

Walden University

College of Management and Human Potential

This is to certify that the doctoral study by

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has been found to be complete and satisfactory in all respects,
and that any and all revisions required by
the review committee have been made.

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Walden University
2023

Abstract

Strategies Managers Implement to Ensure Information Technology Infrastructure
Services for Overseas Users

by

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MS, University of Michigan, 2017

MS, Universidad de Oriente, 2005

BS, Universidad de Los Andes, 1998

Doctoral Study Submitted in Partial Fulfillment
of the Requirements for the Degree of
Doctor of Information Technology

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Abstract

Information technology (IT) has become a critical success factor for businesses. IT leaders' potential failures in implementing IT strategies aligned with the business objectives may negatively impact the success of organizations in the current global market. Grounded in the technology-organizational-environmental (TOE) framework, the purpose of this qualitative, pragmatic inquiry study was to explore the IT strategies used by IT managers of multinational companies in the United States to implement IT infrastructure services to businesses for overseas users in developing countries. The participants were nine IT leaders with experience or who have implemented IT strategies for organizations in the United States with businesses in developing countries. Data were collected using semistructured interviews. Through thematic analysis, six themes were identified: (a) hybrid cloud and on-premises adoption, (b) IT infrastructure redundancy or failover process, (c) development of standardized IT best practices, (d) IT infrastructure strategies by region, (e) measurement of the IT infrastructure services, and (f) external factors impact the adoption of IT infrastructure strategies. A key recommendation is for IT leaders to have cloud file services such as Microsoft 365 or One Drive, allowing employees to work from anywhere. The implications for positive social change include the potential to guide IT managers' decisions that can lead to the long-term sustainability of businesses, thereby improving the socio-economic lifestyle of individuals in the United States and developing countries.

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Dedication

I dedicate this research to my family. My father, late Ramon Amadeo Sotillo; to my loved mother, Miguelina Acuna de Sotillo; my sisters, Ramig Sotillo and Radomig Sotillo; and my brother, Ramon Miguel Sotillo. They have been my support, inspiration, and motivation throughout my entire life. I also want to dedicate this accomplishment to my nieces and nephews; I hope this inspires and shows them that dreams are achievable. I love you all very much.

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I must acknowledge my Lord, Jesus Christ that has been with me my entire life providing me support, guidance, wisdom, and showing me the path to live a life of respect and love for others.

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Section 1: Foundation of the Study

Organizations leverage information technology (IT) to improve performance, reduce costs, and ensure long-term success; however, to achieve these goals there must be an alignment between IT and business strategies. Kotusev (2020) highlighted the importance of strategic alignment between IT and the businesses, noting that this strategic alignment is one of the top concerns of IT executives across the globe. Organizations with businesses overseas must ensure IT infrastructure services are reliable and available, and having established IT strategies can mitigate the impact in the interruption of these services, reducing the possibility of crises, which generally occur unexpectedly. It is important to have an alignment between crisis management and strategic planning within IT because a quick response is required to mitigate the negative impact of the crises in the organization's performance (Karam, 2018). Having clear and defined IT strategies help IT managers to ensure that IT infrastructure services are not affected and allow the businesses to continue running operations with minimum impact. Haseeb et al. (2019) asserted that through the implementation of IT strategies that help to overcome technological challenges in small and medium enterprise organizations, revenue, efficiency, business savings, and investments can be increased by 44%, 42%, 31%, and 25%, respectively. While the importance of IT strategies is well documented for developed countries, little knowledge exists for undeveloped nations (Al-Surmi et al., 2020). Therefore, in this study I sought to understand what strategies IT managers implement to ensure IT infrastructure services to business for overseas users in developing countries.

Background of the Problem

The impact of IT strategic alignment and crisis management on the organization's performance has been researched significantly in developed countries (Coombs & Laufer, 2018); however, Al-Surmi et al. (2020) concluded that little literature in these areas exists for developing countries. PricewaterhouseCoopers (2019) found that 7 in 10 leaders have experienced at least one corporate crisis occurrence in the last 5 years; that the diversity or type of crisis keeps increasing, making the processes more complex; and that a crisis impacts every layer of the organization, affecting internal and external stakeholders. Additionally, PricewaterhouseCoopers found that 57% of companies that have faced a crisis have experienced a significant economic loss due to decline in business relationships, reputation, or workforce morale. Panda and Rath (2018) highlighted that organizations leverage IT infrastructure to succeed in today's competitive business environment and that having IT strategies aligned with the business creates a sustainable competitive advantage, helping businesses to be successful. There should be a direct relationship between IT strategies, the business goals, and the crisis management process if the company wants to remain competitive in the current global market (Ilmudeen et al., 2019).

For organizations to survive, they must produce goods or services at the lowest cost possible (Al-Surmi et al., 2020). This is often achieved by moving some operations to developing countries. Drobyazko et al. (2019) asserted that most multinational companies leverage developing countries to increase profitability, which is generally achieved by reducing cost during the production process. Developing countries are

defined by Sabir et al. (2019) as those countries that create low gross domestic product, in addition to having high levels of poverty, population growth, and unemployment. In the definition of terms, a more detailed explanation about how the term developing countries was operationalized for this study.

Organizations aim for long-term success, which it is generally achieved by reducing the risks of crises and increase of profitability (Al-Surmi et al., 2020). It is essential to understand what strategies, if any, IT managers implement to ensure reliability in IT infrastructure services for overseas users in developing countries, because they help to mitigate the risk of a crisis, achieve increased profitability, and allow organizations to remain competitive in the current global market.

Problem Statement

Little knowledge exists about crisis management in developing countries, leaving few planning options for IT infrastructure and making it more difficult for IT managers to face a crisis (Coombs & Laufer, 2018). The global financial crisis in 2008 caused a \$19.4 trillion loss of market capitalization, which represented a 46% drop when compared to the previous year, with businesses in developing countries experiencing higher risks and threats than businesses in the United States (Fainshmidt et al., 2017). The general IT problem was that organizations are not able to provide reliable IT infrastructure services to businesses for overseas users in developing countries. The specific IT problem was that some IT managers of multinational companies in the United States lack IT strategies to implement IT infrastructure services to the businesses for overseas users in developing countries.

Purpose Statement

The purpose of this qualitative, pragmatic inquiry study was to explore the IT strategies of IT managers of multinational companies in the United States to implement IT infrastructure services to the businesses for overseas users in developing countries. The target population for this study consisted of nine IT leaders with experience or who have implemented IT strategies that ensure IT infrastructure services for multinational organizations in the United States that have businesses in developing countries located in South America, Africa, or Asia. The implications for positive social change include that this study may help influence IT managers' decisions and lead to the long-term sustainability of businesses, thereby improving the socio-economic lifestyle of individuals in the United States and in developing countries.

Nature of the Study

There are three methods of research: qualitative, quantitative, and mixed methods (Creswell & Creswell, 2017). According to Ray and Sharma (2020), qualitative research allows for a deeper understanding of the phenomenon under study by exploring individuals or groups through open-ended questions that help to uncover the reasons, circumstances, or connected insights that end up providing information about causal relationships. I selected the qualitative method for this study because through allowing for "what," "how," and "why" questions, it was the suitable research method to help discover, explore, and understand the strategies that are used by IT managers for multinational companies in the United States to ensure IT infrastructure services for overseas users in developing countries. I used semistructured interviews to collect the

data in this study. Semistructured interviews are considered the most widely implemented type of interviews within qualitative research (Husband, 2020). In the Data Collection subsection of this study, I provide a detailed explanation of the data collection procedures and list the supporting literature justifying the data collection, organization, and analysis techniques used in this qualitative study.

Quantitative research is normally intended to support or test existing theories through hypotheses and uses empirical data in a statistical process to test variables that later can be used to make predictions (Neziraj et al., 2018). This definition is also confirmed by Sürücü and Maslakçi (2020) who stated that in quantitative studies, statistical methods are implemented to measure empirical variables, resulting in numerical values that are used to make inferences about the phenomenon under study. The quantitative approach was not feasible or selected for this study because I did not need to test variables and theories, obtain numerical values as a result of the data collection, or use statistical processes to answer the research question.

Mixed methods are a combination of the quantitative and qualitative approaches to help add additional information to the phenomenon under study that neither quantitative nor qualitative methods can provide alone (Sahin & Öztürk, 2019). During this study, I did not need to test existing theories through hypotheses or use any statistical processes to address the research question; therefore, the mixed methods approach was not suitable.

Tomaszewski et al. (2020) asserted that case study, phenomenology, narrative, and ethnography are four different types of qualitative research designs. Ramanadhan et

al. (2021) stated that qualitative pragmatic inquiry is not a new research design approach within qualitative studies, and it has not received enough attention from the research community lately; however, it is gaining more prominent utilization. The appropriate and chosen research design for this study was qualitative pragmatic inquiry because human experiences in real-world situations were the focus. Kelly and Cordero (2020) stated that emphasis on actionable knowledge; recognition of interconnectedness between experience, knowledge, and action; and inquiry as an experiential process are the three critical factors that support pragmatism. Each of these elements requires human belief and experiences to gain the necessary in-depth knowledge to understand real-world issues and later obtain actionable knowledge that can be used to address the phenomenon under study. These are the main reasons why I chose pragmatic inquiry as the design for this study.

Rashid et al. (2019) added that the multiple case study design requires understanding and learning the organizations under study and can be used when the phenomenon studied cannot be understood by investigating a single case. Huixuan et al. (2015) stated that in “a multiple-case study, several subjects can simultaneously be dealt with, and the comparison and induction of them can provide a more extensive explanation of the issue and bring people into a more robust conclusion than investigating a single case” (p. 3-4). Because the aim of this study was to understand the strategies implemented by IT managers and the collection of the data was based on human experiences and knowledge rather than understanding or learning about organizations, the multiple case study design was not appropriate for this research. Thomas (2004)

explained that the phenomenological design aims to precisely describe the phenomena under study through the general, lived experiences of individuals or groups. This design would not have helped to answer the research question of the study due to its own nature, so it was not suitable for this study. Tomaszewski et al. (2020) noted that the narrative design aims to describe stories of people that are related to lived experiences and is generally used to study disciplines, such as culture, identities, lifestyles, languages, and beliefs. The narrative design was not suitable for this study because I was looking to understand and not to describe the IT strategies used by IT managers to ensure reliable IT infrastructure services. In addition, the strategies implemented or the lack thereof are related to the organization and not to lived experiences of individuals; therefore, the narrative design was not chosen for this study. Schlieve (2020) discussed that in an ethnography, the researchers focus on observing the social realities of a group for long periods of time to learn about the culture of the environment under study. The current study was not focused on learning social realities, making the ethnographic design inappropriate for use.

Research Question

What strategies do IT managers for multinational companies in the United States implement IT infrastructure services to businesses for overseas users in developing countries?

Interview Questions

The interview questions used in this study to gather the data were:

1. What is your current job title and role?

2. How long have you been working in the IT field?
3. Is your organization headquartered in the United States?
4. Where is your headquarters located?
5. Do you have businesses overseas in developing countries? Where?
6. What methods, processes, procedures, or plans do you currently use to ensure IT infrastructure services for overseas users in developing countries?
7. How do you measure or evaluate your processes, procedures, or plans?
8. How does your review process identify areas to improve?
9. What unanticipated challenges did you find during the implementation?
10. What challenges did you face after the implementation?
11. How do you conduct an assessment to ensure best practices are in place?
12. How do you measure the success of the implementation?
13. What, if any, is the contingency plan in case of disruption of IT infrastructure services?
14. What additional information would like to add that I did not ask?

Conceptual Framework

The theory used as the conceptual framework to support this study was the technology-organization-environment (TOE) framework, which was originally proposed by Tornatzky and Fleisher (1990) to explain that technological, organizational, and environmental contexts influence organizations' decisions during the implementation of technological innovations (Cho et al., 2022). Additionally, Cho et al. (2022) asserted that the TOE framework has been widely used to support the implementation of technologies

in countries located in different continents, such as the United States, Europe, and Asia.

The TOE framework has been proven to be a useful analytical framework when deploying IT innovations within organizations in different countries because it provides flexibility and can be implemented to any business independently of the size and location. Cho et al. also explained that the three contexts represent constraints and opportunities for organizations, impacting the organization's technological innovation. Ahmed (2020) detailed each context of the TOE framework, the technological, organizational, and environmental, as follows:

- The technological context refers to the relevant technologies that are available to the organization, which include existing technologies that are already being used as well as those that are available in the market.
- The organizational context describes characteristics and the firm's resources, such as corporate size, formality, management structure, internal communication processes, human capital, and local resources. Generally, organizational context has been used to identify if it is possible to implement or adopt technological innovations within the firm.
- Environmental context is where the organization performs its business activities, which include the presence or absence of technology service providers, government regulations, and resources available based on the environment that surrounds the firm.

Ahmed (2020) also emphasized that the TOE is widely used in many disciplines because researchers can choose the context based on the organization's characteristics.

The TOE framework is considered a generic theory because it provides several methods of adoption without indicating how to apply them in each context. I used each context of this framework to help understand what strategies IT managers for multinational companies in the United States implement to ensure IT infrastructure services to businesses for overseas users in developing countries.

Definition of Terms

Crisis: An unexpected event that has the root cause due to internal or external factors and negatively impacts the organization. Crises are complex events and can jeopardize the survival of the business if actions are not taken immediately. Merendino and Sarens (2020) noted that generally, stakeholders fail to understand that a crisis can be imminent and avoid early detection, therefore increasing the negative impact on the organization. In addition, Merendino and Sarens asserted that in 2018, a total of 24,000 companies in the United States were hit by a crisis and went bankrupt.

Crisis management: The main goal is the mitigation of the financial impact of a crisis in organizations; this is one of the most critical processes that must be established and to be successful it requires the support of all stakeholders (Žigman et al., 2021). Crisis management includes a series of processes and procedures that are created to ensure early detection of potential crises, and it is considered a continuous improvement process where planning or prevention will help to manage the crisis during and after the unexpected event happens (Vašíčková, 2019).

Developing countries: Oplatka (2004) stated that developing countries are mainly defined because “their economy is more agricultural-based, and they are usually

characterized by high mortality rates, high birth rates, high levels of poverty and large gaps between rich and poor” (p. 428). Each developing country is different, thus finding a concept that can generalize them is difficult; however, Oplatka took into consideration two main aspects, the economic and social factors, to try to establish a concept that can be an acceptable definition.

IT infrastructure: A set of IT resources that can be divided in two main dimensions: the IT technical infrastructure and the IT human resources (Benitez & Henseler, 2018). The first includes hardware, software, networks, communication, operating systems (OSs), and data storage. The IT human resources relates to the skills and capabilities that the IT personnel have. Through the IT infrastructure, organizations manage IT operations that offer IT solutions and services to its employees, which maximize efficiency and reduce costs.

IT strategies: The use of IT to support the organizations’ strategies, and consists of a plan developed by organizations that must guide the information technology or information systems roadmap that can leverage existing or new IT resources to help businesses to achieve objectives and goals (Borremans et al., 2018). Borremans et al. (2018) also added that flexibility, standardization, scalability, economic efficiency, and independence are key elements to consider while developing IT strategies.

Multinational companies: Complex organizations that are managed centrally through headquarters that maintain political control over the decisions related to the direction of the company (Koveshnikov et al., 2016). The headquarters generally keeps a

direct or indirect relationship with the subsidiaries (or branches) and it is normally affected by the geographic location, cultural differences, and the type of work performed.

Assumptions, Limitations, and Delimitations

Assumptions

Almasri and McDonald (2021) asserted that assumptions are credible facts that provide support to research studies, adding that assumptions are established by researchers to help to shape the research questions, methods used to collect data, and interpretation of results. There were three assumptions for this study. The first assumption was that the participants would answer the interview questions without any fear of reprisal to their reputation. Another assumption was that participants would answer the interview questions honestly and truthfully. My final assumption was that a qualitative, pragmatic inquiry approach would be able to provide sufficient data for this study to answer the research question.

Limitations

Ross and Bibler Zaidi (2019) emphasized that it is an obligation of the researchers to include limitations in all research studies because limitations can affect the outcome and conclusion of the study. Limitations must be specific to help potential future investigations to continue the area under study and avoid generalization of the results that can compromise the validity of the research (Ross & Bibler Zaidi, 2019). Theofanidis and Fountouki (2018) noted that limitations impact multiple aspects of the research, are out of the control of the researchers, and are considered weaknesses within the research process. The first limitation of this study was that the companies studied were multinational

organizations that have businesses in developing countries. The second limitation was that the participants were IT managers that have subordinates, recommend IT strategies within the organization, or have experience in the implementation of IT infrastructure. Examples of IT professionals include managers, directors, and C-level executives.

Delimitations

Theofanidis and Fountouki (2018) asserted that delimitations are boundaries set by researchers that help to reduce the scope and achieve the objectives of the study. The delimitations of this study included the type of businesses, organizations' locations, and where remote users were located. I focused on multinational organizations within the United States that have businesses in developing countries.

Significance of the Study

Contribution to Information Technology Practice

This study can contribute to IT practice by allowing IT managers to understand what strategies are used to ensure IT infrastructure services for remote users in developing countries, helping to avoid unnecessary outages or downtime in organizations by being able to plan, create, and implement IT strategies that are aligned with the business to avoid crises, therefore impacting the business' performance. Organizations use IT to be competitive in the current global market, and having resources to support businesses overseas helps to reduce cost (Al-Surmi et al., 2020). On-premises network communications and infrastructure, public internet, and cloud services are crucial to ensure that businesses provide reliable IT infrastructure services. For instance, Twala and Kekwaletswe (2020) explained that cloud computing is an IT strategy used currently by

many organizations to reduce IT infrastructure and maintenance costs, increase flexibility and reliability of IT services, and allow businesses to become more efficient.

Understanding the IT strategies that IT managers implement to ensure each component of IT infrastructure services for overseas users in developing countries can help not just IT managers but also organizations to be sustainable in the long term, which is a significant contribution of this study to IT practice.

Implications for Social Change

In the current world, “organizations are put under pressure to display sustainable entrepreneurial behavior, transforming their strategy to meet social and environmental goals” (Greco & De Jong, 2018, para. 1). Organizations that meet business goals can be sustainable in the long term, and consequently, provide an improvement in the socio-economic style of living of individuals, thereby a positive impact in societies. This study was important because providing IT managers with the knowledge and understanding of what organizations are using to ensure IT infrastructure services for remote users in developing countries can help them improve the long term sustainability of businesses. Additionally, IT managers can learn what current strategies are the most effective for avoiding crises and ensure reliability of IT services.

Organizations must produce finished goods at the lowest cost possible to be competitive in the current global market; therefore, businesses look for cheaper labor and fewer regulations in emerging markets to ensure competitiveness. Developing countries are important to businesses because they provide those competitive advantages. As organizations grow and become long-term sustainable in developed and developing

countries, societies and people evolve, and taking advantage of the economic growth to improve their quality of life. The findings of this study provide IT managers with some guidance to ensure the long-term sustainability of their businesses in developed and developing countries, which will result in a positive impact on social change.

A Review of the Professional and Academic Literature

For this literature review, I searched primarily for peer-reviewed articles, white papers, and dissertations published within 5 years of my graduation year. To ensure the academic resources were peer reviewed, Ulrich Web Global Serials Directory and the International Standard Serial Number parameter was used. When searching Walden University Library resources, the peer-reviewed journals only filter was used as well. Google Scholar, SAGE premier, EBSCOhost, and ProQuest were the primary databases and search engines used when searching for literature that supported this study. I used the following keyword search terms: *technology-organization-environment framework*, *TOE*, *IT strategies*, *IT infrastructure*, *IT infrastructure in developing countries*, *IT services*, *IT strategies in developing countries*, *IT strategies and crisis management*, *IT strategies and the organization's performance*, *IT services*, and *IT strategic alignment*.

Sixty-eight of the total 70 articles (97%) referenced in the academic literature review are peer reviewed, and 94% of them were published within 5 years of my anticipated graduation date. Table 1 shows a detailed comparison of the articles used in the literature review versus the complete study.

Table 1*Literature Review Publication Summary*

Section	Total sources	Within 5 years	Peer-reviewed sources	Percentage peer reviewed	Percentage within 5 years
Literature review	70	66	68	97	94
Complete study	221	178	210	95	81

The purpose of this qualitative, pragmatic inquiry study was to explore the IT strategies used by IT managers of multinational companies in the United States to implement IT infrastructure services to the businesses for overseas users in developing countries. Understanding what strategies are used to ensure IT infrastructure services for overseas users in developing countries and the relationship between IT strategies, crises, and the organization's performance can lead IT managers to ensure the long-term sustainability of businesses. The literature review was centered on the importance of IT strategies, crises, and how these affect organizations. The following concepts are further discussed in the next subsections: (a) IT infrastructure, (b) the TOE framework, (c) use of the TOE framework to support the implementation of IT strategies, (d) IT strategies for businesses in developing countries, (e) IT strategies and crises within business organizations, and (f) the impact of IT strategies in the organization's performance.

IT Infrastructure

Wei et al. (2021) asserted that IT is a set of technological and human resources that are allocated by organizations to improve processes to support business strategies;

additionally, that IT depends on internal and external factors in an organization, including IT investments, market conditions, and environmental limitations. IT infrastructure resides within the IT strategies of organizations. Hassan and Salman (2022) explained that IT infrastructure can be considered as a shared set of services, and IT includes two components, technological and human resources, with the first composed of two categories, hardware and software, and the latter being used to support the technology that aims to help organizations to increase efficiency. Wei et al. also added that IT infrastructure allows for an increase in operational performance and knowledge within organizations, and leveraging IT infrastructure makes them more competitive in the current global market. Hassan and Salman reported that IT infrastructure has seven components: internet platforms, data management and storage, networks and telecommunications, software/applications, computer hardware platform, OSs, and human infrastructure.

