjective norms, voluntariness, and image, while the cognitive instrumental processes include job relevance, output quality, result demonstrability, and PEU (Davis & Venkatesh, 2000). Venkatesh and Bala (2008) later proposed a version called TAM3.

Venkatesh and Bala (2008) combined TAM2 and external variables that directly impacted a user's PEU of technology and named the new conceptual framework TAM3. The external variables included anchoring variables such as computer self-efficacy, perceptions of external control, computer anxiety, and computer playfulness, as well as adjustment variables such as perceived enjoyment and objective usability (Veldeman et al., 2017). Central to the evolution of these related frameworks are the foundational variables, PU and PEU, which are defined in TAM and determine users' attitudes towards using and users' intention to use a technology (Rondan-Cataluna et al., 2015).

Research Using TAM

There are many reasons users may possess a certain attitude toward a technology, just as there are many reasons why users may intend to use or not use a technology. The

TAM is an applicable conceptual framework through which to view technology acceptance, regardless of location in the world, demographics, or the critical nature of the applications. However, many of the relevant cases have identified trends that indicate these factors do influence technology acceptance.

IT Service Research Using TAM. Several authors have recently explored technology acceptance in IT service research using TAM. Brandon-Jones and Kauppi (2018) claimed that e-procurement is central to modern supply chain management, but an IT paradox exists wherein gaps are evident between investments and returns on technologies. Brandon-Jones and Kauppi explained that although the organization may claim to have adopted a technology, the individual employee-level user's acceptance of the technology is crucial to ensure the organization can realize the investment.

Veldeman et al. (2017) stated that IT companies have a more positive attitude toward using social media in business-to-business communications because technology businesses want to use technology to improve the user's performance (PU) if the social media platform is free of effort (PEU). Through the TAM, Wei et al. (2016) explored user perception of mobile health apps, a critical IT service and outreach platform for healthcare companies. The researchers asserted that although mobile apps are an important part of healthcare continuity, some users do not continue to use them after a brief period of initial usage. The researchers used the TAM to explore why some of these apps were impeding usage based on users' perceptions. Clarifying the impediments to usage is important, and this approach enabled them to investigate a useful IT service offered to users, used by users, and then discontinued in use because of user perceptions.

The TAM has also been used to study technology acceptance in self-service banking. Kansal (2016) noted that self-service banking affords users many advantages, such as approachability, availability, and affordability. This form of banking has also become a critical and strategic IT service because users often wish to bank after normal banking hours (Kansal, 2016). Kansal found that although the ease of use existed for consumers, users perceived it as less advantageous when they considered the risk. Risk, Kansal noted, impacts the user's perception of usefulness. The limited PU hence negatively impacted both the user's attitude toward using the technology and the user's intention to use the technology.

The exploratory nature of each of these examples illustrates how researchers are currently using TAM. Further, the use of TAM to determine the impact of the user's PU on a critical IT service is relevant to the current study because the research has illustrated that the user's acceptance of the technology overrides the capability of the service. In the following subsection, I will specifically discuss current TAM research on cloud technology, wherein online convenience is also a factor considered by users.

Cloud Technologies Researched Using TAM. The use of the TAM in a diverse collection of studies supports the use of the TAM in research involving cloud technologies. Researchers have used TAM to explore topics such as big data analytics (Verma et al., 2018), library applications (Yoon, 2016), augmented and virtual reality (Hsiu-Mei & Shu-Sheng, 2018), social networking (Dixit & Prakash, 2018), and online video usage and learning satisfaction (Nagy, 2018). There exist many examples of cloud technologies currently, or recently, researched using TAM.

Verma et al. (2018) noted that PU includes aspects such as efficiency and effectiveness. This supports Davis' (1986) claim that PU supports a user's attitude towards using and intention to use based on the user's impression of how the technology will improve their performance. Yoon (2016) found that PEU impacts a user's intention to use an online technology when the user finds the technology to be free of effort.

Some researchers have used TAM to explore learners' intentions toward using augmented and virtual reality learning approaches. Hsiu-Mei and Shu-Sheng (2018) found that users who found the cloud technology to be free of effort and were more likely to adopt the new technology. Similarly, Dixit and Prakash (2018) found in their research using TAM to explore business social networking that the businesses' performance improved (PU) because the power of building better customer relationship models was realized. Nagy (2018) also leveraged TAM to investigate the acceptance of cloud-based video usage and learning satisfaction. The author found that the ease of using the technology supported the learner's performance and ultimate attitude toward using (PU plus PEU) the cloud technology.

As my findings from the literature review have demonstrated up to this point, the TAM can be used to explore user attitudes toward using an IT service and cloud technology, as well as users' intention to use the technology. Researchers have used PU as a means for users to describe the technology's ability to improve the user's performance and the PEU to highlight the degree to which the technology is free of effort. In the following subsection, I will discuss the use of the TAM in research performed across varying demographic groups.

Demographic Research Using TAM. In addition to using TAM to research the acceptance of specific technologies, research has been conducted across many demographic groups, indicating worldwide acceptance of this method for technology research. Although focused on different populations such as older adults (Ozsungur & Hazer, 2018) or children (Eutsler, 2018; McKenzie et al., 2018), researchers have used the TAM to determine whether behavioral intention to use a new technology was impacted by the PEU. Similarly, in higher education Dumpit and Fernandez (2017) found that PEU (free of effort) and PU (improve user's performance) were determinants in the users' attitude toward using a new technology.

From another demographic angle, authors around the world have used TAM to investigate technology acceptance. McKenzie et al. (2018) used the TAM to support the design and development of a childhood literacy iPad application in Australia. McKenzie et al. used qualitative interviews to explore the PEU and PU of learning the English alphabet using the new technology. In Mauritius, Teeroovengadum et al. (2017) found that PEU was a critical factor in technology adoption in the Mauritius education system. A critical point that arose in Teeroovengadum et al.'s research was that PEU may differ based on culture. For example, in Turkey, Akgun (2017) performed research using TAM to explore the acceptance of instructional technology in an academic environment. Akgun found that academics generally have a positive attitude toward the acceptance of new technology.

The TAM has been used to explore technology acceptance regardless of demographic differences. Al-Azawei et al. (2017) illustrated the use of TAM in their investigation of a blended learning system, finding that, although social relationships and physical environments differ across cultures, TAM remains a consistent framework to explore technology acceptance. As these studies show, the TAM has been used to understand technology acceptance across different IT services and cloud technologies for nearly any demographic population. In addition to the initial discussion on TRA, TPB, and TAM2, these and other related theories will be analyzed to illustrate the applicability of TAM to explore IT service continuity practices in disadvantaged businesses.

Analysis of Related Theories

There exists a plethora of theoretical models to examine IT acceptance and usage. Dwivedi et al. (2017) noted that many of these theories offer different explanations of acceptance and usage based on different factors. Some of these factors are used to measure attitude and others are used to measure behavioral intention (Dwivedi et al., 2017). This section will illustrate the complementary and competing aspects of several related theories and their applicability to technology acceptance by addressing users' attitudes and behavioral intentions.

The models that are more central to addressing users' attitudes towards using and behavioral intention to use technology include TRA, TPB, and TAM (Koul & Eydgahi, 2017). TAM is based on a combination of constructs from TRA and TPB and is focused on PU and PEU. Many other models are considered complementary; however the models TAM2, UTUAT, social cognitive theory (SCT), diffusion of innovations (DOI), and the theory of trying (TT) are limited in their evaluation of addressing users' attitudes toward using and behavioral intention to use a technology (Gan & Balakrishnan, 2017; Koul &

Eydgahi, 2017). In many cases the complementary models only focus on one aspect and not the other, while in other cases the models include additional constructs that minimize the focus of attitude toward using (PU plus PEU) and users' intentions to use (PU) are minimized.

The TT is an extension of TPB. As an extension of TPB, TT provides insights into the impact that behavior can have on attitudes towards trying new technologies (Bobbitt & Dabholkar, 2001). However, the TT indicates that people form complex, multidimensional attitudes towards goals instead of forming attitudes toward trying new technologies (Bobbitt & Dabholkar, 2001). The TT does not include the necessary constructs for measuring PU and PEU.

TAM2, an extension of TAM, includes external variables. Whereas TAM remains focused on PEU and PU, TAM2 shifts away from attitude toward using a technology and instead focuses on external variables that influence attitudes towards using a technology (Dwivedi et al., 2017; Koul & Eydgahi, 2017). As such, the theory relies more on subjective norms, image, job relevance, output quality, and results demonstrability than PU and PEU (Dwivedi et al., 2017). Similarly, UTAUT, which is another extension of TAM and TAM2, also focuses less on users' attitudes and hones in on users' behavioral intention to use a technology (Koul & Eydgahi, 2017). UTAUT is most concerned with performance expectancy, effort expectancy, social influence, and facilitating conditions, instead of PU and PEU.

The SCT, much like TAM2 and UTAUT, addresses behavioral intention to use a technology. However, SCT, TAM2, and UTAUT are more concerned with other constructs such as external influences (Gan & Balakrishnan, 2017). Gan and Balakrishnan (2017) noted that SCT does not address attitude toward using technology but instead addresses self-efficacy, behavioral capability, expectations, self-control, observational learning, and reinforcements. DOI does not address users' attitudes toward using or behavioral intention to use technology; instead DOI addresses relative advantage, compatibility, complexity, trialability, and observability factors.

Considering the overlap in many of these competing and contrasting theories, a section dedicated to the analysis of the related theories follows. Within this section, I discuss these relevant theories in more detail. In addition to the discussion on each related theory, a summarized table is provided to illustrate the constructs and basis of each theory.

All are widely accepted and used within the literature, where the applicability of the model or theory is the most appropriate in understanding the potential of users to adopt a certain technology. In this section, I will discuss several of the most closely related theories. Namely, I will discuss the DOI, TRA, TPB, UTAUT, SCT, and TT, as summarized in Table 2.

Table 2

Theories Addressed

Theory name	Theorist	Year	Constructs	Theory
DOI	Everett Rogers	1962	Relative advantage Complexity Compatibility Trialability Observability	How, why, and how fast new technologies spread
TRA	Martin Fishbein Icek Ajzen	1975	Attitudes toward behavior Subjective norms	How individuals will behave based on their preexisting attitudes and behavioral intentions
TPB	Icek Ajzen	1985	Attitudes toward behavior Subjective norms Perceived behavioral control	Attitude toward behavior, subjective norms, and perceived behavioral control together shape an individual's behavioral intentions and behaviors.
SCT	Albert Bandura	1986	Person Behavior Environment	Stresses the role played by the environment on learning, motivation, and self-regulation
TAM	Fred Davis Richard Bagozzi	1989	Perceived usefulness (PU), Perceived ease of use (PEU)	When users are presented with a new technology, a number of factors influence their decision about how and when they will use it.
TT	Richard Bagozzi Paul Warshaw	1990	Attitudes toward success and failure Achievement of goals	Focused on the behavior associated with achieving goals
UTAUT	Viswanath Venkatesh Michael Morris Gordon Davis Fred Davis	2003	Performance expectancy Effort expectancy Social influence Facilitating conditions	User intentions to use an information system and subsequent usage behavior

DOI

In 1962, Rogers presented the DOI construct. DOI is based on the process through which individuals, organizations, or populations decide to adopt new technology (Rogers, 1995). Rogers used the DOI to help in understanding how, why, and how fast new technologies spread. DOI theory describes the process that users employ to communicate about innovative technology over time with other users. Rogers suggested that the adoption of a certain technology will follow a bell curve wherein some users will tend to adopt innovations before others. Rogers also noted that populations' proclivity to recognize the need for technology adoption might be linked to an organizational climate supporting innovation.

Five characteristics are present in the DOI theory: relative advantage, complexity, compatibility, trialability, and observability. Zhang et al. (2015) claimed that, according to Rogers' theory, innovation is an idea, process, or technology perceived to be unfamiliar within a population. Zhang et al. also pointed out that DOI includes the process of spreading knowledge of the innovation from person to person over time, thereby leading to the trends and tendencies toward complete organizational acceptance, or the acceptance of technologies throughout communities.

Several researchers have used the DOI to explore collaboration and the adoption of technologies. Stock-Kupperman (2015) used the DOI to explore the adoption of technology in learning communities. Simonova et al. (2017) applied the DOI to explore the adoption of technology by older persons to maintain autonomy in performing daily activities such as shopping and communicating. Osorio-Gallego et al. (2016) further noted that according to the International Telecommunications Union's 2015 report, 3.2 billion people were using the internet as of 2015, many of whom having started thanks to other persons in their social networks.

However, the DOI does present some limitations. First, the DOI focuses on perceptions and socializing innovations within populations (Zhang et al., 2015). The differences in technical abilities within populations may mean that users' perceptions of technology differ among people from populations with more limited technical backgrounds (Kim et al., 2014). Therefore, the people in more technical environments may more quickly adopt a technology, while the less technical people are also more likely to reject the innovation.

TRA

Although first presented in 1967 by Fishbein and Ajzen, it was not until 1975 that Fishbein and Ajzen began publishing work on the TRA (Hwang et al., 2016). Hwang et al. (2016) described the TRA as stemming from the discipline of social psychology and based on the premise that humans are rational beings who make use of the information available to them. Hwang et al. (2016) also stated that the TRA assumes that a user intends to do something based on immediate and direct precursors to behavioral performance.

The TRA has been used to explain individual and corporate IT environmentalism. In using TRA to explain environmentalism, Chen et al. (2016) summarized the TRA as follows: (a) the more positive the individual's attitude regarding the behavior, the more likely that the individual will perform the behavior, (b) an individual will have a stronger intention to perform a behavior if the subjective norm is greater, and (c) the individual will be more likely to perform a behavior if the individual has a stronger intention to perform the behavior. Apostolou et al. (2017) cited a similar representation of the TRA in their observance that researchers commonly have used the theory in IT research because it complements systems by adding relevant constructs that fit the context of the technology.

The TRA has received some criticism. One of the criticisms of the TRA is that it is based on a person or population's beliefs which can inherently be demonstrated as differing relative baselines across diverse populations (Tian & Xu, 2017). The TRA encompasses the degree to which a user favors (or disfavors) the behavior in question (Apostolou et al., 2017). One of the main factors affecting behavioral intent is the attitude of the user. In addition to attitude, subjective norms can determine how users will behave (Ryu & Park, 2018; Tian & Xu, 2017). The TRA is one of the base theories that Fred Davis and Richard Bagozzi used to develop the TAM in 1989 because the two critical factors of the TAM, PU and PEU, both impact attitude and behavior (Tian & Xu, 2017).

TPB

Ajzen developed the TPB in 1985 as an extension of the TRA (Chia-Lin et al., 2017). Butler et al. (2016) noted that the extension from the TRA to the TPB included the addition of perceived behavioral control. The TPB includes the constructs of attitudes toward behavior, subjective norms, and perceived behavioral control to understand an individual's behavioral intentions and behaviors (Butler et al., 2016; Chia-Lin et al., 2017).

A person's intention to perform a behavior is the key predictor for demonstrating the behavior. Procter et al. (2019) noted that there are three factors from which intentions are derived: (a) whether a person has an attitude (favorable or unfavorable) towards a behavior determines the person's willingness to enact the behavior, (b) whether positive or negative social pressure towards enacting a behavior increases or decreases the chance that a person will exhibit a behavior, and (c) whether a person feels in control of the action (perceived behavioral control) is a determinant of behavior.

The TPB has also received criticism. Some researchers have criticized TPB for being too limited to explain the reasons individuals present a given behavior in some situations (Anzagira et al., 2019). In order to perform exploratory research, Anzagira et al. (2019) had to combine TPB with another framework. Miller (2017) criticized the human behavior aspect of TPB, stating that TPB assumes that behavior is based on rational, detailed thought. Consequently, the TAM is based on a combination of TRA and TPB.

SCT

Bandura developed SCT in the mid-1970s and formally proposed the theory in 1986. According to Middleton et al. (2019), SCT is used to explain how the behavior of people changes through self-control and reinforcement, with the peoples' ultimate goal being goal-directed and maintained over time. Morghen and Robert (2020) described SCT as a psychological perspective on functioning that stresses the critical role played by the environment on learning, motivation, and self-regulation. Vasconcelos et al. (2020) noted that SCT is a dynamic and shared interaction among the person, situation, and behavior. SCT also considers the social environment wherein the person exhibits certain behavior. Vasconcelos et al. claimed that people learn from their environment, which is often based on the consequences of their behavior. Major aspects to SCT include reciprocal determinism, behavioral capability, observational learning, reinforcements, expectations, and self-efficacy.

Vasconcelos et al. (2020) explained these terms as follows. Reciprocal determinism refers to the interaction among the individual with a set of experiences, that person's behavioral responses to stimuli to achieve goals, and the external social context or environment. Behavioral capability refers to a person's ability to perform a behavior based on knowledge and skills. At the same time, observational learning asserts that people will learn through modeling behaviors that they witness as successful demonstrations of behavior. Reinforcements can be positive or negative and refer to the responses to a person's behavior that affect the likelihood of continuing a practice. The consequences of a person's behavior become the person's expectations, while self-efficacy refers to the person's level of confidence that they may successfully perform a behavior.

These six constructs reflect the crucial aspects of SCT. The mutual relationship between the environment and people results in a constant learning environment in a dynamic and reciprocal fashion (Vasconcelos et al., 2020). Middleton et al. (2019) noted that this interaction results in the acquisition and adoption of knowledge and skills. While these constructs help to define how users may behave, they do not address the PU or PEU required to describe users' attitudes towards using or intentions to use technology.

TT

Developed by Bagozzi and Warshaw in 1990, TT is a conceptualization of goal-oriented behavior. As an extension of goal pursuit and TPB, TT aims to predict the users' intention to adopt a behavior (Nikou et al., 2018). However, TT is not focused on volitional or non-volitional behavior as identified in TPB; instead, it is focused on the behavior associated with achieving goals (Lervik-Olsen et al., 2016). Lervik-Olsen et al. further explained that the behavior measured in TT is not the measurement of a final goal, but instead a means of reaching fundamental goals.

The theory of TT helps to describe people's attitudes toward the adoption of technology. TT comprises of dimensions toward success, failure, and learning to use a technology (Nikou et al., 2018). Nawaz et al. (2019) claimed that these dimensions are a function of adopting technology in developing countries. The attitudes represented indicate goal-directed behavior as an estimate of succeeding or failure after a user begins trying to achieve a final goal (Lervik-Olsen et al., 2016). These dimensions of behavior form a general attitude that influences the intention to adopt a technology (Nawaz et al., 2019).

TT differs from other models, such as TAM, TRA, and TPB. TT considers attitude as a multi-dimensional aspect that leads to failure, success, or adoption of technology (Nawaz et al., 2019). Attitude is viewed as a moderating aspect to determine behavior. Problematic behavior hinders both internal and external environmental conditions. The hindrance of environmental conditions based on behavior ultimately affects the behavioral intentions of the users in adopting the technology. While impacts on behavioral intentions do support PU, TT does not support PEU.

UTAUT

Venkatesh and Bala (2008), developed the unified theory of acceptance in 2003. The theory consists of a combination of the TAM, TPB, and the TRA (Isaias et al., 2017). According to Venkatesh and Bala, the purpose of developing the UTAUT was to measure how users adopt a technology; yet, in 2012, an extension of the UTAUT came forth, being labeled UTAUT2 (Isaias et al., 2017). The theory relies on four main constructs—performance expectancy, effort expectancy, social influence, and facilitating conditions—and four moderators—gender, age, voluntariness of use, and experience with the technology (Liebenberg et al., 2018).

Several authors have illustrated the use of the UTAUT in understanding the acceptance of a technology. Eylem and Emel (2017) used the UTAUT to clarify how teachers accept new technology and Liebenberg et al. (2018) used the theory to determine whether the model works within educational settings while measuring applicability and testing moderators. Although some authors have lauded the application of the UTAUT in certain fields, such as construction (Howard et al., 2017), others found that the UTUAT had to be extended in order to better predict users' behaviors (Virdyananto et al., 2016).