Internet Platforms

Plavčan and Rastislav (2020) defined internet platforms as services provided by operators that take place through the internet and require two sides of the market: the buyers and the sellers. Internet platforms have different business models, such as e-commerce, content platforms, online service providers, social networks, and market makers, with organizations choosing among these business models to increase efficiency, reduce cost, and allow for scalability of IT resources. Attaran and Woods (2019) explained that building and maintaining an entire IT infrastructure is complex and expensive, thus organizations use internet platforms to transfer some of the management

and support of the IT infrastructure. Zhong et al. (2020) asserted that internet platforms are reliable and increase the performance and productivity of organizations by leveraging the technological services offered (e.g., through the utilization of e-commerce). IT managers must keep the potential implementation of internet platform technologies in mind when evaluating the IT strategies of organizations.

Data Management and Storage

Diène et al. (2020) explained that data management relates to a general concept that is used to understand the life cycle of the data, which includes the architectural design as well as the processes and procedures of collecting, accessing, preserving, and purging data. Data management is implemented to optimize the utilization of business' data to maximize the organization's performance. Shrestha and Sheikh (2022) noted that data storage is a fundamental part of the IT infrastructure and can be accomplished with servers or storage devices. Aanchal and Prasad (2021) asserted that data storage and data management are critical for the operation of businesses and directly impact the organization's performance, stating that these two areas must be part of the overall IT strategies within organizations because data management can be challenging due to the lack of consistent processes and procedures for collecting, processing, and storage. Aanchal and Prasad added that IT infrastructure operations depend on data storage and data management, and there is a direct relationship between them because the lack of management of data affects storage capacity. IT managers must implement proper IT strategies within the data management and data storage area to ensure IT services within organizations are available, reliable, and cost efficient.

Networks and Telecommunications

Campanile et al. (2020) asserted that network and telecommunications are the backbone of the current computing networks because they are used to interconnect nodes by using communication protocols to interchange data. Campanile et al. added that network technologies have helped to support the constant evolution of computing networks due to their ability to adapt, scale, and evolve. Shang and Zhao (2020) explained that with the rapid growth of computing networks due to the advantages that they offer, network and telecommunications technologies have become key components of the IT infrastructure. However, Shang and Zhao also asserted that network technologies bring some disadvantages that must be taken into consideration because they can create harm and concerns within the IT area due to security risks in communication and transmission of data.

Network and telecommunications are part of the overall IT strategies used by IT managers to ensure the availability and reliability of IT infrastructure services. From the networking standpoint, Garousi Mokhtarzadeh et al. (2020) concluded that there is a direct relationship between the firm's network capability and its performance, regarding telecommunications, Dehgani and Jafari Navimipour (2019) explained that due to the constant exchange of electronic data and the expansion of businesses globally, telecommunication has become necessary for the use of IT systems and, therefore, impact the productivity of businesses. Campanile et al. (2020) explained that as technology evolves there is a blurred line between network and telecommunications because both hardware and software components are part of the network technology. Information and

communications technology (ICT) infrastructure is a term that includes both areas when looking at overall communications within the IT strategies. Gobin-Rahimbux et al. (2020) asserted that the ICT relates to networking and telecommunications and noted that ICT is the foundation of any IT infrastructure. Fernández-Portillo et al. (2020) concluded that there is a relationship between ICT and economic growth. ICT must be considered as part of the overall IT strategies to ensure the reliability of IT services.

Software/Applications

Thota et al. (2020) defined software applications as computer programs that use computer programming languages for development and are created to perform specific tasks or activities. Rodrigues et al. (2021) asserted that businesses leverage and invest in IT to increase performance and add market value. Software applications as part of IT are used by organizations to manage and organize activities, automate processes, create competitive advantage, and reduce costs. Rodrigues et al. added that currently there are multiple options to choose from in terms of software applications, and the most common IT strategy decision that IT managers have to make is whether to develop and host the software applications on-premises or use existing solutions by implementing SAAS. In any case, the decision would depend on the organization's IT infrastructure and financial position. Felipe et al. (2020) concluded that IT directly impacts the firm's performance, and software applications have an essential role because they can provide organizations with the necessary capability to become successful in the current competitive market. Felipe et al. added that IT managers must participate and be involved in strategic business

planning to ensure alignment between IT and business. IT managers must ensure that the proper IT strategy is implemented based on the organization's objective.

Computer Hardware Platforms

Sembiring et al. (2019) noted that computer hardware platforms are considered in IT as those devices that can be physically touched. All computer hardware devices aim to support the process of computing and leverage OSs to manage their resources. The computer hardware platforms are responsible for supporting the software layer, including OSs and business applications. Bae (2021) added that process, memory, and interconnection peripherals are the main three elements of computer hardware, which are fundamentally based on electronic principles. Hannig and Teich (2021) highlighted that hardware is something that is physically built and requires resources or bills of materials to be produced; thereby, the finished good has a cost. This is key for organizations because it has direct financial impacts, and IT managers must consider the costs of hardware devices when evaluating potential IT strategies to ensure the implementation of the most cost-effective technology because organizations' financial resources are limited.

OSs

Qian et al. (2022) asserted that OSs are software developed to manage computer hardware and its resources. OSs are considered a software layer located between the hardware or bare metal devices and software applications. Rasheed et al. (2021) stated that with the development of more powerful and efficient computer hardware devices, OSs have become critical to ensure the maximum performance is obtained. In addition, Rasheed et al. noted that OSs encompass six areas that must be taken into consideration

during the planning or implementation of IT strategies because they directly affect business efficiency: security, memory management, reliability, usability, dependability, and portability. Organizations' performance is impacted by the OS strategy used either at the computer management or end-user level. Sturgeon (2021) asserted that there is a direct correlation between the OS strategy used and the organization's performance. As part of the IT infrastructure and due to the direct impact on the business efficiency, IT managers must think about the OS strategy to plan or deploy to ensure the reliability of IT infrastructure services and maximize the organization's financial performance.

IT Human Infrastructure

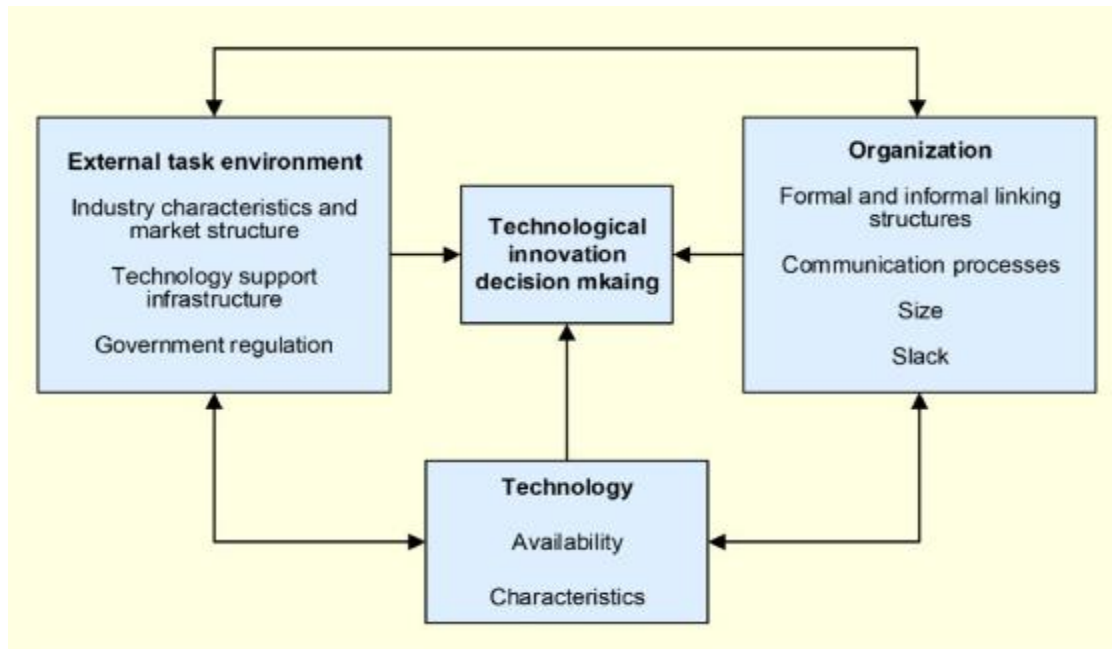
The last component of IT infrastructure is defined by Akbar and Darius (2019) as the managerial and technical skills that the organization's human resources have to manage all the IT competencies successfully. The managerial human resources should have the necessary knowledge to understand the business and technology to ensure alignment and create the necessary IT strategies; thus, organizations can leverage all IT infrastructure resources to increase performance, reduce cost, and produce products or services to the customers, that allow them to compete in the market to ensure long-term sustainability. Akbar and Darius explained that the technical skills within IT human resources refer to the technical knowledge that is used to support the operations and management of the hardware and software within organizations.

Antoni et al. (2020) highlighted the importance of the necessary competencies of the IT human resources within organizations, stating that the entire IT infrastructure relies on both the IT technical and management human resources. Additionally, Antoni et

al. explained that as part of the overall IT capability of an organization, the alignment between the IT human resources and business is necessary to improve organizational performance. It is important for IT managers to understand that the IT strategies related to IT human resources directly impact the organization's performance.

TOE Framework

Al Hadwer et al. (2021) asserted that the TOE framework was developed by Tornatzky and Fleischer in 1990 and added that the TOE framework helps to facilitate the implementation of technologies within organizations because it is used to consider three different dimensions that affect them directly: the technology, organization, and environment. The TOE framework is focused on the factors that affect the organizations as entities rather than individuals. For instance, Al Hadwer et al. used the TOE framework to review the impact of implementing cloud-based technologies within organizations detailing how each dimension of the framework is interconnected among them. Cloud-based technology is an IT strategy IT managers use to expand capabilities within organizations that the existing on-premises infrastructure cannot provide. The three dimensions of the TOE are shown in Figure 1.

Figure 1*TOE Adoption Theoretical Framework*

Note. Adapted from “A Systematic Review of Organizational Factors Impacting Cloud-based Technology Adoption Using Technology-Organization-Environment Framework” by A. Al Hadwer, M. Tavana, D. Gillis, and D. Rezania, 2021, *Internet of Things*, 15, p. 5.

Ergado et al. (2021) explained how the TOE framework is flexible and adaptable to different contexts and used the TOE framework to determine the barriers faced while implementing ICT to improve teaching-learning in a developing country. ICT is a critical IT strategy for organizations, and the TOE framework helped the researchers to identify potential barriers at the technology, organization, and environment levels. Ergado et al. specifically found that some of the technology factors that would affect the implementation of ICT are the availability, accessibility, underutilization, and confidence of use; the organizational factors included support from top management, funding, human

resources, lack of cooperative work, and change management process; while from the environmental perspective, the ICT policies, local culture and infrastructure, and the lack of support services can impact ICT implementation. Ergado et al. found that the TOE framework was a valuable methodology to help understand the potential barriers when implementing technologies within organizations.

Pateli et al. (2020) detailed the organization dimension of the TOE framework. They explained how it is used by businesses to understand the impact of implementing innovations. In fact, Pateli et al. found that the current financial solvency, technology used, and support from upper management within organizations will limit the deployment of any IT initiatives. Organizations have limited resources either financially, technologically, or humanely. IT managers must consider them when aiming to align IT strategies to the businesses because the success or failure depends on them. Stjepić et al. (2021) support Pateli et al. about the importance of understanding the capabilities, limitations, and objectives of the organization when looking to implement technologies, which is considered a critical element within the TOE framework. Furthermore, Stjepić et al. also highlighted the criticality of having management support to successfully implement any innovation within the organization. With these dimensions, the TOE framework intends to ensure that the organizations' resources are evaluated, understood, analyzed, and aligned with the technology to be implemented.

Regarding the technological context within the TOE, Abed (2020) noted that organizations must evaluate the technological innovation to be implemented and highlighted two elements to consider in IT implementations: perceived usefulness and

security. The first relates to the perception of individuals within the organization that the use of the technology would increase performance and reduce waste, facilitating the adoption; and the second, can add significant risks to organizations due to potential vulnerabilities, exposure of critical information, and change of internal processes that can jeopardize the long-term sustainability of the business. Tripopsakul (2018) explained that the technological dimension includes the internal technologies currently used by the organization and those technologies that exist in the marketplace. Tripopsakul also added that there are five factors that influence the technological dimension and must be considered when implementing an IT innovation; these factors include the advantage to the organization, compatibility with current systems, complexity, the capability to be tested, and be measurable. The technological dimension guides IT managers while developing IT strategies that lead to the adoption of new technologies within organizations.

Nair et al. (2019) explained the environmental factor of the TOE framework as the context in which organizations perform the business and include suppliers, customers, governmental regulations and support, local culture, and other external resources surrounding them. It is critical to consider these factors for the successful adoption of IT innovations. Tripopsakul (2018) asserted that the environmental dimension determines the adoption or not of technologies within organizations. The environmental factor must be considered, especially in developing countries where the resources surrounding organizations are more limited than in developed countries. The implementation of IT strategies generally results in changes in existing processes, procedures, human

resources, and technology within businesses. The environmental dimension helps to understand what external resources can affect the adoption of IT innovation.

Limitations of the TOE Framework

Wong et al. (2020) asserted that the TOE framework is based on the innovation adoption theory and considers three contexts during the implementation of technology. The first is the technology itself, the second is the organization, and the last context is the environment. This framework has been used widely during the adoption of technologies. However, like any framework or theory, it has limitations. Bryan and Zuva (2021) stated that the TOE framework is very general, which is considered by some researchers as a strength and a limitation by others, because each implementation is unique and cannot be used or replicated. This is confirmed by Li et al. (2022), which stated how complex is to use the TOE framework because it does not identify what factors to consider when adopting technology, those are related to the specific problem or research question. Cruz-Jesus et al. (2019) noted that the factors to consider for each context vary depending on the implementation. For instance, cost saving could appear in the technological context in some cases and in others under the organizational context; this is because the TOE framework is considered a general framework that provides guidance and it does not have strict rules of implementation. In addition, Bryan and Zuva added that the lack of evolution of the TOE framework through the years has caused new variables can be considered during the adoption of new technologies, such as cognitive and sociological variables, professional skills, culture, and security concerns.

There are other theories that can be used during the adoption of new IT technologies, such as the technology acceptance model (TAM), diffusion of innovation (IDT), and institutional theory. Shachak et al. (2019) asserted that the TAM framework focuses on the implementation and acceptance process of the technology, specifically on everyone's perception. Kamal et al. (2020) explained that the TAM framework is used as a tool to forecast the potential acceptance of users when new technology is adopted and consist of two constructs, the perception of usefulness and ease to use. This research aims to explore what IT strategies IT managers implement to ensure IT infrastructure services for overseas users in developing countries. The use of the TAM framework is not appropriate for this study. Hartley et al. (2022) used the IDT and innovation theory to implement a new technology in the supply chain area but highlighted that the TOE framework is the most utilized by researchers. Malik et al. (2021) asserted that the diffusion of innovation and institutional theory is considered a variation of the TOE, which is the theoretical framework chosen to support this study.

Use of TOE Framework to Support the Implementation of IT Strategies

Pateli et al. (2020) asserted that the TOE framework is used by many organizations as a tool for decision-making, when looking to implement new technologies. It is essential to highlight that the use of the TOE framework is not specific to any IT strategy. Pateli et al. said that the TOE framework could be used in a wide range of IT implementations, therefore impacting the adoption of IT strategies. When implementing new technologies within organizations, the TOE framework ensures that the technology, organization, and environment dimensions are considered. Ghobakhloo

and Ching (2019) explained that the TOE emphasizes the importance of individuals within organizations in the acceptance of new technologies and how it is used.

Ghobakhloo and Ching also asserted that the TOE framework has been used to support the implementation of IDTs in small businesses, an IT strategy used by IT managers to optimize business operations; the conclusion of this study resulted in confirming that the dimensions of the TOE framework determined the implementation of the IDT in Malaysia and Iran. Finally, Ghobakhloo and Ching highlighted that TOE is used also to evaluate the adoption of new IT strategies related to the IDT, such as the implementation of new enterprise resource planning systems, electronic data interface and electronic fund transfer.

Aceto et al. (2018) explained the importance of ICT as a pillar to support the implementation of IT strategies within organizations. Aceto et al. studied the implementation and use of ICT in the health care industry. ICT is driven by the rapid development of communications technologies, helping to increase the access, effectiveness, and quality of IT services provided; thereby, impacting the potential IT strategies that can be adopted. Aceto et al. also reported that ICT directly affects the implementation of IT strategies, such as, cloud, internet of things, wireless communications, big data, social networks, and 3D printing. Most IT strategies used to support business operations depend on the ICT of organizations. ICT and the cloud are critical IT strategies that IT managers use to ensure IT infrastructure services for businesses. Zhao et al. (2021) used the TOE framework to support the potential adoption of 3D printing technologies in U.S. and Indian firms. The TOE framework was critical

when evaluating the organizational and environmental factors in this study because they affect the implementation or adoption of technologies. Evaluating each of the three contexts within the TOE framework can provide an overall understanding of the impact of adopting new technologies within organizations; therefore, the IT strategies to be planned and implemented.

Ergado et al. (2021) determined the barriers faced by educational institutions when looking to implement ICT using the TOE framework. This IT strategy was looking to improve teaching-learning processes. Aceto et al. (2018) asserted that ICT supports the implementation of additional IT strategies within organizations. Understanding each context of the TOE framework and its use depend on the phenomenon under study. The TOE framework provides the necessary information to IT managers that help during the decision-making process of whether to adopt a technology or not. Grant and Yeo (2018) noted that the TOE framework is flexible and has been significantly used in multiple studies when looking to implement ICT in different areas of the businesses. Each context of the TOE framework can be deepened and adapted to the specifics of the study to help understand what factors would affect organizations, therefore, the decision to implement a new technology. Grant and Yeo found that the TOE framework is practical and effective, when implementing ICT as an IT strategy for organizations.

Amron et al. (2019) explained that cloud computing is an IT strategy used by IT managers to allow organizations to become more flexible, scalable, and efficient in the management of resources. This strategy is becoming more acceptable for organizations; however, the implementation is challenging because it depends on many factors. Amron

et al. used the TOE framework to determine the factors that affect the implementation of cloud computing. The technological, organizational, and environmental contexts were used to identify the elements that impact the implementation of such technology.

The above theoretical literature supports the utilization of the TOE framework in a wide range of adoption of IT technologies; therefore, it can be used by IT managers when implementing IT strategies within organizations to ensure competitiveness. The TOE framework's flexibility allows the use in multiple areas within IT. It is important for IT managers to keep in mind such robust framework when implementing IT strategies.

IT Strategies for Businesses in Developing Countries

Sanaei and Sobbani (2018) asserted that the relationship between IT and business strategies has been widely studied within the technology management area, and the foundation of its principles applies to businesses and countries. For instance, countries strive to improve ICT because it supports the implementation of others IT strategies; business organizations use the same approach. Having a robust IT infrastructure offers additional competitive advantage to countries, directly impacting how businesses develop IT strategies. Chege and Wang (2020) stated that organizations use ICT to expand to new markets, increase profitability, and improve efficiency. Chege and Wang also asserted that while ICT offers many advantages to businesses in developing countries, organizations face multiple challenges in implementing it; for instance, high costs of technology, lack of clear governmental policies, limited market of high skills personnel, and resistance to change. IT strategies for businesses in developing countries depend on the countries' ICT infrastructure, and it is important that IT managers clearly understand

the current state of the ICT to be able to develop proper IT strategies, that ensures IT services for users.

From the technology standpoint, IT strategies are generally focused on telecommunications, networking, computing, data, and security. Akpan et al. (2022) asserted that there is a direct relationship between internet penetration in developing countries and the implementation of IT strategies for businesses. Akpan et al. added that telecommunications allow the implementation or support other IT capabilities within organizations, such as, accessing the web, cloud, edge, fog computing, big data analytics, communications, artificial intelligence, and internet security. These capabilities are supported by cloud computing, which is classified into three elements. Ernawati and Febiansyah (2022) asserted that Infrastructure As A Service (IAAS), Platform As A Service (PAAS), and Software As A Service (SAAS) are the three elements that encompass cloud computing. Akpan et al. concluded that the implementation of IT strategies depend on the state of the ICT of the businesses and how it is aligned with the ICT of the country.

Ernawati and Febiansyah (2022) explained that IaaS is an IT strategy that allows organizations to utilize virtualized compute and network resources that a third-party vendor provides to avoid expenses in servers, data centers, and network equipment. The objective of implementing IaaS is to move the costs of purchasing hardware out of the organization, allow flexibility and scalability of IT resources, and help to reduce costs. It has been proven that successfully implementing IaaS increase competitive advantage for organizations and significantly decrease operations costs. Mouradian et al. (2020) defined

PaaS as a complete development and deployment environment that a third party provides to organizations with the aim to develop, deploy, manage, and orchestrate applications; creating a virtual platform that gives agile capabilities to developers to adapt to the current fast pace of the changing technology. Mouradian et al. asserted that PaaS requires communication between the cloud and end users, therefore, depend on the ICT; the latter is critical to the successful of IaaS, PaaS, and SaaS. Raghavan et al. (2020) explained that SaaS is a type of cloud solution that requires a connection through the internet and where customers pay for the service based on a subscription program that adapts best to their needs; the service provider who hosts the applications is responsible for the management life cycle including installation, setup, performance, security, updates, upgrades, and version control. SaaS avoids expenses for businesses in hardware, software, and all areas related to the management because they are the service provider's responsibility. SaaS generally runs over the web, and connection to the internet is critical to ensure businesses obtain the highest value of the SaaS platform.

IT managers must understand the significant impact of the countries' ICT within the IT strategic planning to ensure IT services are reliable and provide the most cost-effective solution. Businesses must leverage ICT to maximize the utilization of IT resources. Reggi and Gil-Garcia (2021) asserted that governments are implementing ICT as a strategy to close the gap among countries with access to technology resources and emphasized that the focus of the ICT investments are aimed to increase accessibility to businesses within the public and private sector, and individuals to improve the development of the economy and society. IT managers must be aware that there is

dependability between implementing IT strategies in developing countries and the current state of the country's ICT.

IT Strategies and Crisis Management Within Business Organizations

Businesses in the current market rely on IT services to be more competitive by becoming more efficient and effective, while producing finished products. It is crucial to have reliable IT services to avoid interruption in processes within organizations that can affect the long sustainability of the businesses. Moerschell and Novak (2020) defined a crisis as an event that can cause or create harm. In addition, Wilk-Jakubowski et al. (2022) reported that the root cause of a crisis can be either by natural causes or by humans' activities and that a crisis is considered an unexpected event that jeopardize or cause loss; thus it is important to plan as much as possible potential disaster through crisis management to mitigate the impact of crises. Moerschell and Novak asserted that during the crisis management process, three phases must be considered, pre-crisis, crisis, and post-crisis.

Leta and Chan (2021) noted the importance for organizations to plan for potential crises and highlighted the criticality to develop a strong precrisis process during crisis management. Leta and Chan divided the precrisis process into two key areas that must be considered: how prepared the organization is to face a crisis and the crisis planning. The first relates to how well prepared and ready the organization is to face potential harm from internal or external elements, and the second is associated with the planning process within organizations to ensure processes and procedures exist; thus, they can be followed to mitigating the harm generated by the crisis. During the precrisis step, scenarios of

potential events must be created to evaluate the organization's preparedness and readiness, develop a response plan, measure the readiness for implementation, and through the continuous improvement process re-evaluate the exiting pre-crisis plan. Moerschell and Novak (2020) highlighted how organizations must establish during the precrisis planning process a detailed communication protocol, provide the necessary training to individuals, perform simulations of crises events to allow faster response, and to test the plan; this will help to detect any inefficiencies that can be used to improve the precrisis plan. This stage determine the success or failure of the crisis management process within organizations.

The next step is the crisis. Moerschell and Novak (2020) explained that in this phase the event that triggers the crisis occurs and organizations use the plan created in the pre-crisis stage. It is important that the plan must be executed as designed to mitigate the impact of the crisis within the organization; however, not all crises' events can be predicted; flexibility is necessary to allow making the necessary adjustments during the crisis. In addition, Saroj and Pal (2020) highlighted the importance of proper management of internal and external communications in organizations during the crisis stage; the failure to have a clear and effective communication strategy can provide a wrong or misleading perception of the threat and the current state of the business, increasing the negative impact of the event, which can potentially take the organization out of business. Saroj and Pal asserted that using social media and new technologies can facilitate the communication of organizations due to their reach and the instant accessibility of the information. Organizations can use these tools to minimize the

negative impact to the business. It is important that during the crisis stage, all stakeholders and people involved follow the pre-crisis plan and provide clear communication internally and externally to mitigate the impact of the threat within the organization.

The last step in the crisis management process is the postcrisis stage. Moerschell and Novak (2020) explained that this is an activity that must be done immediately after the crisis event, and it is aimed at understanding what went well and what went wrong during the crisis stage; the idea is to provide an overall assessment of the crisis plan and to make the necessary adjustments based on the lessons learned. Novak also added that communication to the proper audience must be provided along with the most accurate impact caused by the threat to the organization, in addition to ensuring that operations are back to normal or not. Haavisto and Linge (2022) concluded that during crisis management, transparency in communication allows people to trust organizations, a key factor in mitigating the impact of a crisis in the business. Transparency as part of the communication process within the crisis and post-crisis stages is critical.

Hazaa et al. (2021) established that two factors that are linked directly to crisis management are information technology and strategic planning. This means that crisis management is impacted directly by the organization's IT strategies. Businesses leverage technology to reduce the impact of a threat by implementing proper technologies that allow organizations to continue operating, reducing possible downtime on businesses. Strategic planning requires commitment from the leadership to ensure appropriate policies, processes, and procedures are implemented to prepare, prevent, act, and

overcome a crisis. This is asserted by Burhan et al. (2021), which explained that strategic planning within crisis management is a process that helps to develop, prepare for, and react against an unexpected event that can interrupt business operations. It has been supported by the academic literature that there is a direct relationship between IT strategies and crisis management within organizations. The proper implementation of IT strategies can reduce the possibility of crises.

Impact of IT Strategies in the Organization's Performance

Al-Surmi et al. (2020) concluded that IT, along with business, and market strategies impact directly the organization's performance; in addition, that IT strategies refer to using information technology to support organizations in achieving business goals. It is important to have IT strategies aligned with the organization's objectives to ensure IT can be leveraged to maximize the utilization of resources and reduce costs. Chege and Wang (2020) asserted that IT strategies directly affect business performance and organizations must use IT to enhance internal and external capabilities to create and maintain competitive advantage. Chege and Wang also added that IT strategies can influence decisions about the structure, vision, mission, goals, policies, and procedures of organizations. Al-Surmi et al. classified IT strategies into flexibility, efficiency, and comprehensiveness. Each type is oriented to provide specific advantages to businesses; the correct implementation and utilization allow organizations to create products or services more efficiently, therefore outperforming competitors.

IT flexibility strategy is described by Al-Surmi et al. (2020) as the utilization of IT resources to observe changes in the market to provide the necessary tools to the

management team to support business strategies. Al-Surmi et al. also added that IT flexibility strategy is a key factor for the success of organizations in the current competitive global market and is directly linked to strategic flexibility. Nowak (2022) explained that strategic flexibility relates to the ability of organizations to use internal resources to rapidly adapt or respond to changes while continuing operations. Having flexibility of resources helps organizations to be successful, by responding faster to external or internal threats that can affect normal operations. Nowak also highlighted that strategic flexibility directly impacts business performance and depends on the organization's managerial capabilities, governance practices, and lack of resources; in addition, that some areas where strategic flexibility is impactful are marketing, technology, and innovation. Arunachalam et al. (2022) described strategic flexibility as how organizations face changes by taking immediate actions that can lead to reconsidering current established strategies in technology, investments, and assets. Organizations capable of taking advantage of strategic flexibility are more likely to be successful. Yousuf et al. (2022) concluded that organizations that practice or implement strategic planning enhance business performance. Matalamäki and Joensuu-Salo (2021) noted that strategic flexibility can directly affect business growth and is essential during the implementation of IT technologies.

Al-Surmi et al. (2020) reported that an IT efficiency strategy is used by organizations through the implementation of IT, to help monitor and control daily operations that improve the efficiency and communication of the business. IT is used as a channel to support and detect inefficiencies in processes to better position the

organization in the market. Al-Sumi et al. added that IT efficiency strategy supports communication among the organization, suppliers, and customers. Efficiency within an organization is vital for survival, especially in the current global market where businesses must compete for customers and produce goods at the lower cost possible. Efficiency is an area where management pays attention, and it is considered a critical factor for the success of a business; the more efficient an organization becomes on internal processes, the more chances will have to succeed. Goh (2021) explained that efficiency is a metric that can be calculated based on parameters determined by the researcher and it is used for comparison. Organizations use efficiency to measure internal processes and use the results to understand how well are performing. Mtotywa (2022) confirmed that operational efficiency is directly related to business performance. Efficiency is an area that most companies focus on because the survival in the market will depend on that. Organizations use or leverage IT to become more profitable; implementing IT efficiency strategies has a direct impact in the organization's performance. The implementation of good IT efficiency strategies can lead business to be successful.

The last classification within IT strategies, as explained by Al-Sumi et al. (2020) is the IT comprehensiveness strategy; that aims to support the IT flexibility and efficiency strategies by using IT to ensure correct exchange of information and communication among customers and suppliers. Al-Sumi et al. reported that the IT comprehensiveness strategy uses IT to monitor any internal and external changes that can directly impact the organization and it relies upon the critical relationship between customers and suppliers. It is essential that during the IT comprehensiveness strategy, IT

managers make decisions to ensure alignment of the technology with the businesses. Tabesh and Vera (2020) noted that during the decision comprehensiveness process, managers after gathering and processing information use a rationale procedure to make decisions. This is also supported by She et al. (2020), which asserted that during the decision comprehensiveness process, managers evaluate in detail each possible alternative to select the most appropriate according to the problem to be resolved. From the IT strategic standpoint, it is important to ensure that IT managers use the comprehensiveness decision process to implement the best strategy based on the organization, customers, and suppliers. The IT comprehensiveness strategy is used to support the IT flexibility and efficiency strategies, thereby directly impacting the organization's performance.

The literature support that having IT strategies aligned with businesses' objectives increase the performance of organizations. Ilmudeen et al. (2019) asserted that alignment between IT and businesses is one of the biggest problems that companies currently face, and it is considered one of the highest priorities for IT managers due to the relationship between IT strategies and the organization's performance. Sabherwal et al. (2019) also concluded that there is a relationship between IT strategies and the firm's performance.

Transition and Summary

In Section 1 an overview of the general IT problem was presented, that organizations are not able to provide reliable IT infrastructure services to businesses for overseas users in developing countries while also addressing the specific IT problem that some IT managers of multinational organizations in the United States lack IT strategies to

implement IT infrastructure services to the businesses for overseas users in developing countries. The purpose of this study was to explore these IT strategies and justify the need by establishing a direct relationship among IT strategies alignment with business, crisis management, and the organization's performance throughout the literature. A qualitative, pragmatic inquiry approach was found as the most appropriate research design for this study. The academic literature review included the TOE developed by Tornatzky and Fleisher (1990), which was theoretical or conceptual framework that supported this study. Additionally, the literature review showed the relationship and impact of IT strategies and crisis management on the organization's performance.

In Section 2 of this study continues the discussion about how this research was conducted. The purpose statement is reiterated, the role of the researcher is established and clarified, the type of participants that were selected is described, the criterion used to select the appropriate research method and research design is expanded, ethical research is discussed, data collection and data analysis are addressed, and how to ensure the reliability and validity of this research is explained.

Section 2: The Project

Purpose Statement

The purpose of this qualitative, pragmatic inquiry study was to explore IT strategies of IT managers of multinational companies in the United States to implement IT infrastructure services to the businesses for overseas users in developing countries. The target population for this study consisted of CIOs, IT directors, or IT managers with experience or who have implemented IT strategies that ensure IT infrastructure services for multinational organizations in the United States that have businesses overseas in developing countries located in South America, Africa, or Asia. I chose the participants in this study using a purposive sampling methodology and conducted semistructured interviews to collect the data. The implications for positive social change include that the findings of this study will contribute to enhancing IT managers' decisions leading to the long-term sustainability of businesses, therefore improving the socio-economic lifestyles of individuals in the United States and developing countries.

Role of the Researcher

I was the primary data collection instrument of this study. My role as a qualitative, pragmatic inquiry researcher included selecting participants, collecting data in the most accurate manner to ensure the research question was answered, performing thematic analysis of the data, and presenting the findings in the most truthful and valid possible way to ensure the credibility of the study. Taking this role was supported by Karagiozis (2018) who explained the importance of the role of a researcher in qualitative research through the interactions the researcher has with the participants, the data

collection, and the analysis of the findings. Karagiozis concluded that qualitative researchers must focus on three main areas to increase the validity of the study: (a) the acknowledgment of any bias that can affect the methodology, data collection, analysis, and relationship with the participants; (b) to build a good relationship with the participants through respect, ethical behavior, and understanding of multiple points of view; and (c) the researcher must add and develop a unique voice within the investigation to ensure the individuality and uniqueness of the research.

Cumyn et al. (2019) explained the impact of the researcher's role and ethical behavior in a research study by emphasizing that the burden resides entirely on the researcher's side to adhere to basic guidelines and ethical principles to avoid ethical problems that can lead to discredited research. I reviewed the Walden University Institutional Review Board (IRB) process and research ethics planning worksheet to ensure ethical concerns related to the planning and execution of the study were addressed. I also completed the Collaborative Institutional Training Initiative course (Certificate Number: 37393325) that covered topics, such as the history and ethical principles, privacy and confidentiality, international research, informed consent, internet-based research, and assessing risks. Before conducting this study, *the Belmont Report* was also reviewed. Anabo et al. (2019) emphasized the criticality of following *the Belmont Report* to minimize any ethical concerns due to the fundamental principles the report outlines that a researcher must abide by: respect for individuals, beneficence, and justice for the participants.

Qualitative researchers use interviews, documents, and observations to capture data (Thelwall & Nevill, 2021). The data obtained in this study were collected from interviews of CIOs, IT directors, or IT managers with experience or who have implemented IT strategies that ensure IT infrastructure services for multinational organizations in the United States that have businesses overseas in developing countries located in South America, Africa, or Asia. There must be a well-prepared interview protocol with some level of flexibility, follow-up, and probe questions to allow the researcher to capture good, valid, and consistent data (DeJonckheere & Vaughn, 2019). The interview protocol (see Appendix) used to collect data is critical for the successful completion of any qualitative research because it directly impacts the credibility and validity of the study. To develop my interview protocol, I used the interview protocol refinement framework explained by Yeong et al. (2018), which consisted of four steps. Use of the interview protocol refinement framework ensures a more effective and efficient interview process, reliability and validity of the data collected, better time management, and deeper exploration of the area under study. As some of the steps outlined in the interview protocol, I made sure that there was no professional relationship between the sample chosen and myself as the researcher, communicated to the interviewees the scope of the research before their interviews took place, protected the names of the participants and their respective organizations, and precisely transcribed the participants' interview responses.

Participants

The appropriate selection of participants in research is important to ensure the validity and credibility of the subject under study. Peterson (2019) explained the importance of having neutral empathy with participants in research due to the possibility of bias during the selection process and also added that research bias can come from many common factors that exist among the researcher and participants (e.g., their own experiences, race, location, or desired outcomes). Having neutral empathy with the participants means that the researchers must be “not too close to the participant, but not too distant” (Peterson, 2019, p. 149). This will ensure that a neutral interaction takes place and will avoid any potential bias in the interview process, and therefore, the data collection and later analysis.

Moser and Korstjens (2018) noted that in qualitative research, the sample chosen must provide meaningful data about the phenomenon under study, so the sample is not generally randomly selected; instead, the researcher chooses the sample deliberately. Additionally, Moser and Korstjens asserted that multiple sample strategies can be used in qualitative research depending on the research design. For instance, in phenomenology, criterion sampling is generally implemented; in ethnography and grounded theory, purposive sampling is used; while in multiple case studies, the use of both is sometimes necessary. Ramanadhan et al. (2021) reported that pragmatic approaches combine and use existing established qualitative approaches to help answer the research question. Kegler et al. (2019) concluded that purposive sampling is the most used sampling strategy when employing the qualitative inquiry framework. For the current study, I

chose purposive and criterion sampling to select the appropriate participants. Peterson (2019) shared that purposive sampling is used to ensure that participants in the study have experience and knowledge of the phenomenon under study, and in criterion sampling, participants must meet predetermined criteria that would limit the scope of the sample allowing the researcher to study a more specific and narrower phenomenon.

The participants interviewed in the current study were IT professionals with IT management roles, such as CIOs, IT directors, or IT managers, that had knowledge of and experience with the implementation of IT strategies that ensure IT infrastructure services for multinational organizations in the United States that have businesses overseas in developing countries located in South America, Africa, or Asia. For this study, I considered IT management roles as those to which the infrastructure, communication, support, or IT architects teams report directly or indirectly. Kostova et al. (2018) asserted that multinational companies generally have a centralized location where the strategies and goals are designed, known as the headquarters, which maintains a direct relationship with its subsidiaries that can be in different locations and must work towards achieving the corporate goals. The organizations under study had to be multinational companies headquartered within the U.S. territory and have businesses overseas in South America, Africa, or Asia.

It is important that participants feel comfortable about the study so that the information they provide needs to be kept private and confidential. The Walden University IRB provided guidelines to ensure that there was a trusted relationship between me as the researcher and the participants. Lynch (2018) stated that the role of the

IRB is to ensure research efficiency, transparency, and trust as well as to mitigate the risk to the participants within the study. By following the Walden University IRB guidelines, I ensured the participants' privacy and confidentiality, thereby conducting a more trustable study.

Research Method and Design

Method

For this study, I chose a qualitative research method. Qualitative research produces results that are not quantifiable and are based on human qualities, such as experiences, behaviors, feelings, or interactions among individuals (Rahman, 2017). In addition, Rahman (2017) asserted that human qualities affect the organizations' structure, functioning, and behaviors; thus, the qualitative method is appropriate to use when researchers are trying to analyze multiple realities; furthermore, researchers use qualitative research to interpret and understand phenomena that are related to individuals, organizations, or societies. Aspers (2019) noted that by studying the phenomena in natural settings, a collection of empirical materials can be obtained, allowing the researchers to have a better understanding of concepts, experiences, motivations, behaviors, or attitudes of individuals to help to gather in-depth insight or generate new ideas of the phenomena under study. The use of open-ended questions for the participants is critical to achieve such in-depth insights into the phenomena. Yeong et al. (2018) highlighted that by using open-ended questions, the researcher can gather qualitative data that can lead to the recollection of important information from the participants and determine the success of qualitative research. Busetto (2020) asserted that qualitative

research applies to complex studies that include the analysis and effectiveness of the implementation of strategies to provide insights into what works. Because I was looking to understand what strategies IT managers for multinational companies in the United States use to implement IT infrastructure services in businesses for overseas users in developing countries, it was determined that the qualitative method was most appropriate to accomplish this goal.

Boeren (2018) asserted that quantitative research is used in many empirical studies; however, it is focused on testing causal relationships instead of understanding subjective meanings of the phenomena under study. Baškarada and Koronios (2018) added that quantitative research generally applies to natural sciences where the reasoning is more analytic, and qualitative research is used in social sciences because they are synthetic by nature. Fisher (2019) found that quantitative researchers generally use sample data, measure variables, and analyze them based on probability techniques to use those results to generalize about a larger population. The aim of this study was not to make any inference using sample data or test causal relationships; instead, I sought in-depth knowledge of what strategies IT managers for multinational companies in the United States use to implement IT infrastructure services in businesses for overseas users in developing countries. Therefore, the quantitative method was not suitable for this study.

The mixed-methods approach was not appropriate for this research. Plano Clark (2019) stated that mixed-methods studies use both quantitative and qualitative approaches, combining the use of sample data and the testing of causal relationships to

later analyze them to get in-depth knowledge of the phenomena under study. Plano Clark added that “mixed methods research comes from the effective integration of the quantitative and qualitative perspectives, methodologies, data sources, and data analysis” (p. 108). Munoz-Pascual et al. (2021) asserted that quantitative and qualitative methods have strengths and weaknesses and are used together to complement each other; consequently, mixed methods are used to solve complex research problems. In each mixed-methods study, there are quantifiable data where statistical techniques are applied. In this study, the data collected were not quantifiable; thus, it made mixed methods inappropriate for this study.

Research Design

Haven and Van Grootel (2019) stated that there are five different qualitative designs that can be used: grounded theory, case study, phenomenology, ethnography, and narrative. Ramanadhan et al. (2021) asserted that full implementation of the grounded theory design is complex and is typically not implemented within information systems studies; however, a variation of the grounded theory design can be used incorporating a pragmatic approach. Ramanadhan et al. added that the utilization of a pragmatic approach within qualitative research is increasing due to its ability to answer research questions based on human experiences rather than focusing on understanding organizations. Clarke and Visser (2019) asserted that a pragmatic approach provides flexibility to researchers because it is not limited to the utilization of a specific approach but rather allows to use the combination of different methodologies depending on the phenomenon under study. In addition, Clarke and Visser highlighted that the aim of a pragmatic approach is not to

find the absolute truth, it is to enhance the understanding of the phenomenon under study because it uses human knowledge and experiences. Crane et al. (2019) reported that a pragmatic approach is used when the aim is to understand and determine the efficiency and efficacy of implemented discreet programs. Sovacool et al. (2018) explained the importance of having rigorous and correct research designs within studies and how they must be aligned with the objectives, research questions, and problem statement to ensure maximum contribution within the research literature. Having the appropriate research design helps researchers to improve the communication of the results, thereby, communicating with the audience more effectively and efficiently and minimizing the risk of bias or misunderstanding. For this study, I determined that a pragmatic approach was an appropriate research design because the goal of the research was to understand and explore the IT strategies that IT managers of multinational companies in the United States use to implement IT infrastructure services in the businesses for overseas users in developing countries.

As explained by Huixuan et al. (2015), the multiple case study design helps to study phenomena simultaneously with different subjects to help expand the knowledge and gain a broader understanding rather than studying a single subject. Reinhard et al. (2018) confirmed that a multiple case study design is used to obtain a better and deeper understanding of a phenomenon by expanding the subjects under study and allowing cross-case comparison. Following a systematic multiple case study design helps to increase the internal and external validity of research along with the reliability, which are aspects that are critical for the credibility of a research. Halkias and Neubert (2020)

asserted that conducting multiple case study research is like making multiple experiments at the same time, then comparing the results to explore differences and similarities and constructing a reality that allows the researcher to gain knowledge and understanding of the phenomena further. This gives the researcher the ability to develop more comprehensive knowledge and more robust study outcomes. Ranta et al. (2021) stated that using the multiple case study design in research allows to the researcher to approach the topic of the study in its natural setting, evaluate and compare distinctive organizations, and be a direct participant in the case under study. Therefore, more profound knowledge of the phenomena studied can be gained. In the current study, I was not looking to evaluate, compare, and understand organizations based on what strategies they use to ensure IT infrastructure services for overseas users in developing countries; rather, I wanted to explore and understand those strategies based on the experience and knowledge of the IT leaders. Consequently, the multiple case study design was not appropriate for this study.