Criticism of TAM

Although researchers have used the TAM extensively in research as a lens through which to explore technology acceptance, the model is also not without its criticism. The TAM encompasses the principle that a user's approval of a technology relies on the apparent effectiveness and effortlessness of the new technology (Davis, 1986). When being used, multiple factors, such as external variables, PU, and PEU, influence a user's decision about how and when the user will implement the technology.

The external factors and their impact on PU and PEU constitute an ongoing criticism of the TAM. Although the TAM is the most influential of the individual-level acceptance models, the model fails to explicitly incorporate antecedents to the primary constructs (PU and PEU) of the TAM (Brandon-Jones & Kauppi, 2018). The TAM has received criticism for discounting the influence of these external variables on PU and PEU and, hence, later evolved into TAM2 and TAM3 (Hsiu-Mei & Shu-Sheng, 2018). The additional number of external variables that may influence PU and PEU is countless (Veldeman et al., 2017). Therefore, the evolution of TAM into TAM2 and TAM3 has subsequently received criticism for being too complex (Hui-Fei & Chi-Hua, 2017).

Applicability of Technology Acceptance Model to the Study

The purpose of this qualitative multiple case study was to explore the strategies IT leaders in DBEs can use to implement cloud solutions to minimize IT disruption resulting from human-made and natural disasters. In order to explore these strategies, the TAM has been selected as the lens through which to view the problem. TAM was selected because it was the most applicable theory for the current study.

The TAM is based on TRA and TPB (Brandon-Jones & Kauppi, 2018; Hsiu-Mei & Shu-Sheng, 2018; Hui-Fei & Chi-Hua, 2017), both of which have received criticism for behavioral antecedent analysis based on a person or population's beliefs (Tian & Xu, 2017) or whether a behavior is based on rational, detailed thought (Anzagira et al., 2019;

Miller, 2017). Other lenses such as UTAUT similarly had to be extended in order to better predict users' behaviors (Virdyananto et al., 2016). TAM was also criticized for not accounting for external variables, and therefore was later extended into TAM2 and TAM3.

The strategies employed by IT leaders in DBEs can be based on whether a technology will improve the user's performance (PU) and whether the use of the technology is free of effort (PEU). The TAM demonstrates the interaction of the variables PU and PEU to determine users' attitude toward using, or intention to use, a technology (Brandon-Jones & Kauppi, 2018; Hsiu-Mei & Shu-Sheng, 2018; Hui-Fei & Chi-Hua, 2017).

The TAM has been applied in an exploratory manner across relevant studies. The TAM has been used in research involving IT service (Brandon-Jones & Kauppi, 2018; Kansal, 2016; Veldeman et al., 2017; Wei et al., 2016), cloud technologies (Dixit & Prakash, 2018; Hsiu-Mei & Shu-Sheng, 2018; Verma et al., 2018; Yoon, 2016), and across many demographic groups (Akgun, 2017; Dumpit & Fernandez, 2017; Eutsler, 2018; McKenzie et al., 2018; Ozsungur & Hazer, 2018; Teeroovengadum et al., 2017). Therefore, I can directly apply the TAM to the current research. Users' attitudes toward using a technology, which arise from a combination of PU and PEU, can be directly linked to the guiding research question: "What strategies do IT leaders in DBEs use to implement cloud solutions to minimize IT disruption resulting from human-made and natural disasters?"

The research question focuses on the decisions made by the IT leaders. If the solution is not perceived to improve the user's performance, or if the solution is not free of effort, it is unlikely that the IT leaders will elect to implement the solution unless otherwise influenced. The interview questions intend to provide a groundwork for understanding the IT leaders' decisions by uncovering perceptions on how useful and free of effort the technologies are, and whether other factors are influencing their decisions to decide upon, or bypass, a potential solution.

I chose to use the TAM because of the straightforward representation that the impact PU and PEU have on the user's attitude toward use and intention to use the technology. Specifically, through the lens of the TAM, I will explore the strategies that IT leaders in DBEs use to implement cloud solutions to minimize IT disruption resulting from human-made and natural disasters. In the next section, I will discuss IT service continuity. Because many of the IT service continuity terms are used interchangeably, the following section intends to provide clarification and establish a common ground to further discussion on how IT service continuity was applied to IT leaders in DBEs.

Information Technology Service Continuity

IT service continuity is a broad field, and as a subfield of business continuity, the applications are nearly endless. Within the field of IT service continuity, many terms are used interchangeably; in this section I will discuss the key differences between IT service continuity terms and specializations. I will then discuss the themes that will arise over the course of this investigation to facilitate a more focused conversation at the end of the literature review.

To ensure that an organization's critical IT services operate continuously, IT leaders can implement IT service continuity (Pontes & Albuquerque, 2017). Bulson et al. (2017) stressed that IT service downtimes cause challenging residual problems. Niemimaa (2017) noted that a service interruption could negatively impact customer relationships, business, sales, or the image of the organization. Niemimaa posited that organizations spend inordinate amounts of time on continuity planning for IT services; however, the connection between planning and executing remains unclear. The authors found that several planning practices, such as creating awareness, increasing commitment, integrating IT continuity into the organizational processes, and learning from incidents, support the transition. Niemimaa stated that many industry and academic surveys indicate year after year that management of IT service continuity remains a top concern. Melendez et al. (2016) claimed that IT service continuity is well understood by many IT leaders, but not necessarily implemented.

Business Continuity

IT service continuity is a subset of business continuity in the context that the IT service supports the continuity of the business. Most organizations will experience some form of disaster, whether it is natural, such as being caused by weather events, or human-made, here being caused by events such as software and hardware failure or power or telecommunications outages (Cook, 2015). Fisher et al. (2017) suggested that business continuity plans might help mitigate environmental risks if the organization's business continuity and emergency preparedness activities include aspects such as IT service continuity.

The IT services deemed to be critical to support continuous operations should be linked to the key business operations. Haji (2016) stated that there is a need for organizations to identify these critical factors in business operations to determine how the IT infrastructure must support these processes from primary and backup facilities, and how the IT infrastructure must remain agile to ensure IT operations to support these critical factors throughout a disaster. However, Melendez et al. (2016) added that most small businesses could not provide the same level of business continuity because of cost and resource availability.

IT Service Continuity Planning

IT service continuity is synonymous with IT resiliency (Haji, 2016). IT service continuity can take many forms, but according to Haji (2016), resiliency is about bouncing back. Resilience planning is the first step in IT service continuity. IT service continuity planning is a systematic process to prevent, predict, and manage the disruption of IT services (Haji, 2016). Folke (2016) explained the resilience in IT service continuity to provide the organization with the capacity to persist operations in the face of change. Draper (2016) referred to resilience as the organization's ability to maintain acceptable levels of service through disruptions to its critical processes and the systems that support these processes.

IT service continuity planning includes several factors. Draper (2016) identified these factors as data backup, systems software backup, systems management and infrastructure services, and network sustainability. Additional concerns such as IT processing locations and data centers, recovery sites and locations, primary and secondary site security controls, recovery system management, recovery capabilities, and service supplier contracts or levels of agreement, are issues the business needs to address as well (Draper, 2016). Single points of failure, system performance, system capacity reviews, power sources, the resilience of other supporting utilities, system software controls, application software controls, data security, computing and storage flexibility, and employees are also planning concerns.

Resiliency is not unique to IT service continuity; it is present in many fields. Folke (2016) noted that the concept of resilience is present in many disciplines and has become a part of the practice, policy, and business used to anticipate, respond, and evolve with a crisis or change. According to Cavelty et al. (2015), resilience materializes during crises. Resilience counteracts a complete breakdown and provides the means and responsibility to sustain service during the event. Although a diverse and sometimes contradictory concept and practice, Cavelty et al. (2015) stated that resilience has proliferated into fields such as security, military programs, counterterrorism, and IT infrastructures.

Essentially, resiliency of IT service continuity solutions is the capacity of a system or infrastructure to remain reliable, fault-tolerant, survivable, dependable, and secure through any malfunction, failure, or disruption (Colman-Meixner et al., 2016). Colman-Meixner et al. explained that cloud computing is one of the many solutions available to support resiliency in IT service continuity planning. The required level of resiliency may originate in any of the major components of the infrastructure or system and may be based on the servers that are hosting an application, the network interconnecting the applications or components, or the application itself. Conz, et al. (2017) indicated that the resilience of the organization is primarily affected by internal strategies and less by external influences. They found that although many organizations have invested in technology to support resilience, a gap remains in terms of understanding the strategies that positively or negatively influence resiliency solutions of IT service continuity planning.

IT Service Disaster Recovery

Disaster recovery is a reactive measure. As such, it is implemented following a disastrous interruption (Cervone, 2017; Fernando, 2017; Gupta, 2016) to business continuity. The recovery process minimizes the negative effects of the interruption experienced by the organization and its customers. Alawanthan et al. (2017) noted that in a 2014 disaster recovery preparedness survey, most organizations were not prepared for IT service disaster recovery. Baham et al. (2017) also found that despite the many advances in technology, such as cloud computing, IT disaster recovery practice still lacked a methodology for recovering complex IT systems after a disaster.

Some authors have explained that disaster recovery focuses on restoration following a disaster. Hiller et al. (2015) argued that IT disaster recovery should be its own discipline within the paradigm of disaster recovery. Jagger (2015) and Fernando (2017) further described disaster recovery enacted to protect the organization and its operations following a disaster. Overall, researchers believe that IT service continuity remains paramount for business continuity and disaster recovery.

IT Service Continuity Frameworks

Nair (2014) claimed that IT service continuity frameworks have the objective of identifying, mitigating, and monitoring risks that could impact service continuity. The goals of IT service continuity frameworks include adding discipline, structure, and an organized approach to IT management (Kulkarni, 2015). Individuals and organizations can use many frameworks as formal methods to ensure efficiencies in IT service. Hence, the IT frameworks should help organizations define and implement the most relevant IT service continuity frameworks as formal processes (Aguiar et al., 2018).

The three most accepted and implemented IT frameworks include ITIL, the control objectives for information and related technology (COBIT), and the capability maturity model integration for services (CMMI-SVC; Aguiar et al., 2018). Melendez et al. (2016) recommended the implementation of either ITIL or COBIT, stating that they remain two of the most often used IT service management frameworks for small to medium-sized organizations. These frameworks support process improvement, increase user satisfaction, and reduce service costs and time, ultimately supporting IT service continuity in minimizing the probability and impact of a major IT service interruption on key business services (Ojo, 2017).

Although several formal IT continuity frameworks are available, most small-to-medium-sized organizations rely on *ad hoc* solutions (Frenkel, 2016; Ho, 2017; Melendez et al., 2016). Small-to-medium-sized businesses, which tend not to have the same resources as large businesses, have traditionally relied upon their blend of formal resilience solutions (Frenkel, 2016). Melendez et al. claimed that the integration of one of these formal ITSCM frameworks comes at a cost; therefore, small-to-medium-sized businesses should implement a hybrid solution that works for their budget and organization.

IT Service Continuity and DBEs

According to Frenkel (2016), most small-sized organizations rely on ad hoc solutions instead of formal solutions. Furthermore, DBEs are often considered more vulnerable, having even fewer resources than a standard small business. Melendez et al. (2016) noted that DBEs often do not have the resources to enable the use of a formal IT service continuity framework.

A DBE is a company owned and controlled by economically and socially disadvantaged individuals (Duncan, 2015; Harris & Patten, 2015). Small businesses are assumed to be DBEs based on ownership by African Americans, Hispanics, Native Americans, Asian-Pacific and subcontinent Asian Americans, people with disabilities, veterans, and women (Duncan, 2015; Harris & Patten, 2015; Reese, 2016; U.S. Department of Transportation, n.d.). According to the Mid-Atlantic Hispanic Chamber of Commerce (MAHCC, n.d.), Maryland's DBE program requires companies to meet six criteria to qualify as a DBE: (a) the firm must be at least 51% owned by a socially and economically disadvantaged individual(s) who also controls the firm, (b) the owner must be a U.S. citizen or lawfully admitted permanent resident of the United States, (c) the firm must meet the SBA's size standard and not exceed $17.42 million in gross annual receipts, (d) the owner's personal net worth must be less than $750,000, (e) the firm must be organized as a for-profit business, and (f) the owner(s) must be a member of one of the minority groups.

DBEs are even more vulnerable to business failure when their operations face disaster (Melendez et al., 2016). IT service continuity is necessary for firms of all sizes, yet many elect not to implement resilience solutions (Ho, 2017); similarly, although nearly 80% of organizations rely on some form of cloud technologies, very few small businesses have incorporated cloud-based IT service continuity plans (Herrera & Janczewski, 2016). In addition, although Marshall et al. (2015) found that a lack of preparedness was a key indicator in predicting the demise or survival of DBEs, these organizations still have not implemented IT service continuity planning.

Research on IT Service Continuity

There is much research on IT service continuity across academia and industry; some researchers have attempted to mold the field while others have proposed solutions. According to Melendez et al. (2016), the main responsibility of IT service continuity is to provide high-quality services that will ensure IT permanence during and after disasters. Melendez et al. (2016) went further noting that to remain efficient and competitive, organizations must adopt the best practices in ITSCM.

Because organizations increasingly rely on IT service continuity, resilience needs to cover problems at all levels of the organization (Ho, 2017). Many small business leaders lack the disaster recovery plans that would be supported by IT service continuity (Rossmiller et al., 2017; Torabi et al., 2015). In a poll of 251 U.S. IT decision-makers for small to medium-sized businesses, the results indicated that only 36% have an IT service continuity plan in place for any portion of the business (Frenkel, 2016). Bulson et al. (2017) mentioned that although IT departments are often responsible for ITSCM and resilience, many critical communication components, and an understanding of the business impact need to be coordinated with the end users. Fernando (2017) noted that a formal plan would help IT departments meet these responsibilities, describing the plan as one that includes flowcharts, continuity requirements, relocation plans, terms, IT recovery procedures, documenting workarounds, and plan validation. However, it is generally large organizations that apply these models.

Oberlin (2018) discussed the recognition of unstable environments and critical infrastructure as the first steps in understanding which resources must be considered for use in an IT service continuity plan. This recognition is essential as business continuity and valuation remain increasingly vulnerable to IT service continuity (Niemimaa, 2017). Sahebjamnia et al. (2015) stated that although it is almost impossible to predict the nature, time, and extent of a disaster, the business still needs to operate through the disaster. However, in some areas, natural disasters are not uncommon occurrences in life, and many small businesses in such areas still do not plan for continuity or recovery, often resulting in the demise of these companies (Kemp, 2016; Koen et al., 2016). This is highly relevant as Tarhan et al. (2016) noted that 75% of the world’s population lives in areas that have been affected by natural disasters within the last 20 years.

Understanding the implementation of technology solutions is critical to preparedness. Technology has a direct impact on the success of an organization’s continued operations (Zorica, 2016). To implement and ensure IT service continuity, Urciuoli (2015) stated that leaders need to identify, access, and analyze large amounts of data through different IT platforms and sources. IT service continuity strategies play an important role in ensuring business continuity and reliability (Urciuoli, 2015); to prevent and recover from a disaster, an organization needs significant amounts of data. But the question arises: What happens when the infrastructure is compromised, and the data or communications are lost? Herrera and Janczewski (2016) stated that 80% of organizations rely on cloud technologies and asked what would happen if local or cloud technology failed.

Ultimately, there are many reasons why a user would adopt a certain mindset for or against accepting or using a local or cloud technology that would ensure that business operations remained available. A user's attitude toward technology use encompasses the PU and PEU of the technology, just as the PU of the technology determines the user's intention to use the technology per TAM (Davis, 1986). In the following subsections, I will outline several key areas that may impact the decisions of IT leaders in DBEs regarding whether to use a solution designed to ensure IT service continuity.

Enhancing Infrastructure. Several researchers, such as Fisher et al. (2017), have proposed enhancing the infrastructure resilience of businesses. For instance, they claimed that to assess a holistic risk posture, businesses need to consider all the hazards, physical and cyber, human-made and natural, and threats from infrastructure dependencies and independencies. Citing many of the same concerns, Cook (2015) designed a six-stage business continuity and disaster recovery planning cycle for industry use because, as Cook (2015) claimed, statistics have shown that about 75% of businesses without a continuity plan will fail within three years of a disaster. Hamida et al. (2015) discussed network resilience in terms of malicious attacks, operational overload, and equipment failures, noting that the interdependencies of systems both strengthen and introduce vulnerabilities to the interconnected systems. IT service continuity is a strategy that can keep critical business operations functioning (Hamida et al., 2015).

Yet, disadvantaged communities and regions may be more vulnerable to disasters and have fewer opportunities to bounce back (Firdhous & Karuratane, 2018). Firdhous and Karuratane and Lloret-Gallego et al. (2018) stated that advancements in IT and cloud technologies have enabled resilience in nearly any place in the world. For instance, Lloret-Gallego et al. related the importance of IT resilience not just for the average business, but also for critical infrastructures, such as power grids and communications systems. The evolution in IT has provided many opportunities to ensure IT service continuity in nearly any situation.

Beyond the Business. The potential for cybersecurity to impact IT resilience is a topic covered by Rothrock et al. (2018), who discussed the roles that board members and stakeholders now must adopt to balance the regular mismatch between business productivity and cybersecurity. Rothrock et al. claimed that many business activities rely on open digital connectivity and accessibility to other businesses; reliance on these businesses requires that IT leaders recognize potential business continuity concerns based on these intertwined business relationships. Reflecting the same mindset, Beale (2017) claimed that businesses need to look beyond their own business to assess the risk of vendors who support key aspects of the business.

Should a disruption occur and continue based on the unpreparedness of the impacted vendor, certain critical aspects may cause cascading failures for both businesses. Alexandru (2016) noted that the IT service continuity aspect of ITSCM prevents and mitigates disruptions to business activities because of major IT failures, protecting the critical processes required to restore the business' ability to perform its functional services. Hiller et al. (2015) posited that to obtain the highest levels of preparedness, businesses of all sizes need to embrace the entirety of their organizations to understand the core organizational priorities. Hiller et al. recognized that the core business priorities, business processes, and resource requirements—such as the facility, equipment, IT systems, and people—as well as their linkages to other businesses or organizations, must all be considered for the continuity plan to be effective.

Regulations. Cervone (2017) pointed out that the federal and many state governments have mandates related to emergency operation planning and recovery. For instance, at the federal level, the Health Insurance Portability Act (HIPAA) and Federal Emergency Management Agency (FEMA) regulations mandate that an organization hold data in compliant repositories. At the state level, two examples are the Texas Administrative Code (TAC) section 201.13(b) and Oregon Revised Statutes (ORS) section 291.038, both of which have additional and supporting requirements. Cervone said that the principles are similar in nearly all these regulations: they are designed to ensure safety and well-being, coordinate recovery activities, recover critical business functions, limit disaster-related damages, mitigate financial losses, limit legal liabilities, and minimize the burdens associated with recovery operations.

The United States is not the only country that has passed these regulations; South Africa has many of the same policy concerns. Ferguson (2018) highlighted South Africa's National Development Plan, a business continuity and disaster management plan for the public service sector. Similarly, Faertes (2015) stressed the importance of the adoption of global standards by Brazilian businesses because of the impact of disasters on global supply chains. In many businesses, the organization crosses regulation boundaries.

In terms of crossing organizational boundaries, Haji (2016) provided many recommendations for airline business continuity and IT disaster recovery sites primarily because each supporting organization and the affiliated airline may have separate yet interconnected processes. Mohideen and Dorasamy (2018) stressed the importance of disaster recovery in IT multinational companies; these businesses run operations around the clock, 365 days a year. Mohideen and Dorasamy also pointed out the differences in regulations across companies due to the IT systems operating across different geographic regions and stretched through different time zones.