Neubauer et al. (2019) asserted that phenomenology focuses on exploring human lived experiences and it tries to explain what and how those lived experiences affected individuals. In phenomenology, the phenomena under study are understood depending on the subjective individual's experience; this brings some advantages of finding new meanings to phenomena, that can help explain some human behaviors. Qutoshi (2018) stated that the science of phenomenology is efficacious in describing a phenomenon rather than explaining it, and it is intended to help to gain a deeper knowledge of the human behavior based on lived experiences. Sundler et al. (2019) reaffirm that

phenomenology is based on human science and it aims to explain phenomena as human beings have experienced them. The purpose of this qualitative study was not to describe humans' behaviors based on lived experiences, instead was to explore IT strategies of IT managers of multinational companies in the United States to implement IT infrastructure services to the businesses for overseas users in developing countries. Phenomenology was not chosen because it was not the right research design for this study.

Harwati (2019) stated that in ethnography, the goal is to explain the relationship between people and the environment that surrounds them; ethnography uses an interpretive perspective to achieve its goal. In addition, Havarti noted that the observation and involvement of the ethnographer are critical to the data collection, the interpretation of the results, and ensuring the latter depicts the phenomena under study in the most accurate way. Mohajan (2018) asserted that during research, implementing an ethnographic approach, observation must be done for long periods of time to evaluate the behavior of an entire group that shares common values; in summary, ethnography is learning about people. The purpose of this qualitative study was to explore IT strategies of IT managers of multinational companies in the United States to implement IT infrastructure services to the businesses for overseas users in developing countries, these strategies are not possible to be explored by using an ethnographic approach, therefore ethnography was not a suitable research design for this study.

Nigar (2020) stated that in a narrative approach, the researchers tell stories through a sequence of events and highlight the parts of the stories that are considered relevant; this type of research approach focuses on describing or telling events.

Tomaszewski et al. (2020) added that narrative aims to tell the story of people based on lived experiences and such stories become raw data. Slade et al. (2019) confirmed that a narrative approaches is used when researchers want to obtain deep knowledge of lived experience of individuals, and after collecting the data create a story. In addition, Slate et al. added that this design approach helps researchers understand individuals' cultures and behaviors based on lived experiences. This study was looking to explore the IT strategies of IT managers of multinational companies in the United States to implement IT infrastructure services to the businesses for overseas users in developing countries, therefore narrative was not the right research design for this study.

Population and Sampling

The target population for this study consisted of CIOs, IT directors, or IT managers with experience or who have implemented IT strategies that ensure IT infrastructure services for multinational organizations in the United States that have businesses overseas in developing countries located in South America, Africa, or Asia. Casteel and Bridier (2021) highlighted that population and sampling must have the same unit of analysis in a research study and the results can be used to generalize to a broader population with the same unit of analysis. In addition, Casteel and Bridier explained the importance of the population and sampling in limiting the scope of the study; this is critical for the success of any research because it provides the foundation of the data collection process that directly affects the reliability and credibility of the study. Hennink and Kaiser (2022) noted that in qualitative research, the sampling strategy chosen along with the data saturation impact directly the success of the research. Gill (2020) mentioned

that convenience or volunteer, snowball, purposive, and theoretical sampling are four common types of sampling strategies used in qualitative research. Gill also added that in convenience sampling the participants volunteer for the study and therefore they might not have the necessary expertise or knowledge of the phenomena under study; in snowball sampling the current participants can recommend other people to be part of the study but this can have the same problem as the convenience or voluntary; in theoretical sampling, the researchers try to use the sample of the population to generate theories making this type of sampling technique used more frequently in grounded theories studies. For the reasons mentioned above convenience, snowball, and theoretical sampling were not suitable for this study. Purposive sampling was the strategy chosen in this research.

Campbell et al. (2020) explained that researchers use purposive sampling to make sure that the sample chosen has the proper knowledge and understanding of the phenomena under study; thus, the objectives initially planned are achieved. Campbell et al. also added that this strategy intends to select participants who are most likely able to provide the most appropriate and useful information to the research to increase credibility, trustworthiness, and reliability. Andrade (2021) noted that purposive sampling has the advantage of increasing internal validity and the disadvantage of reducing external validity; this sampling strategy is also convenient and easy to implement because the selection criteria are set by the researcher, allowing to identify the participants of the sample ahead of the data collection. Fusch and Ness (2015) asserted that data saturation “is reached when there is enough information to replicate the study when the ability to

obtain additional new information has been attained, and when further coding is no longer feasible” (p. 1408). It is important to increase the quality of the research by achieving data saturation during the data collection process. The failure to achieve data saturation in research will directly impact the validity of the study.

The size of the sampling is critical to determine the data saturation in qualitative research. Hennink and Kaiser (2022) asserted that data saturation generally occurs when the sampling size is between nine and 17. According to Braun and Clarke (2021), between six and 16 is the sample size for qualitative research to reach data saturation. Low (2019) highlighted the importance of the sample size in qualitative research and emphasized that independently of the number, the sample taken must lead to data saturation. The sample size used in this qualitative research was nine, and data saturation was achieved.

The purpose of this qualitative, pragmatic inquiry study was to explore the IT strategies of IT managers of multinational companies in the United States to implement IT infrastructure services to the businesses for overseas users in developing countries. Purposive sampling allowed the selection of the proper CIOs, IT directors, or IT managers with experience or who have implemented IT strategies that ensure IT infrastructure services. Additionally, it is essential to highlight that data saturation was achieved during the data collection process.

Ethical Research

While conducting a study, researchers must perform every single activity with the highest ethical standards possible. Researchers are encouraged to learn about ethical best

practices, processes, and procedures to ensure the high quality of the research. Generally, organizations establish what is called IRB. Resnik (2021) noted that IRB is responsible for ensuring that all ethical issues or concerns are addressed within research that includes human subjects; this institution has the authority to approve or reject a research. The approval is subject to meet the ethical requirements established by the IRB organization.

To increase my knowledge in ethical research, I took and successfully completed the Walden University Academic Integrity Student Module. I also reviewed the IRB process and tools to make sure I understood the IRB approval process and the required documents. The form Description of Data Sources and Partner Sides were completed and submitted for approval to the IRB. It is important to highlight that before the data collection process began, which means engagement with the participants, the IRB approval was necessary. I received the approval from the IRB to proceed further with this research, the approval number is 04-04-23-1024343. After obtaining the approval and the authorization to engage the participants, I contacted them by email, which included:

- Description of the interview process.
- The title of the research and a brief explanation of the study.
- The benefits that the study can bring to businesses.
- A statement about the confidentiality of the information.
- The Consent Form. It was important that the participant understood and signed it prior to any engagement.
- A statement that there was no compensation of any kind for participating in the research.

- Assurance to participants of the protection of the data collected, including their personal information. It was communicated that the information will be stored in a secure place for 5 years and a proper masking process was going to be implemented.
- A statement that the participation was voluntary, and the participant had the right to withdraw at any point of the research process.
- Assurance to the participants that the process followed the IRB standard ethical guidelines.

Data Collection

Instruments

Clark and Vealé (2018) noted the importance of the researchers' role in a qualitative study and stated that researchers must be involved in the data collection process as the data are gathered in the participant's natural environment. Clark and Vealé also highlighted that bias and subjectivity in qualitative research exists and in some cases, provide advantages to the study by bringing different points of views from researchers; however, it is important that bias and subjectivity are acknowledged thus validity and reliability are not affected. Barrett and Twycross (2018) explained the importance of the data collection process during research and how important researcher's skills are to ensure validity and reliability. In addition, Barrett and Twycross reported three of the most common types of data collection instruments within a qualitative study: interviews, focus groups, and observations. For each type of data collection instrument strengths, weaknesses, and challenges exists.

For this study, I used interviews to collect or gather the data. Moser and Korstjens (2018) stated that interviews in qualitative research are used to collect data; this process consists in having a direct interaction between interviewers who ask questions and interviewees that respond them. The interaction can be face-to-face, by phone, or online. McGrath et al. (2019) added that interviews help researchers to explore and obtain a deeper understanding of the phenomena under study through direct communication with the participants. McGrath et al. also provided some guidance to follow during an interview process within qualitative research, some of the recommendations included that the researcher must be prepared as an interviewer; thus, practicing this skill is important, have a predetermined questionnaire with potential follow-up questions, ensure interviewees have a clear expectation of the goal of the interview, become a good listener, and ensure the interview is transcribed in a timely manner. Appendix provides detailed information about the interview protocol that was followed in this research.

Within the interview data collection instrument, Husband (2020) noted that semistructured interviews are the most widely implemented for data collection within qualitative research, because it allows for purposely creating predetermined questions that should be asked in a specific order but also give liberty and flexibility to the interviewers and interviewees to engage in informal discussions that help the researcher to deepen knowledge about the topic under study. It is important to highlight that during a semistructured interview, the interviewer must let the participant speak freely within the range; thus, the focus must always be to find an answer to the research question. Oplatka

(2018) confirmed that during a semistructured interview, the interviewer must have a set of structured questions but must give flexibility to the interviewee to bring new insights and points of view to the study; however, this flexibility must be limited by the time of the interview and the scope of the study; thus, the answers can help to achieve the goal of the research. Semistructured interviews, which falls within the interview process was used in this study to help to explore the IT strategies of IT managers of multinational companies in the United States to implement IT infrastructure services to the businesses for overseas users in developing countries, which was the aim of this research.

Data Collection Technique

Online semistructured interviews with CIOs, IT directors, or IT managers with experience or who have implemented IT strategies that ensure IT infrastructure services for multinational organizations in the United States that have businesses overseas in developing countries located in South America, Africa, or Asia was used for data collection. Schober (2018) reported the advantages of a face-to-face interview, including better personal connection with the interviewees, noting any nonverbal communication signals, making necessary adjustment during the process, incentive participation, and helping interviewees feel more comfortable allowing them to speak more freely. Schober also provided some disadvantages, mainly focused to the social and economic costs. Face-to-face was not used in this study because the availability, distance, and cost of meeting the participants made it too difficult to implement.

As technology evolves, online semi-structured interviews are another technique used by researchers to collect data. Mirick and Wladkowski (2019) asserted that the rapid

changes in technology has helped qualitative researchers to use web-based applications to perform interviews allowing flexibility in the management of the interviewer and interviewee schedules, cost savings, and the ability for researchers to have a more significant sample population by overcoming constraints due to the geographic location of the participants. Online semistructured interviews were used in this research.

I performed semistructured interviews by following the protocol described in the Appendix. The open-ended questions were structured in a specific order to ensure the interviewees provide meaningful answers, but also to give them flexibility to gain deeper insight into the subject under study. Scholz et al. (2022) asserted that answering open-ended questions are more difficult because they must be answered using the individual's own words; however, it allows interviewers to obtain more detailed information, test the knowledge, and obtain different point of view from the interviewees; thereby, helping to increase the quality of the research. Follow-up questions were prepared and used to ensure continuous participants engagement. DeJonckheere and Vaughn (2019) highlighted the importance of follow-up questions as part of the semistructured interview process because they help to obtain more details and understanding of the topic. DeJonckheere and Vaughn also asserted that follow-up questions are also known as probe questions and aim to complement data collection. The correct use of open-ended questions along with the probe questions ensure that researchers capture the most information possible allowing to gain deeper knowledge of the phenomena under study and ensuring high-quality research.

Data Organization Techniques

As a result of the semistructured interviews, significant qualitative data were collected in this research. Williams and Moser (2019) asserted that the data collection and organization within qualitative research directly affects the outcome of the study; these processes must be consistent during the entire research, clearly defined, and repeatable. The semistructured interviews were recorded using an online application tool named Microsoft Teams, each recorded interview session produced a file that was saved and named using a specific code, for instance Participant AA, Participant BB, Participant CC, and so on. The use of this specific code was to ensure the confidentiality of the participants. Surmiak (2018) noted that some ethical recommendations given by the IRB to ensure successful qualitative research include the confidentiality of the participants and the data, especially when the studies are related to the medical field. The confidentiality depends on the approach taken by the researcher, in this study, the anonymity of the participants and the protection of the data collected were guaranteed.

All files generated by the interview process and the posterior transcript files created in Microsoft Word were saved into a private cloud account where folders were created and organized based on the context and type of files. All notes manually taken during the interview that were not in electronic format were destroyed once the data was converted to an electronic file. The data was stored in the cloud; thus, no backup of this data will be performed as the researcher relies on the high availability of the cloud services. It is important that researchers keep in a secure area all data related to the study to avoid a potential loss of files after the data is collected from the participants. Borghi et

al. (2018) added that generally, researchers face problems managing the collected data, which can impact the integrity of the research and recommend the use of a Research Data Management framework to ensure the data is collected efficiently, documented, organized, stored, and backed up. This study will follow some of the best practices of the Research Data Management framework to ensure the validity, integrity, and reliability of the research.

The data collected in this research will be saved in a private cloud for 5 years and will be deleted following strict processes to ensure the full deletion of the files. This research carefully followed the requirements of the IRB regarding data collection and organization to ensure the requirements to fulfill the degree of Doctor of Information Technology were met.

Data Analysis Technique

Before the data analysis was performed in this research, I carefully reviewed the audio and transcript files to ensure a clear understanding of the collected data. Fisher and Bloomfield (2019) highlighted that in qualitative studies the researchers collect, interpret, and analyze data continuously. Additionally, the data analysis technique chosen would depend on the methodology used, the research question, and the type of data collected by the researcher. Fisher and Bloomfield also asserted that thematic, content, constant comparative, framework, discourse, and grounded theory are the six types of data analysis techniques that can be used in qualitative research.

Thematic analysis was the chosen data analysis technique for this research. Castleberry and Nolen (2018) added that in qualitative studies researchers use thematic

analysis to interpret and analyze data that results from transcribed interviews, helping researchers to gain a more profound knowledge of the phenomena under study.

Castleberry and Nolen also reported that thematic analysis consists of a systematic process that allows exploring and analyzing the data collected to find patterns or themes within the data that can later be used for interpretation. This is a complex process that must be implemented carefully by the researchers to ensure the credibility and reliability of the study. Additionally, Castleberry and Nolen asserted that generally researchers use software to facilitate and improve the data analysis process by eliminating manual work and mitigating potential errors, these programs are called Computer-Assisted Qualitative Data Analysis Software (CAQDAS). Williams and Moser (2019) stated that CAQDAS are programs that effectively can be used to organize data; these applications are also capable of performing complex data analysis and reducing potential human errors introduced by the researchers. These programs are essential to the thematic analysis process within research. NVivo was the CAQDAS chosen program that helped with the data analysis of this study. NVivo is not new in the world of data analysis within qualitative research. Richards (1999) stated that “NVivo supports code-based inquiry, searching, and theorizing combined with the ability to annotate and edit documents. However, NVivo is designed for researchers who wish to display and develop rich data in dynamic documents” (p. 412). This application allows importing text documents with free text units, provides tools to facilitate coding, supports qualitative diagram modes, and is user-friendly due to visual display capabilities. Maher et al. (2018) asserted that NVivo helps qualitative researchers with data management and data analysis, and the

combination of both, along with the traditional manual coding process help researchers to obtain the best outcome possible because it facilitates the analysis and write-up of the results.

Data coding was used as part of the data analysis process. Linneberg and Korsgaard (2019) explained that coding is used in qualitative research where words, sentences, phrases, or any other attributes are identified and then labeled with codes; this helps with the initial interpretation and analysis, allows easy access, assists in the creation of data structure, and provides a deeper insight to the researchers of the raw data collected. Linneberg and Korsgaard also added that coding ensures transparency and validity of qualitative research. For this study, thematic analysis was used as a data analysis technique, and was supported first by coding and then the classification process. NVivo helped to facilitate the data analysis process.

Reliability and Validity

Rose and Jonhson (2020) asserted that trustworthiness in qualitative research can be addressed by improving reliability and validity. Researchers must handle all concerns related to these two aspects of qualitative research to ensure the study is trusted. Rose and Jonhson reported that reliability is associated with the consistency of the processes used throughout the entire research and validity relates to the appropriate tools, processes, and data used by researchers to ensure accuracy in the findings; thus, the outcome obtained satisfies the research question. Rose and Johnson also highlighted that credibility, transferability, dependability, and confirmability are critical to ensure the trustworthiness of qualitative research and are part of the reliability and validity process. Coleman (2021)

asserted that reliability is also referenced as dependability or confirmability and uses tools such as triangulation to ensure consistency in the findings. Coleman also associated validity with credibility and transferability; researchers use tools such as member checking and contradictory evidence to meet the validity criteria. The concepts of dependability, consistency, credibility, and transferability are developed in more detail below to understand how they were used in this research to ensure trustworthiness.

Dependability

Singh et al. (2021) asserted that dependability directly impacts the reliability of researches and helps to ensure consistency of processes and procedures used during the data collection; thus, qualitative research studies can be repeatable and arrive to the same conclusion. To increase dependability in this research, I recorded the interviews and transcribed the data. I also used audit trail for any changes made, and a computer software (NVivo). Singh et al. added that audit trail could be used to improve dependability and Baumgart et al. (2021) asserted that recording interviews, performing transcription, and having a computer software can help with the transparency of the process, thereby increasing the dependability.

Confirmability

Haven and Van Grootel (2019) noted that confirmability relates to the fact that researchers must interpret the data as it is collected and remove any personal or predetermined assumptions on the matter under study; in confirmability, the findings must represent the participants' perspective, not the researchers. The results of the study must be able to be confirmed or corroborated by other researchers, thus this is critical for

the reliability of the research. Baumgart et al. (2021) added that triangulation is a strategy that researchers use to improve confirmability. Natow (2020) explained that triangulation is used to increase the reliability and validity of qualitative studies and consists of multiple data points or data sources to develop a comprehensive understanding of the phenomena under study that help answer the research question. Triangulation allows researchers to look for different perspectives, mitigate the risk of predetermining assumptions, and cross-check evidence. I used triangulation in this research with 62 publicly available documents and 15 industry standards, considered secondary data sources. Thirty nine peer-reviewed journals were used as well to increase confirmability.

Credibility

Haven and Van Grootel (2019) explained the importance of credibility within a study and how researchers must ensure that the data collection, interpretation, and conclusions of the phenomena under study follow consistent and factual processes that would make the research credible to the targeted audience. Haven and Van Grootel also reported that researchers must avoid adding predetermined assumptions to prevent any potential bias in the study and be impartial during data collection, interpretation of results, and writing of conclusions. Credibility is part of the validity process and helps to strengthen the trustworthiness of research; there are multiple strategies that researchers use to ensure the credibility of a study. Coleman (2021) noted that member checking could enhance credibility. Rose and Johnson (2020) explained that member checking is a strategy used for researchers to validate the collected data and should not be confused with transcript verification; it consists of sharing a summary or total findings with

research participants to obtain feedback to test the researchers' understanding allowing them to correct any wrong interpretations; thus, what has been captured by researchers represent accurately the participants' ideas, thoughts, and points of view. To strengthen the credibility of this research, I used member checking with research participants to ensure the data collected represented the participant's point of view accurately and to facilitate data saturation.

Transferability

Munthe-Kaas et al. (2020) explained the importance of transferability in qualitative research by emphasizing the need to ensure that measures, data collection, and analysis are applicable to other studies. Munthe-Kaas et al. also used similar terms when referring to transferability, such as, applicability, generalizability, transportability, or relevance. Researchers need to be able to ensure transferability to maximize the validity of research, therefore trustworthiness of the study. FitzPatrick (2019) associated transferability with external validity and highlighted how important is for qualitative studies that the research processes and findings can be used in other contexts or situations, allowing them to be utilized beyond the bounds of the research. Singh et al. (2021) asserted that using detailed descriptions of the research approach methods that include the background of the problem, the reasoning of the selected sampling, procedures for data collection, and analysis can increase transferability by providing the readers with the necessary information that can help them to determine if the tools used within a research study will fit their needs. I provided detailed descriptions of all

methods, processes, and procedures of this research to maximize transferability, therefore increasing the validity of this research.

Transition and Summary

In Section 2, I described the purpose statement of this research. I also provided a detailed explanation about the role of the researcher, how participants were selected, and the research method and design that were implemented. The comparison among the options within qualitative research that allowed to select the appropriate population and sampling were presented along with the supported literature. To ensure the research follows ethical standards, a detailed section about ethical research and the steps taken to ensure the confidentiality, accessibility, and security of the participants and data were described. Additionally, I detailed the data collection instruments along with data collection, data organization, and data analysis techniques. Finally, Section 2 ended with a deepen explanation of the steps that were taken to ensure the reliability and validity of this research.

Section 3 of this study continues with the presentation of the findings, application to professional practice, implication for social change, recommendations for action, recommendations for further reflection and experience of the research process, and conclusion.

Section 3: Application to Professional Practice and Implications for Change

Section 3 of this study includes (a) an overview of the study, (b) a presentation of the findings, (c) discussion of the applications to professional practice, (d) description of the implications for social change, (e) recommendations for actions, (f) recommendations for further study, (g) my reflections, and (h) my conclusions. I present the findings of this study through the emergent themes.

Overview of the Study

The purpose of this qualitative, pragmatic inquiry study was to explore IT strategies of IT managers of multinational companies in the United States to implement IT infrastructure services to the businesses for overseas users in developing countries. All nine participants worked for small, medium, and large enterprises. The participants consisted of CIOs, IT directors, or IT managers with experience or who have implementing IT strategies that ensure IT infrastructure services for multinational organizations in the United States that have businesses overseas in developing countries located in South America, Africa, or Asia.

I used the collaboration software, Microsoft Teams, to perform, record, and transcribe the interviews. The transcript files were verified by listening the recorded audio and ensuring that the exact words of the participants were captured on the transcript files. I followed the interview protocol for data collection to increase the validity and reliability of the study. Collecting the data through semistructured interviews, analyzing the collected qualitative data, conducting a literature review, and aligning the study with the TOE conceptual framework aided in identifying the six

emergent themes that helped to answer the research question: (a) hybrid cloud and on-premises adoption, (b) IT infrastructure redundancy or failover process, (c) development of standardized IT best practices, (d) IT infrastructure strategies by region, (e) measurement of the IT infrastructure services, and (f) external factors impact the adoption of IT infrastructure strategies. The TOE framework was the conceptual framework that supported this study. The TOE framework was originally proposed by Tornatzky and Fleisher (1990). Table 2 shows the number of participants, participant references, and document counts that helped to identify the themes. Each theme was categorized based on the technology, organization, and environment contexts.

Table 2

Frequency of the Participants, Participant References, and Document Count That Built the Themes by Technology, Organization, and Environment Contexts

Context and theme	Participants	Participant references	Document count
Technological context			
Hybrid cloud and on-premises adoption	9	122	8
IT infrastructure redundancy or failover	9	45	9
Organizational context			
Development of standardized IT best practices	9	98	9
Measurement of the IT infrastructure services	9	78	9
Environmental context			
IT infrastructure strategies by region	9	115	8
External factors that impacts the adoption of IT infrastructure strategies	9	9	6

Table 3 summarizes the literature, industry, and public documents used to support the six themes that emerged in this research.

Table 3

Summary of Industry Standards, Public, and Literature Reviewed Documents by Type

Type of document	Document referenced
Industry standard	15
Peer-reviewed journal	39
Public document	62

Presentation of the Findings

The overarching research question of this study was: What strategies do IT managers for multinational companies in the United States implement IT infrastructure services to businesses for overseas users in developing countries? I used purposive sampling to select the nine participants of this study and conducted semistructured interviews through Microsoft Teams to collect the qualitative data. During the interviews, I connected the participants' responses with the three contexts of the TOE framework. While performing the interviews, I enabled the Microsoft Teams video recording and transcription options. I verified the collected data with the interviewees to make sure it represented their thoughts and opinions through member checking. To protect the confidentiality of the participants, each was assigned a pseudonym using the following pattern: Participant AA, Participant BB, Participant CC, Participant DD, Participant EE, Participant FF, Participant GG, Participant HH, and Participant II.

I corrected the transcription record when there was a difference between what was said by the participants and what the Microsoft Teams application transcribed. I highlighted any changes with yellow color to indicate that a modification was made and ensure the transcript showed exactly what the participant said. After verifying the collected data, I uploaded each semistructured interview transcript to NVivo 14, a CAQDAS. A total of 56 codes were created and used during the categorization process. These codes were the foundation used to develop the six emergent themes that were used to present the findings of this study.

Theme 1: Hybrid Cloud and On-Premises Adoption

The first theme identified to answer the research question is the implementation of a hybrid cloud and on-premises approach. Table 4 indicates the number of participants, references, and document count.

Table 4

References of Theme 1: Hybrid Cloud and On-Premises Adoption

Theme	Participants	References	Document count
Hybrid cloud and on-premises adoption	9	122	8

Participant Findings

A total of eight participants agreed that this is the best strategy to implement because it allows the organization to take advantage of the cloud capabilities and lets organizations to keep local services that cannot be moved due to technological limitations or legal regulations.

Additionally, having file services in the cloud provides mobility to users, allowing them to work from anywhere. Participant AA stated, “So it is not 100% moving to the cloud primarily because of looking at what make sense, what makes the most economic sense.” Participant BB reported, “But the reality is we have business applications that certainly can live in the public cloud and those I would put.” Participant CC expressed, “So the majority of our infrastructure these days and applications are hosted in the cloud.”

Microsoft Office 365 and OneDrive are the most common cloud solution for collaboration and storage of user’s files. Participant GG said:

At one point, the company said we are using Microsoft 365. Everyone is using it. It is an enterprise platform. It is available in every country. Yes, it has a higher cost, but you do not need people. You do not need servers; you do not need this. You do not need that, right? And everything the same.

Additionally, Participant HH stated, “We use OneDrive, we use. I mean, we have everything, nothing is kept on the local laptop or PC.”

Participant BB stated, “When it comes to undeveloped countries, we’re somewhere in the middle, OK. Where we don’t want to commit to a lot of infrastructure even though we absolutely could,” and “We believe that we live in, and we will continue to live in a hybrid world.” Participant DD mentioned, “So we still have some systems that are really on-premises because there are things that you cannot just really ship to the cloud, right?”

Participant BB agreed with the hybrid approach and asserted that:

If I need to do SAP or any account management or any financial information locally, the country, I wouldn't really put it in the public cloud. I would put it somewhere locally and that I have access to it and control.

Participant II noted:

You know it's a mix. I am not going. I cannot get in being particulars, but it is just you know, whatever is the best fit. It is a business case, and sometimes it makes more sense to on-premises, sometimes makes more sense to in the cloud. There are migrations back and forth all the time, just depending where and what is the best fit for the architecture and the overall corporate strategy, and the strategy is determined by typically the business case and then what the needs are.

Participant HH reinforced the implementation of a hybrid strategy as the best approach by saying, "Really come a hybrid. So, like you know our EA 365, that is all cloud now, but some of our other applications you know are on-premises, we are doing a huge, we are noticing more and more."

Some concerns exist within the business organizations about security and data protection; these are two critical elements when deciding to move to the cloud or stay on-premises. Participant DD said, "Cloud is really good, but you know all the cyber security issues," then added, "Yes, it is still hybrid. We are not sold out yet and moving everything to the cloud." Security concerns are the main driver for Participant DD having a hybrid approach.

Participant BB explained the use of a hybrid approach but leveraging existing on-premises infrastructure, by saying,

What we are finding is that some cases, it may make a lot of sense to leverage a combination of on-prem infrastructure through a third-party partnership. Maybe we leverage a partner that they have managed services, OK. Or use a combination of that and cloud services. Actually, public cloud services. Why? Because the infrastructure is already in place when it comes to public cloud services, and they have the know-how, and they have the personnel to actually support us.

Participant GG stated,

But we are cloud agnostic in hybrid cloud friendly. So we have agreements with Azure, we have agreements with you know AWS, we have agreements with Google, you know, GPC, and then we are you know what we wanted to mostly do is bring things off premise so moving away from the traditional active directory or files server, if at all possible, right? Get that stuff out of there.

The adoption of the hybrid approach was a consistent answer for 8 of the 9 participants, emphasizing that a hybrid approach is the best solution to implement. Use of both, the cloud and on-premises offer advantages and flexibility when planning, developing, and implementing IT strategies in undeveloped countries to help organizations achieve their business goal.

Industry and Public Documents

Table 5 indicates the summary of the different type of documents used to support Theme 1.

Table 5*Industry Standards, Public, and Literature Review Documents That Support Theme 1*

Industry standards and public documents	Documents referenced
Industry standard	3
Public document	9

The secondary data sources found support Theme 1. The World Bank Group (2016) defined a hybrid cloud approach as a combination of a public and private cloud infrastructure that provides agility, scalability, and high availability to organizations. In addition, the Cloud Security Alliance (2022) asserted that hybrid cloud refers to organizations keeping some services on-premises and others on the public cloud. In an article published by the National Institutes of Health, Shahid et al. (2023) provided four classifications for cloud adoption: private, community, public, and hybrid. The International Standard Organization (2014) also defined these four types of cloud models and provided guidance for a hybrid cloud deployment. Hewlett Packard (2011) confirmed that the hybrid approach would prevail as the dominant model to implement in organizations for a long time because it provides flexibility when implementing IT strategies and offers the combination of the best of the traditional environment and the cloud.

The World Bank Group (2022) explained that countries that want to transform digitally generally use a hybrid approach, and the implementation rationale is determined by the objectives, performance, current systems, and existing laws and regulations. Additionally, the World Bank Group stated that governments in developing countries are

starting to generate trust in cloud technology; thereby, when governments make this significant shift, businesses are encouraged to follow and embrace the cloud as a solution. The International Standard Organization (2022a) included the hybrid approach as a concept within multicloud and provides standards regarding the characteristics, benefits, considerations, and hybrid cloud management.

The hybrid approach is a common strategy used by organizations. The U.S. Department of Justice (n.d.a) uses a hybrid strategy to take advantage of the capabilities of the cloud to increase reliability and collaboration while using the existing IT infrastructure to maximize efficiency in the utilization of IT resources. The U.S. Department of Treasury (n.d.) asserted that many large financial organizations are implementing a hybrid approach when looking to adopt cloud technology and reaffirmed the utilization of cloud and on-premises resources to ensure efficiency, scalability, and flexibility. Alzahrani et al. (2022) reaffirmed that the hybrid approach provides an improvement in data reliability because of the capabilities offered by the cloud and on-premises IT resources.

Telecommunication and security are critical for the implementation of the hybrid strategy. This is confirmed by the U.S. Department of Homeland Security (2019) that stated that a hybrid cloud requires a trusted internet connection to protect the organization's internal IT infrastructure. The U.S. Department of Commerce (2018) defined a hybrid cloud as basically two different cloud infrastructures that are connected, allowing organizations to provide data and application mobility, along with giving a competitive advantage that can result in business innovations.

Literature

The literature reviewed supports Theme 1. Amin et al. (2021) shared that hybrid models and multicloud are two different approaches considered when implementing IT strategies in governments. Each one offers advantages and disadvantages that must be evaluated, and the impact of these strategies directly effects the private and public sectors. Hosseini Shirvani et al. (2022) stated that there are four different types of cloud deployments: private, community, public, and hybrid. Hosseini Shirvani et al. added that generally, organizations use the hybrid cloud because it allows moving off-premises those Central Processing Unit high-intensive applications and provides high scalability, as well as permits keeping on-premises those high-intensive data transfer services. In other words, it provides flexibility to businesses to manage the IT infrastructure services in the most cost-effective way to ensure they are aligned with the organization's vision. In the current study, I found that the hybrid approach is the most common cloud deployment strategy used for IT managers in developing countries because it gives them the necessary flexibility when deciding what to move to the cloud and what to keep on-premises based on the organization's IT infrastructure, finances, and human resources.

Amin et al. (2021) explained additional areas to be considered when choosing a cloud hybrid approach, emphasizing that some government concerns in developing countries when implementing cloud solutions are related to privacy laws, confidentiality, storage, and latency. Amron et al. (2019) noted the importance of cloud computing within IT strategy to ensure organizations' flexibility, scalability, availability, and efficiency. Amron et al. added that this strategy must be used depending on the organization's

overall business strategies. The participants' responses in the current study aligned with what was found in the literature regarding the capabilities and the positive impact of cloud computing within organizations because it is scalable, flexible in the management of resources, efficient, and provides high availability that ensures uninterrupted IT services. These factors are critical for organizations to be successful because any of them can affect the quality of IT services and, thereby, the organization's performance. Privacy, confidentiality, storage, and latency are areas of concern expressed by IT managers in the current study, and those factors must be considered when looking to decide to move to the cloud or keep on-premises because the impact on the organization is significant. Privacy and confidentiality can cause compliance and legal problems and storage and latency can negatively impact IT services and, thereby, the organization.

Trakadas et al. (2019) confirmed that using a hybrid cloud, organizations increase flexibility in the management of IT resources, reduce cost, and allow to leave local applications and sensitive data that can compromise the future of the business. These are critical factors found during this research and that IT managers must consider when planning, developing, and deploying a hybrid cloud strategy. Suhanto et al. (2019) reaffirmed these advantages and added that security, network latency, and compliance impact the successful deployment of hybrid cloud. Sivan and Zukarnain (2021) shared that security and privacy are two key factors that affect the deployment of hybrid cloud in the Malaysian healthcare system. Developing countries have different laws, infrastructure, cultural, and human resources; thus, it is critical to choose what to move to the cloud and what to stay on-premises. IT managers must evaluate the cost-benefit,

resources needed, and legal implications to the organization. Ali et al. (2021) concluded that implementing cloud technology is unique to organizations and the decision to adopt it depends on the innovation, technology, organization, environment, and benefits. Implementing a hybrid cloud strategy is common within the IT area; however, the deployment varies because each organization's technology, knowledge, financial situation, location, and laws that impact operations are unique. The hybrid cloud is the most common strategy used by IT managers in developing countries; however, the deployment in each organization is different.

Conceptual Framework

This theme fits within the technological context of the TOE framework. It consists of an IT strategy used to ensure IT infrastructure services for users in developing countries, where organizations move to the cloud most of the enterprise applications and file services and leave on-premises local applications specific to regions or countries. Ng Picoto et al. (2021) proved the applicability of the TOE during the implementation of cloud computing within organizations because the technological context of the TOE framework includes the new technology to implement, which in this case is cloud computing; and the existing technologies within organizations that are represented by the on-premises infrastructure. Menta (2022), while implementing cloud computing in the educational system in the Philippines determined the critical success factors for such implementation and reaffirmed the applicability of the TOE when adopting new technologies. Skafi et al. (2020) explained how the three contexts of the TOE helped to determine the factors that impact the adoption of cloud technology in small and medium-

size enterprises in Lebanon. IT managers must consider the current organization's technology, skill of IT resources, financial situation, and laws when planning to implement a hybrid cloud strategy. Each of these four factors fits within the three contexts of the TOE framework, thereby, making it a feasible framework to support this research.

Asiaei and Rahim (2019) shared that the TOE framework cannot cover all key elements of new technology adoptions; however, the scope of the implementation can help to facilitate the selection of the factors that fall within each of the TOE framework contexts. This is critical because each organization is different; thereby the factors within the three contexts can vary among organizations. Finally, Singh and Mansotra (2019) emphasized that the TOE framework can be used in the adoption and implementation stages when adopting new technologies. The TOE is a flexible framework and can be used in multiple scenarios due to the three contexts: technology, organization, and environment.

Theme 2: IT Infrastructure Redundancy or Failover

The second emergent theme in this study is IT infrastructure redundancy or failover process. All nine participants in this study asserted the importance of having redundancy or a failover process to ensure availability of IT infrastructure services in developing countries. Each participant explained that the design of redundancy or failover processes depend on the technological limitations, organizational structure, and cultural impact of individuals within the IT operations. Table 6 indicates the number of participants, references, and document count for this theme.

Table 6*References of Theme 2: IT Infrastructure Redundancy or Failover*

Theme	Participants	References	Document count
IT infrastructure redundancy and failover	9	45	9

Participant Findings

There was a consensus among all nine participants about the criticality of having redundancy or failover processes. In addition, that the IT services included must be chosen based on the criticality of the business. Participant AA stated,

I do not put in support in one location. So, making sure that, yes there is Philippines, but there is also India and there is also Mexico, or there is also somebody in Europe, right where if let's say knock on wood, the typhoon cuts off everything in the Philippines, right, communication. So, we have India who would be taken over providing support.

Participant AA also added,

Where we still have services that are accessible within the VPN, right? So, if the main data center goes down, then whatever is in those locations, it is inaccessible anymore, right? But then we put in like again going back to what are the main services, let's say VPN connectivity, right, there is one server on Manila, there is one on India, there is one in Sidney, right? Making sure that that redundancies in place so we cannot put it across all the services, but really looking at the main services that is consumed by the employees.

Participant HH said, "If a server that has critical enterprise system, it has a failover and I failover to another location," Participant II agreed and stated, "then maybe the more

critical services have quicker repose times for you know like automatic failover.”

Participant CC noted that “We have deployed globally SDWAN technology redundant for all our primary manufacturing sites.” Participant CC explained in more detail about the failover process from the ICT area and said,

At the site level, right, we have obviously we are redundant circuitry, right? So, we bring in multiple data circuits in to make sure that we and there is separate, right? They are not the same provider. They are completely separate and, in some case, depending on the site, they might even have some like cellular slash you know 5G-4G type back and even a third backup potentially right? So now we got connectivity, we can get out.

Participant EE agreed with Participant DD regarding the utilization of multiple circuits to ensure communication and that circuits connected to the location should be using different paths. Participant EE said:

So, the strategy, which is something developed in conjunction with the central team, we normally use both data circuits and using different routes, right? So, we do we must guarantee that we are not, let’s say even we are using with 2 circuits. We are not using the same part of the path we are using so, this ensures some stability.

Participant FF added that “We have a primary circuit and the secondary circuit. So then both of it are kind of on par with each other. So that way when there is an outage, it could go to the secondary.” Participant HH reinforced the importance of failover processes and

explained the implementation of an enterprise MPLS connection along with local internet connectivity, Participant HH said:

We have lot of redundancy. So, we have an MPLS network with Sprint and that covers everyone and then you know to connect our applications and things like that and then for internet access, almost every country has their own local private internet you know to get out to the internet that also serves for redundancy if the MPLS network goes down.

Participant DD explained that during the implementation of IT strategies related to the IT infrastructure failover processes, it is important to evaluate the capabilities and limitations of the country or region where they might be implemented, in addition, to evaluate the closest location with the highest benefit for the organization. Participant DD said “so our strategy really is if there is some kind of issue later on, we can switch over to probably the nearest location, so that business will continue. There is a business continuity here there, right?” This is reinforced by Participant DD when said:

Our IT based local support right there is in Chennai and they have this monsoon rings and then storms or cyclones that happen in one week. They are all gone and there is nothing we can do about it, right? I mean how do you how do you recover that there? But what we did for them is that immediately we, we forced them actually to get through to Singapore, the connectivity through Singapore rather than connecting to the US, so that is how we are strategy right there.

All nine participants explained the importance of failover processes, however there were differences in the successful implementation and monitoring criteria, which

the IT and business organization must determine. For instance, Participant FF said, “then we need to route all the that work to other side, which is again and overburden for the other side, because they did not their capacity is like, say 200,000 per day and then now they got to deal with 100,000 extras.” Participant HH added:

We do use redundancy of those. You know, a lot of times the user does not even know the performance might go down a little bit, but if something happens to either the MPLS or those, you know those local internet lines, it just cuts over automatically.

Participant EE said:

There are a lot of things that are gonna to do what of that I do need to have a redundant environment ready. I do have the data available in other physical location, so based on the criticality of the infrastructure or application component that you are handling, we are gonna have an individual DRP for each one.

It is important to highlight that regarding the IT infrastructure redundancy or failover process, there were common IT strategy concepts used across all participants, but they emphasized that implementations are unique to each organization. Participants explained that the IT infrastructure redundancy or failover process depend on the business requirements, capital expenditures, current organization’s technological infrastructure, and human capital. This strategy can go from replication to a secondary data center, multiple circuit lines through different paths, or to a more complex infrastructure, as Participant BB explained:

There is replication between sites OK and so the IT director, the CIO actually I was talking to CIO, he says look, we are very scare of ransomware attacks, OK, and we have funded a project for that and we need help, but my requirement is OK, I want to be able to activate any data center in the world out of the six that I have with any workload that I have today, the way we are operating that is not doable. So, it took us about 8 months and we put an architecture in place that actually does that.

All nine participants agreed on the importance of having redundancy or failover for the most critical IT services for the business; this aims to ensure IT infrastructure services in developing countries, mitigating the possibility of a crisis.

Industry and Public Documents

Table 7 indicates the summary of the type of documents used to support theme 2.

Table 7

Industry Standards, Public, and Literature Reviewed Documents that Support Theme 2

Industry standards and public documents	Documents referenced
Industry standard	4
Public document	9

The secondary data sources found support Theme 2. The World Bank Group (2016) reported the importance of using multiple data centers when providing IT services; thus, operations can be switched from one data center to another to ensure high availability. The U.S. Department of Justice (n.d.) emphasized that providing reliable IT services through the enhancement of redundancy and failover is very important; these increase resiliency and availability of the services delivered. The International Standard

Organization (2011) provided guidelines about business continuity to minimize the risks of failure of ICT due to the criticality within the IT infrastructure, thereby the organization. This institution provides a framework for do-plan-check-act that helps IT managers ensure continuity of IT services. Additionally, the International Standard Organization (2022), while proposing best practices for information and security management systems, highlighted the need for organizations to ensure availability through redundancy, either by backing up files, additional capacity in IT resources, spare equipment, information processing facilities, or any other type of redundant strategies that can be used to ensure a successful business continuity plan, therefore increase the resiliency of organizations. The World Bank Group (2016a) noted that for disaster recovery and high availability, it is important to have a failover process to help mitigate the risk of failure of IT services. The U.S. Department of Justice (n.d.a) explained how using the cloud as part of the disaster recovery strategy can mitigate downtime services, providing resiliency and availability of IT services. The Cloud Security Alliance (2012), which is one of the world's leading institutions in providing guidance and best practices to organizations, recommended the use of replication for IaaS, SaaS, and PaaS through an automated failover for cloud consumers. The U.S. Department of Treasury (n.d.) highlighted the importance for financial institutions to fail back to on-premises infrastructure in case operations in the cloud fail for an extended period. Organizations leverage IT infrastructure to maximize efficiency, thereby downtime in IT services must be mitigated. The International Standard Organization (2019) provide guidance to ensure business continuity to increase resiliency, the failover process falls within the business

continuity strategies developed by IT managers and having IT aligned with business is critical for the successful operations of any organization. The U.S. Cybersecurity and Infrastructure Security Agency (2021) asserted that it is important for organizations to test business continuity plans through failover, backup, or any IT strategy used that ensure the organization's high availability. The National Institute of Environmental Health Sciences (2019) noted that having redundancy when referring to servers, storage, and cloud can help a successful disaster recovery for IT services, thereby minimizing the negative impact in business' operations. The National Institute of Health (2021) reported that one of the advantages of cloud technology is automated failover. The U.S. Department of Defense (2018) confirmed that using cloud technology provides the ability to have automated failover, this minimize disruptions in the continuity of operations; thereby, mitigating the impact of a crisis.