Shalamanov (2017) called for the improved governance and management of IT claiming that the regulations further enabled IT service continuity. Gouglidis, Green et al. (2016) and Shalamanov also claimed that although most societies and businesses greatly depend on IT, rapid advances in technology, an increasing number of cyber vulnerabilities, interoperability requirements, increased IT costs, and the critical shortage of specialists require better IT governance at an international level. Gouglidis, Green et al. (2016) also noted that the European Commission and the U.S. Department of Homeland Security had defined the need for resilience frameworks to support their business functions; as such, both national-level organizations are developing regulations to ensure the success of IT resilience frameworks.

In some places such as Germany, the law expects IT service continuity (Kaschner & Jordan, 2015), regardless of the size of the business. Kaschner and Jordan explained that German legislatures supported the IT Security Law, which focuses on improving IT security at companies, enhancing the protection of citizens who are on the internet, and strengthening the Federal Office for Information Security. The underlying expectation is that by complying with the law, businesses and government organizations can enhance IT service continuity.

Redundancy. Chaves et al. (2017) provided a means for improving the cyber-resilience of industrial control systems, using the failure of the O-rings on the 1986 Space Shuttle Challenger as an example of a lack of redundancy. With the failure of one critical design aspect (the O-rings), a cascading failure resulted in a catastrophic failure of the entire shuttle. Chaves et al. claimed that critical infrastructure assets, such as industrial control systems, need to incorporate redundancies to stop these failures from occurring.

Gong and Chau (2017) amplified these concerns, using the power grid as an example: the power grid consists of electrical transmission lines, power stations, substations, and transformers that deliver electrical power. In many cases, the power grid is a critical service that not only makes our lives easier and more efficient but also ensures that critical business and human functions remain active. Gong and Chau also presented a mathematical representation to illustrate the need to incorporate resilience and provide optimal strategies to business managers.

A properly configured continuity plan will incorporate cold sites, warm sites, and hot sites (Jagger, 2015). From an IT resilience perspective, the hot site has all the critical IT systems and networks in place, is active and ready to assume the workload, and has data mirrored from the primary business environment. A warm site, according to Jagger, has the same functionality as a hot site, but may be inactive until needed, and may not have the full set of data mirrored. Finally, Jagger described a cold site as one that has the same core IT systems and networks, but its use requires turning on, activating, and restoring the data. Smaller or disadvantaged businesses may not have the resources to implement a fully redundant IT service continuity framework; however, many cloud options exist to enable virtual simulations of the hot, warm, and cold sites.

IT Service Management Leveraging Cloud. More than ever, businesses need to prepare for major crises and plan to ensure IT resilience (Rebah & Sta, 2016). Rebah and Sta stressed that although significant regulations, guiding principles, and lessons exist, establishing a comprehensive plan is difficult, adding that the development of cloud computing offers new services and practices that businesses can leverage. They also claimed that through a combination of cloud services, an IT leader in any size business could implement disaster recovery as a service.

In contrast to the expected success outlined by Rebah and Sta, Mattei and Satterly (2016) described their experiences with implementing cloud services as more complex than they had originally believed. Specifically, they stated that the complexity of the cloud has grown beyond acceptable limits, but after significant research and support, they were able to implement a multi-tier, multi-location infrastructure to maximize IT services throughout a disaster. For reasons such as the complexity that Mattei and Satterly described, Cox and Pilbauer (2018) indicated that smaller organizations should consider strategic sourcing. For instance, outsourcing the critical IT elements that ensure resilience would allow small businesses to remain focused on their core business competencies while eliminating the need to develop and support complex IT solutions.

In addition, Alshammari et al. (2017) claimed that IT resilience can vary in availability and complexity. For instance, they stated although some IT service continuity plans may only require a small IT resource to remain available, larger requirements may span multiple data centers across multiple clouds. As a more complex solution is required, the greater the potential for outsourcing.

Criticisms of IT Service Continuity

Although IT service continuity has proven its value throughout industry, the concept and framework do receive criticism. Several authors have illustrated both the pros and cons of IT service continuity and elaborated on critical success factors for integration and acceptance (Gopi, 2018; Kubiak & Rass, 2018; Thomas, 2019). Many of the criticisms expressed by these authors are directly applicable to small businesses and may be considered even more applicable to vulnerable small businesses such as DBEs.

Some criticisms involve compatibility, complexity, integration, scalability, support, and usability. Gopi (2018) and Thomas (2019) claimed that although many users see the advantages of IT service continuity outweighing the drawbacks, not all frameworks are compatible with business processes and not all packaged platforms are scalable or come with support. Support can come in the form of manufacturer technical functional or integration support, or in the form of beneficial services such as multilingual support. Kubiak and Rass (2018) expressed similar concerns.

The complexity and expense required of IT service continuity solutions come with a cost. In many cases these expenses are higher than their value to the small-to-medium-sized businesses (Kubiak & Rass, 2018). Similarly, Kubiak and Rass noted that IT service continuity solutions need to be as user-friendly as possible for customers to accept the solution.

Summary

Themes emerged throughout the literature review on IT service continuity. Haji (2016) recognized the need for organizations to identify the critical factors in business operations and how the business can adapt the IT infrastructure to continue supporting these processes during natural or human-made disasters. However, Melendez et al. (2016) added that most DBEs do not have the resources to provide the same level of business continuity. Although it is more so that the internal strategies rather than external ones influence IT resilience (Conz et al., 2017), a gap in understanding is evident regarding the strategies that positively or negatively influence resilience.

Several IT governance solutions exist; however, the cost and resource requirements to implement such solutions are typically beyond the means of a small business (Ho, 2017; Ojo, 2017). Frenkel (2016) found that only 36% of small businesses have disaster recovery plans, and Kemp (2016) indicated that many small businesses, even in areas where natural disasters are a way of life, still do not plan for continuity or recovery. These observations support Melendez et al.'s findings (2016) in that IT service continuity is well understood but not necessarily implemented.

Rossmiller et al. (2017) claimed that many small business leaders lack IT service continuity plans because small business leaders only focus on their core business functions, not on the potential for cascading failures that are triggered by IT failure. Torabi et al. (2015) supported this claim and further discussed the need for businesses to identify resilient suppliers so that the business can remain focused on its core competencies. Another critical source of information to support the IT leaders' selection of solutions is data (Urciuoli, 2015); the data is used to analyze, and plan solutions designed to prevent and recover from disaster. Urciuoli stated that new IT systems support the analysis of this large amount of required data when it comes to monitoring potential disruptions and recovering from disasters. Additionally, Fernando (2017) described the need to develop a formal plan.

Other reasons to implement IT service continuity provisions remain evident, such as noncommercialized approaches toward IT service management, continuous improvement, agile approaches, and measurements to ensure the continuity of IT resources. Pontes and Albuquerque (2017) noted that the main objectives of ITSCM include the allocation of available resources for use in other areas of the business through availability management and continuity management. Therefore, they proposed an approach for managing database services that help ensure IT service availability and continuity.

Similarly, Alawanthan et al. (2017) recommended process improvement for IT disaster recovery plans, claiming that through process improvement, the lessons learned from IT disaster recovery could strengthen the current plans. Baham et al. (2017) used Kanban, an agile methodology, to support the disaster recovery of IT systems under catastrophic scenarios, positing that an adaptive and flexible methodology would ensure efficiency in disaster recovery when businesses must confront unintended and cascading consequences.

Ibrahim (2017), who proposed a resiliency measure for communications networks, claimed that the measures of resilience might be quantified. For instance, Ibrahim argued network resiliency could be evaluated through the many stages of a disaster, suggesting that resilience might be measured through preperformance based on planning and preparedness; during a disaster, based on absorption; and after a disaster, based on recovery and adaption. Using another means of measurement, Gupta (2016) categorized disaster recovery into six general areas and 18 separate parameters, each of which might be individually measured to assess the level of readiness.

As noted by Herrera and Janczewski (2016), 80% of organizations rely on cloud technologies in their daily business operations. However, few ask what happens if their cloud technology fails. Ho (2017) indicated that businesses of all sizes need to be resilient with their IT infrastructures, and although solutions are available, many small businesses still fail to implement IT service continuity plans, in many cases, having no disaster preparedness plan whatsoever. Several authors have indicated that cloud technology could be viewed as positive or negative (Alshammari et al., 2017; Cox &

Pilbauer, 2018; Mattei & Satterly, 2016; Rebah & Sta, 2016), and could therefore influence a user's attitude towards applying a cloud-based IT service continuity solution. Therefore, the following section is dedicated to a review on cloud computing literature.

Cloud Computing

The researchers at the National Institute of Standards and Technology (NIST, 2018) have referred to cloud computing as "a model for enabling ubiquitous, convenient, on-demand network access to a shared pool of configurable computing resources (e.g., networks, servers, storage, applications, and services) that can be rapidly provisioned and released with minimal management effort or service provider interaction" (p. 2). The cloud model comprises five essential characteristics, four deployment models, and three service models. The five essential characteristics include on-demand self-service, broad network access, resource pooling, rapid elasticity, and measured service. The four deployment models include a private cloud, a community cloud, a public cloud, and a hybrid cloud. The three service models include Infrastructure as a Service (IaaS), Platform as a Service (PaaS), and Software as a Service (SaaS; NIST, 2018).

Cloud computing has revolutionized the way many businesses manage their IT (Govindaraju et al., 2018), yet it is also a standard that continues to evolve (NIST, 2018; Ullah et al., 2018). IT organizations can lower their operating costs by adopting cloud computing and reducing their infrastructure and administration costs, while also enabling faster deployment cycles (Kathuria et al., 2018). The combination of services, such as IaaS, PaaS, and SaaS, in different deployment models, such as public, community, private, and hybrid clouds, can help to improve the quality of a service, reduce overall costs, and provide a safer mechanism for managing organizational IT assets (Silvestru et al., 2015). Moreover, several cloud solutions for IT service continuity are readily available on the internet; however, although businesses are transitioning their IT infrastructure to the cloud more and more often, the transition is not an easy one (Retana et al., 2018).

Companies such as DC BLOX (DC BLOX, n.d.), Unitrends (Unitrends, n.d.), and Zerto (Zerto, n.d.) offer solutions tailored toward small to medium-sized companies. The vendors claim that these IT service continuity solutions allow companies to operate seamlessly through what would otherwise be a catastrophic failure of the infrastructure; the solutions available range from simple cloud backups to complete virtual infrastructures. In cloud computing, virtual resources support the services. These virtual resources are more often detached from on-site and physical servers (Sousa et al., 2014). Due to the flexibility provided by this technology, cloud computing can be either positive or negative for users (Alshammari et al., 2017; Cox & Pilbauer, 2018; Mattei & Satterly, 2016; Rebah & Sta, 2016).

Souza Couto et al. (2015) noted that businesses rely on disaster recovery solutions, such as IT resilience, regardless of the type of disaster they face. They also claimed that as businesses migrate from legacy to cloud infrastructures, or IaaS, the providers will need to ensure that the cloud services remain disaster-resilient. Shirazi et al. (2016) stated that cloud computing can support critical infrastructures because of its cost savings, scalability, and elasticity. As more and more critical services move to the cloud, the systems must be able to effectively manage the underlying physical technologies that enable the configurations, elasticity, dynamic invocation of services and monitor IT resilience and security. Shirazi et al. claimed that a top concern in using cloud computing is wanting the underlying technologies to remain responsive so as not to interrupt critical service delivery.

Not all services are proprietary, however. Anuprabha and Nivaashini (2018) illustrated examples of how cloud computing could provide on-demand resources in a manner that considers failover and disaster recovery mechanisms, demonstrating that providers could use OpenStack and open source cloud operating systems, as opposed to proprietary underlying services, which could result in higher costs to the end-users.

Cloud computing is a promising IT service model that is already significantly impacting businesses, governments, and individual users around the world (Herrera, 2014). However, the additional layers of abstraction that cloud environments present introduce complexity hurdles in assessing organizational readiness and resilience. Herrera stated that because of this complexity, there is no consensus on its analysis. Tawalbeh et al. (2015) also claimed that organizations that rely on cloud computing and virtualized infrastructure services face risks in maintaining foundational IT services because of the same complexity described by Herrera (2014).

Tawalbeh et al. (2015) claimed that although users can reduce the costs of complicated maintenance on physical servers, they must rely on the cloud service provider to perform this maintenance as part of their package. Furthermore, the businesses expect the service providers to perform these services without impacting the users; thus, they should consider shifting these virtual services to other physical machines that are transparent to the users.

The shared pool of configurable computing resources, such as networks, servers, storage, applications, and services, as described by NIST (2018), relies on the elastic and efficient management of the cloud. Tawalbeh et al. (2015) recognized that regardless of how the cloud is configured, it must be resilient. Through the service models recognized by NIST (2011), namely IaaS, PaaS, and SaaS, organizations can rapidly provision the cloud without interacting with service providers.

These service models, also referred to as delivery models (Tawalbeh et al., 2015), are leveraged by many commercially available products such as DC BLOX and Unitrends. Services such as DC BLOX and Unitrends deliver resilient IT services to nearly anywhere in the world. Unitrends claims to offer all-inclusive backup and disaster recovery that is easy to deploy and manage and to provide disaster recovery as a service (DRaaS); however, they do not offer any of the three standard service delivery types, namely IaaS, PaaS, and SaaS.

Infrastructure as a Service (IaaS)

NIST (2011) defined IaaS as "the capability provided to the consumer is to provision processing, storage, networks, and other fundamental computing resources where the consumer can deploy and run arbitrary software, which can include operating systems and applications" (p. 3). In IaaS, the user does not manage or control the underlying physical cloud infrastructure but instead has control over the virtual operating systems, storage, and deployed applications, along with possibly limited control of select networking components (NIST, 2011). Providers lease the IaaS virtual services in the form of virtual machine instances (Van den Bossche et al., 2015).

IaaS is expected to be globally accessible, efficient, and stable (Haig-Smith & Tanner, 2016). It is a service model within cloud computing that provides users with fundamental infrastructure resources. These virtual resources provide processing, storage, and network infrastructure that users can deploy with their required operating systems and applications, without the users being responsible for the underlying physical infrastructure (Zhu et al., 2016).

A customized IT infrastructure and network functionality are not just important business resources (Govindaraju et al., 2018); they are becoming more and more of a necessity for businesses. An IaaS network's functions remain limited, inflexible, and hard to control for users; these functions typically require a provider within the elastic cloud environment, such as Amazon EC2, Microsoft Azure, OpenStack, and Compute Engine (Wang et al., 2017).

The expediency of the pay-as-you-go model offered by the cloud allows businesses to conveniently scale resources to meet their requirements (Wang et al., 2017). By leveraging IaaS through a service-level agreement (SLA) between providers and users, an assurance of the quality of the service is present while overprovisioning, which would come at a higher cost, is also avoided (Chou et al., 2015).

Platform as a Service (PaaS)

NIST (2011) defined PaaS as "the capability provided to the consumer is to deploy onto the cloud infrastructure consumer-created or acquired applications created using programming languages, libraries, services, and tools supported by the provider" (p. 3). As with IaaS and SaaS, the user does not manage or control the underlying physical infrastructure, such as the network, servers, operating systems, or storage, but the user does have control over the virtual applications and possibly the configuration settings for the hosting environment. As recognized by Machado et al. (2017), this setup is attractive because it minimizes costs for infrastructure and resource management, while providing a flexible pay-as-you-go pricing model based on how the user scales the platform up or down.

PaaS provides the platforms, tools, and applications to users as an on-demand service. This flexible use of resources allows users to access high-end capabilities without having to install these tools on their local machines (Patil, 2016). Diverse types of businesses, governments, and users around the world use cloud services such as PaaS for many different purposes (Machado et al., 2017).

Through the internet or another network, PaaS can provide the service directly to users without the users having to build underlying infrastructure and machines (Vu et al., 2017). Vu et al. claimed that one of the main goals in software engineering is for developers and users at all skill levels to be able to build software products and prototypes easily. They also claimed that through PaaS, this goal is attainable without the necessary burden of the management of the physical infrastructure. PaaS users manage the virtual environment associated with their leased network, firewall, database, and storage (Wu & Zheng, 2016).

Software as a Service (SaaS)

NIST (2011) defined SaaS as "the capability provided to the consumer is to use the provider's applications running on a cloud infrastructure. The applications are accessible from various client devices through either a thin client interface, such as a web browser, or a program interface" (p. 2). In this service model, the user does not manage or control the underlying physical infrastructure. However, it is possible that the user could have control over the limited user-specific application configuration settings (Vu et al., 2017).

SaaS, a new software licensing model, has gained popularity around the world (Feng et al., 2018). According to Feng et al., this popularity is primarily because of SaaS's lower cost of ownership and ease of deployment compared with traditional options. The popularity is widespread, and analysts forecast that the service would reach $55.1 billion revenue by the end of 2018, and it would continue to rise in the following years.

As a significant segment of the software product market, SaaS has fundamentally changed how software can be delivered, managed, and used (Guo & Ma, 2018). Traditional software vendors periodically upgrade the quality of their software and charge a licensing fee for use. In contrast, according to Guo and Ma, SaaS vendors continuously improve the quality of their products. As an added benefit of employing SaaS, users can scale their software up or down based on demand without the residual costs associated with lengthy licensing contracts. Licensing fees are valid for the use of the software, which affords the end-user the additional flexibility associated with short-term licensing (Guo & Ma, 2018).

Cloud Resilience

Gouglidis, Shirazi et al. (2016) defined resilience as "the ability of a network or system to provide and maintain an acceptable level of service in the face of various faults and challenges to normal operation" (p. 2). Resiliency, as observed by Colman-Meixner et al. (2016), is a critical challenge that results in more than $25 billion in annual losses for North American companies alone. They stated that businesses, societies, and individuals are becoming more and more reliant on cloud computing, regardless of the challenges encountered, primarily because of the technology's potential for resilience.

Systems are expected to remain secure and resilient. This expectation is especially important in the highly connected world of cloud computing (Wagner & Sood, 2016). Wagner and Sood claimed that before cloud computing, the development of similar systems was time-consuming, costly, and difficult to scale, and the extra resources necessary to achieve this high quality of services often caused businesses to trade among performance, security, and cost. They argued that cloud resilience helps meet these requirements without trade-offs.

Along with cost reduction, cloud computing also renders service offerings with high availability (Varghese et al., 2015). These offerings are valuable for businesses, but in many cases, they are also essential for critical networks, such as emergency fleet management (Xu et al., 2018). Gouglidis, Green et al. (2016) observed that the protection of critical infrastructures is essential for the proper functioning of the national economy, society, and sovereignty. Varghese et al. (2015) explained that for service providers to maintain high availability, they should have multiple data centers that can replicate data to the degree required by an SLA. The more data centers a service provider maintains, the more data will be available to users (Varghese et al., 2015).

Cloud resilience may support system operations during and after malicious attacks (Sophia & Gandhi, 2017). Sophia and Gandhi claimed this support might depend on the individual or combined features found in IaaS, PaaS, and SaaS. However, as claimed by Di Pietro et al. (2014), although there is an increasing reliance on the cloud, the technology is not mature enough for widespread acceptance. Di Pietro et al. contended that the promises of cloud resilience for infrastructures are challenging because of the environmental complexities and the service's built-in efficiencies. Colman-Meixner et al. (2016) indicated that failures could originate at any point in a cloud infrastructure, such as the hosting servers, the network interconnecting them, or the applications.

Souza Couto et al. (2015) countered these concerns by providing key strategies for obtaining a disaster-resilient infrastructure, including, employing backups of virtual machines across a geographically distributed infrastructure. They claimed that through hypervisors, the replication of virtual machines in different servers on the infrastructure is possible. Sophia and Gandhi (2017) advocated that organizations must consider defense, detection, restoration, and recovery when attempting to obtain resilience. They added that designers should design and build the system such that when an interruption of service occurs for any reason, the system should recognize the event and respond to overcome the potential disruption.

Klein et al. (2014) pointed out that the resilience of cloud services can extend into self-adaptive paradigms, such as brownouts, by using load balancers. Similarly, Harter et al. (2014) argued that failures in cloud computing could occur within the network or data centers; therefore, it is necessary to leverage the proper strategies to ensure that an end-to-end recovery is possible.

As noted by Osanaiye et al. (2016), in the current internet-connected society, people always expect the cloud and other internet services to be available, and any resulting downtime can result in user dissatisfaction. Welsh and Benkhelifa (2017) claimed that the development of resilient systems remains necessary to ensure businesses and state-run processes remain stable because these are the IT structures underpinning most aspects of society. Harter et al. (2014) added that businesses are becoming increasingly dependent upon cloud solutions, while Gouglidis, Shirazi et al. (2016) further noted that critical infrastructures, such as those responsible for sustaining societal functions, such as health, safety, security, and the overall well-being of the population, are also becoming more and more dependent on cloud solutions.

Because of the reliance on cloud computing, many services are provided based on agreements between providers and customers. Osanaiye et al. (2016) used the example of telecommunications industries in several countries; these companies must maintain their cloud services to a level that ensures downtime is limited to less than five minutes in any given year. Osanaiye et al. also noted that these outages could be a result of several factors, such as natural disasters, component failures, or cyber-attacks.

Cloud computing essentially replaces many of the hard-and-fast IT resilience solutions of the past and is one of the most utilized infrastructures (Welsh & Benkhelifa, 2017). Because of the cloud's key features, such as availability, pay-per-use, and scalability, cloud computing is becoming increasingly popular for IT resilience. Although it is not recognized by NIST (2018) as a cloud service model, Villamayor et al. (2018) used the term "resilience as a service (RaaS)" to describe a fault-tolerant framework. They claimed that a RaaS framework could restore and complete the execution of applications by using the resources that are immediately available within the cloud.

As cloud service solutions become more complex, critical networked environments, such as industrial control systems and communication networks, should include the different layers of interconnected systems (Ariffin et al., 2017). By combining the properties attained in the multiple layers of interconnected systems, according to Arrifin et al., one can achieve resilience. Attaining resilience depends on factors such as redundancy, connectivity, availability, dependability, fault tolerance, and security. Ariffin et al. posited that these combined factors enable the composition of a resilient infrastructure.

Although Pasupulati and Shropshire (2016) claimed that cloud computing provides on-demand and highly scalable services, individuals create clouds by using a massive amount of physical computing resources. These resources, they noted, often include hardware, operating systems, virtualization software, virtual networks, and applications. They claimed that to enhance services and reduce the potential for an outage, through orchestration software, people can combine multiple cloud substrates configured for specific purposes to enable resiliency using multiple cloud stacks.

Wang et al. (2018) determined that there are several reasons that physical machines within data centers fail. Overloading physical machines with the virtual cloud requirements may cause servers to fail. They claimed that if these demands on the physical machines were allowed to go unchecked, failures and ensuing attempts to resolve errors could result in cascading failures.

To guarantee resilience in cloud computing, the services must be simultaneously mapped and routed to and through the virtual network in a way that allows for alternate virtual routes in the case of physical failures (Bui et al., 2014). As a result of establishing this added routing of virtual performance, logically partitioned virtual networks have appeared as part of the physical infrastructure. Thus, according to Bui et al., through orchestration software or the combined control of physical and virtual resources, organizations can optimize cloud services for resiliency.

The use of cloud computing to provide services is as diverse as the organizations themselves (Jaiswal et al., 2014). Moving services to the cloud includes many benefits such as reduced operating costs and the ability to flexibly scale services to meet demand (Hecht et al., 2014). The authors claimed that, because of the development of virtualized cloud services, the solutions to traditional problems can be more resilient due to the services' ability to rely on multiple, independent physical computing resources.

Although the meaning of the term *resilience* varies depending on the context and user, overall it is a measurement of the service delivery provided when facing changes

(Welsh & Benkhelifa, 2017). Using systematic approaches, developers are creating many emerging analytics and services that support resiliency (Chang et al., 2016). Although users benefit from lower costs, new technology, and scalable services, reliance upon virtualized services is one benefit that requires continuous delivery. Cinque et al. (2018) explained that SLAs are established between the cloud service provider and users to ensure that only the necessary services are provided, provided continuously, and within an agreed-upon budget. The common assumption is that cloud infrastructure is stable and that failures in service are the exception (Stankovski et al., 2015).

Criticisms of Cloud Computing

As with nearly any technology, several criticisms of cloud computing exist. Researchers have criticized the aspects of security, complexity, and lack of control. In the subsequent subsections, I will discuss each of these criticisms and the relevant mitigation techniques.

Security. Security plays a critical role in organizations and their ability to ensure the availability of and access to their data (Varadharajan & Tupakula, 2017). Varadharajan and Tupakula noted that in traditional IT infrastructures, control mechanisms, languages, and systems must maintain access to system resources in the underlying platform. However, in a virtualized cloud enterprise framework, access to the underlying platform is not typical (Villarreal-Vasquez et al., 2017) because within a virtualized environment, if an attacker escalated their privileges to a super user status, they would be able to originate attacks against users who are trusting the server's kernel.

This aspect of security is a major concern for users employing a shared cloud infrastructure.

To mitigate kernel-level attacks across the cloud ecosystem, resilience must be engrained in the cloud solution (Villarreal-Vasquez et al., 2017). Alcaraz (2018) agreed that resilience must be built in because society is experiencing enormous security problems linked to cyber-attacks. Sikula et al. (2015) claimed that the U.S. government spent considerable time enhancing its cyber—physical controls to protect critical systems and services from disaster.

Sikula et al. (2015) noted that these bolstered efforts by the U.S. government to identify and minimize risks were more valuable for traditional infrastructure, where the systems rely on factor analyses of steady-state systems that have predictable patterns of disruption. Liu et al. (2018) claimed that to minimize infrastructure interruption in a cloud ecosystem, the underlying infrastructure should guarantee an expected quality level based on an SLA.

Peiyue and Gyorgy (2017) stated that the goal of secure cloud ecosystems is efficiency, flexibility, and security; they went on to explain that industries, such as automotive, healthcare, and manufacturing, around the globe, use these ecosystems. Liu et al. (2018) claimed that critical infrastructures supporting significant functions in society also widely use these cloud ecosystems and noted that the security and resilience of cloud computing are closely linked to the livelihood of people and nations.

Based on the security concerns identified by Varadharajan and Tupakula (2017), Villarreal-Vasquez et al. (2017) and Alcaraz (2018), it would appear as though users' attitudes toward using cloud solutions would be negative. These security concerns would not appear to improve the user's performance (PU), and the users would not appear to be free of effort (PEU). Therefore, users' intention to use (PU) would then also appear to be negatively impacted. However, this is not always the case.

For example, as illustrated by Liu et al. (2018) and Peiyue and Gyorgy (2017), users around the globe are using cloud solutions in a vast range of applications. Therefore, many users have a positive attitude toward the use of cloud systems, regardless of the security concerns evidenced in the literature. The PU of cloud solutions may outweigh the PEU if users recognize the technology as something that will improve their performance, even if it requires additional effort.

As illustrated by commercial solutions such as Unitrends (Unitrends, n.d.), the vendor takes full responsibility for the setup, testing, failover, and failback of applications with minimal time and effort investment required by the customers. The solution appears to be straightforward. However, pricing may be a factor for DBEs. The standard monthly service begins at $529 per server and scales up to $2,499 based on the SLA, computing and storage power, and dedicated time investment of the customer.

Complexity. Cloud computing continues to mature and has evolved to the point where many organizations are effectively creating cloud environments as providers continue to expand their service offerings (Ullah et al., 2018). However, the cloud's evolution requires organizations to adopt agile mindsets and increase their technical knowledge to remain competitive (Ullah et al., 2018). Retana et al. (2018) stated that the transition to cloud computing is not easy.

Cloud computing increases complexity. Herrera (2014) noted that the additional and sometimes complex layers of abstraction presented by cloud computing introduce hurdles for businesses. Herrera also stated that because of this added complexity and the differences in organizations' technical expertise, there is no consensus on how to understand the complexity across organizations. According to Tawalbeh et al. (2015), organizations that rely on cloud computing face risks in maintaining IT services because of their complexity and because they are not necessarily still in control of the underlying IT for which they are responsible.

This complexity cited in the literature could cause users to perceive the use of this technology as difficult or otherwise not free of effort. Per the TAM, the PEU and the PU affect the users' attitudes toward using a technology (Brandon-Jones & Kauppi, 2018). The PEU is how much effort a person must give to implement a technology (Davis, 1986). However, complexity factors can be mitigated through SLAs. For example, Zerto (Zerto, n.d.) offers the myZerto Support Portal, which includes tips and forums for the do-it-yourselfers or SLAs for full implementation.

Outsourcing the transition or selecting a turnkey solution such as Unitrends can help overcome the challenge of complexity in implementing cloud solutions. Ullah et al. (2018) claimed that cloud solutions, at least post-transition, are easy to use, scalable, and extensible. Similarly, Wagner and Sood (2016) claimed that the redundancy built into cloud solutions allows for easier operations because the solution can somewhat restore services without interaction by users.

Lack of Control. In cloud computing, users do not manage or control the underlying infrastructure (Machado et al., 2017). As noted by Tawalbeh et al. (2015), users rely on a cloud service provider and therefore place the fate of their infrastructure into the hands of an outsourced provider. Machado et al. (2017) claimed that the cloud is extremely attractive for some users because of the pay-as-you-go pricing model, ease in scaling up or down, and the ability to rely on technology experts as shared resources. However, lack of control is commonly cited as a reason for organizations' distrust of cloud services (Tawalbeh et al., 2015).

Tawalbeh et al. further noted that reliance upon external service providers extends beyond surface offerings. As users continue to expand their reliance on the cloud, they not only become reliant on the provider's infrastructures, but also on the platforms and software. This continued reliance is good from a business perspective but can be detrimental to resilience if the external service provider has their own, or compounded, infrastructure problems (Herrera, 2014).

The user's lack of control over technology can be positive or negative. The attitude of users may depend on the users' associated knowledge of and skills in cloud computing. Although users can maximize their control of services, such as with Kafka, Lambdas, and S3 buckets, external organizations most commonly manage the infrastructure (Wagner & Sood, 2016).

Impacting both the user's attitude toward use and intention to use, PU depends on whether the implementation of technology is free from effort (Davis, 1986). Some companies, such as DC BLOX, offer colocation, cloud storage, and network connectivity solutions to support IT resilience. For example, the services offered by DC BLOX include customer portals to support disaster recovery and hybrid IT solutions, with varying levels of control based on SLAs, contracts, and pay-as-you-go options (DC BLOX, n.d.).

Summary

Throughout the literature review on cloud computing, several themes emerged. The academic discussion on cloud computing involves a significant number of aspects. As a result, users could easily be dissuaded or persuaded based on the PE or PEU of the technology. For instance, an IT leader could justify their position for or against cloud technology based on their impression of whether the technology is free of effort and improves the user's performance.

The themes that were most prevalent throughout the literature review include perceptions that cloud computing (a) is difficult to transition to due to complexity (Herrera, 2014; Retana et al., 2018; Tawalbeh et al., 2015), (b) is not mature enough for widespread acceptance and the perception is augmented with SLAs (Cinque et al., 2018; Di Pietro et al., 2014; Ullah et al., 2018), (c) can harden or soften security controls depending on how the technology is implemented (Colman-Meixner et al., 2016; Liu et al., 2018; Villarreal-Vasquez et al., 2017), and (d) provides on-demand resources that support the necessary redundancy for IT service continuity (Anuprabha & Nivaashini, 2018; NIST, 2011; Sophia & Gandhi, 2017; Souza Couto et al., 2015; Villamayor et al., 2018; Zhu et al., 2016). Additionally, regardless of the availability of resources to anyone, anywhere on the internet, such as DC BLOX, Unitrends, and Zerto, there is still the matter of cost. Several authors have claimed that cloud technology offers the scalable, on-demand and highly-available services required to support IT service continuity (Chou et al., 2015; Kathuria et al., 2018; Shirazi et al., 2016; Varghese et al., 2015; Wang et al., 2017), yet others have stated that it comes with an up-front cost that may not be attractive to smaller businesses (Ho, 2017; Kubiak & Rass, 2018; Melendez et al., 2016; Ojo, 2017).

Critical Evaluation of Themes

The purpose of this qualitative multiple case study was to explore the strategies IT leaders in DBEs use to implement cloud solutions to minimize IT disruption resulting from human-made and natural disasters. This literature review has been broken down into (a) the TAM, (b) IT service continuity, and (c) cloud computing in order to comprehensively describe the major aspects supporting the purpose of this study.

TAM as a Conceptual Framework

The acceptance of a technology such as cloud solutions to minimize IT disruption can be viewed through a lens such as the TAM. The review of literature on the TAM is summarized as follows:

- PU indicates a user's perception of whether a technology will improve their performance (Davis, 1986),
- PEU indicates a user's perception of whether a technology is free of effort (Davis, 1986),
- PU impacts a user's intention to use a technology, while the combination of PU and PEU ultimately impacts the user's perceived attitude towards using a

technology (Brandon-Jones & Kauppi, 2018; Hsiu-Mei & Shu-Sheng, 2018; Hui-Fei & Chi-Hua, 2017),

- TAM has been leveraged in research involving IT service continuity (Brandon-Jones & Kauppi, 2018; Kansal, 2016; Veldeman et al., 2017; Wei et al., 2016), cloud computing (Dixit & Prakash, 2018; Hsiu-Mei & Shu-Sheng, 2018; Nagy, 2018; Verma et al., 2018; Yoon, 2016), and across many demographic groups (Akgun, 2017; Dumpit & Fernandez, 2017; Eutsler, 2018; McKenzie et al., 2018; Ozsungur & Hazer, 2018; Teeroovengadum et al., 2017), and
- PEU has been found to differ based on culture (Teeroovengadum et al., 2017).

IT Service Continuity and DBEs

Throughout the review of literature on IT service continuity, several themes were noted. These included

- IT service continuity is well understood but not necessarily implemented by small businesses (Conz et al., 2017; Melendez et al., 2016),
- IT service continuity plans are considered less of a priority than core business functions (Rossmiller et al., 2017; Torabi et al., 2015),
- Formal ITSCM frameworks come at a cost typically beyond the budget of a small business (Frenkel, 2016; Ho, 2017; Melendez et al., 2016), and
- Resource availability to dedicate to, and integration complexity of, IT service continuity, are key detractors for implementation (Mattei & Satterly, 2016; Melendez et al., 2016).

Notwithstanding the hurdles, there are certain key indicators in predicting the demise or survival of DBEs. One such indicator includes the lack of IT service continuity preparedness (Marshall et al., 2015); another indicator is that disadvantaged status typically includes fewer resources and opportunities to bounce back (Firdhous & Karuratane, 2018). Some authors have recommended strategic sourcing of IT service continuity using cloud computing (Cox & Pilbauer, 2018).

IT Service Continuity and Cloud Computing

The review of the literature on cloud computing and IT service continuity identified the following themes:

- Cloud computing is difficult to transition to due to complexity (Herrera, 2014; Retana et al., 2018; Tawalbeh et al., 2015),
- Cloud computing is not mature enough for widespread acceptance and the perception is augmented with SLAs (Cinque et al., 2018; Di Pietro et al., 2014; Ullah et al., 2018),
- The implementation of cloud computing can harden or soften security controls depending on how the technology is implemented (Colman-Meixner et al., 2016; Liu et al., 2018; Villarreal-Vasquez et al., 2017),
- Cloud computing provides on-demand resources that support the necessary redundancy for IT service continuity (Anuprabha & Nivaashini, 2018; NIST, 2011; Sophia & Gandhi, 2017; Souza Couto et al., 2015; Villamayor et al., 2018; Zhu et al., 2016),

- Cloud computing is available to anyone, anywhere on the internet (DC BLOX, n.d.; Unitrends, n.d.; Zerto, n.d.),
- Cloud computing offers the scalable, on-demand and highly available services required to support IT service continuity (Chou et al., 2015; Kathuria et al., 2018; Shirazi et al., 2016; Varghese et al., 2015; Wang et al., 2017), and
- Cloud computing comes with an upfront cost that may not be attractive to smaller businesses (Ho, 2017; Kubiak & Rass, 2018; Melendez et al., 2016; Ojo, 2017).

The use of cloud computing to provide IT service continuity solutions is not new; several solutions are available on the internet for use by anyone, anywhere. The problem that DBEs appear to be faced with are the upfront costs, complexity in integration, potential loss of control and perception of introducing additional security vulnerabilities.

Summary

Blending of the literature on TAM, IT service continuity, and cloud computing provides significant insights into potential themes for application within the study. For instance, the lack of IT service continuity within DBEs is a key indicator to predicting the demise or survival of the company (Marshall et al., 2015), primarily because DBEs have fewer resources and the ability to rebound from disasters (Firdhous & Karuratane, 2018). The reasons identified within the literature for lack of IT service continuity in DBEs include lack of priority over core business functions (Rossmiller et al., 2017; Torabi et al., 2015), lack of resources available to dedicate to complex IT service continuity requirements (Mattei & Satterly, 2016; Melendez et al., 2016), and cost of formal ITSCM frameworks (Frenkel, 2016; Ho, 2017; Melendez et al., 2016).

While this critical IT service is well understood but still not implemented by small businesses (Conz et al., 2017; Melendez et al., 2016), outsourcing of IT service continuity using cloud computing (Cox & Pilbauer, 2018) remains an option. But most agree that cloud computing is mature enough to handle critical tasks required of IT service continuity (Cinque et al., 2018; Di Pietro et al., 2014; Ullah et al., 2018). Some potential users appear to be less interested in cloud computing for use in IT service continuity due to the complexity of transitioning to the cloud infrastructure (Herrera, 2014; Retana et al., 2018; Tawalbeh et al., 2015) and the potential for the use of cloud computing to create vulnerabilities in the organization's security posture (Colman-Meixner et al., 2016; Liu et al., 2018; Villarreal-Vasquez et al., 2017).

IT service continuity solutions leveraging cloud computing provide options for implementation from anywhere, at any time on the internet (DC BLOX, n.d.; Unitrends, n.d.; Zerto, n.d.). Albeit with a cost (Ho, 2017; Kubiak & Rass, 2018; Melendez et al., 2016; Ojo, 2017), cloud computing offers the use of scalable, on-demand and highly available services necessary to support IT service continuity (Anuprabha & Nivaashini, 2018; Chou et al., 2015; Kathuria et al., 2018; NIST, 2011; Shirazi et al., 2016; Sophia & Gandhi, 2017; Souza Couto et al., 2015; Varghese et al., 2015; Villamayor et al., 2018; Wang et al., 2017; Zhu et al., 2016)

Through the lens of the TAM, I planned to explore the strategies that IT leaders in DBEs use to implement cloud solutions to minimize IT disruption resulting from human-made and natural disasters. By collecting and analyzing the relevant data, I was able to uncover reasons why users perceive the usefulness or ease of use of cloud computing as an IT service continuity solution. I gained insight into the decisions made by these IT leaders in determining whether these solutions would improve their performance and whether the proposed technology solutions were free of effort to implement and use.