Literature

The literature reviewed supports Theme 2. The IT infrastructure redundancy or failover process is implemented to mitigate the impact of crises within organizations. Hazaa et al. (2021) explained that information technology and strategic planning directly relate to crisis management. The proper implementation of an IT infrastructure redundancy or failover process can reduce the impact of a crisis in organizations, thereby ensuring long-term success. Gallagher and Lennon (2022) shared the importance of the failover process and the key elements for success, which is to ensure that this process is transparent for end users. This means customers should not be impacted by the failover process and the operations must continue without interruptions; however, in the

background, there are processes of moving resources from one location to another. A failover process should be transparent to users and no downtime must be expected due to an automated process, that is usually triggered when an anomaly is detected in an IT service. Chege et al. (2020) stated that implementing ICT in developing countries faces many challenges; ICT is critical for IT services to ensure high availability and reliability; these two can only be achieved with a successful failover process. Von Tüllenbourg et al. (2019) explained the importance of redundancy and switchover to achieve reliability in IT services and they developed a failover process for power equipment controllers using software-defined networking. Having redundancy or failover would increase the reliability and availability of IT services, mitigating the risk of an outage, thereby impacting business' operations. Outages in IT services negatively affect organizations' reputation and finances; therefore, redundancy or failover strategies are critical to ensure uninterrupted IT infrastructure services.

Kostrzewa and Ernst (2020) asserted that the only way to avoid failures within IT infrastructure is by having complete redundancy, which is not possible; thus, designing an appropriate failover IT strategy can minimize the risk of crises. IT managers understand the need for redundancy or failover processes to ensure organizations are not impacted by an interruption of IT services because the negative impact in organizations. The current global market increases the level of competitiveness; thus, providing reliable services is crucial for organizations to survive. Ensuring IT services due to redundancy or failover is a critical strategy that IT managers must consider when implementing technologies.

Wang et al. (2022) added that cloud computing helps to provide high availability due to redundancy in all cloud services provided; cloud computing can help to mitigate the impact of IT management activities, such as servers patching, firmware updates, and scheduled shutdown maintenance. Virtualization of on-premises servers is another strategy used for IT managers to ensure redundancy or failover; this is confirmed by Erulanova et al. (2020) when reported that virtualization gives flexibility to the IT infrastructure because virtual servers can be distributed in different hardware, minimizing the risk of failures. Redundancy or failover is critical within the IT area because IT infrastructure directly impacts efficiency in organizations. There are many technologies that can be used for redundancy, such as cloud, virtualized servers, RAID configurations, redundant telecommunication paths, data replication, fault-tolerance of web applications, and clustering. IT managers must consider the current organization's objectives to plan the proper redundancy or failover process because each organization has limited technology, financial, and human resources. Having IT strategies that provide high availability and reliability of IT services is critical for mitigating the risks of crises and ensuring organizations' success in the current global market, especially when operations are run in developing countries.

Conceptual Framework

This IT strategy related to the IT infrastructure redundancy or failover process is supported by the three contexts of the TOE framework. Hasan et al. (2021) used the TOE framework to evaluate the organizations' readiness when evaluating cyber security because the framework is robust, flexible, and holistic. In their study, Hasan et al.

emphasized the need for and importance of organizations to failover in case of unexpected events, to mitigate the impact on businesses. Rodríguez-Espíndola et al. (2022) highlighted the flexibility to use the TOE framework due to the three contexts when implementing technologies. This framework relies on the technology, organization, and environment contexts, which provides flexibility because each context must be considered when developing redundancy or failover processes. The planning and deployment of such strategy depend on the existing organization technology, which falls within the technology context; financial, organizational objectives, and human resources can be included within the organization context; and finally, the environment context where potential laws and regulations can impact the implementation. The TOE framework provides guidance to ensure the successful adoption of new technologies within organizations by considering all the necessary factors that can affect the implementation and their impact.

Sihotang (2022) asserted that the flexibility of the TOE framework when adopting new technologies allows for a wide range of use in different disciplines and contexts, for instance, in government entities and the private sector. The TOE framework can be applicable to any organization because of its flexibility; this includes government entities, public, and private businesses. The type of businesses selected for this research fall within any of those categories, making this framework suitable for the study.

Daradkeh et al. (2019) noted that the TOE framework can be used as a first step to understanding the impact of adopting new technologies within organizations because it is robust and comprehensive. This fits within the redundancy or failover process because

any of these strategies would potentially introduce the adoption of new technology that could affect the existing organization's technology, processes, IT resource management, knowledge, and policies; thus, the technology, organization, and environment contexts must be considered to ensure a successful implementation. In summary, the TOE framework supports Theme 2, regarding the IT strategy of having redundancy or failover to provide high availability of IT services within organizations.

Theme 3: Development of Standardized IT Best Practices

The development of standardized IT best practices for the enterprise is the third theme that emerged from this study. Table 8 indicates the number of participants, references, and documents count.

Table 8

References of Theme 3: Development of Standardized IT Best Practices

Theme	Participants	References	Document count
Development of standardized IT best practices	9	98	9

Participant Findings

A total of seven of the nine participants highlighted the importance of having standardized IT best practices because it helps to increase efficiency, productivity, and competence. Additionally, facilitate support to customers, reduce costs, and knowledge gaps. Participants in this study agreed that standardization cannot be done across the entire enterprise, especially when organizations have businesses in developing countries with unique characteristics; however, the standardization serves as guidelines that must be looked at before processes or procedures are implemented. There was a consensus

across participants about the importance of written standardized overall IT best practices or procedures; for instance, Participant CC stated, “We have got a playbook of standards, I would say hardware design there with some, virtual virtualized servers in, in and nimble storage on the back-end kind of thing and that supports things that are running in the plant.” Participant EE said, “First, we need to follow some corporate guidance, right? This is the first, let’s say they start of the process. If I am implementing something, I need to ensure that we are following corporate procedures, right?” Participant HH highlighted, “You know, even if you think about what that is gonna do to our onboarding, right, it is gonna allows us to automate and make sure that we get our procedures and policies out to everybody.” Participant II agreed and stated that:

So, we are a global company, same process everywhere and so in a you gotta work with the local team if there is an issue and make sure that you got the support in place to make sure everyone is successful. But yeah, once you do that, I just reuse the same global process everywhere.

In addition, Participant II added, “You know the internal company standards and so forth to come up with the best solution. So, it is there is no one way to go about things. There are usually many ways to go about things.”

Participants provided some examples of standardized IT best practices that are implemented across the organizations. One overall strategy used for IT managers is the migration from desktops to laptops, this means users must have laptops instead of desktops, this was triggered due to the COVID-19 pandemic and the need of mobility. Participant AA said, “so the first strategy was transitioning them out from desktop to

laptop. So, everybody now has a laptop.” Participant BB agreed and stated, “but the reality is users inherently are going to have a laptop.” This also was reinforced by Participant FF that shared, “so they used to provide laptops and then they used to have that laptops are also encrypted.” Within that strategy, two options emerged to ensure IT infrastructure services. The first was the automation of the building process for laptops, this is achieved by using the vendor to pre-build and pre-configure computer devices before are shipped to the end users. Participant AA said:

So, we have implemented a technology called autopilot and a dropship model, right? When? What that means is from the vendor so let’s say Dell. When they send the laptop directly to the employees’ home and then the employee would just start it up and then there are very specific, very user-friendly instructions and it builds from scratch, right? So, there is no IT intervention anymore. So, if the hardware actually failed, they could again rerun the program and then it will rebuild itself.

Participant CC used a similar process as Participant AA, Participant CC stated:

Using automated tooling that they can do that through and even these days, what they do is they ship the laptop to the user and it essentially is self-service, right, they will log in, they sent credentials separately or they may have their temporary credentials, they would be in the box with the device and then they were able to log in the first time. And once they get internet connectivity, the device will set up itself.

The second alternative is to have a pull of laptops pre-configured in specific locations and ship them to the end-users in case of issues. Participant DD stated:

When their laptop is damaged, it is ours, I mean we have locations all around the globe. So, we have already laptops available right there to be sent out immediately. If, for example, worse comes to worse. So, I think in emergency situation we have a laptop to be shipped to, so somebody out there.

Participant CC mentioned that organizations strive to have standards in hardware design, in this specific example virtualized servers and nimble storage, however, the important part is to have redundancy or failover to mitigate any possible unexpected event in the IT infrastructure. Participants agreed in the need to keep devices of the IT infrastructure under maintenance contract as well as reinforce the need to work closely with vendors. Participant HH said, “but infrastructure, we definitely stay really on top of the latest technology, we do not go past our maintenance on any hardware we have that is kind of our strategy.” Participant BB said, “you have to develop best practices on how these are done and you develop those in conjunction with your vendors.” Participant EE said,

When we talked about laptops, OK, laptops our official provider is Dell. Right, and that is engaged as well. This is not only afford work, we work in partnership with them so that they will, for example, during the pandemic time, just let you know they have implemented a kind of a client in the laptops to check if the battery was good or not and if it was present in some kind of defect or

inefficiency, they are gonna proactive identify the users and open a, let's say a ticket to Dell to replace those that particular battery from that particular laptop.

Regarding the operating systems, there was a consensus among all participants of having computer hardware with approved and tested operating systems with the latest patches applied. Ensuring that the existing operating systems for servers do not go beyond the end of life is critical. Participant FF said “those software and like I am basically let's say operating system 2021 it is getting end of life. So, we plan to implement to a higher version until that is covered for the next couple of years.”

Participant DD detailed a standard deployment process when said:

So, for example Windows. When we upgrade our systems or when we apply patches, we do follow some standards right here that we first have to test in some environments right before we even apply. So, when we do something right here, it is previously it was really local. We go from region to region, but in the last few years already, what we do is that we just do a Big Bang. We first test, for example, a small part right here. We do tests. We test all our applications, our environment, and then after that we do a Big Bang wherein we just push up the patches.

Different organizations apply different procedures to deploy the latest operating systems patches, but the overall IT strategy is to stay current; this is reinforced by Participant HH when said it very clear, “what we do is we go through, you know, we stay pretty current with the operating systems.” From the telecommunication and networking area within the IT infrastructure, redundancy of devices and using multiple paths on incoming

connectivity to locations are the most common IT strategies implemented to ensure IT infrastructure services, along with having a failover process in place. This was developed in detail on Theme 2, the IT infrastructure failover process.

Participant HH and Participant GG strengthened the concept of standardizing IT best practices in all areas possible of hardware and software. They also acknowledged that standardizations are guidelines that must be flexible, as some cannot be fully implemented in all regions because of their unique characteristics. Participant HH said,

We have an EA and Microsoft Enterprise Agreement. So that ensures is that we use the software all the same across the world. We use the same hardware, we invest in Dell EMC, things like that and we do that across the board because sometimes when you buy that stuff, it might cost you more in a place like Brazil or China.

Participant GG stated,

So, you have to get creative in some regards, but again having standards that you hope are usable most places in terms of make and model and type of a computer that helps at least so that when you can share and then you see and knowing what is available locally and trying to leverage it if it makes sense.

Regarding the IT human capability, participants of the study explained the challenge of skill set but emphasized the use of a similar approach to the backup or redundancy strategy, in this particular case, is having the right talent distributed in the closest region for primary support. The worst scenario, the support would fall back to the

U. S. Additionally, participants highlighted the importance of training, retaining, and leveraging the local talent. Participant AA stated:

What we actually make sure of is there is a backup strategy where yea we have employees over in the Philippines, but then there is also there, there we have also an equal skill set over in India and also a portion in maybe higher cost countries right in the past we have actually adapted what we call onshore to offshore.

Participant AA also said, “the reality that making sure that is a certain country is not available, then there is also a backup.” Participant BB and Participant CC shared the same approach. In fact, Participant CC highlighted the importance of the local human capital in the support of remote locations to ensure IT infrastructure services. Participant CC stated:

We have been pretty fortunate to have talent that comes out a lot of these locations that we have talked about, right. So, we have IT talent in Brazil and Mexico and a lot of these places and we continue to leverage that.

Participant FF said, “we have different level of skill sets available with offshore mostly people come, people go.”

Industry and Public Documents

Table 9 indicates the summary of the different type of documents used to support Theme 3.

Table 9

Industry Standards, Public, and Literature Reviewed Documents that Support Theme 3

Industry standards and public documents	Documents referenced
Industry standard	3
Public document	9

The secondary data sources found support Theme 3. The World Health Organization (2019) asserted that standardization or harmonization of processes within organizations provides significant benefits in planning, executing, and delivering activities, helping to achieve business goals. The World Health Organization & International Telecommunication Union (2020) stated that the standardization of processes helps with interoperability and scalability, and recommends standardization within the IT area to facilitate analysis and comparisons to improve the quality of the outputs desired. The U.S. Department of Treasury (n.d.) explained how standardized processes in organizations increase collaboration and should not be attached to any specific technology. The World Health Organization (2021) explained that through the implementation of standards as part of a global strategy in the healthcare area, organizations have increased interoperability, thereby collaboration. Furthermore, the World Health Organization (2023) emphasized that the lack of standard processes result in inconsistent deployment of digital technologies, negatively affecting interoperability.

The implementation of best practices provides organizational flexibility and competitive advantage, which can be used to improve the quality of services. This is confirmed by the U.S. Department of Defense (2018) when noted that using best practices during the implementation of cloud technology across the organization provided

flexibility for future deployment of IT strategies. The World Bank Group (2016) shared the importance to implement best practices and standardized processes while deploying ICT technology in Philippines to ensure interoperability. The U.S. Cybersecurity and Infrastructure Security Agency (2021) emphasized the use of best practices across the organization when implementing trusted internet connection. The IEEE Standard Association (n.d.) explained the importance of having standardization of processes, especially within the technology area because it provides internal and external advantages that organizations can leverage to reduce costs and improve efficiency. The U.S. Department of Justice (n.d.a) noted that implementing standards can provide organizations with easier visibility of potential risks, enable collaboration, and flexibility. The Cloud Security Alliance (2015) asserted that implementing standardized IT processes in organizations directly affects the products or services produced, in addition to provide competitive advantage in the market. The latter is confirmed by the IEEE Standard Association (2022) when asserted that the implementation of technology standards in organizations bring competitive advantage, improves efficiency, and facilitates future technology deployments.

Literature

The literature reviewed supports Theme 3. Hassan and Salman (2022) stated that internet platforms, storage, network and telecommunications, applications, hardware, operating systems, and human capital are the elements of the IT infrastructure. Tien (2019) studied the implementation and standardization of best practices within the food industry in Vietnam and stated that the customization and standardization of best

practices help businesses to meet the requirements of each market and maximize productivity. Implementing standardized IT best practices across organizations is an area of concern for IT managers because standardization streamline processes, increase knowledge and collaboration within organizations, improve support, and reduce cost; thereby maximizing efficiency and productivity. An overall standardization of IT processes is crucial for businesses. He et al. (2021) explained the importance of best practices to ensure collaboration, guarantee privacy, and provide guidelines to assure an effective data collection process. Sutton et al. (2020) asserted that unstandardized data are useless and cannot be adequately utilized, affecting quality, transportability, and interoperability.

Having standardized IT best practices improves the support and management of organizations by simplifying and consolidating processes and procedures, increase collaboration, quality of services, efficiency, operability, and scalability. Organizations with standard processes can react and adapt quickly to the adoption of new technologies. Jobin et al. (2019) noted the importance of having guidelines and best practices in IT because it allows consistent implementation, facilitating collaboration and management. Rubinger et al. (2020) asserted that best practices are considered guidance that are used during the implementation of certain strategies that help to enhance the quality and efficiency of the technology deployed.

Crowe (2023) divided the standards into three categories: mandatory, recommended best practice, and guidance. It is essential to highlight that implementing such standard strategies depends on the organizations' structure, culture, and goals. Each

organization can choose the type of standard approach implement; however, it is important to emphasize that these three categories are not mutually exclusive. Standard and best practices are not unique to the information technology. Blind et al. (2023) asserted that following standards such as ISO14001, which relates to the environment, helps organizations achieve operational efficiency and improve innovation. Standards are used in many areas because they help to increase efficiency, reduce cost, maximize collaboration, and provide competitive advantage. Pinto et al. (2019) asserted that standards promote interoperability, scalability, ease of use, and integration.

Organizations compete in the current global market; thus, maximizing efficiency is critical to survive. Manoharan et al. (2023) noted that best practices improve collaboration, innovation, and cost management within information technology. Each organization has its own specific processes or procedures when implementing IT strategies due to the uniqueness in technology, organization, and environment; however, it was shared by seven participants the importance of having standardized IT best practices across the enterprise that serve as guidelines for any IT implementation, and the literature supports this. The participants also acknowledged that in some scenarios, the overall standardization is not possible and those have to be looked at individually. This often due to the local technology, internal organization processes, and environmental factors surrounding the organization in developing countries.

Conceptual Framework

Abed (2020) explained that the three contexts of the TOE framework are the technology context, which includes all the organization technological infrastructure and

what technology is available in the market; the organization context, which relates to the organization structure such as management, support, internal processes; and finally the environmental context that can be seen as external factors that can affect the implementation of new technologies. Standardized procedures fall within the organizational context of the TOE framework because they are part of internal processes that are created to provide guidelines, support, and improve effectiveness. Having defined and documented processes across the organization ensure consistency in the deployment and management of IT services, thereby directly affecting the organization's performance. Sihotang (2022) asserted that one driver within the organization context that can be used when implementing or evaluating the adoption of technologies is the creation, enhancement, and implementation of policies and strategies. Creating and managing standardized IT best practices across an organization is critical for the success of businesses, especially in developing countries where skills and IT resources are limited. Standardized IT best practices provide IT infrastructure consistency, increase knowledge, and improve support. These elements are factors within the organizational context of the TOE framework.

Malik et al. (2021) added that some factors that fall within the organization context are process harmonization, IT governance, human resources capability, learning culture, and financial stability. Malik et al. asserted that standardizing IT best practices can be considered an activity that falls within the IT governance and implementing standard practices improves process harmonization, increases knowledge and efficiency, provides consistency in the development and management of IT services, and ensures

collaboration. Cho et al. (2021) noted that the organizational context refers to all aspects related to the organization as an entity. This provides a wide range of possibilities when selecting what factors can affect the implementation of new technologies. The organization context within the TOE framework provides robustness and flexibility, making the TOE framework suitable to support a wide range of research regarding the adoption of new technologies in organizations.

Theme 4: Measurement of the IT Infrastructure Services

The fourth theme that emerged from this research was measurement of the IT infrastructure services. Table 10 indicates the number of participants, references, and document count for this theme.

Table 10

References of Theme 4: Measurement of the IT Infrastructure Services

Theme	Participants	References	Document count
Measurement of the IT infrastructure services	9	78	9

Participant Findings

All nine participants emphasized the importance of measuring the IT infrastructure strategies implemented to identify their success or failure. If an IT strategy is successful, use the measure obtained to continue improving the IT infrastructure services; otherwise, take the necessary steps to correct such implementation. Using key performance indicators (KPIs) or metrics was the overall approach for all nine participants to measure IT services. Participant AA said, “in my organization we have key performance indicators.” Participant BB agreed with Participant AA and stated “and

so the first thing that we do is basically KPIs and in fact, even right now in my current role.” Same approach for Participant CC, “I would say we have; you know real KPIs on how is the team doing around delivery of or meeting SLAs.” Participant DD said, “well we have KPIs, right. Your key performance indicators, we always set our baseline.”

Participant EE said,

So, we create some business value metrics or KPIs, at the end of the day, right?

We created this KPI to check if we are meeting the target with the infrastructure that we have implemented. So normally we try to again look in both ways, not just in the technical side, but also in the value of business that we are generating by the solution that we have implemented.

All participants emphasized the importance of having KPIs to create baselines that can help to measure IT infrastructure strategies, to use them later for self-evaluation.

Participant DD also said,

So, if that is our KPI for performance for a certain location, when we go to the app tools because we do logs right? So, we try to measure it if it is below performance then we know that we are not meeting our KPIs.

Participant FF said, “So we captured that metrics we review those metrics at the actual, sometimes on each day on an operational basis because ours is very time sensitive.”

Participant FF also added “all our metrics are measured by the timelines of the implementation that we work with the customers.” Participant GG reinforced the importance to have IT strategies implemented measured when stated, “so well a goal is not a goal if it is not measurable, right? So yeah, I mean it obviously varies per each type,

but everything is measured against what are your expected outcome form the onset.”

Participant HH said, “we always have, you know KPI.” Participant II explained the importance of reviewing frequently key performance indicators, Participant II said,

We got all kinds of key performance indicators that we meet regularly on, you know, and they cover all kinds of aspects, and you know they one of those would typically pick something up. So a lot of key performance metrics that are measured and tracked and look at trends.

Each organization uses KPIs or metrics depending on the IT infrastructure services to be evaluated or tracked. Participant AA uses time response, as an example,

We measured the hit rate, at the same time response time right from time the ticket comes into the queue of that organization to the time the engineer or the support specialist has accepted it and reached out to them to the employee then that is tagged as response.

Participant CC explained the use of metrics to track the delivery of computer equipment; Participant CC said:

So built into that platform are SLAs, right? So just from a general support perspective, we know like when the time somebody places, yeah, let’s say they ordered equipment. We know how long that took. We can measure that duration, the SLA related to that and to the delivery to issues with the provisioning, a lot of there is a lot of like automation built.

Participant EE expanded the use of metrics in multiple areas and how they help to determine some IT infrastructure strategies:

Let's say, publish some metrics and we have, let's say several graphics that show the users let's say prefer to connect into our environment, even though if it is through laptops, if a cell phone or a tablet, whatever the device the users are using and that they monitor as well let's say the number of data, yeah, the flow that we do in both connections. So, there are a lot of metrics that monitors and that the end of the day to measure how effective it is, and let's say the most preferable devices used by any kind of users that we do have.