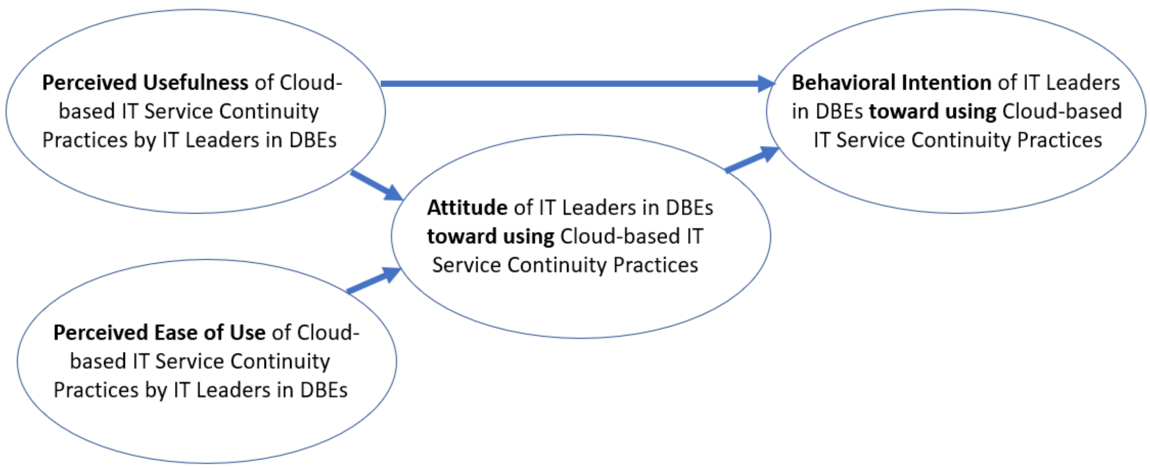
Transition and Summary

Section 1 introduced the problem the current research focused on and has presented knowledge and insight into the background of the problem. The section presented the problem statement, purpose statement, research questions related to an applied IT issue, and the lens through which I framed the present research. The section presented the nature of the study, the significance of this research to IT, and how the study influences social change. The section also gave an in-depth description of the components central to this research, namely, IT resilience and DBEs. The literature review concluded with a section dedicated to the theoretical framework and competing theories, from which I selected the TAM because of its applicability to the research problem.

Given these multiple themes, there are potentially many reasons that users may or may not choose to rely on cloud services to support IT service continuity. One way to objectively view a problem is using a lens. The current research used the TAM as a lens to explore the strategies IT leaders in DBEs employ to implement cloud solutions to minimize IT disruption resulting from human-made and natural disasters. Specifically, I used the two main characteristics of the TAM, PU and PEU, to understand users' attitudes toward use and intention toward using cloud computing to support IT service continuity. Figure 3 represents the culmination of the three major aspects of the literature review. The TAM is the theoretical construct through which I explored the PU and PEU to understand IT leaders in DBEs' attitudes toward using, and behavioral intention to use, cloud-based IT service continuity practices.

Figure 3

The Technology Acceptance Model as Applied to This Study



Section 2: The Project

Purpose Statement

The purpose of this qualitative multiple case study was to explore the strategies IT leaders in DBEs use to implement cloud solutions to minimize IT disruption resulting from human-made and natural disasters. The target population consisted of the IT leaders of DBEs within Maryland that have experienced a disaster. The results of this multiple case study can promote positive social change by helping organizations to identify IT service continuity strategies, which may ultimately result in continued employment opportunities for personnel.

Role of the Researcher

The role of the researcher has significant implications in qualitative research. Yin (2014) stated that in qualitative studies, the researcher is the primary data collection instrument and their bias can greatly influence the results of a study. As the researcher and primary instrument performing all data collection and analyses and formulating the conclusions, I was mindful of the impact bias could have had over the research process. I mitigated potential bias by conducting multiple interviews, using member checking, and reviewing documentation.

My personal experiences may have influenced the study because I am familiar with the study topic, have worked in this field since 1988, and have lived in the targeted geographic area (Maryland) since 2005. Moon (2015) indicated that although potential researcher bias may not be eliminated, it may be mitigated through controls such as multiple interviewees, interview protocols, and member checking. As controls for mitigating bias, I conducted interviews with multiple people, reviewed organizational documentation, followed an interview protocol, and performed member checking. Additionally, I used different tools and data sources, aiming for manual research to be conducted in an unbiased manner.

I did not have any influence over the targeted participants and used the principles described in the *Belmont Report* to ensure the ethical treatment of the participants. The *Belmont Report* focuses on the ethical use of human subjects (National Institutes of Health, 1979) and embodies the principles of respect for persons, beneficence, and justice (National Institutes of Health, 1979; see also Judkins-Cohn et al., 2014; Manda-Taylor et al., 2017). As further outlined in the ethical research section, I safeguarded the principles of respect for persons, beneficence, and justice by treating all participants equally, fairly, and with respect.

Bias needs to be minimized in data collection (Fusch et al., 2017). Researchers must use data correlation techniques such as methodological triangulation to add depth to the data, increase validity of the study, and mitigate bias in the data collected (Fischer & Van de Bovenkamp, 2019; Fusch et al., 2017). I performed methodological triangulation in my study by performing interviews with multiple participants, observing participants during the interviews, reviewing organizational documents, and performing member checking. I followed the semistructured interview protocol shown in Appendix D to ensure consistency in format; this also allowed me to document any observations and notes obtained during the interview.

Participants

Eligibility criteria for study participants should be based on objective measures. Establishing the appropriate participants is one of the most important aspects of credible and meaningful research (Cooper & McNair, 2017; Elo et al., 2014; Joolaee et al., 2015). The criteria for participation in this study included the following: (a) individuals must be IT leaders supporting the DBE, (b) individuals must have been in this role for at least 3 years, (c) individuals must work or live in Maryland, (d) individuals must have supported IT service continuity, and (e) individuals must have experienced IT disruption based on human-made or natural disasters. I designed these criteria with the intention of establishing a participant base that would provide credible and meaningful research.

Prior to recruiting within an organization, permission must be received, and protections must be in place for the participants (Pote, 2016). To gain access to participants, I began by reaching out to the organizations' authorizing representative to obtain permission to perform the study using their employees and data. A critical aspect to gaining access to participants is to ensure that protections are in place for the participants and organization through open conversation with the organization (Hoyland et al., 2015). The informed consent form and organizational protections disclose protections of the research participants' rights and their organizations' approval to allow employees to participate in a study (Amundsen et al., 2017). Before conducting the interviews or collecting any other form of data, I obtained Institutional Review Board (IRB) and organizational agreements to ensure that the proper protections were in place for the participants and to establish support by the organization's leadership.

However, obtaining approval by the organization does not necessarily equate to the participants' willingness to participate, so I planned a strategy to address this issue. My strategy was to request a list of participants and their contact information from each organization's representative. Then, I contacted each potential participant to advise them of the study and gain permission from them individually. Yin (2015) noted that qualitative interviews resemble natural conversation. While setting the stage for the participants' inclusion in the study, I integrated a natural conversational tone into the discussions, while remaining focused on the purpose of the conversation which was to perform data collection. In my contact, I described the organization's letter of cooperation, IRB oversight, and informed consent so that potential participants understood the request and their rights.

I used the initial discussions to establish rapport, generally describe the overall research objectives, and address participant needs such as meeting locations and agreeable dates and times for interviews. These initial discussions to establish rapport were critical to the data collection process and set the stage for interactions (Davies & Coldridge, 2015; Home & Rump, 2015; Peticca-Harris et al., 2016). In addition to establishing rapport, my initial discussions with potential participants were intended to obtain their willingness to participate in the study, ensuring that the individuals understood their rights as outlined on the informed consent form. I prepared for each conversation and ensured that the participants were aware that their organization supported their involvement and their personal rights by providing copies of the organization's agreement and informed consent forms.

When the participants felt comfortable that the permissions and protections had been put in place, I provided additional information about my background in the IT service industry and the reasons why I reached out to them for their support in my study. Yin (2017) noted that a key to remaining on target is to continue to remember the rationale for the exploratory study. Therefore, throughout my interaction with participants, I ensured that my primary research question remained central to the discussion.

Research Method and Design

Researchers have the choice of several research methods and designs. According to McCusker and Gunaydin (2015) and Leppink (2017), the three methodologies include qualitative, quantitative, and mixed methods. Within each of these methodologies, several designs exist, and researchers use combinations appropriate for the nature of the study (Leppink, 2017). Prior to selecting a research method and design, I conducted a review of the current methods and designs to determine the most appropriate combination for this qualitative exploratory multiple case study.

Research Method

Research studies require a research paradigm so that elements of research results can be accepted or rejected as part of basic research (Kankam, 2019). The adoption of a research paradigm leads to improved credibility and generalizability of the study (Kankam, 2019; Ryan, 2018). The four research paradigms that are applied to research include interpretivism, positivism, postpositivism, and pragmatism (Kankam, 2019). The interpretivism paradigm requires the researcher to grasp the subjective meaning of the action (Kankam, 2019) and relates to qualitative research (Kankam, 2019; Ryan, 2018; Wagner, 2017). The positivism paradigm maintains the intention of impartiality and measurement (Kankam, 2019) and relates to qualitative research (Kankam, 2019; Ryan, 2018; Wagner, 2017). Postpositivist maintains objectivity and could relate to either qualitative or quantitative methodologies (Kankam, 2019; Wagner, 2017), while pragmatism maintains a combination of subjective and objectives ontologies and uses mixed methods, relying on both qualitative and quantitative methods (Kankam, 2019; Wagner, 2017).

Research methods encompass different approaches and strategies (Kankam, 2019; Ryan, 2018). The qualitative research method is exploratory in nature and is used to answer an overarching research question (Kankam, 2019; Makrakis & Kostoulas-Makrakis, 2016; Ryan, 2018). Quantitative researchers rely on measurements and relationships among variables (Kankam, 2019; Makrakis & Kostoulas-Makrakis, 2016; Ryan, 2018). Mixed methods include a combination of qualitative exploratory research and a measurement and understanding of the relationships among variables (Kankam, 2019; Makrakis & Kostoulas-Makrakis, 2016; Ryan, 2018). My research was exploratory in nature and intended to answer an overarching research question. I did not perform testing of hypotheses or measuring relationships between variables.

The quantitative research method focuses on precise measurements and numerical or statistical analysis to support the testing of hypotheses (Campbell, 2014; McCusker & Gunaydin, 2015; Ryan, 2018). According to Barnham (2015), quantitative researchers focus on “what” and “where” questions as opposed to the “how” and “why” questions found in qualitative research. Within my research, I did not perform measurements, but instead I focused on exploration. Because I did not perform measurement or testing of hypotheses, the quantitative research method was not appropriate for this study.

A mixed methods approach includes measurements and numerical or statistical analysis to support the testing of hypotheses combined with an exploratory aspect (Campbell, 2014; Kamalodeen & Jameson-Charles, 2016; McCusker & Gunaydin, 2015; Raich et al., 2014; Ryan, 2018). As Barnham (2015) stated, the quantitative aspect of mixed methods focuses on the “what” and “where” aspects of the research. As stated, quantitative measures were not appropriate for this exploratory study. Because I was not performing quantitative measurements, the mixed-methods approach was also not appropriate for this study.

Qualitative research methods are exploratory in nature and have several designs available to researchers (Barczak, 2015; Campbell, 2014; Kamalodeen & Jameson-Charles, 2016; McCusker & Gunaydin, 2015; Montes-Rodríguez et al., 2019; Ryan, 2018). Qualitative research is used to understand the “how” and “why” aspects of research (Barnham, 2015). The qualitative research method informs the researcher on the actual situations that the participants are in and works well to identify common themes (Goodman & Marshall, 2018). Because I applied exploration strategies used by IT leaders in DBEs, the qualitative research method was appropriate.

After examining the differences in the research methods, I decided that the qualitative research method was best suited for this study. The determination of a research method is contingent upon the research question and is critical to performing reliable and valid research (Al Zefeiti & Mohamad, 2015; Barnham, 2015; Ullah & Ameen, 2018). Within my study, I performed exploratory research using an interpretive philosophy based on the qualitative data received from the case organizations. I used TAM as my conceptual framework and continued exploration until data saturation was reached in pursuit of answering the overarching research question.

Research Design

Disciplined, explicit, and systematic approaches are central to obtaining the most appropriate research results (Mohajan, 2018). The research design is key to the approach adopted because each design is different, and the data type, depth, and volume of data collected differ based on the design selected. To address the research questions in the qualitative study, I used the case study design. Other qualitative design types considered for use included ethnography, narrative, and phenomenology (Cypress, 2018; Davis et al., 2016; Duitsman et al., 2019; Wiesche et al., 2017; Yazdkhasti et al., 2019).

Ethnographic research is an anthropological method with strong philosophical and theoretical foundations and is often helpful in interpretive and critical studies of organizational, social, and technological phenomena (Chughtai & Myers, 2017). Ethnography can reveal social and cultural practices in a specific context, and the methods employed include mapping exercises, interviews, and working with and observing people (Sharman, 2017). Rooted in anthropology, ethnographic research focuses on understanding the behaviors, beliefs, and languages of people in cultural groups (Draper, 2015). Because the current research was not concerned with a specific cultural group, ethnographic research was not appropriate for the study.

Narrative research, founded on the idea that individuals have a story to tell, is a descriptive and explanatory method designed to systematically represent experiences as individuals perceive them (Mazerolle et al., 2018). Wolgemuth (2014) noted that narrative research is a means for exploring the life experiences of participants by describing their experience with a phenomenon. As a method to reconstruct social events from the perspectives of individuals, narrative interviews encourage a telling of the interviewee's own story, emphasizing the actions or people the individual regards as significant (McAloon et al., 2017). Because this research focused on the strategies employed by the participants, narrative accounts of social events were not appropriate.

Phenomenological research involves identifying the commonalities of the participants who have experienced a specific phenomenon (Gentles et al., 2015; Wiesche et al., 2017) and is a reflective study of a lived experience (Adams & van Manen, 2017). The goal of conducting phenomenological research is to describe and clarify human experiences encountered during a specific phenomenon (Sousa, 2014). Because this study did not focus on the experiences of individuals having lived a specific phenomenon, phenomenology was not appropriate.

Case study researchers investigate a real-life phenomenon, such as an individual, group, organization, event, problem, or anomaly, in an in-depth manner and within its environmental context (Ridder, 2017). According to Atmowardoyo (2018), case studies are a type of descriptive research because case study designs can describe an existing condition of a case. Within a case study, insights emerge from interviews, observations, or data collection. Steigenberger (2016) recommended the triangulation of data sources, which entails the combination of multiple sources and methods, to ensure that the case study insights have a solid foundation. This research focused on a phenomenon that the IT leaders could have experienced separately. Therefore, I implemented a multiple case study research design using the triangulation of data sources to achieve solidly grounded insights. I studied the IT leadership of the DBEs to learn the strategies used to implement cloud solutions designed to minimize IT disruption resulting from human-made and natural disasters. I explored the implemented strategies from the perspective of multiple IT leaders until data saturation was achieved in each case.

Data saturation needed to be achieved for each case and participant. Data saturation occurs when new data from multiple sources do not continue to inform the research question (Fusch & Ness, 2015; Gentles et al., 2015). Reaching a point of data saturation depends on the topic, the purpose of the research, methods of data collection, participants, and analysis conducted (Tran et al., 2016). Because I conducted a multiple case study, I needed to achieve data saturation with each case as well as with each participant. When new data no longer continued to inform the research question, I had attained data saturation.

According to Turner and Thompson (2014), returning and reviewing the study results with participants supports the recognition of data saturation and verifies the accuracy and reliability of the data. They also claimed that in order to verify the accuracy and reliability of the data, member checking should be used. To ensure data saturation, I implemented methodological triangulation. The triangulation included in this study consisted of collecting data through interviews, reviewing public and any shared private documentation, and member checking.

Population and Sampling

To align with the purpose of my study, I used the census sampling method to select participants for this study from within two case organizations. The target population for this multiple case study was selected from two DBEs with full-time IT leaders located in the Baltimore, Maryland geographic region. The population selection focused on an estimated total population of seventeen IT leaders within the two organizations who had experienced IT service continuity disruption within the DBE. The gatekeepers for the two case organizations stated estimated population sizes of eight and nine potential participants, which accounts for the total estimated population size of seventeen. Prior to performing interviews, one IT leader became no longer available to the organization and this research. Therefore, the total population was 16 IT leaders within two organizations who had experienced IT service continuity disruption within the DBE. These individuals and DBEs had experienced IT disruption resulting from human-made or natural disasters. Additionally, these individuals had served as IT leaders in Maryland DBEs for at least three years and did not have a direct working relationship with me.

The sampling method that was used for gaining participants for inclusion in my study was the census method, which is a non-probabilistic sampling method. In-depth, purposeful samples accomplish what random samples cannot (Patton, 2014). Setting limits for a case is necessary to focus, frame, and manage the data collection and analysis

(Harrison et al., 2017). The target population was the entire set of subjects that could inform the research, whereas a sample of the target population included a subset of the entire population that met the criteria for the study (Asiamah et al., 2017; Nikolaos & Panagiotis, 2016). Within the Baltimore, Maryland region, the number of organizations meeting these criteria was dynamic and included a limited number of individuals by nature. The use of purposeful census sampling allowed me to attain data saturation by focusing on individuals who meet certain criteria.

I had identified two organizations that employed individuals meeting the required criteria. The purpose of selecting a population in qualitative studies is to gather as much insight as possible, even with a low number of participants (Malterud et al., 2015). Yin (2017) noted that sample size is irrelevant in qualitative research, and Patton (2014) explained that sample size in qualitative inquiry instead depends on factors such as the purpose of the inquiry and what you want to know. Yin (2015) stressed that researchers should think of case studies as opportunities to collect the most relevant and plentiful data. Both organizations had preliminarily agreed to allow their employees to participate and offered to provide contact information for each of their employees. Therefore, I targeted all 16 of the participants for inclusion in the study.

Although a small number of participants is appropriate within qualitative studies, one must reach saturation as well. Saturation is the point at which continuing to collect new data does not lead to the discovery of new information to address the research question (Fusch & Ness, 2015; Lowe et al., 2018; Rijnsoever, 2017). Lowe et al. (2018) noted that reaching saturation is difficult to predict because there are no validated and objective means by which to establish saturation. Determining the point at which saturation is reached is difficult to foresee and depends on the judgment and experience of the researcher (Saunders et al., 2018; Tran et al., 2016). I continued to conduct interviews, review documentation, and perform member checking until additional data no longer informed the study.

Identifying the point of saturation occurred as I performed a cyclic process of data collection and evaluation. Although there exist general “rules of thumb” (Hennink et al., 2017) based on empirical and statistical formulae, Guetterman (2015) attested that going beyond saturation will only result in repetitive data without depth. When no new themes, data points, or ambiguity existed in the data collected, I determined that I had reached saturation.

The criteria for selecting participants followed the purposeful method described. As Asiamah et al. (2017) noted the targeted population must not just be willing to participate, but they must also be available at the time of the study. The allotted time for the interviews must be reasonable and responses must be recorded verbatim as conditions allow (Hagaman & Wutich, 2017). Baur et al. (2015) claimed that recording and transcribing interviews is critical to support triangulation of data sources. Fusch and Ness (2015) emphasized that good data collection, which includes taking copious notes, can assist in the analysis and coding of themes that arise from interviews. With these recommendations in mind, I worked with participants to ensure that the data collection criteria were met, as well as to allow the participants the flexibility to schedule meeting locations to support their personal needs or requirements.

Ethical Research

In conducting this research, I proceeded in an ethical manner that was intended to ensure the protection of all participants. Ethical considerations of the participants need to be incorporated into the research from inception through delivery of the final report (Al Tajir, 2018). The Belmont Report outlined a principled framework that may be used to guide ethical considerations throughout research involving human subjects (Adashi et al., 2018; Van Der Zande et al., 2014). The primary purpose of the Belmont Report is to protect the rights of all research participants (Miracle, 2016). The ethical considerations listed in the Belmont Report include beneficence, justice, and respect for persons (Miracle, 2016). Beneficence means not to harm, justice is meant to hold the researcher to the standards of the individual and societal level, and respect for persons is focused on the requirement to acknowledge the autonomy of, and protection provided for, those with diminished autonomy (Yip et al., 2016). I ensured that the Belmont Report’s intent remained paramount throughout the study.

The Office of Research Ethics and Compliance (OREC) is in place at Walden University to safeguard that studies affiliated with the institution meet ethical standards (Walden University, 2019). Walden University requires all doctoral studies to be approved by OREC to make certain that the studies conform to IRB and federal regulations. To ensure that I consider the Belmont Report throughout the study, I obtained IRB approval from Walden University based on my plan to protect the rights of the research participants. To support the consideration of beneficence, I ensured that my actions did not purposely cause any harm to the participants by following the steps to anonymize the participants and participating organizations as further described in the following paragraphs. In respect to supporting justice, the group that participated in this study represented a societal group that would appreciate the gains potentially made by this research while the larger, more general, IT service community would also realize the benefit. And, in support of respect for persons, I included informed consent as part of the study and allowed the participants the option to discontinue participating in the research at any time, without consequence. Similarly, none of the participants had a subordinate relationship, or other potentially coercive relationship, to me which ensured they participated in the research based on their willingness.

To confirm the adequacy of ethical protection of the participants, several conditions were met and adhered to throughout the study. The rights, privacy, and safety of the participants fell under the umbrella of ethics and were integral to the research process (Al Tajir, 2018). The research that I performed was reviewed and approved before I initiated contact with any potential participant. I had undergone additional education in ethics as part of my study program and obtained IRB approval from Walden University prior to beginning data collection. The research was conducted under Walden IRB approval number 10-30-20-0723340 and was monitored throughout completion with additional provisions included beyond the final report.

Once I received IRB approval, I contacted each potential participant to introduce myself, explain the general nature of the study, and provide copies of the informed consent form and organizational letter of cooperation. As a central point in this interaction, I made sure that each participant was aware of the study and documented their willingness to participate. Informed consent helps to objectively disclose the protection of research participants' rights in a manner that also requires conditions to remain free of coercion and undue influence (Dekking et al., 2014). Prior to collecting any data, I also ensured that the informed consent form was understood and accepted.

The informed consent form included consent to participate, data retention and protection policies, incentives for participation, identity protection practices, participant criteria, and the withdrawal process. An informed consent form is a clearly written document used to ensure that potential participants have the necessary information about the study to make an informed decision on whether to accept or decline participation (Lee, 2018). I made sure that participants knew that their participation was completely voluntary and supported by their organization. Incentives for participation may help gain interest in participating in the study; however, incentives might encourage people to take part in the study for the wrong reasons (Luchtenberg et al., 2015; Perumalswami et al., 2016). Therefore, while the participants were not receiving direct compensation for their participation, I highlighted the philanthropic benefits their participation might provide, as well as the indirect benefits they could realize. Due to COVID-19 restrictions, I met with all participants by telephone or through online meeting applications. Therefore, offers to purchase drinks such as coffee in appreciation for their time, were not a consideration. The informed consent form also described the safeguards put in place for their identity protection. I ensured that each participant understood that they could withdraw at any time by simply stating so, either in written or verbal communication to me. I made clear that, if any participant decided to withdraw from the study, I would respect their decision.

I masked the participants, organization, and any other identifying details to make certain that the study's input remained anonymous. Masking participant identities and allowing participants to review their transcripts not only protects their confidentiality but alleviates concerns about self-censoring that may impact the validity of the study (Surmiak, 2018). I retained all data collected as part of this research in a locked safe, either in digital or print form, and will continue to do so for five years from the date of final research approval. I am the only person with access to the safe, which is located within an access-controlled area of my home. The participant identifiers (IDs) were maintained on a password protected and encrypted spreadsheet and stored along with the remainder of the research data. All research data, including NVivo files, was stored in a password-protected and encrypted folder maintained on a dedicated USB drive. The USB drive remains locked within the physical safe when not in use. Maintaining the data on a dedicated USB drive provided digital and physical data protection from the beginning of data collection and will continue to do so during the five years of data retention following the study's completion.

Data Collection

Data collection includes the instruments and techniques used, as well as the system used to maintain organization of the data. The following sections describe how I performed data collection for this multiple case study.

Instruments

As the investigator, I was the primary data collection instrument. Yin (2014) stated that in qualitative research, the investigator is the primary instrument. Majid and

Vanstone (2018) affirmed this claim by noting that the researcher should assume the role of the investigator, which is considered the primary research instrument. Lochmiller and Lester (2017) stressed that the investigator must be fully engaged in data collection, and therefore is considered the primary research instrument. In addition to the investigator performing as the primary data collection instrument in this study, additional instruments were employed.

Data to support the necessary analysis came from multiple sources. The six most common sources of evidence are documentation, archival records, interviews, direct observations, participant-observation, and physical artifacts (Yin, 2017). Within this research, I leveraged the use of interview data, organizational documents, and direct observation. Yin (2017) noted that no single source retains a complete advantage over the others, but instead, different sources are complementary. I used multiple sources of evidence to support data triangulation.

I gathered data by conducting semistructured interviews and analyzing documents. Semistructured interviews with open-ended questions are a key method employed to collect data for qualitative case study research (Pfeiffer, 2018). Moser and Korstjens (2017) defined interviews as a data collection method wherein a conversation is used by the researcher to pose questions, and the participants provide answers. Ranney et al. (2015) noted that the goal in performing the interview is that the participant will view the interview as an extended conversation, which for the data collector will yield data on the topic areas outlined in the interview guide. In addition to the interview, I maintained a journal of field notes and requested each participant to provide any company documentation to support their input.

In addition to the interview data, I conducted analysis on publicly available documents such as organizational websites and public records, while also requesting access to internal organizational documents such as policy manuals, incident reports, and strategic plans. Yin (2017) noted that electronic and paper documentation is likely to be relevant to case studies. Moser and Korstjens (2017) stated that documentation can be used to corroborate data collected during interviews. Sources such as emails, memorandums, and policies are often uncovered during interviews (Patton, 2014). Therefore, I reviewed publicly available documentation and requested access to internal documents that were uncovered. The document analysis was performed on all documents that I was provided access to and similarly indicated additional supporting documentation that was too sensitive to share.

I also used direct observation as a source of data. Patton (2014) explained that observations include a full range of interpersonal interactions, and Yin (2017) claimed that direct observation can be provided through social or environmental conditions available during data collection. The observations captured during the interviews can be used to capture environmental conditions that may contribute to the phenomenon (Phillippi & Lauderdale, 2018; Torelli, 2019). I documented my observations throughout the interviews for use in my analysis.

During the interviews, I followed the interview protocol and asked the interviewees questions. One of the primary advantages of semistructured interviews is that the data collection technique enables the interviewer to use follow-up questions based on the participant's responses (Kallio et al., 2016). As part of the interview protocol, which is outlined in Appendix D, the follow-up questions were included.

The interview protocol included open-ended questions and prompts to ensure the uniformity of interviews across participants. It also detailed the rules and guidelines to be used while conducting the interviews, the pre- and post-interview guidelines, and the set of open-ended questions to be asked during the interview (Castillo-Montoya, 2016; Dikko, 2016). Using the protocol, I began with an explanation of the purpose of the investigation. I then read the consent document to the participants to ensure that they understood their options in respect to continuing and discontinuing the interview at any time. I also identified their signature on the consent form or email receipt and asked for their permission to record the interview. Open-ended questions (see Appendix D) were used to guide the interview, and probing questions were asked to solicit clarification. I also rephrased the answers to ensure that I accurately captured their intended meaning. Throughout the interview, I documented my direct observations as field notes.

In an iterative manner, I performed member checking and transcript review to enhance the reliability and validity of the data collection process. I remained mindful of any gaps or ambiguities within the data collected. Verifying the data, findings, and interpretations with the participants is called member checking (Patton, 2014). Birt et al. (2016) claimed that member checking is a means of exploring the credibility of results. It is a means by which the participants are queried to check, comment on, or approve the researcher's data or interpretation (Netta, 2018). I performed member checking by verifying the data that I had collected from each individual and my interpretation of the data through follow-up conversations where I requested their concurrence. During the follow-up conversation, I provided ample opportunity for each participant to add further information. Part of the member checking process included transcript review.

The transcript review was offered to each participant to ensure accuracy in data collection and interpretation. Varpio et al. (2017) noted that transcript review allows participants to consider if their intended meanings are represented. Nadja (2018) stated that transcript reviews may occur in person or via electronic communication such as email. Similarly, Busetto et al. (2020) claimed that summaries of transcripts may be presented to participants and they can be asked whether they believe this is a representation of their views. I offered the transcript review to each participant and I reviewed summaries of the transcripts during member checking.

I compared the transcripts of the interviews with documentation gathered by the organizations and the field notes captured during the interviews. Reliability and validity are two components linked to academic rigor, according to Morse (2015). To be considered reliable, Morse stressed, the data collection instrument must have the ability to obtain the same results if the study were repeated, and to be considered valid, the data collection must represent the actual situation under study. To ensure reliability, the data collection protocol and interpretation of interview transcripts remained consistent for each participant. Wong and Cooper (2016) claimed that the use of member checking or participant feedback during a review of the transcripts enhances validity. Therefore, member checking, which included the interviewees' review of their transcript, the evaluation of my field notes, and the comparison of interview data to organizational documentation were leveraged to enhance reliability and validity.

Data Collection Technique

Upon approval by Walden University's IRB to proceed, I obtained the list of names and contact information from the case organizations' gatekeepers. Once the list of names was collected, I included names in a spreadsheet to allow for uniform tracking of progress with each participant. I then contacted each participant to meet (establish credibility) and gain their interest in the study. I included a discussion on informed consent, ensured that I obtained a signed copy of their informed consent form, and shared a copy of the organization's letter of cooperation. I then used this time to request any organizational documents, answer any questions, and establish a time and location for the interview.

As I began the semi structured interviews, I followed the interview protocol. The interview protocol (see Appendix D) served as a guide throughout the interviews. The interviews occurred in a comfortable environment where I at first talked with each participant to help them relax. Berger (2015) claimed that creating an open environment of information sharing is essential to interview success. The interviews began with an explanation of the research study and a review of their consent. I used open-ended questions as outlined in the interview protocol and asked probing questions to solicit clarification. I recorded each interview and captured observations to allow for richer data analysis. The recorded interviews were transcribed for data coding and analysis, as well as for use in verifying accuracy in data collected from the participant. As the interviews concluded, I thanked each participant and requested a follow-up discussion to review the transcripts within the next two weeks.

For the follow-up discussions (member checking), I also asked each participant to validate my interpretation of their responses. The data collected during the interviews provided the initial data for the study, and the triangulation included member checking, a review of my notes, and document review. Member checking is a technique applied to explore the credibility of results and is also known as participant validation (Birt et al., 2016). De Massis and Kotlar (2014) noted that member checking allows the participants to review the researcher's interpretations and agree, make corrections, or provide additional information, or all three. Baur et al. (2015) recommended recording and then transcribing interviews. I read the transcription and listened to the audio simultaneously to ensure I had captured not just the words, but also the intent in each response. I compared my observations, the participants' responses, and the organizational documentation collected. Recording the interviews, transcribing the sessions, and comparing these with my notes and organization documents enhanced my interpretation of the data. I contacted each participant to conduct follow-up interviews to ensure that the information that I had collected was documented correctly, and to allow me to ask any follow-up questions, thereby helping me to reach data saturation.

The advantage of this data collection technique is that it allows the participants to ensure that the researcher's understanding reflects the information they intended to convey during the interview. During the process of member checking, the participants were provided with an open opportunity to include any clarifying information. Document analysis can provide insight into organizational structures and the tailored practices employed within each company (Barglowski et al., 2015). The documents collected or reviewed here were used to provide corroborating evidence for the identified perspectives and themes (Siegner et al., 2018). A more complete description of the document analysis is presented in the data analysis section.

The use of my notes helped me gain additional insight. Observations about the participant's verbal or nonverbal response as part of the interview protocol support triangulation (Brown, 2015; Pearse et al., 2019; Tecau, 2018). The advantage of observations is that they helped me to gain additional information from the interview participants. While this technique for data collection has many advantages, it also has some disadvantage regarding the time demand on the participants. As part of member checking, a follow-up conversation was conducted with participants to corroborate what was communicated during the interview sessions with what was observed and found in documentation. This iterative process continued until data saturation was achieved.

Data Organization Techniques

To ensure that access to the data was controlled, and that I retained easy access to the data collected, I used a structured format for storage and organization. Rigor in data collection fundamentally influences the results of the study (Kallio et al., 2016), however, the data organization must be managed. Computer software such as Excel or NVivo facilitates the data analysis process for researchers, while maintaining the research data in an accurate, concrete, and comprehensive manner (Cayir & Saritas, 2017). As data was collected, it was catalogued and analyzed using a combination of Excel and NVivo. Excel was selected for its ability to pivot and transition into a database format should the need arise, but initially, it was used for its logical representation of data collection and themes. NVivo was selected for its ability to accept multiple data types, organize collected data, and represent the themes. The collection through audio-recorded interviews, my notes based on observations, and supporting documented evidence was organized using Excel and NVivo to ensure that the data were linked back to the sources. Each source of data was located within labeled folders to identify the source of the data, whether it was digital or physical. However, the participants and their organizations were not explicitly named to ensure their anonymity. As previously described in the ethical research section, all digital data collected was kept in an encrypted and password protected folder on a USB drive that will be stored within an access-controlled safe, along with any collected papers. This combination of software and storage was used to ensure that the data remained both organized and that access to the data was controlled.

The data was acquired in many formats, such as through digital interview recordings, physical interview notes, and digital and physical documentation. All data were managed through this structured format to safeguard the sources and data collected. In a separate, password-protected spreadsheet, a matrix was used to match each participant to a code. For instance, the first participant was listed as Participant 1, the second as Participant 2, and so on. Organizational documents were treated in the same way, such as Document 1 and so on. Similarly, the case organizations will be coded in a similar manner, such as Organization 1. The digital data collected in this research were stored in a private, password-protected computer and was further guarded within a password-protected folder. All physical data collected in this research was stored within a locked safe with the appropriate physical access controls to ensure the data always remained secure. The digital and physical data will be retained for five years after completion of the study and will then be destroyed.

Data Analysis Technique

There are four types of triangulation for case studies: data, investigator, theory, and methodological (Wilson, 2014). Triangulation is used to gain a broader, deeper, and more comprehensive understanding of the data, and as a source for enhancing knowledge about the issue in question (Flick, 2017). The objective of my data analysis was to search the data until meaningful answers to my research question emerged. I used data and methodological triangulation in my study in order to gain a thorough understanding of the collected data.

Data triangulation is a form of triangulation applied when the gathering of multiple sources of data come from several people or over time, while methodological triangulation refers to using different methods to collect the data (Hussein, 2015; Wilson, 2014). Fusch and Ness (2015) claimed that investigator triangulation involves multiple investigators and that theory triangulation is the application of multiple theories to answer the research question. Within my study, I used data and methodological triangulation because the data came from multiple sources, and it was analyzed and correlated through multiple methods. Because I was the only investigator, investigator triangulation was not appropriate. Additionally, since I leveraged just the TAM as my lens, theory triangulation was also not appropriate for use in this study.

Analysis of the data is an iterative process whereby the data is systematically searched and reassembled to allow concepts and meaning to emerge (Noble & Smith, 2015). Data analysis can be an intensive process that requires time and meticulous study (Yakut & Saritas, 2017). To assist in the organization of data collected via multiple methods, dividing them into categories, developing themes, and providing support in coding, computer software may be leveraged (Yakut & Saritas, 2017). Through inductive approaches specific cases provide generalized data application (Papautsky et al., 2015). This differs from deductive approaches where generalized data is assumed to apply to specific instances (Papautsky et al., 2015). Inductive approaches to coding rely on themes to emerge from the data collected (Kruth, 2014; Papautsky et al., 2015). I used an inductive approach and I coded the data based on the analysis of the data, research questions, and the conceptual (TAM) framework. I continued data collection until no new insights were gained from the data.

The experience of gaining deep and insightful interactions with the data is expected to aid the researcher in properly interpreting the data (Maher et al., 2018). In this study, these interactions with the data, intended to make sense of the data and generate understanding (Maher et al., 2018), were supported using a computer-assisted analysis tool, NVivo. NVivo is a software tool that is intended to support qualitative analysis through storage and organization, categorization and analysis, and visualization and discovery features (QSR International, n.d.). In addition to NVivo, Excel and a research journal were used to sort and track the data collection and analysis. The tools described were used to perform transcription, support coding, draw correlations among themes, and develop models (Yakut & Saritas, 2017); however, as the researcher, I remained central to the data analysis as the primary research instrument.

I analyzed the interviews by listening to the audio recording, viewing the transcript, and reviewing my notes. I reviewed all participant-provided and public data about each of the DBEs, such as websites, news articles, and social media, for the identification of supporting evidence. I reviewed my observations and tracked data collection and analysis within an Excel spreadsheet. I inputted data into NVivo to support further exploration of the codes and themes by searching for keywords and patterns. I also used NVivo to support mind-mapping and report generation. I continued to execute these steps as an iterative process until no new themes emerged.

Data saturation was achieved per participant and case organization. As an iterative process, the data analysis shapes decisions for subsequent data collection decisions (Korstjens & Moser, 2018), which begins with the very first data collected and continues until saturation is achieved and no further coding is feasible (Fusch & Ness, 2015; Sandelowski, 2000). Throughout my study, I performed transcript review, searched for public and private documentation, and applied member checking to ensure that I reached saturation. In addition, I continued to identify and seek out additional interview participants for each organization. No additional potential participants were included in this study. I also continued to monitor the advance of literature to gain additional insight. Combining this iterative approach to data collection and analysis, I obtained confirmation of themes emerging in response to the research guiding this study.

Document analysis was used as a means of triangulation. According to Cardno (2018), triangulation using document analysis adds additional rigor to a study. Mackieson et al. (2019) noted that document analysis is used to corroborate findings across different data sets and is used to help reduce the impact of potential bias. Document analysis includes content analysis and thematic analysis. Moreover, Mackieson et al. described content analysis as a process to organize data into pre-determined categories in an exploratory study and thematic analysis as a means of identifying, interpreting, and extracting patterns of meaning in the data. I performed a systematic process of reading and interpreting the printed and digital documents to support the NVivo software. Yin (2017) noted that sometimes important messages may be inferred, or the data collector is required to read between the lines. I used document analysis as a means of triangulation in my data collection and analysis by analyzing the content and themes.

Qualitative research analysis follows a five-phase cycle. Yin (2015) described the five-phase cycle as consisting of: (a) compiling, (b) disassembling, (c) reassembling, (d) interpreting, and (e) concluding. I used this phased process to guide my data analysis. Once I completed the interviews, captured my observations, and collected the organizational documents, my data was compiled similar to databasing. I then moved into the disassembling phase where the data was broken down into smaller pieces and labeled, and where logical groupings of data and themes began to be presented. By understanding the data at a granular level based on disassembling the data, the substantive themes, groupings, and sequences were organized into logical arrangements. Upon completion of the rearrangement, or reassembling procedure, I then began to interpret the data.

Although I used NVivo to help with the visual representation of the data, as the researcher, I created the analytic narrative based on multiple recompilations of the data to identify representative data correlation. I then transitioned into the concluding phase, where I drew conclusions related to the interpretation of collected data.

Key themes were distinguished from all other themes in the data by coding the data. Yin (2015) claimed that the purpose of coding is to begin moving methodically toward a higher conceptual level where the codes will inevitably represent meanings inferred from the original data. Yin also recommended that in order to illustrate the coding derived from the five-phased cycle, a schematic diagram that takes the form of a conceptual tree could be used. The most tangible concepts are the initial level 1 codes, with the next higher level of abstraction being considered level 2 codes, which might combine two or more level 1 codes. Yin went on to explain that at the most abstract level, theoretical statements represent the significance of the research interpretations and conclusion to literature. I used this model of coding, supported by NVivo software, to distinguish the key themes from all others.