The consensus of all participants was that metrics must be evaluated and reviewed periodically to ensure actions are taken in case of failure, degradation, or improvement of IT services. KPIs or metrics also helps to uncover potential issues. Participant BB said,

We go through an analysis of the KPIs and we look clearly we have set some goals internally, OK. As to what we need to deliver for the next fiscal year. OK. And based on those goals, we have our KPIs. Then at the end of each quarter, we will look at the KPIs, did we deliver what we intend to deliver? If yes, that is great. If not OK. It is and this how we uncover, you know problematic areas as well as opportunities.

In addition to KPIs, six participants shared that customer surveys help to obtain feedback and provide additional information about if existing IT strategies meet customer's expectations. Participant AA stated, "so we have the customer satisfaction survey," when asked about how the organization measures the IT strategies implemented. Participant BB reinforced the utilization of both when said,

I am fond of surveys because it is not enough to have your own KPIs. OK. You need to have an understanding as to what someone else your customers think about you. OK. And so, though surveys, we get feedback.

Participant CC also added that:

You know, qualitative side it is you know hey we also use things like customer surveys and things like that. How was your survey? How was your experience? You know, did we, did it meet your needs? And how was? You know, did the device work as expected? Those kinds of things.

Participant DD emphasized that the success in the implementation of IT infrastructure strategies is related to the satisfaction of customers, Participant DD said,

User surveys. Great, because ultimately the whole thing is really user based, right? People has to use the systems. Yeah, so we do annual, sometimes semi-annual what we call as interviews, surveys (SurveyMonkey), so we ask that to the users right, because they are the consumers of our systems.

Participant GG explained how surveys are used to measure IT infrastructure services and to identify potential business needs. Participant GG said,

Sometimes we do surveys, surveys are good way to either to get the pulse for what the business needs or to get the pulse for how something went right. So we definitely use those. We used to own a survey company within the company, so lot surveys but yeah, that is definitely common tactic.

The participants agreed that KPIs and customer surveys are an excellent way to measure IT infrastructure services, both help to determine the success or failure of IT strategies.

Industry and Public Documents

Table 11 indicates the summary of the different type of documents used to support Theme 4.

Table 11

Industry Standards, Public, and Literature Reviewed Documents that Support Theme 4

Industry standards and public documents	Documents referenced
Industry standard	2
Public document	10

The secondary data sources found support Theme 4. The World Bank Group (2017) reported the utilization of KPIs to monitor and measure evaluated parameters that must help organizations to achieve specific goals. Additionally, the World Bank Group (2021) emphasized that KPIs are used to establish a baseline that help to measure and monitor performances, to ensure that the expected outcomes are met. For instance, the International Standard Organization (2022) in the ISO/IEC 27001 manual provides a standard to follow regarding the utilization of KPIs when implementing information security management systems. Schroeder and Trinh (2022) explained the importance of using metrics to ensure existing security policies in place are adequate; the metrics established give leadership the necessary information to consider during the decision-making process. The ISO/IEC 30134-1 from the International Standard Organization (2016) provides some general concepts, objectives, and requirements when using KPIs

within the information technology area; this specific standard for example, provides guidance for measuring performance in data centers. The World Bank Group (2016b) affirmed the importance of determining and implementing quantifiable KPIs while deploying cloud technology to determine the success or failure of the execution project. The U.S. Department of Defense (2017) uses KPIs to measure the performance of delivered services or capabilities along with budgeting, to ensure that critical factors affecting the organization's performance are monitored. Brenner et al. (2023) stated that KPIs are essential because they allow to evaluate, measure, and monitor the performance of services provided. Brenner et al. studied the implementation of KPIs in digital health interventions. Kang et al. (2016) defined KPIs as metrics that evaluate organizations' performance based on efficiency, availability, and outcomes; while providing input to individuals to enable continuous improvement processes.

The U.S. Office of Personnel Management. (n.d.) stated that customer surveys are designed to obtain feedback on services provided to areas, such as, human resources, information technology, and finance. It is important that the proper dimensions are evaluated to maximize the effectiveness and performance of businesses. For instance, the U.S. Department of Treasury (n.d.) leveraged surveys to obtain data about current IT spending in cloud technology; the collected data provided significant information about spending trend, which helped the organization to create and implement new policies. Dalka et al. (2022) asserted that surveys are important for organizations because they help to understand the experience of individuals, which sometimes cannot be quantifiable through metrics. KPIs and customer surveys can be used as additional tools to measure

strategies' quality, performance, and effectiveness. These metrics are essential to ensure that IT strategies implemented meet the expected outcomes.

Literature

The literature reviewed supports Theme 4. The use of metrics to evaluate an IT strategy's success, failure, or potential improvement is commonly used across business organizations. Wannes and Ghannouchi (2019) asserted that KPIs can help to improve business processes and must be evaluated periodically; the latter allow to make the necessary adjustments to achieve business's goals. Mesároš et al. (2021) explained that KPIs are used to measure or monitor performance and can be implemented into multiple areas, such as, finance, environment, project management, productivity, and information technology. Mesároš et al. also asserted that KPIs are unique because they depend on the organization's structure and processes, or country laws and regulations. It is important to highlight that KPIs are quantifiable values that individuals use to help measure the quality of services. Each KPI must be chosen carefully to ensure the services measured are aligned with the organization's objectives, thereby assuring long-term success. Organization objectives vary because they are unique; therefore, KPIs are also unique for organizations; this is confirmed by Dwivedi and Madaan (2020), who emphasized that KPIs vary from one organization to another because of the organization's structure and objectives.

Reyes et al. (2020) explained that it is critical to answer what, why, and how KPIs are aligned with the organization's goals before creating or selecting them. Thakur et al. (2020) emphasized the importance of selecting the appropriate KPIs because an

inadequate selection can lead organizations to miss opportunities, impacting business goals. Organizations strive to become more efficient because it allows them to be more competitive in the current global market. KPIs help organizations to constantly evaluate performance by monitoring those services that are critical for success. The alignment of KPIs with the organization's objectives is crucial, thus the right questions must be asked about how and why a specific KPI is important to be monitored because an inadequate selection can harm the organization. Schiavone et al. (2021) confirmed that KPIs are quantifiable parameters defined to measure the success, progress, or failure of strategies oriented to achieve business goals. KPIs are helpful during the decision-making process; thus, the selection must be aligned with the organization's objectives.

Customer surveys are another way to identify whether IT strategies' implementations are successful. Xu et al. (2022) confirmed that surveys provides information about customer satisfaction. Holmlund et al. (2020) associated the utilization of customer surveys with the customer experience and explained that generally, qualitative data is collected. Customer surveys are used to obtain information about the quality of services and can be used as an alternative or as a complement to KPIs to make sure that there is an alignment between the KPIs measured and the customers' experience. Organizations choose customer surveys to obtain feedback on services and use the results to make adjustments in processes, policies, or procedures; this is confirmed by Aldunate et al. (2022), which explained that customer surveys are used to obtain feedback about the level of satisfaction of services and then use the collected data

for improvement. KPIs and customer surveys can complement each other and when used properly, can help organizations to meet business goals.

Conceptual Framework

Ibrahim and Handayani (2022) stated that managers use key performance indicators to monitor and evaluate variables to meet goals to ensure the success of businesses. Ibrahim and Handayani used the TOE framework in the study because the three contexts, technology, organization, and environment provided flexibility. Skafi et al. (2020) reaffirmed that the organizational context within the TOE framework relates to all internal processes. KPIs and customer surveys are part of internal processes within organizations that help to evaluate the quality of services or how well a strategy is implemented. KPIs and customer surveys are used by leadership to enhance the decision-making process .

KPIs and customer surveys are unique in organizations and they fall within the organization context. Skafi et al. (2020) added that the TOE framework throughout the three different contexts directly affect the adoption of new technologies. By using proper KPIs or customer surveys, the execution along with the evaluation of the final implementation can be measured, providing significant information that later can be used to improve the next technology adoption. These two tools are primarily used to evaluate new and existing services thus they must be aligned with the business objectives.

Malik et al. (2021) added that the organizational context relates to the organization's characteristics and attributes that affect the implementation of new technologies. Badi et al. (2021) explained that the TOE framework focused on decision-

making when adopting new technology and use the organization as a unit. KPIs and customer surveys are critical for making decisions in the best interest of organizations to ensure long-term success. These tools can be leveraged to support business initiative and objectives; thus, proper strategies are evaluated and implemented, allowing organizations to remain competitive in the current global market. The organizational context of the TOE framework includes internal processes, KPIs and customer surveys are part of these internal processes, therefore the TOE framework is appropriate and supports this theme.

Theme 5: IT Infrastructure Strategies by Region

Having specific IT infrastructure strategies by region is the fifth theme found in this research. Table 12 indicates the number of participants, references, and document count for this theme.

Table 12

References of Theme 5: Infrastructure Strategies by Region

Theme	Participants	References	Document count
IT infrastructure strategies by region	9	115	8

Participant Findings

A total of 8 of the 9 participants highlighted the importance of having specific IT infrastructure strategies by region due to challenges about countries' laws, regulations, and cultural mindset. Language, infrastructure, employee skills, political stability, and environment are different in developing countries, thereby, specific IT strategies are required. It was emphasized by all eight participants that each requirement must be evaluated independently to make sure it meets business objectives. Participant AA said:

So, demographics of a certain location probably matters, let's say, for example, in India, it is a younger population probably right where they wanted to, they have a different set of motivating factors like maybe learning, challenging, maybe compensation, right. But then for other locations, maybe stability, right, because they have already have families of their own, right? So it's impacts the dynamics of how we could motivate the employees.

IT strategies are specific for a region, a country, or a particular location, and the technology, organization, and environment that surround the business must be considered. Participant AA, shared a local policy for supporting women in India,

India for example, right let's say in Hyderabad, right we have operations for 24/7, 24 by 5. And support engineers would have to be in the office during the graveyard shift, right? But for women in that country, right, it is not safe to be traveling at night. So, there is that option for them to work from home or we provide like a shuttle service for them, right? So, again this is the main strategy.

Another specific policy for users in Sri Lanka was detailed by Participant AA,

Let's say in Sri Lanka, where for them to get the higher bandwidth and they have to pay quite a lot, which is probably more than 50% of their compensation monthly pay, right so we actually provide like internet reimbursement for them, which is not very common across. It is a special approval for that location again it is a challenge for that country.

ICT is another common area where IT managers face issues and, in some cases, determine the IT infrastructure strategy of leaving services on-premises or establishing

policies that include expectations about the IT service provided. Participant AA said, “in developing countries, the challenge is the infrastructure, right? Where people would actually be able to support regardless of where they are,” and “we provide certain services like making sure that there is an expectation of the internet bandwidth, right, which is a challenge.” Participant BB agreed that latency is an issue in developing countries and explained how they select the proper strategy to support the business when stated, “latency was very high and they just pick up the fun and complain. So that is something that is a technical requirement, classic,” and

We before we launch a business in undeveloped country, we will actually do an assessment what exists there from an operational perspective, like data centers from people’s perspective, personnel. From the connectivity perspective, right. Can we provide that ourselves, OK. Or is it better to go through a partnership. That is actually very important. What we are finding is that in some cases it may make a lot of sense to leverage a combination of Prem infrastructure through a third-party partnership. Maybe leverage a partner that have managed services. OK. Or use a combination of that and cloud services.

Participant GG said,

Sometimes infrastructure is the problem, right? There just is not the bandwidth or they are just not. Some of the things you might have, you know in other regions, so you have to look around for what, what local resources there are or can you bring it in from somewhere else.

Another area of concern expressed was related to laws and regulations. Participant BB stated:

The other thing is regulatory compliance, right. So as a company, we as a public company, we have to comply with certain rules. So, we need to be very careful as to where we put our data and who has access to it.

Participant CC explained how they had to adjust the IT infrastructure strategies adoption plan within some of the developing countries due to cost and supply chain issues by pre-ordering equipment and a more exhaustive pre-planning process. Participant CC said, “we have struggled because either the, you know equipment was not available and in country or it was too expensive, or the lead times,” and “we are trying network refreshes for example at some point the sites and we have had preordered equipment because the lead time is like 6, 8, to 12 months lead times.” Participant DD and Participant CC agreed regarding the lack of hardware availability and the lead times issue, Participant DD stated, “One is really the equipment, right? Sometimes in those countries they do not have a lot, so you still have to bring some of the equipment from other countries. You have to buy it and then bringing there.” Participant EE also emphasized the complexity of purchasing and delivering hardware in developing countries. Participant EE said “the lead time to bring this device from the US to here, it is probably higher than that. So, this is kind of the complex that we manage and try to figure out.”

Another area where IT infrastructure strategies are critical for business’s success is related to taxation and payroll; those strategies must be specific to the region because it

is important to understand the requirements; thus, organizations remain in compliance with local laws and regulations. Participant DD also said:

The tax is another one. I mean, I am talking about the application right now, so you have to follow the tax right there. Payroll is another one, I mean, it is hard to standard payroll because in the local areas right there, they have their own. I mean laws regarding payroll systems, right? And taxation is different as well, so it is a bit of a challenge.

Participant GG agreed with Participant DD when referring to IT infrastructure strategies related to tax and payroll. They must be treated differently based on the region where the business is located. Participant GG added, “but you know it is again local needs, you know taxation or tariff or restrictions” and “customs problems. The labor workforce law problems.”

It is important to pay attention to local IT infrastructure to ensure the proper IT strategies are implemented. An example of this, is provided by Participant HH when said, “we ran into some problems years ago of really just getting by the great China firewall like all companies do, but we figured out ways around that.” Costs are a factor while implementing IT infrastructure strategies as well. Participant II stated:

It might be some more cost in one area versus the next. You know, maybe a circuit cost more for example but I could put my services anywhere in the world and I would have the same look and feel everywhere from the US to Korea to India to Vietnam to Malaysia to anywhere in Africa and so forth.

A strategy used to maximize support and minimize language barrier in developing countries when providing services to organizations was explained by Participant AA:

Again communication style is totally different, right? So, what we did was to change the number using a US number so it is through the support engineers located outside the US but then when we call the employees right it is showing a US number. The company US numbers, right so we had then at the same time we had to train the support engineers to minimize how to you call this minimize the way we speak, right? I mean the minimize the pronunciation, the accent.

Participant CC and Participant DD agreed with Participant AA regarding the challenges faced within developing countries about language barriers and the implementation of English as the standard language across the organization.

Participants agreed that to ensure success within organizations in developing countries, it is essential that specific IT infrastructure strategies are implemented. These IT strategies depend on the local technology, organization, and environment. Participant GG said it clearly when stated, “but if you are going to be doing business in certain countries or certain parts of those countries, you have to handle them in differently.” Similarly, Participant BB said, “that is a very interesting conversation because depending on where you are, the processes and the procedures change in developing countries to be specific.” Finally, Participant AA added, “I guess in leading an IT organization, a global IT organization being sensitive about those local differences matters.”

Industry and Public Documents

Table 13 indicates the summary of the different type of documents that support Theme 5.

Table 13

Industry Standards, Public, and literature Reviewed Documents that Support Theme 5

Industry standards and public documents	Documents referenced
Industry standard	2
Public document	10

The secondary data sources found support Theme 5. The World Bank Group (2019) asserted that infrastructure is critical to the long-term success of organizations, and developing countries have limitations and deficiencies. IT infrastructure faces the same reality; thus, IT managers need to understand the current state of local infrastructure to implement adequate IT strategies. The World Bank Group (2013) explained the challenges developing countries have in ICT and the affordability of individuals, along with areas where it is not reachable or is very limited. The International Standard Organization (2021) explained how developing countries could benefit from the implementation of standards and provide a framework to follow regarding IT technology; however, International Standard Organization also highlighted that they provide a framework and must be adapted to the specifics of each region or developing country. Khanna et al. (2005) stated that organizations implement common strategies in developing countries but emphasized that organizations cannot implement the same strategies because each scenario must be evaluated individually. The World Health Organization (2021) provided general and specific principles to follow when

implementing digital technologies and acknowledged that the general principles cannot cover all regions or countries; specific implementation strategies must be considered based on local laws, policies, and IT infrastructure. The World Bank Group (2016) provided general guidelines for the implementation of cloud technology in governments; however, the institution reported the different IT strategies implemented because they depend on the region or country. For instance, in Serbia, due to regulations and lack of reliability of ICT and in Philippines due to individuals with limited skills, lack of ICT governance, and security policies. Schmets et al. (2016) stated that while planning strategies to strengthen the healthcare system in developing countries, an overall strategy or blueprint could not be applicable because each country's reality is different; thereby the implementation of the strategies varies from country to country. The U.S. Agency for International Development (n.d.) reaffirmed the creation of a framework to deploy a global digital technology strategy within organizations, which outlines key principles that must be followed, but the institution emphasized that recognizing local systems, policies, and infrastructure help to ensure a long-term successful implementation. The International Standard Organization (2016a) recognized that when implementing a plan or strategy in developing countries, there are different local realities, which must be considered to ensure resources are allocated accordingly. The World Bank Group (2022a) asserted that organizations looking to implement new technologies in developing countries must consider multiple dimensions, such as, the level of the technology in the region, country, sectors, and business function to ensure the success deployment. It is crucial for IT managers to understand local reality to plan, develop, and implement IT

infrastructure strategies to ensure business success. The World Bank Group (2017) developed a framework to implement IT service delivery through a one-stop shop; however, the adoption was different in Eurasia and South and East Asia due to local needs of citizens, technology, and regulations. IT strategies include the adoption of proper KPIs, which must be specific to a region or country. This is confirmed by the World Bank Group (2021), which asserted that the creation and implementation of KPIs to evaluate performance and objectives are determined by the environment that surrounds a region or country. The literature supports that IT leaders must consider the reality and context of each region or country where organizations perform business; therefore, specific IT infrastructure strategies must be implemented to allow organizations to succeed.

Literature

The literature reviewed supports Theme 5. Implementing IT infrastructure strategies according to the region is critical for businesses to succeed because overall IT strategies can only cover some scenarios across organizations. Developing countries have vast differences in technology, organizational structure, and external factors. Avgerou (2008) explained that information technology helps businesses obtain the advantages of a global economy by expanding to different markets; however, Avgerou emphasized that it is important to understand the unique conditions of processes, technical, sociological, and political changes within developing countries, which is an increased area of study within the IT research. Avgerou also added the limitation of resources in developing countries, such as, financial, technological, and skills; making it more difficult for IT managers to

adopt new technologies. IT leaders understand the need to develop overall IT strategies, standards, and best practices for organizations; however, they acknowledge that developing countries differ in many areas, such as, IT infrastructure, laws and regulations, financial stability, and culture. It is necessary the adoption of specific IT strategies aligned with the organization's objectives and adapted to local requirements. Overall IT strategies are used as general guidelines, but when there are limitations in technological, organizational, and environmental factors, specific strategies must be implemented to overcome those challenges to ensure the organization's success.

Hoekman et al. (2005) emphasized that different policies can apply to different countries, mainly when referring to undeveloped nations. Hoekman et al. studied the transfer of technology to developing countries and concluded that many factors affect it, such as, infrastructure, human capital, market conditions, laws and regulations, and the economy. Developing countries might have areas in common; however, they are also unique in many factors, which must be considered when implementing IT strategies. Pawlak and Kołodziejczak (2020) highlighted that developing countries are very diverse and tailoring strategies and policies according to each region is critical. IT leaders must understand the current reality of developing countries when trying to plan, implement, and deploy IT strategies because the differences among countries' technological, organizational, and environmental factors can lead to country-specific IT strategies.

Chege et al. (2020) emphasized how diverse developing countries are. For instance, how different definitions exist for SMEs, which depends on the country; this can impact the planning or implementation of IT strategies. It is critical for IT leaders to

know and understand the local reality where organizations perform business, which includes laws, talent, regulations, costs, business processes, IT infrastructure, and the economy. There was a consensus within the IT leadership that one size cannot fit all; thus, specific strategies are required to ensure business goals are achieved. The correct implementation of IT strategies impacts the success or failure of an organization.

Conceptual Framework

Malik et al. (2021) explained the three contexts of the TOE framework: technology, organization, and environment. Malik et al. mentioned that some elements considered within the technology context are cost, security, scalability, computability, infrastructure facility, interoperability, and maturity. Within the organizational context top management support, firm size, human resources, IT governance, company culture, and standardization of internal processes. The environmental context includes government laws and regulations, market conditions, local characteristics of the industry, etc. Developing countries have unique characteristics; however, the applicability of the TOE framework remains intact no matter what country, region, or location a new technology is implemented because the environmental context provides a wide range of factors that must be considered to ensure a successful implementation. IT managers must know and understand local requirements to plan, implement, and deploy IT strategies that help organizations achieve business goals. There is a direct relationship between IT strategies and business success.

Ganguly (2022) affirmed that using the TOE framework in the adoption of new technologies helps identify potential barriers in technology, organizational structure, and

the environment. Ganguly also asserted that the TOE framework allows the creation of variables that can be adapted for each new implementation, making this theoretical framework very adaptable. Ganguly stated that flexibility and adaptability allow the TOE framework to be used in multiple regions, countries, and locations when organizations adopt new technology and these features are extended to each of the contexts of the TOE. When planning, executing, and delivering specific IT strategies per region, leveraging the environmental context of the TOE can ensure a successful implementation, thereby positively impacting the organization's performance.

Borgman et al. (2013) stated that the environmental context of the TOE refers to where organizations conduct business, which includes the location and what surrounds them. As organizations perform business in developing countries where there are noticeable differences across regions, the environmental context helps IT leaders determine what factors must be considered in each implementation, which can vary from one region to another; this is possible due to the flexibility and adaptability of the TOE framework.

Theme 6: External Factors Impact the Adoption of IT Strategies

The sixth theme that emerged was external factors impact the adoption of IT infrastructure strategies. Table 14 indicates the number of participants, references, and document count.