Reliability and Validity

Evaluating the quality of research is essential. However, there is no accepted consensus regarding the standards by which qualitative research should be judged (Noble & Smith, 2015). According to Sandelowski (1993), rigor in qualitative research is less about adherence to the procedures and rules than it is about fidelity to the spirit of the research. Long and Johnson (2000) noted that there is a consensus that research studies must be open to critique and evaluation. Without an assessment and proof of the soundness of the method, the accuracy of the study findings, and the integrity of the assumptions and conclusions, ambiguous or meaningless studies may result in wasted time and effort (Long & Johnson, 2000). To ensure that the research is of high quality, it is important that data is obtained from reliable and valid sources.

Reliability may be described as the degree of dependability with which an instrument measures that which it was designed to measure (Long & Johnson, 2000). Guba and Lincoln (1989) stated that dependability is equivalent to the conventional criterion of reliability because it is focused on the constancy of data over time. Long and Johnson (2000) recognized validity as the determination of whether a measurement instrument measured what it is purported to measure. To address reliability, I used an interview protocol and performed member checking. The interview guide was intended to ensure consistency in the process across interviews, while the member checking ensured that my interpretation of each participant's responses was consistent with their intended response. To address validity, and to ensure that the instrument measured what it was supposed to measure, I implemented several tactics. I ensured that my data collection instruments remained constant throughout the study, I ensured that all processes were explained clearly to all participants, and I ensured that as the primary research instrument, I remained consistent throughout the study.

Korstjens and Moser (2018) claimed that there are four quality criteria for all qualitative research. The quality, or trustworthiness, criteria include dependability, credibility, transferability, and confirmability (Rolfe, 2006). The following descriptions illustrate how I ensured that my high-quality research remained consistent.

Dependability

Dependability, which refers more to reliability (Rolfe, 2006), refers to the stability of findings over time (Korstjens & Moser, 2018). As defined by Morrow (2005), dependability refers to the consistency in the way that a study is conducted. The study should remain consistent across time, researchers, and analysis techniques. I used member checking and Yin's (2014) analytic phases to ensure reliability, stability of findings, and consistency in how my study was conducted. Morrow (2005) noted that there are several methods by which dependability may be witnessed through explicit and repeatable processes enacted throughout the study.

One key method to illustrate dependability in qualitative research is to include the careful tracking of the research design, data collection, and analysis (Morrow, 2005). Korstjens and Moser (2018) recommended the use of an audit trail to ensure dependability and credibility. They explained that the audit trail is a complete set of notes on the decisions made throughout the research process, including meetings, reflective thoughts, sampling, research materials adopted, emergence of findings, and any information regarding data management. I implemented an audit trail throughout data collection and analysis to support dependability and credibility of the study. Thus, through the detailed chronology of the research activities, processes, and influences on the data collection and analysis, a point of reference was achieved for review by peer researchers, advisors, or colleagues (Morrow, 2005). Similarly, the audit trail included emerging themes, categories, models, and any analytic memos. I implemented the use of a research log that would be available for review and represents the processes, biases, and limitations I encountered during the research.

Credibility

Several strategies were employed to ensure credibility. Corresponding roughly to the postpositivist concept of internal validity (Rolfe, 2006), credibility refers to the confidence that can be found in the truth of the research findings (Korstjens & Moser, 2018). Credibility is used to establish whether the research findings represent the data drawn from the participants' input and accurately capture the participants' original views (Korstjens & Moser, 2018; Morrow, 2005). Korstjens and Moser recommended prolonged engagement, persistent observation, triangulation, and member checking. I employed triangulation and member checking in my study. They also elaborated on triangulation, adding that it should incorporate data triangulation, investigator triangulation, and method triangulation. Data triangulation was achieved by gathering data from multiple persons across multiple sites, while method triangulation was achieved by using multiple methods to collect the data, such as interviews and documents. Member checking, which is the feeding back of data, analytical categories, interpretations, and conclusions to the participants (Korstjens & Moser, 2018), was achieved through follow-up conversations with each participant to receive confirmation that their intended answers were consistent with my interpretations.

Recorded and written transcriptions of the interviews were used to ensure credibility within the study. I also sought out publicly available and privately controlled supporting documentation that any of the participants provided to support the study. To further ensure that the data collected in this study was accurately collected, interpreted, and pertained to the research question, I performed member checking with each participant.

Transferability

Transferability, a form of external validity (Rolfe, 2006), refers to the ability of the reader to generalize the research findings to their own context (Morrow, 2005). Rolfe claimed that transferability is achieved when the researcher provides enough detail about the researcher and case, as the primary research instrument, for the reader to decide how the findings may be transferred to other studies. I have provided rich detail about myself as the researcher and case, to allow readers to decide if the findings may be transferred to other studies.

Korstjens and Moser (2018) elaborated on thick description as a strategy to ensure trustworthiness in qualitative research, recommending that researchers describe not just the behavior and experiences, but the contexts as well. I followed this recommendation to allow my behavior and experiences as a researcher to be more meaningful to the reader. To support the transferability of my study, I have provided complete descriptions of the research from beginning to end to allow readers to relate to the study and determine how to apply this research to future studies.

Confirmability

As recognized by Morrow (2005), confirmability refers to the acknowledgment that qualitative research is never objective, and addresses the core issue under study, as opposed to the beliefs and biases of the researcher. Rolfe (2006) expanded upon this explanation by noting that confirmability is primarily an issue of presentation. Confirmability, according to Korstjens and Moser (2018), is concerned with establishing that the findings are based on the data and not on the researcher's imagination. To support confirmability within my research study, I leveraged an audit trail that illustrated and recorded the research steps taken from the start of the project through to the reporting of the findings. Although participants and the organizations were anonymized in this research, I indicated from which participant each interview or other data was obtained. This chain of evidence further ensured the accuracy and neutrality of the data collected.

Data Saturation

Reaching the point at which collecting new data does not lead to the discovery of new information to answer research questions, also known as reaching saturation, is a critical aspect of qualitative research (Lowe et al., 2018). Using the techniques described in the data collection section, I achieved saturation through triangulation and member checking. Fusch and Ness (2015) claimed that saturation is achieved when there is enough data to replicate the study, yet no further coding is feasible. Hagaman and Wutich (2017) claimed that 16 or fewer interviews were necessary to identify common themes, but also acknowledged that there is significant debate about the number of interviews needed to reach data saturation for themes. Tran et al. (2017) claimed that the determination of the point of data saturation is complex because researchers only have information on what they have found. Essentially, researchers only know what they know. Tran et al. pointed out that researchers do not know what they have yet to uncover and therefore, the decision to stop data collection is solely determined by their own judgment and experience. I used triangulation of data sources to ensure that I had uncovered data from multiple sources.

Fusch et al. (2018) claimed that triangulation is one approach to mitigating bias and reaching data saturation. Triangulation not only adds depth to the data that is collected (Fusch et al., 2018), but remains a key concept to support validity and reliability in qualitative studies (Korstjens & Moser, 2018; Morrow, 2005; Rolfe, 2006). Therefore, as Fusch et al. clearly articulated, the importance of triangulation cannot be underestimated to ensure the reliability, validity, and saturation of the data and research. To ensure that I achieved data saturation, as well as to ensure the reliability and validity of the research study, I used triangulation. I gathered data from multiple sources in the form of interviews, observations, and documentation. I continued collecting data until no new themes emerged to answer the research questions.

Transition and Summary

Section 2 of this study has provided additional details about the project beginning with reiterating that the purpose of this research was to understand the strategies IT leaders in DBEs use to implement cloud solutions to minimize IT disruption resulting from human-made and natural disasters. The section included detail surrounding the role of the researcher, described the participants, research method and design, and the population and sampling. Additionally, the section provided a detailed discussion on the ethical research, data collection and organization, and analysis techniques to be employed. Finally, the section concluded with a discussion to describe how reliability and validity of the data would be met through dependability, credibility, transferability, and confirmability, while ensuring data saturation is achieved.

Section 3 presents the findings of my research and an overview of the study. This following section also describes the applications for professional practice, implications for social change, reflections, recommendations for future work, and conclusions resulting from the study.

Section 3: Application to Professional Practice and Implications for Change

The focus of this study was on exploring the strategies used by IT leaders in DBEs to implement cloud-based IT service continuity solutions. In this section, I present my research findings and their application to professional practice to positively affect social change. This section includes an overview of the study, presentation of the findings, application to professional practice, implications for social change, recommendations for action, suggestions for further study, a reflection on the research process, and a conclusion.

Overview of Study

The purpose of this qualitative multiple case study was to explore the strategies IT leaders in DBEs use to implement cloud solutions to minimize IT disruption resulting from human-made and natural disasters. I gathered data from semistructured interviews that I conducted with 16 IT leaders from two DBEs operating in Maryland and from document analysis. I used member checking to validate the study findings. The findings reveal three themes pertaining to the methods that the IT leaders used to implement cloud solutions: (a) alignment with business requirements, (b) sustaining business growth, and (c) trust in cloud services.

Presentation of the Findings

This section contains a discussion of the three themes that emerged during the study. I sought to answer the following research question: What strategies do IT leaders in DBEs use to implement cloud solutions to minimize IT disruption resulting from human-made and natural disasters? By answering the specific research question, the specific IT problem can be addressed: Some IT leaders in DBEs lack strategies to implement cloud solutions to reduce IT disruption resulting from human-made and natural disasters. My semistructured interviews with 16 participants focused on strategies to implement cloud solutions designed to minimize IT disruption. I also reviewed IT service plans, IT service continuity plans, public records, and SLAs. Both case organizations were forthcoming with documentation, although I also performed internet research on each organization as well. I received five copies of Organization 1's IT service continuity plan, three copies of Organization 2's IT service plan, and five SLAs and retrieved one document on each organization through internet research. Through data analysis, three main themes appeared from the research: (a) alignment with business requirements, (b) sustaining business growth, and (c) trust in cloud services. IT leaders in DBEs can use each theme to form a foundation for developing a strategy to implement cloud solutions to minimize IT disruption resulting from human-made and natural disasters.

Theme 1: Alignment With Business Requirements

Cloud technology has a significant impact on the way organizations align business requirements with IT (Zhang et al., 2020). The first theme to appear from the data was alignment with business requirements to ensure that the cloud-based IT service continuity solution remains compliant, reliable, and secure. This theme supports the position of Zhang et al. (2020) and appeared when I combined the reliable code, secure code, and compliant code. I applied the reliable code to data where participants or documentation described the need for reliable IT service. Similarly, I applied the secure code to data that described the need for secure IT service and the compliant code to data that described adherence to compliance for IT services. Fifteen of the 16 participants indicated that the alignment of cloud-based IT service continuity and business requirements is critical. These responses are consistent with the observations of Govindaraju et al. (2018) in that IT-business alignment is used by businesses to achieve objectives, market competitiveness, and financial performance.

Participant 1 stated that his decision to implement cloud-based IT service continuity solutions included reliability as a top consideration. He further stated that security was an aspect of consideration. Participants 1, 4, 5, 7, 8, 11, 12, and 14 agreed that the cloud solution's reliability was critical. Both case organizations use cloud solutions that are backed by SLAs. Within the documentation for both case organizations, reliability is not discussed, but it is addressed within the SLAs for which both organizations have signed up. For instance, the SLA for Organization 1, Document 1 commits to a 99.99% uptime for all included services. The SLA for Organization 2, Document 6, ensures a 99.95% uptime for included services.

The coding matrix, presented in Table 3, illustrates that security is considered less important to the alignment of business practices than reliability. As shown in Table 3, the security concerns expressed during the interviews and as reviewed in documentation accounted for only half the number of reliability concerns. Although all participants except Participants 2, 4, and 12 indicated that security was a factor in their decision, Participant 7 noted that while she recognized that putting data in the cloud means that someone else is holding the organization's information, the benefits make up for the paranoia. Participant 15 echoed these remarks by stating that security has developed on cloud infrastructures.

Documents 3 and 9 demonstrate the companies' commitment to security. These documents support the assertion by Chaves et al. (2017) that security should be designed into a service, not bolted on after the fact. The policy of Organization 1 (Document 3) stated that it is upon the company to ensure the complete security of their services. The policy of Organization 2 (Document 9) stated that although its hosting services provide security, confidentiality, and integrity of their services, the organization remains responsible for the backup of its sensitive and proprietary data.

Table 3

Codes for Alignment With Business Requirements

Code	Participant mention count	Document mention count
Reliability	46	12
Security	23	3
Compliance	3	1

Compliance, the third code attributed to alignment with business requirements theme, accounted for an even smaller number of participant transcript and document mention counts. Shalamanov (2017) asserted that compliance is a factor in improving cyber resilience based on best practices, which is consistent with the observation of this third code. Participant 4 stated that the organization needed to ensure that it was compliant with the industry in which it works. Participant 10 expanded upon this concern with a discussion of a new compliance requirement for businesses in the industry. Participant 10 said they planned for the Cybersecurity Maturity Model Certification and are thankful because many other companies will need to realign their IT practices to meet this new requirement. As listed in Document 5, an SLA for Organization 1, the services will comply with all laws and regulations applicable to their provision of services. However, the organization is responsible for compliance with any law or regulation applicable to its industry.

The research participants' responses and supporting documentation support findings from several researchers. In addition to Zhang et al.'s (2020) recognition of the need for organizations to align business requirements with IT, Govindaraju et al. (2018) claimed that IT-business alignment should allow businesses to achieve objectives, market competitiveness, and financial performance. Shalamanov (2017) asserted that compliance improves cyber resilience because it considers best practices. Several additional authors support the participants' responses within this theme.

Luglio et al. (2020) found that cloud-based service continuity solutions must be compliant with the business' legal and policy requirements to overcome flaws while enabling cloud solutions. Luglio et al. explained that compliance with laws and company mandates is typically tied to a balance between reliability and security. Stawowski (2018) supported this argument by noting that compliance and security in reliable service continuity solutions are challenges that many critical service providers face but remain paramount for essential services. Further, Baldwin (2019) stated that compliance should be tailored to the organization. Baldwin claimed that the requirement of compliance should be attributed to the size of the organization. As described throughout this theme, nearly all the participants recognized the need to align cloud-based IT service continuity solutions with business requirements.

The TAM, which is the lens through which this research was viewed, supports these findings. Once organizations understand security, reliability, and compliance standards, these business requirements and supporting practices support long-term adoption and effectiveness. The combination of the technology's PU and PEU are indicators of the users' attitude towards using the technology. Overall, PU is an indication of users' intention to use the technology (Kwee-Meier, et al., 2016; Teeroovengadum, et al., 2017). Using an inductive approach, I found that many participants, such as Participant 1, noted that it is easy to go with something with the bona fides behind it. Participant 9 amplified these comments by claiming that cloud solutions are easy to use. PU was also discussed by many participants, such as Participant 14, who noted that cloud solutions make her more productive because she can get to them from her laptop even while watching TV. She claimed that means she is more productive due to the convenience attributed to using cloud solutions.

Theme 2: Sustaining Business Growth

The second theme to appear from the data was sustaining business growth. This theme was derived from the participant interviews and organizational documentation. In agreement with this theme, Ghimire et al. (2020) claimed that sustaining business growth was equally important in determining cloud-based strategies that IT leaders use to implement cloud solutions to minimize IT disruption resulting from human-made and natural disasters. In many cases, cloud-based services were being used to improve business profits and accelerate business growth. Cloud-based IT service continuity solutions improve performance by offering a flexible, balanced approach to allocation of resources (Teixeira et al., 2019). All participants indicated that factors such as cost, flexibility, and the infrastructure's ability to scale with business growth were important to the DBEs selection of cloud solutions.

This theme appeared when I combined the cost, flexibility, and scalability codes. According to Lima et al. (2018), flexibility and cost of cloud services are intertwined with business growth and scalability. These considerations ultimately render traditional IT service continuity solutions ineffective because they will not be able to provide the flexibility, reliability, and scalability desired by businesses (Jain et al., 2020).

I applied the cost code to data where participants or documentation described the need for cloud-based IT services to be free or low-cost. Similarly, I applied the flexibility code to data that described the need to allow a non-rigid solution based on disruption experienced by the COVID-19 pandemic. I also applied the scalability code to data that described trade-offs among cost, flexibility, and usage. Table 4 presents the participant and document mention counts based on the coding matrix for sustained business growth.

Table 4

Codes for Sustaining Business Growth

Code	Participant mention count	Document mention count
Cost	44	7
Flexibility	21	1
Scalability	9	0

In agreement with statements by Ghimire et al. (2020) and Teixeira et al. (2019), all but one participant described the cost as a strategic consideration in the selection of cloud-based IT services intended to minimize IT disruption. Participant 3 stated that the DBE needed to make sure it could afford whichever solution was decided upon. Participant 2 said the DBE selected cloud-based IT services partially based on cost because the organization did not have to incur the additional costs of hardware, administration support, or a physical location in which to house equipment. In Documents 4, 5, and 10, the SLA documentation for both organizations, the service providers claimed that, if the service uptime guarantee was not met, the customers would be eligible for service credit to be applied to their monthly bill. Participant 15 stated that the organization has to manage the number of users because once the organization goes over 10 users, the costs increase significantly.

Consistent with the participants' cost statements, Rigg (2021), found that small businesses leverage cloud computing to support ongoing business operations because it offers benefits in cost, flexibility, and scalability points supporting business growth. Rigg stated that cost is the primary benefit because it allows small businesses to dedicate critical resources to operating expenses (OpEx) instead of major purchases or investments in capital expenses (CapEx). By focusing resource allocations on OpEx instead of CapEx, small businesses can spend more time dedicated to operating and growing. Hamadah and Agel (2019) support the assessment shared by Rigg and go on to explain that the minimized costs for recovery time objective (RTO) and recovery point objective (RPO) have proved efficiency in providing IT service continuity when compared to traditional services.

Twelve of the 16 participants and Document 9 listed flexibility as a contributor to their selection of cloud-based IT services being selected to ensure IT disruption is minimized. These participant responses are consistent with Rigg's (2021) findings. Participant 8 stated that not everyone works in the same office. Therefore, having the ability to work on the same platform from different locations was a driving factor in selecting cloud solutions. Participants 9 and 14 noted that cloud-based services have been helpful in continuing work throughout COVID shutdowns when offices were shut down for months. Participant 13 expanded on the impact COVID shutdowns had, wherein the participant noted that when their office building is shut down, or the whole state for that matter, the employees have the flexibility to work from home.

The third code attributed to the sustainment of business growth is scalability, and although it accounts for a relatively small participant mention count and nonexistent document count, as Lima et al. (2018) noted, the terms are intertwined. As Participant 11 said, in making their decisions, the IT leaders were aware that one of the pitfalls is the added cost that comes with scope creep. Rigg (2021) and Participants 1, 2, 3, 8, 9, 12, 13, and 15 shared these same concerns. However, the concerns of cost increase tied to increased usage were not mentioned in the documentation, such as SLAs for either organization.

Other authors, such as Muflihah and Subriadi (2018) and Alshammari and Alwan (2018), also supported this theme of essential factors common to IT service continuity and business growth. By marrying the IT service continuity plans with the cloud-based IT infrastructure, small businesses are provided flexibility in their plan that can be updated as business needs evolve (Muflihah & Subriadi, 2018). The use of cloud-based infrastructure not only reduces cost but also ensures the availability and flexibility of services considered vital to business sustainment and growth (Alshammari & Alwan, 2018). All participants in this research study indicated that cost, flexibility, and the infrastructure's ability to scale as the business grows, were important decision points for the IT leaders as they selected cloud solutions for the DBEs.

The TAM also supports these findings. The IT leaders identified cost, flexibility, and scalability as requirements to sustain business growth. These decision points helped ensure short- and long-term adoption and effectiveness of cloud-based solutions designed to ensure IT service continuity. As highlighted by the cost and scalability codes, the participants selected cloud-based solutions designed to mitigate IT service disruption believing that the services would help them sustain their business growth over time. This aspect indicates PU. As Liu and Chou (2020) noted, PU indicates that when users believe that a system will help them perform better, their attitude towards the system is positively influenced. Similarly, the flexibility code illustrates the PEU. When users believe that a system is easy to use, they are more willing to use it (Liu & Chou, 2020). Participant 9 noted that the DBE only has to pay for subscriptions and not maintain hardware with the cloud solutions, which helps to keep it free from effort. As Participant 2 stated, the solution needed to be useful in the short and long term. These two codes are attributed directly to PEU, while Participant 7's claim that cloud services allow the flexibility to work from anyplace supports PU.

Theme 3: Trust in Cloud Services

The third theme to appear from the data was trust in cloud services. This theme considers the ease in adopting the solution, industry acceptance, and continued support factors. Singh and Mansotra (2019) stated that while the ease in adopting a solution may be supported by cloud vendors, the ongoing support and industry acceptance lead to the organization's trust in cloud service. This theme appeared when I combined the ease in adoption, industry acceptance, and continued support codes. These codes are consistent with the factors quantified by Han (2021) in measuring privacy and trust in cloud services.

I applied the ease in adoption codes to indications of complexity in learning cloud services and comfort with the cloud environment. I applied the industry acceptance code to the trust represented across the industry of existing cloud adopters, and I applied the continued support code to mentions of service support guarantees based on reputation and documentation. Table 5 presents the participant and document mention counts based on the coding matrix for trust in cloud services.

Table 5

Codes for Trust in Cloud Services

Code	Participant mention count	Document mention count
Ease in Adoption	35	2
Industry Acceptance	40	1
Support	40	14

All participants indicated that ease of adoption was a critical aspect that influenced trust in cloud services. These responses by research participants echo the position of Amron et al. (2019) in that ease in adoption contributes to the implementation of cloud computing. Documents 2 and 8 described adoption support or migration as a service. It was explained by Participant 2 that the organization determined what they could manage on their own, without a huge burden. Twelve participants noted that little to no training was required to adopt cloud solutions. According to Kesa and Draus (2019), the internet is one of the driving factors for ease in adopting cloud services. The documentation for both organizations confirmed that the cloud services had been adopted and are in use.

The second code for this theme is industry acceptance. While there was only one mention in the documentation for these organizations attributed to industry acceptance, there were many responses indicating that industry acceptance was a key contributing factor in the IT leaders' decisions to implement cloud solutions to minimize IT disruption. These responses affirm observations by Amron et al. (2017) that acceptance directly supports the trust in implementing cloud solutions. The IT service plan for Organization 2, Document 9, explicitly lists two industry partners leveraged to ensure IT service continuity. Fifteen of 16 participants mentioned that industry acceptance was an important data point in their decision. Participant 1 stated that name recognition and a well-known product were important, while Participants 2 and 10 indicated that part of their strategy was to look at what everyone else was doing. Participant 11 said that while they use the tools familiar to everyone else in the industry, they were also interested in using the same solutions as most of their customers. This aligns with a research study by Idoga et al. (2019), where the authors found that what others in the industry are using for cloud solutions impacts trust when adopting new services.

The final code within the trust in cloud service theme is support. The documentation included 14 mentions of support, while the participants mentioned support as a determining factor 40 times. These responses are consistent with Amron et al. (2019) and Lee and Brink (2020) assertions that high dependency on the cloud providers requires assurance in continued support to ensure reliability of the infrastructure. Support is mentioned in both organizations' documentation, including within the service continuity plans and SLAs provided by their service providers. All 16 participants, except for Participant 4, described support as a determining factor. Participant 8 stated that they selected a provider that they knew would support them regardless of what happened. He noted that even in the best-implemented solutions, there is always something that can go wrong. Participant 15 stated that their decision to implement cloud-based IT services was directly tied to ensuring they had paid SLAs. Participant 6 stated that cloud-based services with SLAs helped in their decision because they do not have internal resources dedicated to administering IT infrastructure.

The TAM supports these findings as well. The IT leaders identified ease of adoption, industry acceptance, and support as requirements for trust in cloud services designed to ensure IT service continuity to minimize IT disruption resulting from human-made and natural disasters. As illustrated by the ease in adoption and support, the IT leaders believed that the service providers would ensure the services were easy to use. These codes demonstrate PU, which directly supports the intention to use aspect of the TAM. Similarly, the industry acceptance code highlights the IT leaders' attitude towards using the services due to the assumption that the services require little or are free of effort. Tripathi (2019) stated that IT leaders could leverage cloud computing to remain agile in response to environmental changes, such as human-made and natural disasters, while also focusing on developing innovative applications instead of spending time installing and maintaining servers. Tripathi also noted that small businesses are more likely to adopt new technologies such as cloud computing due to its PU and PEU. Participant 10 claimed that their strategy was to spend less and work more, which she explained means that they wanted solutions that did not force them to spend all their time maintaining the infrastructure. Still, instead, they wanted to spend their time making money for the DBE. Participant 15 noted that one objective to ensuring the service was easy to use was to ensure that whichever cloud solution was decided upon came with a service guarantee. Participant 1 also stated that as a small business, they do not have the ability to build their own cloud-based system, so they rely on the solutions that come with an SLA and are trusted by others in the industry. Documents 1, 4, 5, 6, and 10 describe the service guarantees for each organization.

Applications to Professional Practice

This study's findings, the outcome of the analysis performed using TAM as the conceptual framework, and the scholarly literature review contribute to the discussion of cloud solutions employed by IT leaders at DBEs to minimize IT disruption resulting from disasters. The specific IT problem that formed the basis of this research is that some IT leaders in DBEs lack strategies to implement cloud solutions to reduce IT disruption resulting from human-made and natural disasters. The results of this study indicate that cloud solutions intended to support IT service continuity must meet several criteria.

Brandon-Jones and Kauppi (2018) and Hsiu-Mei and Shu-Sheng (2018) noted that PU impacts a user's intention to use technology, while the combination of PU and PEU ultimately impacts a user's perceived attitude towards using technology. Teeroovengadum et al. (2017) also claimed that PEU differs based on culture. The criteria expressed by the participants of the study and in the organizational documents indicate that the organizations considered PU and PEU in their decisions to implement cloud solutions.

The participants in this study provided insights into their criteria and methods for selecting cloud solutions to minimize IT disruption. Most participants stated that they relied on personal knowledge to build their strategies and did not use robust frameworks such as COBIT, CMMI-SVC, or ITIL. I identified three primary themes while analyzing data: alignment with business requirements, sustaining business growth, and trust in cloud services.

Based on the research study's outcome, my findings illustrate that successful IT leaders in DBEs should effectively employ three effective strategies in implementing cloud solutions to reduce IT disruption resulting from human-made and natural disasters. Mainly, IT leaders in DBEs should consider business requirements as a primary criterion in implementing cloud solutions intended to support IT service continuity. The factors that support the sustainment of business requirements include (a) reliability, (b) security, and (c) compliance. Govindaraju et al. (2018) and most of the participants in the study highlighted the importance of aligning business requirements with cloud-based IT service continuity solutions. Solutions designed to meet business requirements increase PU and PEU's degree that IT leaders in DBEs experience when selecting cloud solutions.

Secondly, IT leaders in DBEs should consider the sustainment of business growth to implement cloud solutions intended to support IT service continuity. The factors supporting business growth included (a) cost, (b) flexibility, and (c) scalability. Jain et al. (2020) stated that these considerations overshadow traditional IT service continuity solutions because they will not provide the same level of flexibility and scalability for the cost. These factors positively influenced PU and PEU because the IT leaders believed the value of cloud solutions outweighed traditional solutions.

Thirdly, ensuring trust in the selected cloud services is a strategy that IT leaders in DBEs should consider. The factors contributing to trust in cloud services included (a) industry acceptance, (b) ease in adoption, and (c) vendor support. Consistent with concerns asserted by Singh and Mansotra (2019), cloud vendors may support the ease in adopting solutions. This, in conjunction with ongoing support by the vendor or a third-party and industry acceptance, positively influenced PU and PEU because the IT leaders in the DBEs identified the support and acceptance as beneficial.

Applying these strategies to professional practice calls for IT leaders in DBEs to incorporate these approaches towards implementing cloud solutions to minimize IT disruption resulting from human-made and natural disasters. The outcome of my research implies that the application of strategies used by successful IT leaders in DBEs to implement cloud solutions to minimize disruption resulting from human-made and natural disasters may provide other IT leaders an essential guide to operationalizing solutions tailored to the DBE's requirements. My study's findings align with the TAM because successful IT leaders in DBEs bring together three main strategies to ensure IT disruption is mitigated using cloud solutions.

The findings of this study are meaningful to IT leaders in DBEs because they provide strategies that other IT leaders have used to develop and implement cloud solutions to minimize IT disruption resulting from human-made and natural disasters. The findings shed light on why decisions are made to pursue cloud solutions compared to traditional IT services. Addressing the alignment of cloud solutions with business requirements (reliability, security, compliance), sustaining business growth (cost, flexibility, scalability), and trust in cloud services (industry acceptance, ease in adoption, and vendor support) will better equip IT leaders in meeting the DBE's goals in minimizing IT disruption while balancing practical small business concerns.

Implications for Social Change

This study aimed to provide an understanding of the rationale and choices made by the IT leadership of DBEs. By understanding the rationales and choices made of this vulnerable population of companies, similar businesses may leverage this insight to survive through and beyond disaster. This research positively impacts change on IT and business practices for DBEs, which ultimately results in positive social change for the people and communities.

According to the SBA (n.d.), there are over 28.2 million small businesses in the United States. This large number of small businesses accounts for 46% of all private-sector jobs. With such a large percentage of the U.S. population relying on these continued services, the closure of DBEs results in cascading failures for the employees, their families, and their communities. Therefore, when DBEs survive disasters, the economic stability for families and environments impacted by the company is enabled.

The strategies shared within this study may result in the continued employment of personnel within the company. This study may be a vehicle for positive social change if the DBEs can operationalize the knowledge and continue to focus on their impact on society. Some of the changes that the employees, families, and communities may experience include sustained and steady business services that impart positive results on society. The positive social change may be a result of the study. However, the positive change will be felt by communities, families, and individuals.

Recommendations for Action

IT leaders should review the organizational processes that cloud-based IT services support. The findings in this study show that alignment with business requirements, sustainment of business growth, and trust in cloud services drive the selection of cloud-based IT service continuity options. IT leaders should seek to understand the value of proposed, informal solutions in the form of cost, flexibility, and scalability to ensure that the solution will receive executive support. The IT leaders should verify with potential solution providers that the requirements of reliability, security, and compliance will fall within the organization’s required limits. Before selecting a solution, they should evaluate customer reviews, and perform queries of peers in the same industry to understand which solutions are the most accepted. IT leaders need to understand the level of effort required to adopt a solution and the level of support throughout integration and maintenance the supporting cloud solution provider offers. The leaders should ensure that the complete strategy remains current within the organizational documentation and that methods to reach points of contact are verified regularly.

IT leaders should ensure that the cloud-based IT service continuity practices are built into everything the small business does and that the IT service continuity is not isolated. The cloud-based IT service continuity level of support should be aligned with the organization’s most critical operational practices based on a business impact analysis and associated risk framework. This will ensure that continuity of high-risk tasks requiring IT service remains intact during human-made or natural disasters.

Organizational policies and plans that drive cloud-based IT service selection should be based on shared knowledge and not just personal experience. Many participants in this study leveraged their personal experiences when designing cloud-based IT service continuity solutions. This study provides an exploration of practices used by multiple successful DBEs that can provide a framework for other DBEs within Maryland to follow.

IT leaders should design cloud-based IT services with continuity in mind and not wait until the DBE is a larger organization with separate threaded processes relying on disparate infrastructure. Supplier and partner relationships should be fostered and grown so that the IT leaders remain fully informed of changes to supporting organizations that might impact SLAs, cost, or compliance. IT leaders should regularly test the cloud-based IT service continuity solution by isolating and eliminating processes performed on adjacent infrastructure. Finally, the strategies should continuously evolve to ensure that the most appropriate IT service continuity solution and service options continue to support the organization daily with plans to mitigate disruption.

The significance of this study is particularly important to IT leaders in DBEs. The findings of this study are also significant for any cloud-based IT-supported organization or supplier of cloud-based IT services. The strategies revealed by the findings of this study are as follows:

- alignment with business requirements,
- sustain business growth, and
- trust in cloud services.

IT leaders can further enhance the critical components of the cloud-based IT service continuity plan to develop alternative strategies that support different cost, security, and flexibility options. I will disseminate the results of this study through conferences, journal engagements, and training. I may also disseminate these through consulting practices.

Recommendations for Further Study

The findings of this study present various insights into practices IT leaders in DBEs use to ensure IT services continuity through human-made or natural disasters. The research, as with any research, includes certain inherent limitations. Initial limitations identified before conducting the study include the possibility that the participants could be following the same practices. Similarly, the organizations could be leveraging outsourced IT leadership support, thereby causing a deviation in their answers to interview questions. Before engaging participants and organizations, I recognized the potential that the organizations might not be willing to share organizational data due to their proprietary nature. Most of these limitations were mitigated using a multiple case study, wherein the participants followed similar but isolated practices. I found that IT leadership was not outsourced by either case organization. However, cloud solutions were largely outsourced. The committee and chair guidance, and the IRB requirements, mitigated concerns about participants sharing organizational documents.

However, several additional limitations were identified throughout the study. For instance, qualitative research can lead to unintended bias because it can be subjective, depending on how the results are interpreted by the researcher. While safeguards are applied to mitigate potential bias, it is possible that it crept into the study, though I was unaware of this. The study participants were IT leaders in DBEs who must have worked in the role for at least three years, must work or live in Maryland, have supported IT service continuity, and must have experienced IT disruption. Limitations based on these criteria include job role, industry, and geographic location. I conducted the study on DBEs. I recommend that further research expands into other organizational sizes, industries, job roles, and geographic locations. Additional opportunities for further research include the following:

- researchers can perform a quantitative or mixed-methods approach to measure the effectiveness of cloud-based IT service continuity practices,
- researchers can explore this topic through the lens of a conceptual framework other than TAM, and
- researchers can explore how a formal ITSCM checklist used by COBIT, CMMC-SVC, or ITIL is met based on small business concerns.

Further research will help promote positive social change by seeking to help other businesses identify cloud-based IT service continuity strategies and ultimately provide continued services with sustained employment for the personnel.

Reflections

I have worked in IT for over 30 years, and I understand the need for IT service continuity. I have experienced IT service continuity in cloud-based and traditional IT infrastructure. I have seen the impact that human-made and natural disasters have on organizations, supporting infrastructure, and ultimately, personnel. Throughout this study, I made efforts to remain unbiased and to ensure an objective approach was adhered to throughout the study and the documentation of results. Throughout data collection, I performed semistructured interviews, where I followed a uniform sequence of events leading up to the scripted interview session. Aside from the discussed data collection efforts, I did not pursue conversations with participants. I accepted the data collected during the interviews and within the documentation as is. Once I transcribed the interviews and compared the data with the documentation, I performed follow-up communications to ensure that I properly captured each participant's intended responses.

Throughout the process, I met several very experienced IT professionals who share the same passion for IT as those of us in the DIT program. Through triangulation to support verification, I learned a valuable rationale for why some options were selected over others. In addition to the study itself, this process has allowed me to meet with IT professionals within my region more than I have done previously. The result of these meetings has been gained access to IT resources with complementary specializations within the region. Overall, this experience has been beneficial for me as an IT professional. I am excited about sharing this research with colleagues in the local IT industry. I hope that IT leaders can leverage these valuable insights to ensure that organizations can continue operations to serve local communities regardless of human-made or natural disasters and that their personnel will experience sustained employment.

Summary and Study Conclusions

IT service continuity is a critical aspect of organizations and directly impacts the livelihood of the organization, its customers, and its personnel. Regardless of the size of the organization, IT service continuity is paramount. Small and disadvantaged companies have fewer resources available to support dedicated staff and service continuity efforts than large organizations. Cloud solutions are available to anyone with access to the internet, yet many small businesses do not leverage these low-cost solutions.

This study highlighted the key concerns of IT leaders within DBEs who have experienced disruption. These successful companies leverage cloud solutions, and although formal ITSCM frameworks such as COBIT, CMMC-SVE, and ITIL are too costly for these organizations, these successful DBEs shared their sound practices for designing low-cost cloud-based solutions. The case organizations shared formulated into three major themes: alignment with business requirements, sustaining business growth, and trust in cloud services. Each aspect of these shared concerns holds equal value. Additionally, each theme comprises elements of value to the organization from both business and IT perspectives.

Resources are a commodity within DBEs, or very likely, within all small businesses. Overall, the findings of this study are consistent with the literature and the TAM. Data received throughout the collection phase closely followed the rationale provided by the TAM in understanding the users' attitude towards using (PU plus PEU) and user's intention to use (PU) cloud-based IT service continuity solutions. Establishing a sharable framework based on this study's findings will help smaller organizations develop their own tailored cloud-based solutions that are engrained in the most critical business processes. These findings may be leveraged by organizations of all sizes, by IT leaders seeking to tailor solutions to meet their needs, or by cloud solution providers offering low-cost turnkey solutions to DBEs and other small companies.

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Appendix A: Permission to Use Figure 1

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Publication: Journal of Business Communication

Publisher: SAGE Publications

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Appendix C: Permission to Use Figure 2

Request permission to use Extended TAM diagram

AG Andrina Granić <granic@pmfst.hr>
Mon 1/7, 6:47 AM

hello allen,

thanks on your interest in our work. hereby we are approving re-usage of the figure although i suppose that you are referring to the one on page 87.

wishing you success in your future work. best
andrina

...

Šalje: Allen Raub <allen.raub@waldenu.edu>
Poslano: 30. prosinca 2018. 16:35:25
Prima: Andrina Granić
Predmet: Request permission to use Extended TAM diagram

Good afternoon,

I am writing to request your permission to re-use a diagram found within your article Technology Acceptance Model: a literature review from 1986 to 2013, dated 2015 through the Universal Access in The Information Society, 14(1), p.86.

I am a doctoral student at Walden University and am requesting your permission to re-use this figure to support my final doctoral study. Please let me know if you approve.

Sincerely,
Allen

Appendix D: Interview Protocol

What strategies do IT leaders in DBEs use to implement cloud solutions to minimize IT disruption resulting from human-made and natural disasters?

Component	**Observation**
The purpose of this qualitative case study is to explore the successful practices employed by IT leaders in DBEs following a disaster. Disasters are identified as an incident resulting in a crisis, for instance, the failure of IT necessary to sustain business operations. The results of this case study will promote positive social change by enabling organizations to identify IT service continuity strategies that will ultimately result in continued employment opportunities for personnel.	
Review consent form	
Participant may stop at any time	
I will be taking notes	
I will be recording for transcription	

Opportunity for questions upon completion (uniformity across multiple interviews)	
Interview Questions	
What strategies do you use to implement cloud solutions that minimize IT disruption?	
What did you think were the deciding factors for implementing the current cloud solution ensure IT service continuity over other solutions there are available?	
Why did you consider cloud solutions to minimize IT disruption over other available solutions that do not leverage cloud technology?	
What concerns did you have, if any, regarding the implementation of cloud solutions to minimize IT disruption?	
What training did you receive to aid in your decision to select the current cloud solution that is in place?	
How did you identify potential barriers to implementing the cloud solution?	

How do you think the cloud solution is more or less free of effort than other solutions?	
How does the cloud technology improve your performance?	
Do you have anything else to add that I have not asked about cloud solutions to minimize IT disruption resulting from human-made and natural disasters?	
Discuss follow-up conversation (transcribed conversation and notes for review).	
Thank you!!	