Table 14

References of Theme 6: External Factors Impact the Adoption of IT Strategies

Theme	Participants	References	Document count
External factors impact the adoption of IT infrastructure strategies	9	9	6

Participant Findings

A total of six participants agreed that factors external to the organization directly affect the adoption or forces to evaluate current IT infrastructure strategies.

The most noticeable example given was the COVID-19 pandemic. Flexibility and mobility of end users were two areas to consider when implementing IT infrastructure strategies. Participant AA said, “because, again during the pandemic, there are countries where, especially in the developing countries, right, there are no transportation, everything is locked down, nobody can deliver anything to the homes of the employees.” Participant DD reported how the COVID-19 pandemic helped to accelerate cloud migrations and brought opportunities in some areas that the organization never anticipated. Participant DD stated,

I mean the pandemic, the COVID situation actually has improved these services, right, because it is not, it does not have to be really dependent on that, that location when they were, they are in the connectivity maybe is slow but they are they able to dial in.

Participant DD also added, “I mean the pandemic is created a lot of things for us, right? So, the things that we never anticipated during the pandemic has come up.” Participant EE agreed with Participant DD and went even further, Participant EE said:

I think this was a trigger not different from the pandemic, let's accelerate everything on this. Even though, in the past we used to have, let's say remote options to connect into our network like some VPN connectivity, we normally use Cisco anywhere connection so we, Cisco is our let's say VPN provider but during the pandemic, well the company has, I would say simplified all the things because in the past you have connectivity from remote locations.

Participant DD emphasized the implementation of additional IT infrastructure strategies within the organization as a result of the COVID-19, Participant DD stated, "but at the pandemics, let's say eliminate a lot of things and let's say gave us many ways to connect into our network," and

So, you have a second option that you can use also your laptop through and a Microsoft Authenticator, which another way to reach the Office 365 environment. Or you can do through your mobile or your table. So nowadays you can be connected everywhere you think you can do it.

Flexibility and mobility were critical elements to consider for the implementation of IT infrastructure strategies, this is confirmed by Participant FF when said, "so basically like before the pandemic hit, right? Everybody has to work from office." Participant GG detailed how critical cloud was to mitigate the impact of COVID-19 in the organization and said,

If we have learned anything from COVID right, the pandemic in general. Umm, so if it's a has to be at a Colo and a data center, you know that's where you are usually gonna get obviously uninterruptible power or backup generators. You are

huge dual lines coming in from multiple ISPs, that sort of thing, right? So still again, the idea is do not put stuff in physical offices because an office could change, right? You do not want to have to move your service stuff every time your office moves, so if you really cannot put it in the cloud or cannot afford to put in the cloud, it is too big. It is too slow. Still, you wanted at a data center that has all of those things Fire Protection, extra lines, extra electricity.

Participant HH said, “In fact during the pandemic, one of the things, we took the opportunity to do where everyone was home is we did go through our policies.” It is important to highlight that there were consensus among all six participants about what opportunities the COVID-19 presented to the organizations to create, evaluate, and implement IT infrastructure strategies to ensure services in developing countries.

Industry and Public Documents

Table 15 indicates the summary of the different type of documents used to support Theme 6.

Table 15

Industry Standards, Public, and Literature Reviewed Documents that Support Theme 6

Industry standards and public documents	Documents referenced
Industry standard	1
Public document	12

The secondary data sources found support Theme 6. The World Health Organization (2022) stated that COVID-19 forced organizations to implement a remote working strategy almost overnight. This is confirmed by the International Labour Organization (2020), which explained that before the pandemic, just a limited number of

the workforce of organizations was working remotely and that changed drastically with COVID-19. The U.S. Agency for International Development (n.d.) asserted that through the implementation of digital technology, which includes ICT, mobile platforms, and data infrastructure, governments were able to quickly adapt to the new reality of remote telemedicine and learning, minimizing the risk of exposure and still allowing people to be connected. The World Bank Group (2022a) reported that COVID-19 pushed organizations to upgrade their current technologies to overcome the challenges brought by the pandemic. The International Standard Organization (2021) explained how fast and changing the current global context is and how standards can help to provide guidance in order to achieve the organization's objectives. The World Health Organization (2022a) emphasized that during COVID-19 countries made rapid changes in policies, processes, and procedures in so many areas of the society to continue providing essential services to the community; these rapidly implemented changes included IT services. Schmetts et al. (2016) asserted that in the current fast-paced changing environment, external conditions must be considered because they can directly affect the business; monitoring and rapid changes are necessary when external factors affect the organization's objectives. The U.S. Department of Justice (n.d.) explained how an effective use of the technology and policies changes allowed the organization to implement a hybrid work approach, which grew exponentially due to the COVID-19. The U.S. Department of Treasury (n.d.) asserted that during COVID-19, organizations in the financial services accelerated the implementation of cloud computing to provide new innovating services and support the increased demand for remote work. Alghamdi and Alghamdi (2022) affirmed that

COVID-19 triggered a rapid implementation of digital technologies in the healthcare industry to help overcome the barriers and risks brought by the COVID-19. De' et al. (2020) noted the increase of use in digital technologies during the COVID-19 because it allowed connectivity, provided updated information and tracking services, supported remote work, and online learning. Ye et al. (2020) confirmed the utilization of IT to mitigate the impact of COVID-19 through the rapid implementation of new policies and the leverage of technologies, such as, mobile, web-based services, big data analytical tools, cloud computing, telemedicine, artificial intelligence, and the Internet of Things. The World Health Organization (2020) confirmed the positive impact of information technology to mitigate the impact of COVID-19 worldwide. The pandemic directly affected how businesses and government entities operate, therefore, new IT infrastructure strategies had to be rapidly implemented to adapt to the new reality. Allowing employees to connect remotely was one of the main strategies that IT managers faced, especially in developing countries.

Literature

The literature reviewed supports Theme 6. External factors impact the adoption of IT infrastructure strategies. He et al. (2021) asserted that COVID-19 impacted everyone in our society and provided an opportunity to design, develop, and implement technology solutions to help overcome the barriers caused by the pandemic. He et al. also added that information systems were directly affected and a rapid response was required in the technology area to adapt to the new reality. COVID-19 affected organizations and IT infrastructure strategies played a crucial role to overcome the barriers brought by the

pandemic, these IT strategies included providing mobility and flexibility to users; thereby, employees could work remotely. IT leaders faced an unexpected external factor that forced them to evaluate existing IT strategies. The new reality required a rapid response; thus, organizations could survive and remain competitive by mitigating the impact in business operations or avoiding disruption of services. He et al. added that telecommunication, video conferencing, mobile applications, computing, remote connection, and data management were the primary IT strategies quickly reviewed and updated in organizations to minimize the impact of COVID-19. There was a consensus among IT leaders about how external factors affected normal operations within organizations and the need to react quickly.

Akpan et al. (2022) asserted that SMEs implemented virtual technologies, and along with the use of mobile devices, allowed or increased the ability to connect remotely. COVID-19 caused changes in how some IT infrastructure services were delivered to organizations and forced IT managers to challenge existing strategies. It is important to emphasize that a rapid response to counter external factors is critical for a business to succeed. Amankwah-Amoah et al. (2021) asserted that COVID-19 significantly changed how organizations perform businesses and served as an accelerator due to the need to embrace new processes and technologies, that triggered internal changes. Amankwah-Amoah et al. also added that organizations that did not adapt quickly to the new reality failed and went out of business.

Gabryelczyk (2020) concluded that COVID-19 revolutionized the way digital transformation was understood and accelerated the implementation of IT strategies

related to the expansion of IT infrastructure, such as, network capacity and compute resources. Organizations leveraged IT to counter the impact of COVID-19 in daily operations. IT leaders were required to evaluate and update existing IT strategies rapidly; failing to accomplish these activities could cause harm to organizations, thereby possibly running them out of business. Kutnjak (2021) asserted that COVID-19 required organizations to make rapid adjustments in processes, business models, and strategies to face challenges, issues, barriers, and problems created by the pandemic. It is important to highlight that COVID-19 is an example of an external factor to organizations. The lesson learned for IT leaders was that external factors directly affect organizations. To counter the impact of external factors that can harm organizations, new and updated strategies, along with a rapid response are required, thereby ensuring organizations' long-term sustainability. IT leaders must account for understanding how external factors can affect organizations to design, plan, and implement IT strategies.

Conceptual Framework

Bryan and Zuva (2021) stated that the TOE framework comprises three contexts: technology, organization, and environment. Bryan and Zuva also explained that each element or context directly affects the adoption of new technologies and the strength of the TOE framework is as a result of considering internal and external factors. The external factors within the environmental context can provide challenges and opportunities to organizations when implementing or adopting new technologies. COVID-19 is considered an external factor and falls within the environmental context of the TOE framework. This is confirmed by Singh and Alshammari (2021), which asserted

that COVID-19 is considered an environmental force within the TOE framework. IT leaders must know and understand how external factors can directly impact business operations and are responsible for creating, evaluating, and implementing the necessary IT strategies that counter the adverse effects in organizations to ensure competitiveness, thereby helping organizations to succeed.

Bryan and Zuva (2021) mentioned that the creation of variables during the adoption of technologies varies because each implementation is unique and a standard framework model cannot be created when using the TOE framework. IT leaders must consider that some strategies can apply to organizations and others cannot. In scenarios where strategies can be common across organizations, their deployment would vary because of the uniqueness of organizations. For instance, COVID-19 as an external factor forced IT leaders to implement strategies that allow the workforce of organizations to work remotely; this was a common strategy across IT leaders. However, the deployment was unique for organizations because of the technology, organizational structure, and external factors surrounding them are different. Each element falls within the three contexts of the TOE framework; thus, it is applicable.

Nguyen et al. (2022) added that from the environmental context, which represents the surroundings where organizations perform businesses, government regulations and policies, vendor support, competitors, and legal framework are some elements that directly impact organizations when adopting new technologies. COVID-19 represented an external factor for organizations and affected also every single area in society, including changes in government policies, vendor strategies, and legal requirements.

COVID-19 changed drastically the surrounding environment where businesses operate; the TOE framework, through the environmental context, considers external factors that can potentially impact the adoption of new technologies and along with its robustness and flexibility, it is the appropriate framework to use.

Application to Professional Practice

This research is meaningful for the adoption of IT strategies in developing countries. The purpose of this qualitative, pragmatic inquiry study was to explore what strategies IT managers for multinational companies in the United States implement IT infrastructure services to businesses for overseas users in developing countries. Chege and Wang (2020) explained that organizations must leverage IT to maintain or increase competitive advantage because IT strategies directly affect business performance. IT strategies are linked to the success or failure of organizations; thus, providing IT managers guidance regarding IT infrastructure strategies used in developing countries to ensure services, can help with the long-term sustainability of businesses. Al-Surmi et al. (2020) explained that organizations leverage emerging markets or developing countries to increase performance and reduce costs. Having appropriate IT infrastructure strategies can minimize the possibility of crises within organizations because developing countries have higher risks. Burhan et al. (2021) emphasized that strategic planning, along with crisis management can prepare organizations against unexpected events that can harm businesses. The implementation of adequate IT infrastructure strategies is crucial for businesses to survive.

Salamzadeh et al. (2023) asserted that today, organizations constantly face the risks of crises due to the complexity of the current environment and crisis management provides tools to businesses to minimize the potential loss. Crisis management can directly impact internal processes; thus, it is important to work with multiple areas within the organization. Properly implementing IT infrastructure strategies can mitigate the impact of crises. Haseeb et al. (2019) said that by implementing appropriate IT infrastructure strategies within organizations, the efficiency and earnings can be increased, and cost can be reduced; therefore, directly impacting business performance.

IT managers, IT directors, or CIOs can use the six emergent themes, which are: (a) hybrid cloud and on-premises adoption, (b) IT infrastructure redundancy and failover process, (c) development of standardized IT best practices, (d) IT infrastructure strategies by region, (e) measurement of the IT infrastructure services, and (f) external factors impact the adoption of IT infrastructure strategies. Each theme was the result of a meticulous implemented qualitative methodology, to make sure the research question was answered within the TOE framework. The themes found in this research are supported by the literature reviewed, which included industries standards, public, and peer reviewed documents. These themes can enhance the existing knowledge about IT strategies but specifically for organizations with businesses overseas in developing countries. It is essential to emphasize that organizations are unique, thereby the implementation of the IT strategies. IT leaders must be aware of that when designing, evaluating, implementing, and developing IT infrastructure strategies.

Finally, these six IT infrastructure strategies can help IT leaders to mitigate the impact of crises within organizations, provide competitive advantage in the current global market, or increase efficiency, thereby ensuring long-term sustainability of the businesses. Here is where this research adds value to the IT practice.

Implication for Social Change

The results of this research can have favorable implications for social change because organizations rely upon developing countries to help increase efficiency and reduce costs; however, there are challenges that must be faced because resources are limited in developing countries and IT managers, IT directors, or CIOs must ensure proper IT infrastructure strategies are implemented to overcome those challenges. Akpan et al. (2022) asserted that there is a significant gap when implementing technologies in developed and undeveloped nations and the latter have the largest population of workforce. Sihotang et al. (2022) argued that “in developing countries which are often associated with negative indices such as poverty, insecurity, and instability” (p. 1). Chege and Wang (2020) studied the impact of implementing the ICT in developing countries and determined that there is a direct relationship between technology innovation and job creation. Bringing or ensuring businesses remain in developing countries will contribute to the improve of job creation and the skills of the workforce.

These six IT infrastructure strategies can be implemented in developing countries and potentially help organizations to mitigate the impact of a crisis, be competitive, reduce cost, or improve revenue, resulting in a positive impact on business organizations. The proper implementation of IT strategies allow businesses to remain in the current

global market and be sustainable in time. Societies and people in developing countries can take advantage that, thereby an improving of the quality of life is expected.

Recommendations for Action

IT leaders may consider the findings of this research. The strategies described in Theme 1 and Theme 2 could provide IT leaders for multinational companies in the United States with some guidance to ensure IT infrastructure services to businesses for overseas users in developing countries. In addition, the support to Theme 1 and Theme 2 is given by Theme 3, Theme 4, Theme 5, and Theme 6. Deploying overall IT strategies help to improve support, mitigate the risk of a crisis, reduce cost, and develop human capital across the enterprise; however, it is very important to keep in mind that developing countries have their own reality regarding the technology, organization, and environment. IT leaders must deploy specific IT policies in developing countries to meet the requirements of businesses. Measuring the effectiveness of the IT infrastructure strategies through KPIs or customers surveys can provide guidance of the success or failure of implemented IT strategies; this information can be used to make adjustments when necessary to ensure IT strategies are aligned with the business goals, thereby helping organizations to be successful. Understanding that external factors can force or accelerate the implementation of IT infrastructure strategies, can give IT leaders an overall knowledge of how to face uncertainties. In this case, while facing the COVID-19 pandemic, the priority was to provide mobility and flexibility to end users.

The results of this study related to: (a) hybrid cloud and on-premises adoption, (b) IT infrastructure redundancy and failover process, (c) development of standardized IT

best practices, (d) IT infrastructure strategies by region, (e) measurement of the IT infrastructure services, and (f) external factors impact the adoption of IT infrastructure strategies can provide IT leaders the necessary guidance and understanding of the IT strategies that are implemented for multinational companies in the United States to ensure IT infrastructure services to businesses for overseas users in developing countries. I plan to submit this research for publication and share the results in conferences, business workshops, trainings, seminars, and scholarly journals.

Recommendations for Further Research

The findings of this research related to what strategies IT managers for multinational companies in the United States implement IT infrastructure services to businesses for overseas users in developing countries can require further exploration.

There are four recommendations for further research:

1. The study did not differentiate about small, medium, and large organizations.

The size of organizations is an area that can be explored in more detail, which is to understand the IT strategies for multinational companies in the United States with businesses in developing countries by small, medium, and large enterprises.

2. Similarly, the research did not study a specific developing country or region.

This approach can help to further understand similarities and differences of IT strategies due to the technology, organization, and environment. Narrowing the criteria, can deepen the knowledge regarding to the IT infrastructure strategies by country or region, which relates to the Theme 3.

3. Further research can study organizations that are not headquartered in the United States and understand what strategies, if any, are implemented to ensure IT infrastructure services in developing countries.

Last, the limitation detailed in Section 1 about the IT professionals to be interviewed, can be expanded to subordinates of IT managers, IT directors, or CIOs with more technical expertise to deepen the technical knowledge and understand better the challenges on the specifics of each implementation, such as planning, execution, and deployment of IT infrastructure strategies.

Reflections

This research provided me the opportunity to interact with IT leaders from multiple organizations, small, medium, and large enterprises, which allowed me to increase my knowledge regarding the IT infrastructure strategies implemented in developing countries and acknowledge the challenges faced. This study helped me to develop skills in scholarly writing, citations, interviews, qualitative methodology, qualitative data analysis, and to write doctoral research. I also learned how to use a theoretical framework and apply it to the subject under study. The TOE framework provided me with a better understanding of how to categorize elements that affect the adoption of new technologies within organizations. This study also helped me to understand the role of researchers and the struggles or barriers found during research; for instance, the challenge of collecting data by having participants availability or willingness to share the qualitative data.

The interview process, qualitative methodology, and qualitative analysis impacted me significantly. The preparation for the interview, real-time adjustments that I had to make when participants were leaving the topic under study, and posterior self-evaluation because I had to listen to the interviews to verify the transcribed files were correct, helped to realize areas of improvements. The interview process helped me to connect to other IT leaders in different areas. I am happy to say that I had the opportunity to interview very high-quality IT leaders. Qualitative methodology and data analysis were something new to me, concepts, such as, qualitative pragmatic approach, coding, classification, and themes had no meaning, but now they do. Currently, I have a good understanding.

Finally, my perspective and understanding regarding IT infrastructure strategies that are implemented for multinational companies within the United States to minimize the impact of a crisis in developing countries have improved, and I am knowledgeable in the area now. The journey during this research was long, but pleasant because all the support given by Walden University, knowledge acquired, self-development, and inner growth of my own personality. I may use these newly learned skills in my current workplace, when interacting with people, or in any future projects or opportunities.

Conclusions

IT infrastructure strategies must be aligned with the businesses to mitigate the impact of crises, increase efficiency in processes, reduce cost, provide competitive advantage, or revenue growth. I used a qualitative, pragmatic inquiry approach to explore IT strategies of IT managers of multinational companies in the United States to implement IT infrastructure services to the businesses for overseas users in developing

countries. All 9 participants consisted of IT managers, IT directors, or CIOs with experience or who have implemented IT strategies that ensure IT infrastructure services for multinational organizations in the United States that have businesses overseas in developing countries located in South America, Africa, or Asia. The data collection technique used was semi-structured interviews and NVivo 14 was the CAQDAS that helped with the data analysis.

Six themes emerged from the data analysis, which were identified based on the three contexts of the TOE framework: technology, organization, and environment. Within the technology context (a) hybrid cloud and on-premises adoption and (b) IT infrastructure redundancy and failover process. The organizational context included (c) development of standardized IT best practices and (d) IT infrastructure strategies by region. The environmental context is encompassed by (e) measurement of the IT infrastructure services and (f) external factors impact the adoption of IT infrastructure strategies. The findings are supported by the literature including industry standards, public documents, and peer reviewed journals. The results provide guidance to IT managers about IT infrastructure strategies to be implemented in developing countries.

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Appendix: Interview Protocol

Strategies Managers Implement to Ensure Information Technology Infrastructure Services for Overseas Users

Interview Script

Introduction

Good morning /Afternoon/Evening. My name is Ramon Sotillo-Acuna. I am a student at Walden University. I am currently working on my dissertation for the Doctor of Information Technology program. I have worked in IT for around 25 years, mostly in the manufacturing area. I have experience in the IT infrastructure and Data Governance. My current role is Sr. IT Delivery Manager for Data Quality and Data Virtualization. The purpose of this interview is to collect data about the strategies your organization implement to ensure IT infrastructure services for overseas users in developing countries. I will ask a series of opened-ended questions with the respective follow up, if necessary. I will transcribe your responses and then later I will schedule a follow up meeting with you to make sure the answers given and transcribed represent accurately your responses.

Permission to record

Before the semi-structure interview begins, I will request permission to record the conversation. This will help to make sure that the information captured is accurate and represent the ideas and thoughts of the interviewee. I will ensure the confidentiality of the conversation, that the name as well as the company will be protected and, in any case, mentioned in the study. I will guarantee that no identifiable information will be shared. I

will communicate that the data would be encrypted and preserved in a secure location for 5 years.

Consent

I will make sure that the interviewee has read, understood, and provided consent before proceeding with the interview.

Interview Questions

Make sure the participants have the necessary time to answer each question to allow capturing as much information is possible. Use follow up questions, if necessary.

1. What is your current job title and role?
2. How long have you been working in the IT field?
3. Is your organization headquartered in the United States?
4. Where is your headquarters located?
5. Do you have businesses overseas in developing countries? Where?
6. What methods, processes, procedures, or plans do you currently use to ensure IT infrastructure services for overseas users in developing countries?
7. How do you measure or evaluate your processes, procedures, or plans?
8. How does your review process identify areas to improve?
9. What unanticipated challenges did you find during the implementation?
10. What challenges did you face after the implementation?
11. How do you conduct an assessment to ensure best practices are in place?
12. How do you measure the success of the implementation?

13. What, if any, is the contingency plan in case of disruption of IT infrastructure services?

14. What additional information would like to add that I did not ask?

Conclusion

Communicate to the participant that the interview has concluded, the recording will be stopped, and a follow up with an email or another meeting will be necessary to ensure the answers transcribed represent the responses given. I will provide the necessary contact information to the participant for additional questions or concerns.

Thank the participant for the time, patience, availability, and help given.